

A Review on Municipal Solid Waste Management

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Abstract

In India efficiency of Solid Waste collection around 70% , when compared almost 100% in the developed countries. Large portion of solid waste is dumped indiscriminately on outskirts of towns or cities without any prior treatment. This tends to contamination of groundwater and increased air pollution due to leachate percolation and release of gases respectively. Several studies reveal that out of total solid waste, 80% can be utilized again either by recycling or reusing. Improper waste segregation and other factors lead recycling sector to work on outdated technology. However, plastic and paper recycling have been especially growing due to continuous increasing consumption of both the commodities. This study describes about current status of municipal solid waste management in different regions of India.

Key Words: Collection, Municipal Solid Waste, Treatment, Waste generation.

1. Introduction

India is having second largest population in the world after China with more than 1.27 billion population contributing 17.6% of world's total population. India is one of the fastest growing economy in the world with 7.30%. Due to rapid increase in the production and consumption processes, societies generate as well as reject solid materials regularly from various sectors – agricultural, commercial, domestic, industrial and institutional. The considerable volume of wastes thus generated and rejected is called solid wastes.

Municipal solid waste is being generated due to various household activities and other commercial & institutional activities. Municipal waste and certain industrial waste have comparatively significant impact on environment. Misra et al. 2004 revealed that substantial amount of these wastes is extremely dangerous to the living organisms including human beings.¹

2. Classification of Solid Wastes

Solid wastes are classified on the basis of source of generation and type

Source-based classification

Based on Tchobanoglous, et al., 1977, the sources of solid wastes have been consistent, dependent on sectors and activities (and these include the following:

Residential: This refers to wastes from dwellings, apartments, etc., and consists of leftover food, vegetable peels, plastic, clothes, ashes, etc.

Commercial: This refers to wastes consisting of leftover food, glasses, metals, ashes, etc., generated from stores, restaurants, markets, hotels, motels,

Institutional: This mainly consists of paper, plastic, glasses, etc., generated from educational, administrative and public buildings such as schools, colleges, offices, prisons, etc.

Municipal: This includes dust, leafy matter, building debris, treatment plant residual sludge, etc., generated from various municipal activities like construction and demolition, street cleaning, landscaping, etc.

Industrial: This mainly consists of process wastes, ashes, demolition and construction wastes, hazardous wastes, etc., due to industrial activities.

Agricultural: This mainly consists of spoiled food grains and vegetables, agricultural remains, litter, etc., generated from fields, orchards, vineyards, farms, etc.²

Type-based classification

Based on Phelps, et al., 1995 Classification of wastes based on types, i.e., physical, chemical, and biological characteristics of wastes, is as follows

Garbage: This refers to animal and vegetable wastes resulting from the handling, sale, storage, preparation, cooking and serving of food. Garbage comprising these wastes contains putrescible (rotting) organic matter, which produces an obnoxious odour and attracts rats and other vermin. It, therefore, requires special attention in storage, handling and disposal.

Ashes and residues: These are substances remaining from the burning of wood, coal, charcoal, coke and other combustible materials for cooking and heating in houses, institutions and small industrial establishments.

Bulky wastes: These include large household appliances such as refrigerators, washing machines, furniture, crates, vehicle parts, tyres, wood, trees and branches. Since these household wastes cannot be accommodated in normal storage containers, they require a special collection mechanism.

Street wastes: These refer to wastes that are collected from streets, walkways, alleys, parks and vacant plots, and include paper, cardboard, plastics, dirt, leaves and other vegetable matter. Littering in public places is indeed a widespread and acute problem in many countries including India, and a solid waste management system must address this menace appropriately.

Biodegradable and non-biodegradable wastes: Biodegradable wastes mainly refer to substances consisting of organic matter such as leftover food, vegetable and fruit peels, paper, textile, wood, etc., generated from various household and industrial activities. Because of the action of micro-organisms, these wastes are degraded from complex to simpler compounds.

Farm wastes: These wastes result from diverse agricultural activities such as planting, harvesting, production of milk, rearing of animals for slaughter and the operation of feedlots. In many areas, the disposal of animal waste has become a critical problem, especially from feedlots, poultry farms and dairies.

Hazardous wastes: Hazardous wastes are those defined as wastes of industrial, institutional or consumer origin that are potentially dangerous either immediately or over a period of time to human beings and the environment. This is due to their physical, chemical and biological or radioactive characteristics like ignitability, corrosivity, reactivity and toxicity.^{2,3}

3. Methods of Collection

According to Municipal Waste Management Rules (2000), it is the responsibility of municipalities to prohibit littering of solid waste in cities, towns and in urban areas notified by governments. To facilitate compliance, municipal authorities have to organize house to house collection through any of the methods:

Community bin collection

House to house collection

Collection on regular time interval (which must be pre-informed)

Scheduling by using bell ringing of musical vehicle (without exceeding the noise levels)

Solid waste management

Solid waste management (SWM) is associated with the control of waste generation, its storage, collection, transfer and transport, processing and disposal in a manner that is in accordance with the best principles of public. The remaining final solid waste is disposed in landfills after necessary treatment to lessen the adverse environmental impacts. In 2005 Misra et al. states that the objective of treatment is to improve physical and/or chemical characteristics of waste, reduce toxicity and reduce its final volume.¹ In India, different treatment methods are practiced depending on the type of waste. In 1996 Blackman, states that SWM are characterized by their capacity to treat specific type of waste, residues generation, cost, risk associated, safety and other environmental aspects.^{4,5}

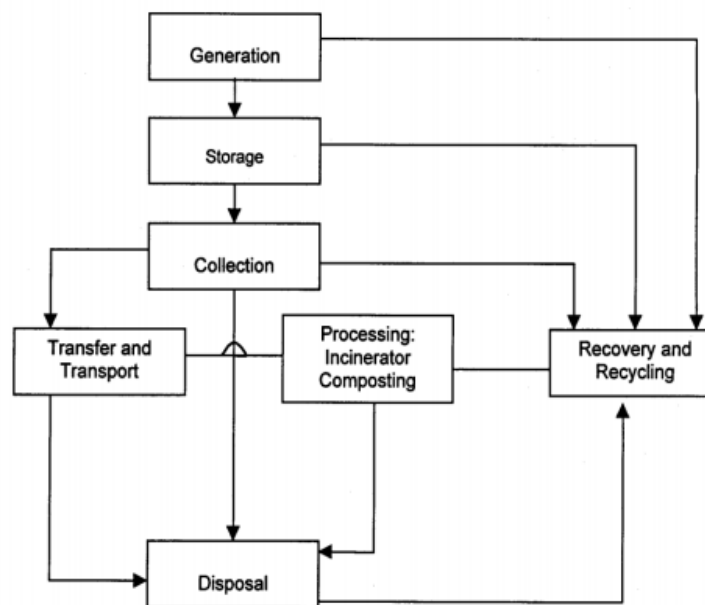


Figure 1 Schematic representation of SWM system

4. Conclusion

Despite the fact that Solid waste management practices has been improving in recent years, the pace of improvement needs to be accelerated. Measures mentioned in MSW rules must be implemented. Time has come to encourage technology based entrepreneurship to achieve effective solid waste management. NGOs should be involved in various components of waste management including public awareness.

5. References

- [1]. Misra, V. & Pandey, S. D. 2005. Hazardous waste, impact on health and environment for development of better waste management strategies in future in India. Environment International, 31, 417-43.
- [2]. Tchobanoglous, G., Theisen, H., and Eliassan, R. 1977. Solid Wastes Engineering Principles and Management Issues, McGraw-Hill Book Company, New York

- [3]. Phelps, H.O., Heinke. G. W., Jonker, J.F., Ouano, E.A.R., and Vandecasteele, C. 1995. Management of Solid Wastes, UNESCO, Paris.
- [4]. Attarwalla, F. A. 1993. Solid Waste Management - A Manual, All India Institute of Local Self-Government, Andheri (W), Bombay, India.
- [5]. Sharholy, M., Ahmad, K., Mahmood, G. & Trivedi, R. C. 2008. Municipal solid waste management in Indian cities – A review. Waste Management, 28, 459-467.