

Strategic Planning of Waste Management and Recycling of Waste Material in Bhopal City

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Abstract

The goals of composing this paper are to ponder the present practices identified with the different waste administration activities taken in India for human prosperity. The other intention is to give a few proposals and suggestions to improve the waste administration rehearse in Indian towns. This paper depends on auxiliary research. Existing reports identified with squander the board and proposals of organizers/NGOs/advisors/government responsibility organizations/key industry specialists/for improving the framework are contemplated. It offers profound information about the different waste administration activities in India and discovers the degree for development in the administration of waste for the welfare of the general public. The paper endeavors to comprehend the significant pretended by the conventional division occupied with squander the executives in our nation. This work is unique and could be additionally broadened.

Keywords: Recycling, Waste Disposal, Waste Management

Introduction

Bhopal, the capital city of Madhya Pradesh, a Province in Central India, is known for its rich natural endowments and the diversity of its natural, physical and cultural resources. It is located in a hilly undulating region (550-600 meter MSL). The hinterland of Bhopal slopes north and southeast. The hillocks and lakes in the city create favourable conditions for environmental conservation and city management practices because of its gradient. Two main streams i.e. Betwa and Narmada, the former flowing towards north and the later flowing

towards west, provide the drainage to the city. Halalinallahs from the northwest and Kaliasot from southeast meet Betwa and Kolar from the southwest joins river Narmada. Bhopal is also the "Hiroshima" of India. In 1984 the Union Carbide Chemicals factory mismanagement caused leakage of poisonous gas MIC (Methyl Isocynate) leading to the death of over 5000 persons and the permanent impairment of almost a hundred thousand others. After a protracted legal battle some succor has been provided to those affected. This has left a permanent psychological scar over the city of Bhopal. The Municipal Corporation of Bhopal is spread over an area of 285.88 square Kms which can be classified as follows:

OLD CITY	41.58 Sq. Kms	BHEL	44.18 Sq. Kms
NEW CITY	77.97 Sq. Kms	VILLAGE AREA	122.15 Sq. Kms

Nearly all incidents generate waste, debris and materials. While the amount of waste varies between incidents, the generated waste is often greater than the amount of waste many communities handle each year. Additionally, homeland security incidents may generate waste streams, such as chemical, biological and radiological-contaminated wastes, which typically are not handled by communities or waste management facilities. In addition to helping the whole community prepare for these potential wastes, pre-incident planning encompasses source reduction and hazard mitigation activities aimed at reducing the total amount of waste generated by an incident, especially for a large-scale natural disaster.

Classification of waste

There may be different types of waste such as Domestic waste, Factory waste, Waste from oil factory, E-waste, Construction waste, Agricultural waste, Food processing waste, Bio-medical waste, Nuclear waste, Slaughter house waste etc. We can classify waste as follows:

- Solid waste- vegetable waste, kitchen waste, household waste etc.
- E-waste- discarded electronic devices such as computer, TV, music systems etc.
- Liquid waste- water used for different industries, tanneries, distilleries, thermal power plants
- Plastic waste- plastic bags, bottles, bucket, etc.
- Metal waste- unused metal sheet, metal scraps etc.

- Nuclear waste- unused materials from nuclear power plants
- Further we can group all these types of waste into wet waste

Dry waste (Non-biodegradable) includes the following:

- Paper and plastic, all kinds
- Cardboard and cartons
- Containers of all kinds excluding those containing hazardous material
- Packaging of all kinds
- Glass of all kinds
- Metals of all kinds
- Rags, rubber
- House sweeping (dust etc.)
- Ashes
- Foils, wrappings, pouches, sachets and tetra packs (rinsed)
- Discarded electronic items from offices, colonies viz. cassettes, computer diskettes, printer cartridges and electronic parts.
- Discarded clothing, furniture and equipment

Table 1: Growth in Solid Waste Generation in Urban Cities of Bhopal

Year	Total Population	Urban Population%	Waste Generation Rate % (KG per/ca/day)	Total Waste Generation(Tone/day)
2015	1,798,218	20.15	0.49	9873.50
2016	1,917,051	23.39	0.50	11695.00

Source: Wikipedia report 2016.

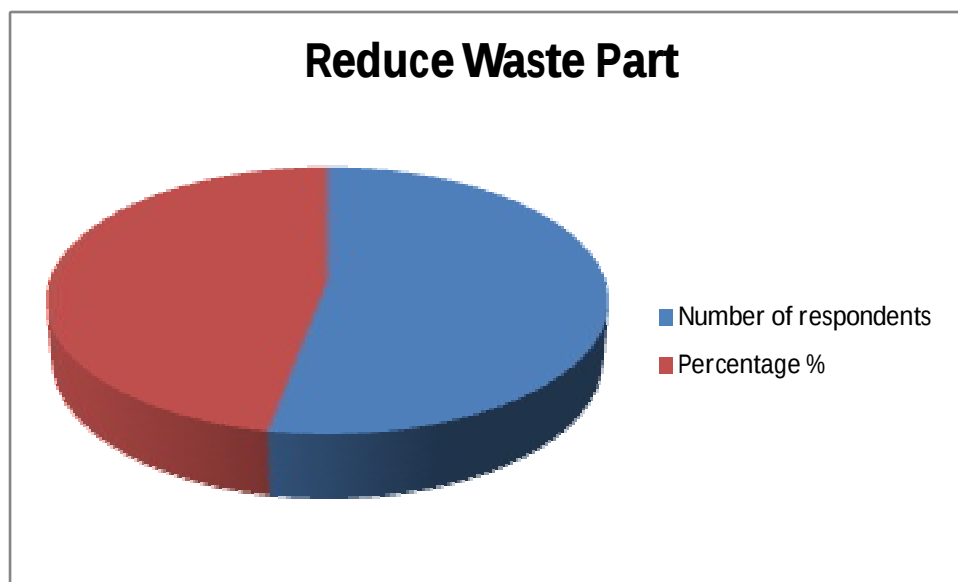
BMC currently used 370 trucks and container carriers, 4,920 bin/container and 300 handcarts per day. In addition, 7,156 cleaners/ sweepers with 190 supervising officers and only 1 supervise transport officer for all events (DCC, 2015). Nearly 30% of wastes mention for repossession and recovering and more than 40% remains laying around on roadsides, open spaces or in drains (Bhopal city sate of environment).

Table No. 2 Are you personally motivated to reduce waste as part of your job?

Results	Number of respondents	Percentage %
Questionnaires returned	95	84.5
Questionnaires unreturned	05	8.5
	100	100

Question 1

Are you personally motivated to reduce waste as part of your job?



Graph No. 1

The results of this question show that 84.5 per cent of the respondents are motivated to reduce waste as part of their job, while only 8.5 per cent or one respondent stated that it

was not part of their job description. These are very positive results as almost all the respondents are motivated to reduce waste; this may be related to their position within the company as the majority of respondents hold managerial positions and thus it is their responsibility to reduce project costs and one way of doing this is to reduce waste.

Basic principles of Solid Waste Management

Rs: Refuse, Reduce, Reuse & Recycle

Refuse: Do not buy anything which we do not really need.

Reduce - Reduce the amount of garbage generated. Alter our lifestyle so that minimum garbage is generated.

Reuse - Reuse everything to its maximum after properly cleaning it. Make secondary use of different articles.

Recycle – Keep things which can be recycled to be given to rag pickers or waste pickers (Kabadiwallahs). Convert the recyclable garbage into manures or other useful products.

Waste Management Initiatives in India

During the recent past, the management of solid waste has received considerable attention from the Central and State Governments and local (municipal) authorities in India. A number of partnerships/alliances are found to exist in the field of solid waste management in Indian cities. These alliances are public-private, community-public and private-private arrangements. To identify the status of existing alliances in the study area, it is first necessary to identify the various actors working in the field of waste management. These actors can be grouped as under:

- Public sector: this comprises of local authority and local public departments at city level;
- Private-formal sector: this constitutes large and small registered enterprises doing collection, transport, treatment, and disposal and recycling;

- Private-informal sector: this constitutes the small-scale, non-recognized private sector and comprises of waste-pickers, dump-pickers, itinerant-waste buyers, traders and non-registered small-scale enterprises; and
- Community representatives in the form of NGOs, etc.

Challenges in India

Key issues and challenges include lack of collection and segregation at source, scarcity of land, dumping of e-waste, lack of awareness, etc. Simple dumping of mixed waste is the practice followed practically everywhere and especially in the developing countries as they cannot mobilize financial resources for applying expensive technology propounded by the developed countries.

Suggestions for future improvement

The political will is the first priority. Generally Government bodies and municipalities give priority to present problems which they face but do not think for future problems due to environmental decay. Their view is that, they will solve problems when they will face it but not now. Because doing something for environment does not provide political gains or assure next time seat. Now questions is that how can we change this mentality? We believe there should be a positive approach for a long time planning and implementation. Legislation and its effective enforcement is a key to sustainability for which the framework requires to be established. Efforts to improve waste storage and collection are required. This can be done when each household and locality are provided standard bins that are placed outside for ease of collection. In areas where this is not appropriate, centrally located waste collection points should be established that are shared by a number of households. Wastes need o be increasingly sorted at the source, to separate materials that can be recycled and to educe the amount of wastes requiring collection and disposal. Co-operation is required among communities, the informal sector, the formal waste collectors and the authorities. An effective Solid Waste Management system should aim at minimizing manual handling and 100 % collection & transportation of solid wastes should be achieved.

Conclusion

It is suffice to say that we require a more stringent integrated and strategic waste prevention framework to effectively address wastage related issues. There is an urgent need to build upon existing systems instead of attempting to replace them blindly with models from developed countries. To prevent any epidemic and to make each city a healthy city-economically and environmentally, there is an urgent need for a well-defined strategic waste management plan and a strong implementation of the same in India. To achieve financial sustainability, socio-economic and environmental goals in the field of waste management, there is a need to systematically analyze the strengths and weaknesses of the community as well as the municipal corporation, based on which an effective waste management system can be evolved with the participation of various stakeholders in India. The public apathy can be altered by awareness building campaigns and educational measures. Sensitization of the community is also essential to achieve the above objectives and we need to act and act fast as every city in India is already a hotbed of many contagious diseases, most of which are caused by ineffective waste management.

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