

# A proposition for Urban Waste Management and Employment Generation by Community Based Organization (CBO): Bangladesh Perspective

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**Abstract.** Waste is a great concern in urban life in every city of the world. Developed cities of world are using modern disposal and recycling technologies as well as state of the art equipments and ensuring their dwelling neat and tidy. Cities of developed countries like Bangladesh do not have that access to the hi-tech technologies. Recycling is often viewed as an important aspect of an efficient and effective solid waste management system in the developed countries. Waste disposal and recycling is carried out by informal sectors in traditional way and sometime disposed off in the open space without processing and not taking any precaution to protect the environment. This paper discussed about the role of organized cluster of cities' solid waste disposal, recycling and extracting benefits out off these waste in general. How employment can be generated from the garbage also highlighted. Paper also suggested the government involvement and initiatives to aware the city dwellers about waste isolation, classifications, collection, recycling and disposal. There are various types of solid waste which may be divided into two categories as organic waste and dry waste. In this paper I have highlighted about disposal of household waste from the houses/flat through collection pipes through store tank to the wheeled waste bins by the bin pusher/pullers to the designated processing plant of a particular cluster of the city. Besides the household waste, market, hotel, restaurants' are also produce waste and these are also be collected in an organized fashion. All type of waste are to keep in two trash bins from the source place either house or market/hotels one for organic waste and another dry waste before carried up to final destination where waste will be recycled.

**Keywords:** Urban, Organic waste, bio gas, CBO, employment generation, peri-agriculture, plastic, plan, policy etc

## 1. Introduction

Waste, when not manage properly, can pose serious health hazard [1] Therefore, waste management is an important issue that needs effective solutions. Dhaka (Bangladesh) generates 4,364 tons of waste daily<sup>[2]</sup> Landfills and incineration are popular methods what many countries adopt to handle their wastes. However, these methods are still a major challenge for many countries. Recycling is an efficient and effective solid waste management system. The term recycling is defined as “the process through which materials previously used are collected, processed, remanufactured, and reused” [3] Waste considered as a problem in our daily life, people want to avoid waste and always try to leave neat and clean. Though waste is unwanted and rather not desirable but there is no denying fact that it is obvious. So fight or disposed off the waste in such a way that it would not be problematic for the people. Waste is created from the house, market or business hub or commercial building or organization above all where the people are working or residing waste is following. So if the cause of waste can be carefully monitor and regulate then it will be easy to manage the waste though it may not be possible to stop producing waste. In this paper main focus will be on waste management in a cluster of community or certain area of a town or city of Bangladesh. Main focus of this paper are to disposed off the waste from the household kitchen to the storage tank or collecting the organic or dry waste to the final treatment plant and recycling of dry waste and produce sustainable reusable products,

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energy generation, organic manure production, organized manure use at the peri-urban area for cultivation of vegetable and food grain. For accomplishing all the task related to waste management in a community this paper proposed a structural organization for manpower requirement who will be self sustained and self accounting after certain period of time which is the another main focus of this paper. Creating awareness among the city dwellers, incentives criterion to popularize the issue among the urban population and role and benefits of the CBOs, responsibility and involvement of various government organs are also spelled out in the paper.

## 2. Urban waste management in the country

### 2.1. Current situation of waste management in the urban area

City corporations/Municipalities of the major cities are responsible for solid waste disposal; normally they collect the waste from the secondary collection point and disposed off the designated dumping place. In Bangladesh we have more than 10 city corporations including Dhaka south and Dhaka north carrying out their duties. Cleaners, sweepers are distributed among the various wards/zones they work under the guidance of ward commissioners but the results are not satisfactory. Because of resource constraints and many other reasons, they have not been able to provide a satisfactory waste management system in their respective areas. The major sources of municipal solid wastes are domestic, streets, market places, commercial establishments, clinics and hospitals. At present, Total volume of municipal solid wastes in urban areas is 13,332.89 tons/day and Only Dhaka City generates about 3500 - 4000 tons of solid waste per day, the per capita generation being 0.5 kg/day. The density of solid waste is reported to be 600 kg/m<sup>3</sup>. [4] Future waste projections (Total Waste Generation) by 2025 (solid waste) 17,155,000 tons/year, per capita waste generation 0.60 kg/day in Urban Areas. [5] Out of total waste generated, collection of waste (% of waste generated) 44.30% - 76.47% in major urban cities. [6]

### 2.2. Existing CBO practice of waste management in the cluster of a city (Uttara, Dhaka)

Some of the area of Dhaka like Sector-5 of Uttara model Town is practicing organized waste management

The fact sheet is appended below:

- Population: 105,913
- Waste generation: 51.16 ton/day
- 2781 tons/year waste recycled
- Plastic waste 935.53 tons/year recycled
- Paper waste 1305.27 tons/ year of recycled.
- Rags, textile and jute 540 tons/ year
- Recycled
- Two truck full load of waste can be minimized in Uttara model town as a result can save estimated Taka (Bangladeshi currency, 83 Taka=1US\$) 9,490,000 per year. [7]



Fig. 1 : Organic waste bin



Fig. 2: Dry waste bin

### 2.3. Composition of household/commercial waste

Out of household/commercial waste generated from houses/flat/apartment or market/bazaar, hotel/restaurants, commercial complex etc contain organic waste and dry waste. Composition of organic waste are kitchen waste, human waste, garden waste, agriculture waste, leaves of fruits, vegetable pieces,

cakes of non-edible oilseeds, waste grain, seed of any plant species as well as non-marketable or non-edible seeds (wild species of Fichus, mango and banana) Kitchen waste contains starch, sugar, cellulose or protein etc. Compositions of dry waste are paper, plastic, metal, glass, rags etc.

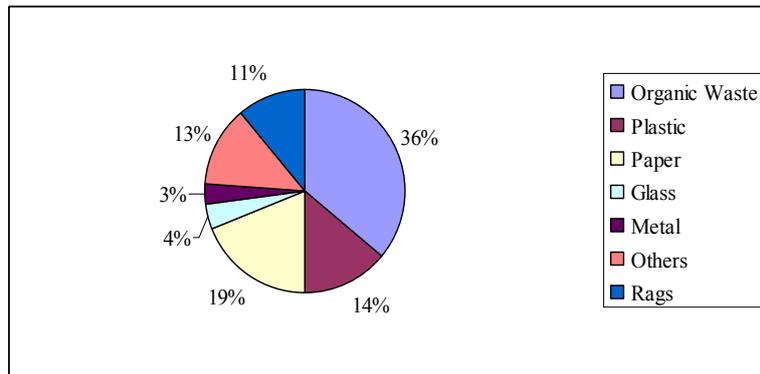


Fig. 3: Graph showing the percentages of waste

### 3. Proposed CBO model in waste management and employment generation

#### 3.1. Mechanism of waste collection from the kitchen to waste processing plant

In the proposed CBO waste collection system multistoried buildings with having multiunit dwellers provision per floor are shown in the following figures. All the kitchens of building are connected with two types of large diameter pipes for organic and dry waste discharge to the respective small waste store house/tank at the ground floor. Waste puller /pusher recruited by CBO will collect these from the store house once in a day. Store houses are such build that wheeled waste bin will place below the store house, open and get it to the bin and would be manually carried to the plant.

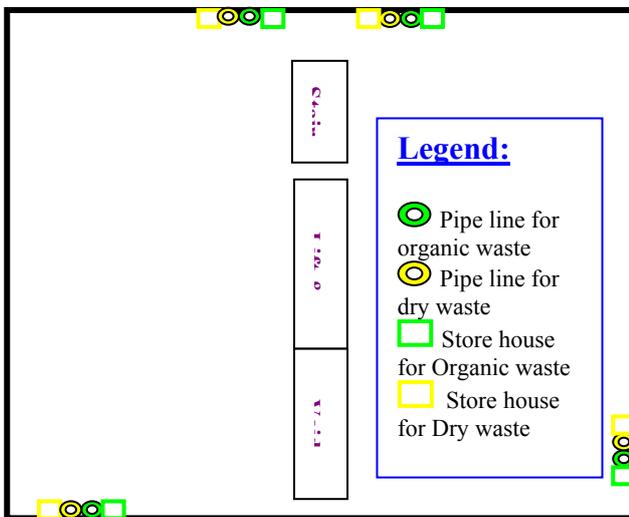


Fig. 4: Ground floor plan of a multiunit multistoried building waste isolation and disposal arrangement from the kitchen.

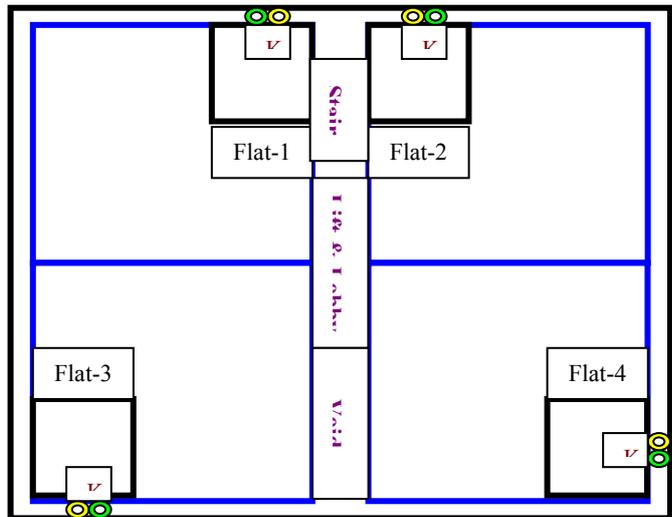


Fig. 5: 1<sup>st</sup> floor to 15<sup>th</sup> floor plan of multiunit building with waste isolation and disposal arrangement from the kitchen.

#### 3.2. Role of CBO flat/house dwellers and expected merits

All dwellers (Head of the families) of certain cluster of the city would be the members of the CBO. Out of the dwellers some one will be the advisor who will be selected based on the professional background. A managing Committee composes of one president, one secretary and some executive members will be elected by members for proper functioning of the community annually. Managing Committee will recruit the necessary manpower to operate the recycling unit, waste collection unit, manure production and distribution unit, peri-urban agriculture unit etc. The entire program will be integrated by computer software and waste collection, gas production, and other recycled products will be monitored in regular basis. There will be maintenance unit to provide service support to the production unit as well as waste pipe line in the dwelling house. There will be 24/7 service centre to provide any sort of waste recovery and recycling service. Proper

motivation and strict instruction must be given to the house member or maid/boy to properly isolate the waste and keep proper bins or correct throwing pipe. Educate the house staff regarding the health and environment issue of the waste. There may be some benefits for individual dwellers such as:

- Building will be neat and clean, disposing household waste will be easier
- Once the CBO function efficiently there will be no cost of disposing waste from house /commercial place
- Surroundings environment will be clean, air pollution will be less
- Contribute to preserve the climate and environment
- Organic waste can be use for producing bio gas which may transform into energy in many form for domestic/commercial or vehicular use
- Byproduct of bio gas is a good organic manure which can be use for peri-agriculture project
- Dry waste can be recycled and financial benefits may be derived out of that.

A proposed Organization of CBO waste management unit is given below:

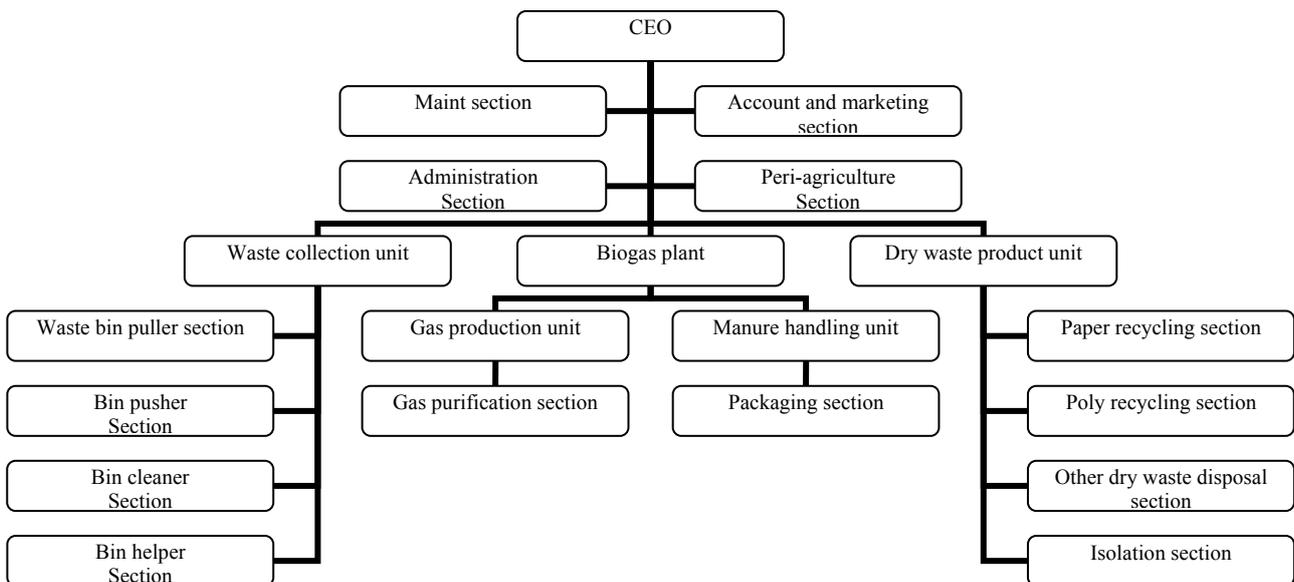


Fig. 6: Proposed CBO for urban waste management

### 3.3. Role of Policy makers and government body and the benefit

All level of the government body should come forward to materialize the CBO initiative. For doing so public awareness should be created through publicity in electronic and print media. Incentive may be provided to draw the people attention and generate interest to work with various clusters of the cities to handle waste disposal issue. Once the CBO will organized then there may be some problem faced by the CBO in terms of land and infrastructure development, if it has been and provided initially by the concern authority to CBO then it will be self sustainable and government will be directly and indirectly benefited in may ways like :

- Major portion of the urban waste will be disposed off by the CBO
- Pressure on natural gas as well as energy will be reduced
- Fertilizer requirement for agriculture will be partially solved
- Unemployment problem will be partially solved
- Cleaner environment will be the out come
- Prevent deforestation
- produce more food grains
- Save commercial energy
- Reduce soil erosion
- Contribute in the carbon trading and saving ozone layer
- Contribute to protect the world through climate change campaign

### 3.4. Output of the Waste management unit of CBO

CBO waste management (govt) unit will have multidimensional initiative like production of bio gas from organic waste which contains around 55% methane 20-30% carbon dioxide, some moisture, some oxide of sulfur and nitrogen. This gas can be used directly for cooking with bio gas stove. Again this gas can be purified almost 95% pure methane with the simplest and cheapest method of removing the CO<sub>2</sub>, is by washing the gas with water under pressure., which is pure enough for vehicle fuel. [8] Biogas can be connected with special type of Bio Gas operated Engine/Generator which will convert Bio Gas in to Electricity that electricity can be sale to the customer or govt agency. Like wise from dry waste there may be reusable paper from paper recycling section, poly carpet, poly bin, poly pallet and other reusable items from the poly paper and other plastic items. Other dry waste contains metal, glass, e waste etc after segregation these can be supplied to the respective vendor for recycling and in turn will earn revenue. Byproduct of the bio gas plant is good manure, it can be used by the CBO for peri-urban agriculture or it can be sale to the market as a substitute of chemical fertilizer.

#### **4. Employment generation by Waste management unit of CBO**

For accomplishing the waste management task by CBO needs a good number of work force starting from the executive level down to waste bin puller/pusher/cleaner/helper. There will be requiring some mid level workforce and some technician and supervisors. It is expected that more than 100-200 persons will be require for a CBO waste management unit. Manpower will be varying basing on the size of the populations of particular cluster of the urban area. Fig. 6: above highlighted the tentative sections and subunit in a CBO unit, for manning these sections and subunits quite a good number of manpower will be needed which ultimately generate a huge number of employment to the nation.

#### **5. Conclusion**

Waste management is not a new issue, quite a mature issue to the world. A nation can be judged to study her environment. Developed countries of the world are viewed waste as their assets and converting waste into energy. They have the state of the art waste handling and recycling modern and efficient tools they have the latest technology and striving to achieve more effective technology for proper and perfect management of waste. A developing country like Bangladesh has huge potential in this sector. If proper steps can be taken from both government and people from the urban area then lot of burning issue can be mitigate. Out of these issues are unemployment problem and waste management problem particularly in the urban area. All type of Municipal authorities of the urban area is responsible for cleaning the city and ensure healthy atmosphere of the surrounding area but they have resource constrained. As a responsible citizen of the country, all should have come forward to solve the problem and breathe sound. A CBO can be the effective solution for waste management. Now a day urban people are live in various communities for many reasons, it also offers multifarious benefits to the dwellers. If these community works together to fight waste, live green and to mitigate unemployment problem then it will be possible. For accessing to technology and technical help there are a good number of organization working home and abroad who deals with this issue can be easily contacted. [9] In this connection government encouragement, incentive, publicity, sponsorship can be the vital matters to consider in depth.

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