

# Secondary Research Related to Waste Management and Recommendations for Improving System

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## Abstract

The objectives of writing this paper is to study the current practices related to the various waste management initiatives taken in India for human wellbeing. The other purpose is to provide some suggestions and recommendations to improve the waste management practices in Indian towns. This paper is based on secondary research. Existing reports related to waste management and recommendations of planners/NGOs/consultants/government accountability agencies/key industry experts/ for improving the system are studied. It offers deep knowledge about the various waste management initiatives in India and find out the scope for improvement in the management of waste for the welfare of the society. The paper attempts to understand the important role played by the formal sector engaged in waste management in our country. This work is original and could be further extended.

**Keywords-** India, Recycling, Waste Disposal, Waste Management.

## I. INTRODUCTION

This right can be fulfilled by maintaining a clear and healthy environment. Now for the first question, what is waste? Any material which is not needed by the owner, producer or processor is waste. Generally, waste is defined as at the end of the product life cycle and is disposed of in landfills. Most businesses define waste as “anything that does not create value” (BSR, 2010). In a common man’s eye anything that is unwanted or not useful is garbage or waste. However scientifically speaking there is no waste as such in the world. Almost all the components of solid waste have some potential if it is converted or treated in a scientific manner. Hence we can define solid waste as “Organic or inorganic waste materials produced out of household or commercial activities, that have lost their value in the eyes of the first owner but which may be of great value to somebody else.” (Robinson, W.D.1986). Generation of waste is inevitable in every habitation howsoever big or small. Since the dawn of civilization humanity has gradually deviated from nature & today there has been a drastic change in the lifestyle of human society. Direct reflection of this change is found in the nature & quantity of garbage that a community generates. We can dispose the waste or reuse the waste and can earn money through proper management. Indian cities which are fast competing with global economies in their drive for fast economic development have so far failed to effectively manage the huge quantity of waste generated. There are about 593 districts and approximately 5,000 towns in India. About 27.8 percent of India’s total population of more than 1 billion (as per Census 2001) lives in urban areas. The projected urban population percentage is 33.4 percent by the year 2026. The quantum of waste generated in Indian towns and cities is increasing day-by-day on account of its increasing Population and increased GDP. The annual quantity of solid waste generated in Indian cities has increased from six million tons in 1947 to 48 million tons in 1997 with an annual growth

rate of 4.25 percent, and it is expected to increase to 300 million tons by Population explosion, coupled with improved life style of people, results in increased generation of solid wastes in urban as well as rural areas of the country. In India like all other sectors there is a marked distinction between the solid waste from urban & rural areas. However, due to ever increasing urbanization, fast adoption of 'use & throw concept' & equally fast communication between urban & rural areas the gap between the two is diminishing. The solid waste from rural areas is more of a biodegradable nature & the same from urban areas contains more non-biodegradable components like plastics & packaging. The repugnant latitude towards solid waste & its management is however, common in both the sectors. Universally 'making garbage out of sight' is the commonly followed practice. In India, the urban local bodies, popularly known as the municipal corporations/councils, are responsible for management of activities related to public health. However, with increasing public and political awareness as well as new possibilities opened by economic growth, solid waste

## II. LITERATURE SURVEY

In our country municipal corporations are primarily responsible for solid waste management. But with the growing population and urbanization municipal bodies are facing financial crunch and can no longer cope with the demands. The limited revenues earmarked for the municipalities make them ill equipped to provide for high cost involved in the collection, storage, treatment and proper disposal of waste [1]. Municipalities are only able to provide secondary collection of waste, means they only collect waste from municipal bins or depots. A substantial part of the municipal solid waste generated remains unattended and grows in the heaps at poorly maintained collection centres. Open dumping of garbage facilitates breeding of disease vectors such as flies, mosquitoes, cockroaches, rats and other pests. At present the standard of solid waste management is far from being satisfactory [2]. The environmental and health hazards caused by the unsanitary conditions in the cities were epitomized by the episode of Plague in Surat in 1994. That triggered public interest litigation in the Supreme Court of India. Based on the recommendations of the committee set up by the apex court in that Public Interest Litigation (PIL), the Government of India has framed Municipal Solid Waste (Management and Handling) Rules 2000, under the Environmental Protection Act, 1986[3]. The Municipal Solid Waste (Management and Handling) Rules 2000. Though doorstep collection of segregated waste is important for municipal solid waste management, it is not carried out by many of the municipal bodies in the country as they are lacking in financial resources or the expertise to comply with those rules and they often make little effort to revise outdated and deficient waste management systems [4]. As the authorities were hardly able to provide cost-efficient service to citizens, one possibility was to outsource solid waste management by putting in charge professional private organizations like Centre for Development Communication (CDC). The key concept is a daily door-to-door collection of segregated domestic waste, but the model includes all aspects of solid waste management from waste generation to waste processing (e.g. recycling and vermi-composting) and the final disposal [8]. The end consumer is both main contributor and main beneficiary, as he should segregate the waste instead of littering it and, in turn, profits from the cleanliness of the city and creation of a new awareness that CDC work is generating. Presently the Swachta Doot [9] project is being successfully being implemented in several cities of India. Management is starting to receive due attention.

### III. DEVELOPMENT OF NEW METHOD

#### 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 (Biodegradable) and dry waste (Non-Biodegradable).

**Wet waste (Biodegradable)** includes the following:

- Kitchen waste including food waste of all kinds, cooked and uncooked, including eggshells and bones
- Flower and fruit waste including juice peels and house-plant waste
- Garden sweeping or yard waste consisting of green/dry leaves
- Sanitary wastes
- Green waste from vegetable & fruit vendors/shops
- Waste from food & tea stalls/shops etc.

**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.

In addition to the above wastes, another type of waste called “**Domestic Hazardous Waste**” may also be generated at the household level. These include used aerosol cans, batteries, and household kitchen and drain cleaning agents, car batteries and car care products, cosmetic items, chemical-based insecticides/pesticides, light bulbs, tube-lights and compact fluorescent lamps (CFL), paint, oil, lubricant and their empty containers. Waste that is considered hazardous is first required by the EPA to meet the legal definition of solid waste. The EPA incorporates hazardous waste into three categories. The first category are source-specific wastes, the second category is nonspecific wastes, and third, commercial chemical products.

Generally, hazardous waste “is waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludge. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes.

**Basic principles of Solid Waste Management**

1) 4Rs: 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
- 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.

2) Segregation at source: Store organic or biodegradable and inorganic or non-biodegradable solid waste in different bins. Recycle of all the components with minimum labor and cost.

3) Different treatments for different types of solid wastes: One must apply the techniques which are suitable to the given type of garbage. For example the technique suitable for general market waste may not be suitable for waste.

4) Treatment at nearest possible point: The solid waste should be treated in as decentralized manner as possible. The garbage generated should be treated preferably at the site of generation i.e. every house.

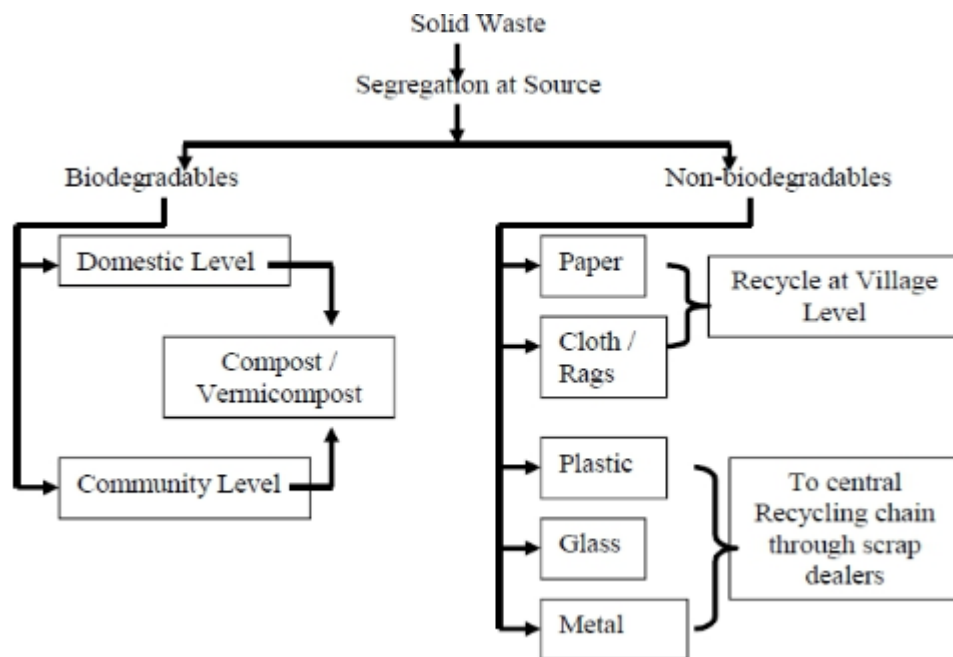


Figure 1- An ideal Solid Waste Management at a glance

## IV. CONCLUSION

The generation of large quantities of MSW in Nagpur city has become a serious environmental issue. NMC, though committed to the services, is finding this issue difficult to manage properly due to the growing magnitude of problems. The major problems in MSWM in Nagpur city are due to the lack of MSW segregation at source, low operational efficiency of MSW transportation system with old vehicles and an inefficient informal recycling system. Nagpur Municipal area generates 905 metric tons of MSW per day, whereas, no data was maintained for receiving it at landfill site, demonstrating the need for augmentation of the present collection and transportation system. To achieve a target of 100% collection, transportation, treatment and disposal, NMC, would first need to prepare a micro plan which would identify the quantity of waste generated in the city and the broad strategy to be adopted to manage the system. The existing handcarts used for collection of solid waste, are to be replaced by tricycle carts. Capacity improvements to the existing MSWM framework need to be stressed. For collection system, emphasis should be on segregation at the household level and 100% door-to-door collection.

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