

CHALLENGES OF SOLID WASTE MANAGEMENT IN SYLHET CITY CORPORATION

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Abstract

The world races toward its urban future, waste generation of urban lifestyle which producing the faster rate of urbanization, made an adverse effect on the environment. Nowadays solid waste management pattern is an alarming issue in Sylhet city area of 26.50 km sq. with a population of 1 million. This paper mainly focused on the observation of existing scenarios of solid waste management practices in Sylhet city and also establishing of a feasible solid waste management system for Sylhet city. During this study, information were taken from direct field observation from different areas of Sylhet city and other sources. The results showed that solid waste generation had reached to about 260 tons day⁻¹ in Sylhet city in 2017 which is 2.5 times higher than 2004. The solid waste was collected 52% of a door to door system was running, 22% use of community bin for waste disposal and rests dumps open places. From the investigation found that maximum people thought because of improper removal of waste and illegal dumps on open places are two considerable reasons for environmental pollution. The study is bringing some challenges for progressing of solid waste management. Some causes found for inability to the management of urban solid waste consists of inadequate financing, lack of community participation and lack of implementation of proper laws. In this regard, the integrated systems with a combination of given challenges might be helpful to build up a green city of Sylhet City Corporation.

Keywords: Waste segregation, recycling, sustainable environment, environment pollution.

Introduction

One of the most egregious environmental problems around the world that face with municipal authorities is solid waste disposal. The high multiplication of human population, its associated increase in urbanization and increased financial activities has made the negative impact of solid waste management very noticeable in towns and cities around the world. Solid waste has become one of the most prominent environmental problem in developing countries (Alam *et al.*, 2006). The developing countries would face a serious problem within 25 years (Thomas *et al.*, 2007). According to WHO, solid waste may be as useless, unwanted or discarded materials come from domestic, trade, commercial, industrial and agricultural as well as from public services. Management of Municipal Solid Waste (MSW) is a substantial challenge over the world especially in developing countries in particular in the larger urban centers, (Scheinberg, *et al.*, 2010a). Rapid and unplanned urbanization leaves municipalities largely overwhelmed when it comes to the collection and disposal of increasing amounts of waste (Medina, 2005). In July 2012, the world bank website reported that in most developing countries, open dumping with open burning is the norm' (World Bank, 2012) this was the case in the 1990s. However, recent data again suggest that the current reality constitutes a significant improvement (Scheinberg *et al.*, 2010b; Wilson *et al.*, 2012; Wilson *et al.*, 2013). Municipal solid waste management in developing countries is characterized by the existence of a well-established informal sector, active in collection and recycling of valuable materials such as certain plastics, bottles, jars, tin cans, aluminium cans, papers etc. (Gunsilius, *et al.*, 2011; Wilson *et al.*, 2009). However, the present condition of collecting and disposal system is very insufficient. Although the general attitude of dumping and collecting system presence for a long time but waste management pattern is not considered in Bangladesh. Moreover, people suffer from lack of proper in solid waste management; decaying waste is an eyesore, smell strong and pollutes the land as well as the environment. So, expressing concern on solid waste management by recycling or reusing processes which means collecting, processing, remanufacturing and reusing materials contributes to municipal solid waste management by diverting materials which have an economic value from the main waste flow, thus reducing quantities of waste to be collected and disposed efficiently and effectively. Recycling process of solid waste not only ensure sustainable environment but also produce green manure which imputation on agriculture as well as reduce the global warming problem.

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A research revealed that solid waste management would be generated 60 million revenues in the year 2018 (Source: Wikipedia). Fewer people sincerely taken into account this as an revenue source into various facets of waste management like recycling, reusing and reap the benefits. Obviously, the greatest advantage of waste management is keeping the environment fresh and neat. For solid waste management set up a huge factory but needs a lot of money. Waste management practices widely are done only as a small-scale process. But most of the confined residential homes, schools, and colleges are not practiced in a uniform manner in large industries.

Consequently, daily basis garbage collection will make the environment unhygienic and unpleasant streets due to leaving excess debris on the streets to rot up. Even after completion of the final stage, much dirt is left behind.

However, the continuing growth in generation and management of wastes is a concerning issue of challenging the urban planners in Sylhet city. The Sylhet city was established in 1867 which is turned as Sylhet City Corporation (SCC) in 9th April 2001. Sylhet is the north-eastern part of Bangladesh which located at 24°53'N latitude and 91°52'E longitude stands on the bank of Surma river as shown in Fig. 1.

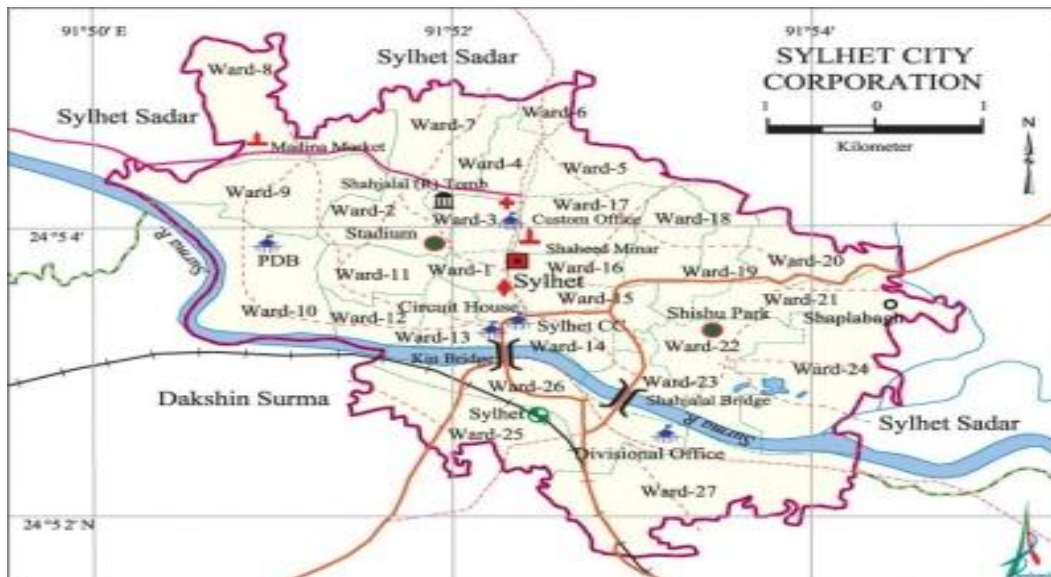


Fig.1. Different locations of Sylhet City Corporation (SCC)

The SCC supervises municipal solid waste management in an area of 26.50 km sq with a population of 1 million and generates 250-260 metric tons of waste per day (Source: Sylhet City Corporation). The Fig. 2 showed that the generation of solid waste gradually increased in the city. About 100 tons per day of waste was generated in 2004 which almost 2.5 times higher than in 2017 (Sylhet city corporationbd). The Sylhet City Corporation is duty bounded for gathering and dumping the waste from the municipal collection point in the city's 28 wards. In Sylhet city, solid waste existing collection system is seen that door-to-door waste collector locally called Gariwala collects mixed waste from household through individual payment method. The waste collector disposed of these mixed wastes nearer municipal collection point. There are 21 secondary collection points and transfer to dumping station at 'Lalmatia' covering a space of about 7 acres (Islam et al., 2017).

Further, the waste picker collects the recyclable waste from this mixed waste. These collection and disposal system of solid wastes are presence for a long time. However, approximately half of the solid waste generated within Sylhet city corporation area is not collected. If door-to-door waste collector collects waste separately from household, then waste collector easily found the valuable and pure wastes. Moreover, the total collecting and disposing system of waste are taken under modern solid waste management practices, it will become environmentally friendly.

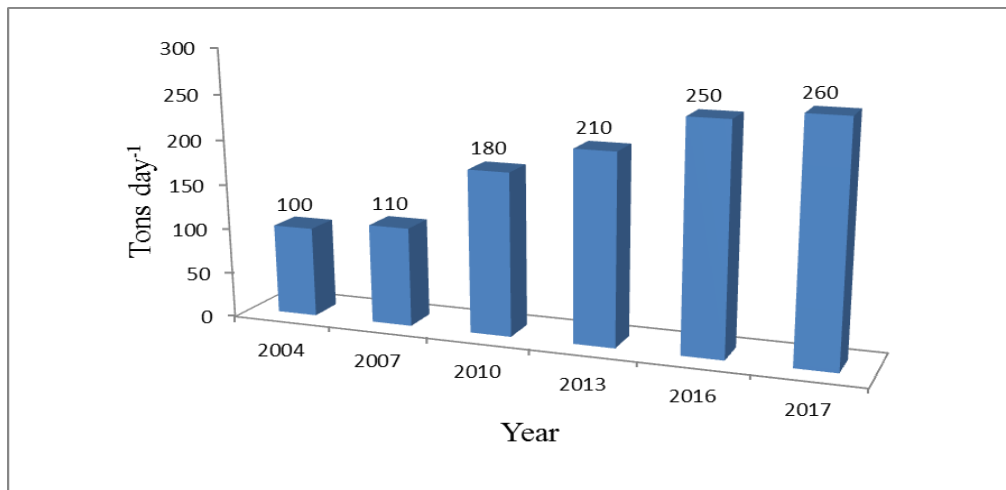


Fig. 2. Amount of solid waste generation in Sylhet City Corporation

Another important source of information developed by the Bangladesh Government was 3R (Reduce, Reuse, and Recycle) strategy in 2011 with the technical support of waste concern which should be imputed (Matter *et al.*, 2012). Now developed countries focused on modernization of waste prevention and reducing the quantities being generated (Cox *et al.*, 2010; Wilson *et al.*, 2010). Sylhet City Corporation might be taken 3R strategy which entails source segregation as a guiding principle and states to take initiative for raising public awareness (MoEF, 2010). The present study was investigated on the existing solid waste management process in Sylhet City Corporation and designs an effective layout for solid waste management to build up a green city.

Materials and Methods

An interview schedule was prepared according to the objectives of the research. This study deals with the process for identifying waste management system of Sylhet City Corporation. The questionnaire was made final to use for this research after the necessary correction on the basis of present condition of waste management.

Site selection

The primary data were collected from different areas Shibgonj, Mirabazar, Lamabazar, Bilpar, Varthokhola, Tilagor areas of Sylhet City Corporation. It's one of the smallest cities in Bangladesh which is divided into 28 wards. The data were gathered from different sources to observing the present situation of waste management.

Questionnaire preparation

A set of questionnaire was developed based on objectives for primary data collection from the target respondents. The questionnaire was examined and checked by the targeted groups. The questionnaire was the combination of open-ended and close-ended questions.

Primary data collection

To find out the solid waste management practice in Sylhet City Corporation, the primary data were gathered from 50 respondents which were selected randomly and data were collected through questionnaire survey from house owner, housewife and waste hauler with field observation. The process of waste collection and disposal data were accumulated by focus group discussion.

Secondary data collection

Secondary data were collected from Sylhet City Corporation, research papers and study report on solid waste management. The collected information was analyzed to develop an understanding of the problems and prospects of the present solid waste management system of SCC.

Sampling unit

The key sampling units were divided into three groups on the basis of the family member like as Small (1-4), Medium (5-6) and Large (7-10) which are producing approximately (0.5-1.0), (1.0-2.0) and (1.5-2.0) kg day⁻¹ respectively. Also data were collected from different waste generated sources in Sylhet City Corporation.

Data collection

This study was focused on the existing management practice of solid waste in Sylhet city. The information was collected about solid waste management (including collection, transportation, storage and disposal) system. This study has identified the lacking of waste management and the future management plan of SCC.

Data analysis

The data were compiled, tabulated and analyzed in accordance with the objective of the study. The organized data was then overviewed to get a general sense of emerging trends, patterns and concepts. The data was parted into broad categories like waste generation, waste collection-cum-transportation, waste decision making process and public involvement in the decision making. Statistical data were analyzed using Microsoft Excel 2007 software.

Results and Discussion

The solid waste management practicing in Sylhet City Corporation is obvious to any observer is a challenge as like as other larger city i.e. Dhaka, Chittagong and Rajshahi. The finding of the study has been presented and discussed in this section.

Existing solid waste management in Sylhet City Corporation

The present solid waste management in Sylhet City Corporation exists in Sylhet city as shown in Fig. 3. Presently, the household waste is collected in four different ways. The study was found that relatively effective dumping of household waste management was the door to door collection system on the basis of existing other ways. It is noticeable that some residents were dumped solid waste in the open places. The final disposal sites also spread all over the open environment are unsightly as no proper systems were maintained for sanitary land filling which results in high threaten to health and the environment.

Waste segregation is an important part of a solid waste management system. It is one of the preconditions of the waste treatment and disposal which would be environmental friendly and safe for human health. The Fig. 4 shows that waste was separated by 73% families which is not satisfactory level. Because of people are not aware of the importance of segregation practice. The Fig. 5 represents that 52%, 22% and 26% of waste was collected by the waste hauler, community bin and throw the open place respectively. The study investigated some of the residents are not interested to pay money for disposing of in the designed dumping station. Consequently, it creates huge environmental hazards and impact on human health.

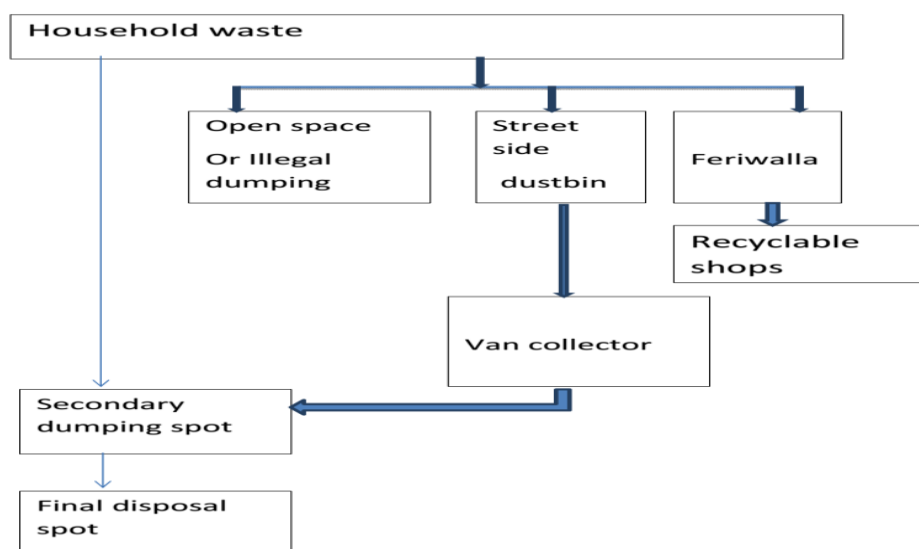


Fig. 3. Existing solid waste management in Sylhet City Corporation

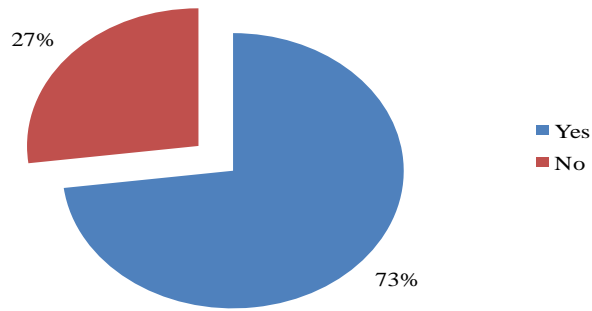


Fig. 4. Waste segregation practice in study areas

The Fig. 6 shows that waste was collected 63% on an daily basis of household waste by the Sylhet City Corporation. The scenario is quite depressing as 17% household was not collected means thrown into open places or unused places either in water bodies. Therefore, it spreads bad odor in environments and the emission of greenhouse gases.

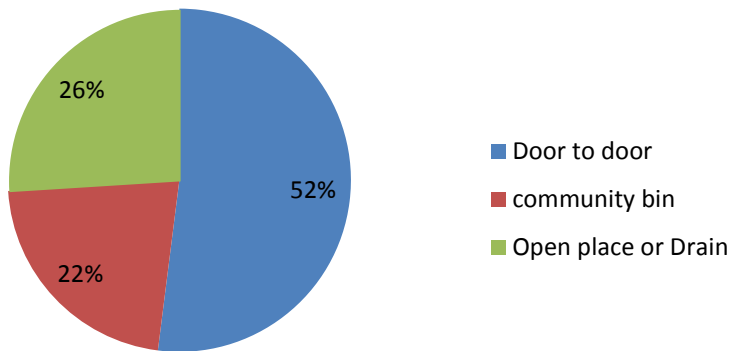


Fig. 5. Solid waste collection services areas

The working performance of the solid waste management department of any municipality can lead to a very useful and effective management of resources on solid wastes. Respondents were provided opinions on the collection performance of Sylhet City Corporation as shown in Fig.7.

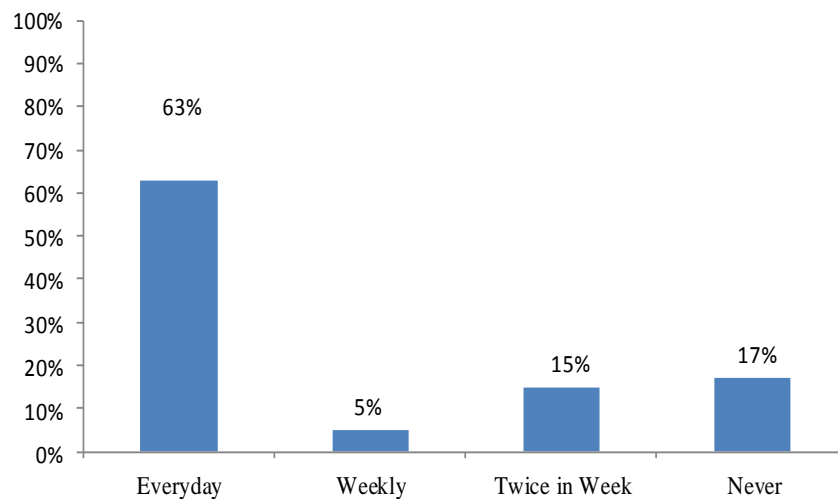


Fig. 6. Waste collection schedule in study areas

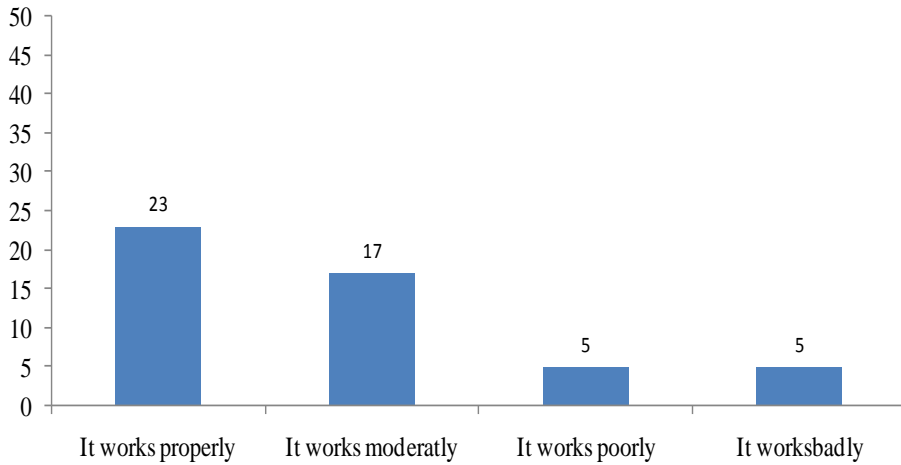


Fig. 7. Solid waste collection performance of Sylhet City Corporation

The dwellers were not satisfied with the present solid waste management system of Sylhet City Corporation. The study indicates that some respondents were thought the solid waste management system moderate. According to the observation of the study reported that the solid waste management department was not working effectively to build up a green city of Sylhet. Therefore, improving the collection efficiency some steps should be taken such as modification and upgradation of solid waste management laws and regulations.

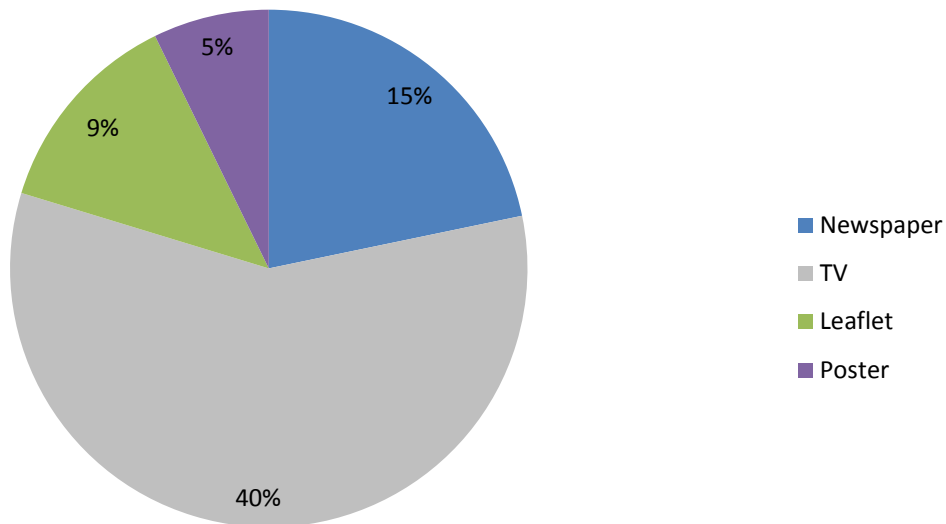


Fig. 8. Environmental pollution from solid wastes

Fig. 8 shows the respondent’s opinions which they hypothesized about the reasons for polluting environment by solid waste. The respondents from the study side are not much aware of the new approach of the government called 3R’s strategy (Reduce, Reuse and Recycle) solely. But this strategy reduces the number of waste products which can greatly influence in opposing environmental pollution.

Fig. 9 showed the maximum respondent opinions about awareness creation medium that 40% in favor of Television (TV) compared with others media due to availability as well as appreciable to all classes of people. The respondents were sequentially suggested that teaching program should be taken at School or Colleges for creating awareness among people because of its more fruitfulness than rest others. Nonetheless, newspapers, poster, and leaflet can be effective media along with others for raising awareness of proper solid waste management.

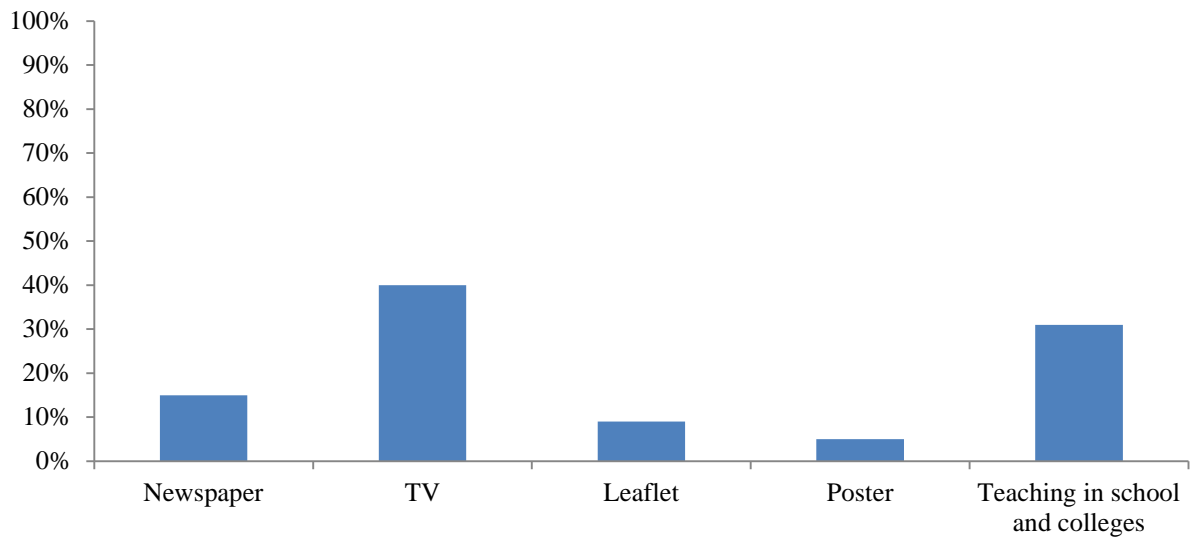


Fig. 9. Solid waste management awareness creation media

Design an effective layout for solid waste management

The source segregation at house level is not practice for recyclable and reusable materials in Sylhet city. Dumpsites for municipal solid waste are situated on low-lying, flood-prone land; they are not managed as sanitary landfills, apart from pollution concern (JICA, 2012). Thus, polluting elements causes air and groundwater pollution. Therefore, an effective layout for solid waste management of household is conferred in Fig. 10. The results presented that the household wastes might be collected in different three ways. Firstly, the mixed wastes will be collected by the primary collector and transfer these wastes to the nearer municipal collection point. Then it is shifted to a secondary transfer station where will be made segregation of different wastes through segregation designated vehicles. These vehicles will dispose of a sanitary landfill of the pure wastes in SCC final disposal site. And also, the rest wastes will be transferred to recyclable shop from where these moving into a recyclable industry for recycling valuable waste materials. In another way where exists flow of money from the household to recyclable industry, the household wastes sell to the door to door recyclable buyer. The buyer will sell these wastes to a recyclable industry. In another way, waste segregation would be made at the household level. From these separated wastes non-recyclable and non-reusable wastes would be disposed of in the roadside bin which will be collected by Sylhet City Corporation (SCC) for final disposal sites. Particular wastes would be transferred to incineration plant for different application purposes. Then the by-products wastes would be made for sanitary landfill. Waste separation at the household level will improve the quality of recyclables and its value. Obviously, this waste management system, there might be much scope for earning money in different ways which will better exploit the value of recyclables than existing waste management pattern.

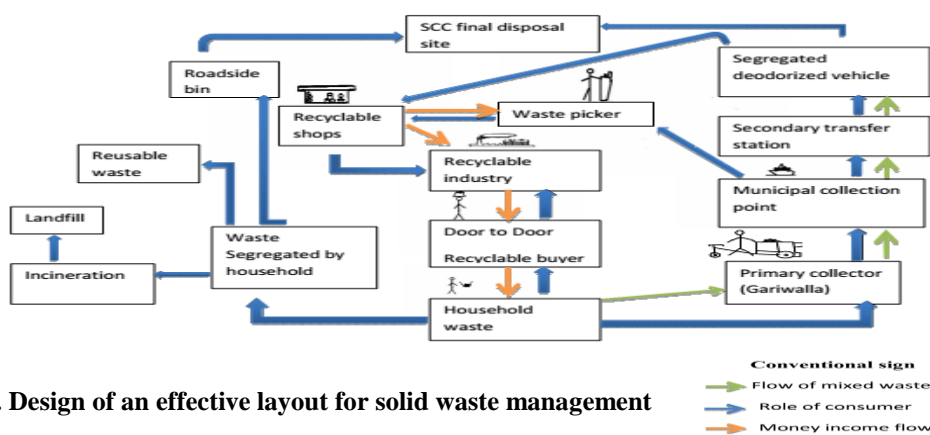


Fig.10. Design of an effective layout for solid waste management

Challenges for household waste management

As like different towns and cities of developing countries, many adverse impacts due to improper solid waste management are seen in Sylhet City Corporation such as scattered waste on roadside drains. These blockages create

noxious conditions in the city which is a very eyesore as well as detrimental to the environment. Preventing from degradation of urban environment it is necessary to take some challenges. For imputation of effective solid waste management in Sylhet City Corporation, it is necessary to follow some basic rules and principles for collecting and is disposing of wastes such as:

1. Collection of particular wastes on the recommended day from the respective location.
2. Dispose of wastes will be made at night or early morning on the designated collection day.
3. Newspapers, flyers, boxes, paper cups, and all paper products will be stacked and tied into bundles. These wastes should collect in a day of the week like Wednesday.
4. Only plastic containers and wrapping waste will be disposed of as burnable waste as shown in Fig. 11. These wastes should be collected twice a week such as Wednesday and Tuesday.
5. Recyclable wastes such as different type's bottle, pots, metals, cards, boxes, cans will be fully used and punctured before disposing of them. These wastes should be collected in twice a week like Sunday and Tuesday.
6. Hazardous waste that contains explosive or flammable items will be disposed of in the manner as shown in Fig. 11. These wastes are collected twice a month. Like a day of the first and last week of each month i.e. Saturday and Thursday.
7. Landfill wastes will be disposed of before a material's full of its use and wrap sharp objects. Some types of landfill wastes are shown in Fig.11. Landfill waste should collect once a week i.e. Monday.
8. Burnable and perishable waste such as food waste, papers, plastics, textiles, leather, rubber, woods etc. will be disposed of four times of a week as example Saturday, Monday, Wednesday and Thursday.
9. The large waste such as wardrobe, sofa, tables as shown in Fig. 11. The larger wastes up to 5 items will be disposed of at once a week. Cost should have to pay for removal of these larger wastes.
10. In the above discussion the City Corporation can make the following schedule for solid waste collection:



Fig. 11. Categories of different wastes disposal

Garbage collection schedule calendar

For the proper collection of entire wastes, a garbage collection schedule calendar is made for this purpose. The garbage should be collected on the recommended day indicated with different colors as shown in Fig. 12. Every month follow in this waste collection schedule according to different types of wastes. Waste disposal is an emerging problem in Sylhet city. The existing disposal system of solid waste impacts on the environment. So, solid waste management is a challenge in Sylhet city to build up a green city through proper solid waste management. Mixed waste was collected from households and carried to municipal roadside containers. Every possible step should be taken and every possible

decision needs to be made to ensure proper management of wastages. This study is a small step to minimizing risks for environment caused by poor wastage management in areas like Sylhet City. Citizen’s awareness regarding solid waste segregation at the source, waste minimization and its proper management should be emphasized.

Finally, the study concluded the waste disposal is an emerging problem in Sylhet city. The existing disposal system of solid waste impacts on the environment. So, solid waste management is a challenge in Sylhet city to build up a green city through proper solid waste management. The study result shows that solid waste was generated 260 tons day⁻¹ of Sylhet City in 2017. According to half of the respondents were given an opinion that solid waste collection performance of Sylhet City Corporation is satisfactory. Mixed waste was collected from households and carried to municipal roadside containers. Waste segregation at the household level improves the quality of recyclable materials and increases the value. From the observation of the study, Sylhet City Corporation should be taken the recommended challenges for proper waste collection and dispose of.

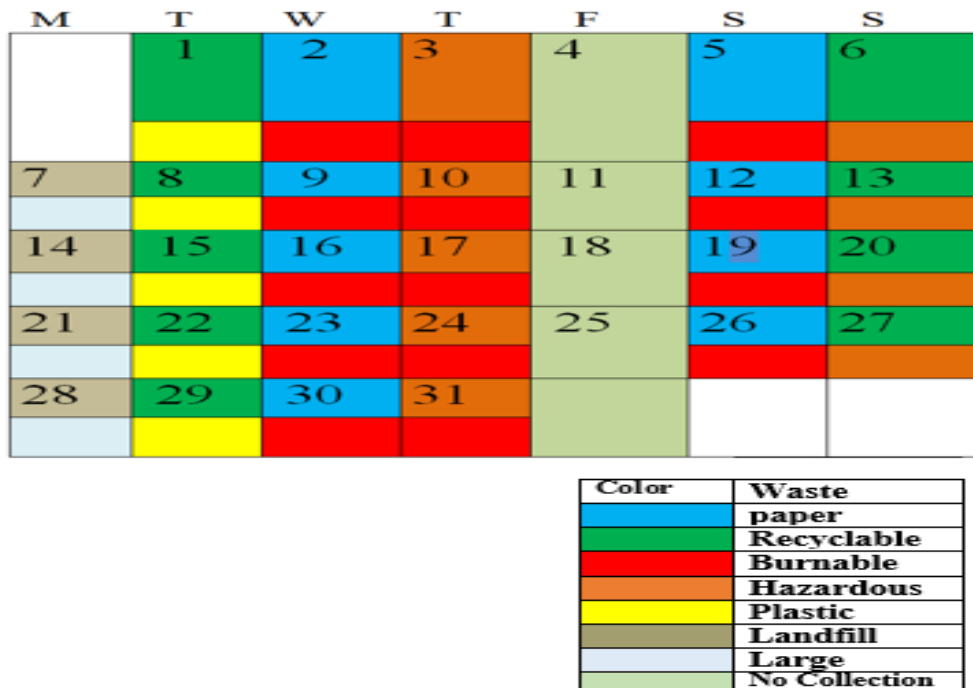


Fig. 12. Garbage collection schedule calendar

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