

Solid Waste Management in Dhaka City: 3R Statement and Need for Institutionalization Approach to Solution

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Introduction

Dhaka, the capital of Bangladesh is the prime city of the country as its share of national urban population was 25% in 1961, 31% in 1991 and 34% in 2001 respectively. Dhaka's dominance not only in terms of population, but also in terms of economy, trade, commerce, and administration is obvious. In 1991, among the thirty-four mega cities of the world having a population of more than five million, Dhaka ranked twenty-fifth (BBS, 1997) while in 2000 it ranked eleventh and it is predicted to be the world's fourth largest city by the year 2015 with an estimated population of 21.1 million (Lizin, 2002). The present population of Dhaka mega city is estimated at 11.3 million while that of Dhaka City Corporation (DCC) area at 5.94 million in the year 2004.

Until 1951, Bangladesh was almost completely a rural-agrarian country with 95.67% of the population living in rural areas and only 4.33 percent in urban areas. Table 1 shows the urbanization pattern in Bangladesh as well as urban population growth of Dhaka city. The level of urbanization was extremely low in 1951 with only 4.33% of the total population living in urban areas. It has increased gradually to 5.19% in 1961 (BBS, 1991 and BBS, 2001). A recent study by World Bank has estimated that about 40% of the total population in Bangladesh will be living in urban area in Bangladesh by 2025 (ADB, 2004).

Table 1: Urbanization in Bangladesh and Urban Population Growth of Dhaka City

Bangladesh				Dhaka	
Year	Total Urban Population	Per cent of Urban Population	Average Annual Growth Rate (%)	Population	Average Annual Growth Rate (%)
1951	1819773	4.33	1.69	411279	1.28
1961	2640726	5.19	3.75	718766	5.74
1974	6273602	8.78	6.62	2068353	8.47
1981	13535963	15.54	10.63	3440147	7.53
1991	20872204	20.15	5.43	6487459	6.55
2001*	28808477	23.39	3.27	9912908	4.33

Source: BBS, 1997, BBS, 2001

Solid waste management is an obligatory function of urban local Bodies in Bangladesh. In Dhaka it is the priority function of Dhaka City Corporation (DCC). At present, there are 10 zonal offices and around 7500 workers under DCC to handle Solid Waste Management of the city. They are responsible for cleaning of roads and are ready with 100 vehicles of which 35 are compactors, 45 are container carriers and 20 are arm roll carriers. Around 50% of the collected waste are used for land filling in Aminbazar, Beribandh and Matuail. This sanitary

land filling and waste management will be in a better manner after receiving of 100 vehicles in total. In this populous city, solid waste management issue is to be addressed in a guided manner. A total and complete action oriented package is important to deal with SWM activities. Solid waste generation in Dhaka city is 0.3 to 0.5 kilogram per capita per day. These are of various composition, qualities and quantities. Total composition changes over seasonal factors. During humid and rainy times moisture content of waste becomes high. It is to mention that at all times, toxic and hazardous waste is very critical to handle (Table 2,3, Figure 2).

Any Human being, activities are associated with some solid waste (unwanted or discarded materials). This waste is unavoidable but proper management of waste is essential to protect our environment. It ensures a healthy livable arena. Solid waste generated per day is admixture of perishable and nonperishable items including fragile and hospital wastes, building construction debris, motor parts etc. Some are definitely toxic and some needs incinerator (needed for hospital wastes). Over time population growth has evolved a number of modern commodities as solid waste. As a consequence food waste has increased a huge amount. Use of synthetic packaging material for food like plastic has increased a lot. Till date in the Dhaka city there are no waste food or bottle disposal kits or system. So food waste packets, water bottles, plastics, polythene, related metal and stapler pins are haphazardly thrown everywhere. (Lack of awareness, training and education is also a factor in these cases). Table 2 explains typology of solid waste in Dhaka by percentage of weight.

Table 2: General distribution of solid waste in Dhaka City

Waste Composition	1994	2000 (Dhaka, % by weight)
Food and vegetable	35 - 80%	70%
Paper	01 - 08%	04%
Plastic	00 - 02%	05%
Polythene	.5 - 03%	-
Textile	00 - 03%	0.13%
Glass and ceramics	.4 - 01%	0.25%
Garden trimming	00 - 05%	11%
Tin-can/metals	00 - 03%	0.13%
Wood	00 - 04%	0.16%
Ferrous materials	00 - 10%	-
Ash-brick, stone	00 - 10%	01-10%
Other (stone, durt)	01 - 10%	5%
Moisture		65%

Note: Assessments of Generation of Household solid Waste in Dhaka city of Bangladesh

A remarkable feature is about working hours of workers. DCC cleaners work average of 4 hours with minimum 2 hours. Private sector workers work for average 6 hours with minimum 4 hours (source: DCC).

Methodology

The methodology for this study included collection of information from secondary and primary sources, interview with environmental experts, discussion with Dhaka City

Corporation, informal discussion with social scientists and planners, and data collection from web sites.

Existing Situation of 3Rs for SWM in Dhaka

Dhaka City Corporation (DCC) is the designated authority to manage solid waste and to keep the city clean. The cleaning systems can be classified as household level, solid waste disposal from house, collective disposal point of the multi-dwellings, collection and transportation by a private sector NGO, dumping to the nearest bin/point and collection by DCC to main dump yard (Figure 2) as pre designated. At this point the word “management’ intervenes. AND that is why 3Rs (Reduce, Reuse, Recycle) statement is to be accepted. 3Rs at house hold level: Reduction by sorting is the number one way to manage solid waste by segregating perishable and non perishable solid waste. It reduces nearly 30 to 50% solid waste at root (house) level. The non perishable waste can again be segregated as fragile and general waste like paper materials etc. At this very moment Reuse gets in to the scenario. Poorer section like house attendant or scavengers perform this job. This is a very typical culture of Asia. Dhaka City Corporation yet to have any Solid Waste Recycling (Table 3, Figure 2). However; waste which have market value are being reclaimed or recycled. Recycling contributes to resource conservation for environmental protection. These actors are at 1st level: a class of small scale mobile purchasers. At 2nd level poor commercial activists or waste traders, at 3rd level a few numbers of entrepreneurs produces organic compost or manure from organic solid wastes. DCC has own training and motivational program, awareness and health education in their own capacity. DCC is providing training to private sector participants also. In the training program DCC conducts training for toxic and hazardous waste handling. Tools and technology, and hygiene factor is also incorporated in the training to deal with waste generation cycle (Figure 1).

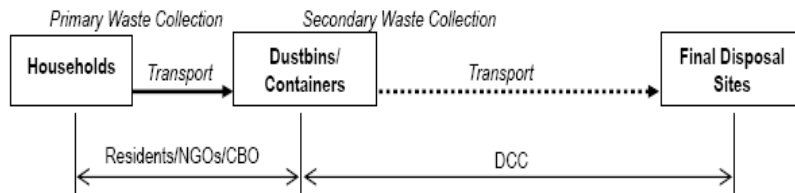


Fig. 1: Distribution system of Solid Waste from residence to final disposal

Table 3. Estimated volume of recycled waste in Dhaka City

Estimated Volume of Recycled Wastes in Dhaka City

Material	a) Estimated generation of recyclable waste (t/d)	b) Estimated recycled waste (t/d)	c) Recycle rate	d) Contribution to waste reduction (b / 3,200)
Plastic	124	103	83 %	3.2 %
Paper	260	168	65 %	5.3 %
Glass	46	24	52 %	0.8 %
Metal	27	41	*	1.3 %
Compostable	2,211	6	0 %	0.2 %
Others	99	94	95 %	2.9 %
Total	2,767	436		13.6 %

Source: Survey on recycle market by the Study Team

Globalization of 3Rs

Asian participants of Regional 3Rs forum emphasized on a statement in Tokyo, Japan on 11-12 November, 2009, on the establishment of the Forum, for the promotion of the 3Rs in the Asia region. These were:

Reaffirming and building the international agenda and process; need to reorienting production and consumption patterns towards sustainability, giving highest priority to waste prevention and minimization;

Reconfirming important linkages between the beneficial aspects of 3Rs and the significant contributions that could be made in achieving, by promoting the 3Rs and sound waste management;

Recognizing the 3Rs and **acknowledging** themes of sustainable consumption and production and waste management, among others, **reaffirming and building upon** the decision of GC 25/D of UNEP's Governing Council, the Forum tried to understand both the main benefits of 3Rs and the co-benefits in the forms of improvement of environmental management and competitiveness in the industrial sector, achieving resources and energy efficiency, and climate change mitigation.

Recognizing this importance of comprehensive and integrated national 3R strategies and overall policies, planning, and development at the local, sub-national, and national levels should be adopted, underscoring the importance of cooperation and partnership with international organizations, and bilateral and multilateral donor communities towards capacity development. Recognizing that improved awareness in civil society on the social, economic, and environmental benefits of the 3Rs, we need to take required measures. The success of 3Rs will be effective by promotion and implementation of a sound material-cycle society that would definitely agrees to:

- High-level policy-strategies on 3Rs and Developing appropriate industrial capacity for sound recycling.
- Long and short term priorities by mainstreaming,
- Mobilizing financial resources for implementation measures,
- Developing and transferring human resources to overcome management, technical and technological gaps; developing organizational framework to deal with non-formal sector; and creating broader scope for achieving resource efficiency,
- Climate change mitigation, information sharing and research networking,
- Developing and implementing effective policy mechanisms,
- Capacity for collection and safe treatment of hazardous waste and e-waste, and
- Empowering corporation to cope with critical and emerging issues.

Existing Pattern of Solid Waste Management of Dhaka City

The existing pattern and condition of waste generation, disposal, collection, storage and recycling system can be understood from Figure 2 to 7.

Garbage Disposal Bins

The solid waste disposal in Dhaka is practiced by collecting the refuse materials from the garbage bins constructed by the municipal corporation. These are made by 1. Bricks or concrete, 2. Tin or metal 3. Mechanically lifted boxes. Existing system of SWM can be expressed through the following observations:

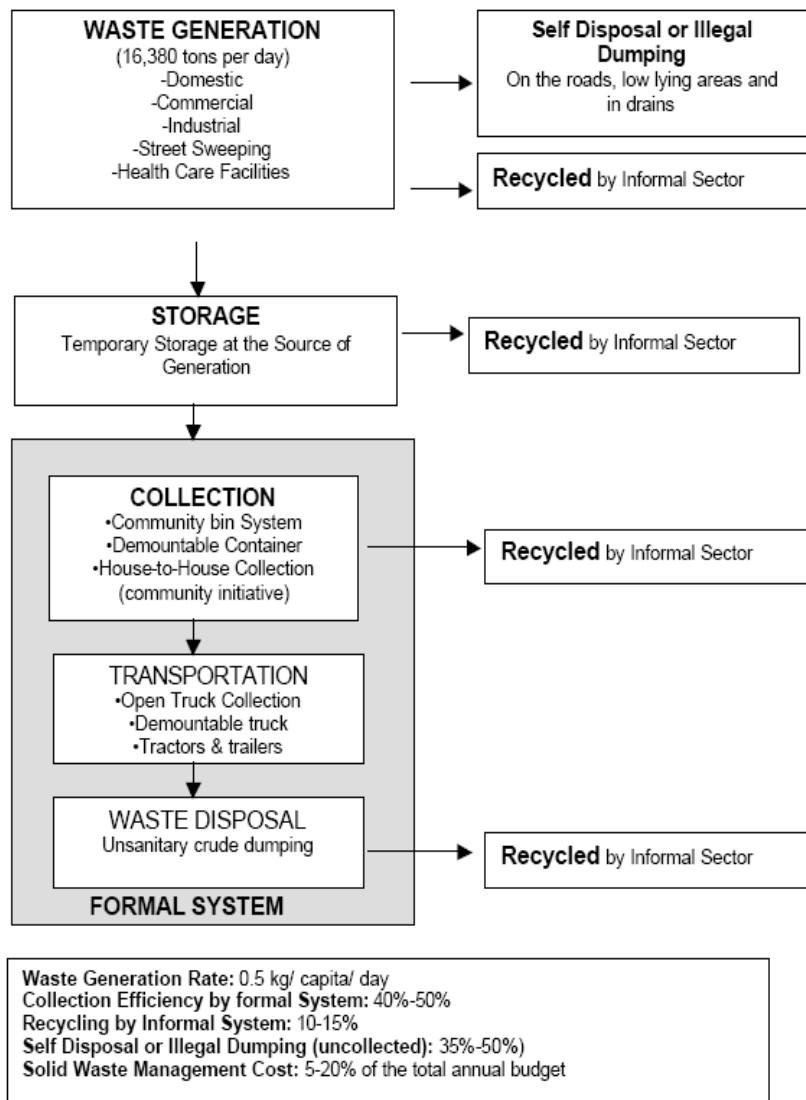


Fig. 2: Existing pattern of Recycling of Solid Waste generation in Dhaka City

- Home is not educated for SWM
- Garbage bins are not efficiently located
- Garbage bins are not user friendly
- Garbage bins are not weather friendly
- The system of cleaning is inefficient
- The bins and collection points are ill-maintained (not health protected)
- Collection time is not appropriate
- Concerned persons are not educated to use the bins



Fig. 4: Demountable container



Fig. 5: Open truck used for carrying solid waste from bin to dump yard



Fig. 6: Small scale trader/entrepreneur after sorting of solid waste



Fig. 7: Crude dumping site in Dhaka City

Government Intervention

The existing haphazard, unplanned and less efficient system of SWM needs to be regulated. Piecemeal works, planning, research and development cannot keep pace with the huge problem. Both the private and public sector should coordinate to strengthen their efficiencies and capabilities to extend their services. A combined effort is to be launched. Institutions to be developed to provide information, up to date research and development works regarding SWM. Efforts are underway to improve the organizational structure for solid waste management in the city. For instance, Dhaka City Corporation has recently established a Solid Waste Management cell to improve the waste management services in the city. SOM should be organized and run by (a dedicated department) conservancy section (Figure 3) of the urban local bodies, whose prime responsibility is maintenance of the sanitation system. The organizational structure of conservancy section is shown in the following figure.

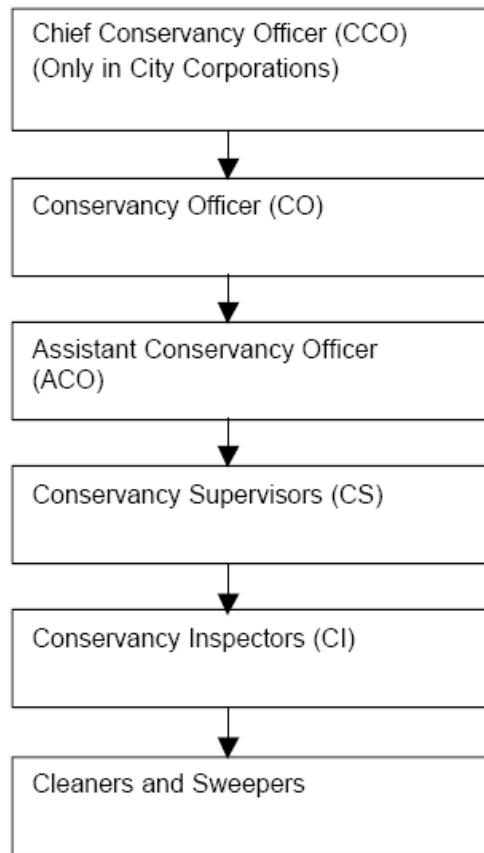


Fig. 3: Organizational Structure of Conservancy Section of DCC

The number of staff for conservancy depends upon the size of the city and workload. Some of the cleaners and sweepers can be hired on temporary basis. Although the organizational structure deals with the collection and storage of waste as well as street sweeping, transportation of waste can be done by separate department of City Corporation. The chief conservancy officer or the conservancy officer has to coordinate with the transport department to get the waste transferred from collection point to designated waste disposal sites. As more vehicles will be available from DCC for SWM of Dhaka City, more formal and non-formal staff recruitment is expected.

Generally DCC has 10 zone offices to handle SWM activities. In many zones especially in the northern zones there are city development committees and NGOs to coordinate the total work. Even then management activities are not up to the mark. Cleaning is not monitored, action is not taken. Motivation is a factor where household level and neighborhood participation is not visualized. It seems urgent to start motivation to common people of all types to start the SWM from the grass root level. Motivational leaflets along with the daily news paper are recommended. Incentives for the children and for the house-aids are recommended. Weekly and other magazines should contain attractive and easily understandable illustrations and stickers, tattoos of SWM. As example a new born baby irrespective of his mother tongue gets hooked up with cartoon movies. Similar documentary videos on SWM will also be educative. Initiatives to be taken jointly by the DCC and civic committee of each zone office for local

area meeting in an open area; musical movies and good examples of other cities can be documented. Cultural programs highlighting SWM theme will be beneficiary.

Institutionalization of SWM is to be addressed as the most prior component. To motivate people and to educate people should be basic theme. Main components are to be emphasized. Target actors are to be attempted. Actors are primarily the house assistant /aids, drivers, house keeper or house attendant, darwan, manager depending on single or multi dwelling houses and apartment buildings. Actions needed but not limited to be:

- Education at home
- Action oriented Zones of DCC
- Sincere and active civic committee
- Responsible professionals: i.e., planners, architects, engineers related to house design to emphasize WSM component during preparing master plan and house design.
- Networking of all zones , DCC and civic community
- Container management by DCC so that surrounding places remains clean
- Collection time should match with prevailing office timing
- Interval time for collection so that (at least) no perishable waste is left in the source of waste generation point
- There should be sufficient allocation of resource for SWM activities for timely approach to any relevant requirements
- Updated technology of SWM should be incorporated
- Training for related actors should be in the budget for review, dissemination and updating
- To uphold the priority of SWM by explaining health factors and critical issues
- All the development institutions should deal with SWM components along with their own dedicated agendas
- Direct benefits and incentives should be introduced for all types of SWM actors (permanent and temporary)
- Marketing chains of marketable items should be initiated. Especially positive points must be indicated to promote these products. Organic composts should have a remarkable role. For that matter, initiative, awareness, marketing information and chain should be established. Role of middlemen should be eliminated from the very beginning.
- Social aspects of SWM to be the awareness slogan. Positive points to be highlighted to all the beneficiaries. There must be financial benefits and social benefits. It will lead us all to a better life.

Conclusion

By the planned 3Rs for SWM, we can revive damage already caused and will not let that go beyond control. As doctors in many occurrences say “*You are already late, it has turned to cancer, only thing what we can do is your peaceful farewell from this world*”. We do not want that situation. Let us not let this issue to become headline and headache present burning issues like water, gas and electricity, but be the achiever. It is time at our door to recognize the problem. Then we are to reaffirm, recognize, acknowledge, understand, at per scoring of the problem for protection of environment. Designated city cleaning organization (DCC) and environment concern department (DOE) is expected to explain 3Rs to general public and

share with peoples representatives like NGOs and zone offices. They should distribute leaflets; organize colorful programs to disseminate their know-how. This way by establishing 3Rs in all levels of society SWM will definitely be earned. Private sectors are doing piecemeal, uncoordinated and insignificant 3Rs projects. More private-public sector coordinated, target oriented projects with timely completion and accountability is demanded from social bodies. Importance of cooperation and partnership with international organizations, and bilateral and multilateral donor communities towards capacity development also bring success for efficient SWM.

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