

Sustainable Solid Waste Management

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Abstract: *In this paper, an attempt is made to understand the sustainable solid waste management, its composition, characteristics, collection and its transportation. Solid waste management is been a vital environmental issue since last few decades. Due to improper waste management, lots of health issues are arising, apart from that the ground water quality is affecting, due to which the drinking water quality is affecting. The Addition to a comprehensive analysis of solid waste storage, generation (as per lower, middle and higher income group households), its composition, characteristics, collection and transportation. It is found as per some researches that the lower income group (LIG) generate less quantity of waste and also found more of biodegradable waste generation from the households. The necessities of waste management system, bad effects of mismanagement, various issues are raised in several studies are mentioned in the paper. It is found as per some researches that waste management should adopt by Proper collection, storage, processing, transport & disposal of waste so that the impacts of waste can be minimised & the quality of life can be improved. Therefore, sustainable solid waste management should be implemented to maintain an sustainable and pollution free environment.*

Keywords: Solid waste management, Health hazards, Reuse, Recycle, Environmental issue.

1. Introduction

Solid waste is unwanted materials disposed off from homes, industries, shops, offices, hospitals etc. The quality and quantity of municipal solid waste generated by a particular community will vary according to their socio-economic status, cultural habitats, urban structure, population and commercial activities (Esakku et al. 2007). Urban India is facing an ever increasing challenge of providing for the incremental infrastructural needs of a growing urban population. According to the 2011 census, the population of India was 1.21 billion, out of which 31% live in cities. It is projected that by 2050, half of India's population will live in cities.

With this increasing population, municipal solid waste management (MSWM) in the country has emerged as a challenge not only because of the environmental and aesthetic concerns, but also because of the huge quantities of municipal solid waste (MSW) generated per day. According to Central Pollution Control Board (CPCB, 2013) 1,43,449 tonnes per day (TPD) of municipal solid waste was generated in India during 2014–2015, with an average waste of 0.11 kilogram (kg/capita/day). Therefore the total municipal solid waste, approximately 1,17,644 tonnes per day, (80%) was collected, while only 25,805 tonnes per day, (20%) was processed or treated. Segregation at source, collection, transportation, treatment and scientific disposal of waste was largely insufficient leading to degradation of the environment and poor quality of life (CPCB 2013).

The waste generation in small cities is lesser than larger cities. The amount of solid waste generation is also directly related to the economic status of families. As per studies conducted by Tata Energy Research Institute, higher income group generate more solid waste than middle and lower income groups (CPCB 2013).

Apart from creating air pollution, soil contamination and groundwater contamination, open dumping of wastes generally becomes breeding ground for various dreadful

disease causing health issues towards peoples or residents, particularly in the vicinity of the waste disposal sites. Further, with increasing awareness of public on environmental and health issues, there is a general opinion that the standard of services with respect to collection and disposal of municipal solid waste is progressively declining. It is also true in many cities that as much as half of the solid waste generated remains unattended.

2. Classification by Source of Solid Waste

- 2.1 Household Waste: this category comprises waste that are consequence of household activities, these include food preparations, sweeping and garden waste. They also include old clothing, retired appliances, packaging and etc.
- 2.2 Commercial Waste: this category consist of waste from stores, offices, fuel service stations, restaurants, hotels, informal shops and hawkers.
- 2.3 Institutional Waste: schools, offices, hospitals etc, are included in this category, this category generally involves a large proportion of paper than food.
- 2.4 Street Sweeping: this category of waste includes dirt and litter and also contain an amount of household waste, drain cleaning, animal manure and small dead animals.
- 2.5 Construction And Demolition Waste: these consist of bricks, concrete, sand etc, which are generated due to construction & demolition activities.

3. Classification Based on Material Composition

- 3.1 Rubbish: refers to waste which consist of inorganic material such as metal cans, dirt stones, ceramics, glass bottles and etc.
- 3.2 Garbage: refers to waste consists of organic and decomposable, paper, plastics, rags, leather, rubber, grass and garden waste.
- 3.3 Ash: this refers to residue from fires used for cooking, burning wood and leaves etc.

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3.4 Treatment residues: consist of septic tank sludge, De watered sludge or chemicals.

4. Classification Based on Environmental Consideration

- 4.1 Bio - degradable waste: are those waste which can be naturally decomposed, food waste ,garden waste and some other organic waste which are biodegradable and usually don't have long term effects, on the environment.
- 4.2 Non- biodegradable waste: include all other waste which cannot be naturally decomposed, example for e-plastic, glass, metals and other inert materials.
- 4.3 Hazardous waste: are those which pose a high environmental and health risk for the community and require special handling. Waste which are toxic, reactive, radioactive, explosive are included in hazardous waste.

5. Solid Waste Management

Solid waste management includes the entire process of dealing with solid waste ,starting from the collection from the primary source to ultimately disposing off it hygienically, so that it may not be a nuisance or create any harmful effect on nearby community. The solid waste management involves , management at waste generation level , storage at the source of generation , primary collection , street cleansing , temporary storage at locality level , regular and periodic transportation of this temporarily collected waste to disposing sites and treatment plants.

Segregation at source, collection, transportation, treatment and scientific disposal of waste was largely insufficient leading to degradation of environment and poor quality of life. The objective of Solid Waste (SW) Management is to maintain clean and hygienic conditions and reduce the quantity of solid waste. (Shuddhi, 2014)

Solid waste management (SWM) is a basic public necessity and this service is provided by respective urban local bodies (ULBs) in India. SWM starts with the collection of solid wastes and ends with their disposal and/or beneficial use. Proper SWM requires separate collection of different wastes, called source separated waste collection. Indian cities are still struggling to achieve the collection of all MSW generated. Metros and other big cities in India collect between 70- 90% of MSW. Smaller cities and towns collect less than 50%. The benchmark for collection is 100%, which is one of the most important targets for ULBs at present. (kurian joseph, 2016)

6. Impacts of Improper Solid Waste Management

Improper solid waste management causes air, water and soil pollution. It clogs drains, creating stagnant water for insect breeding and causes floods during rainy seasons. Greenhouse gases are generated from the decomposition of organic wastes in landfills; insects and rodent vectors are attracted to

the waste and can spread diseases such as cholera and dengue fever. Some health problems linked to improper solid waste management are, nose & throat infections, lung infection, breathing problems, inflammation, high pollution load, bacterial infections, obstruction in airways, elevated mucus production, covert lung haemorrhage, chromosome break, anaemia, cardiovascular risk, altered immunity, allergy, asthma and other infections.

Open burning is the burning of any matter in such a manner that products of combustion resulting from the burning are emitted directly into the ambient (surrounding outside) air without passing through an adequate stack, duct or chimney. Open burning of wastes is practiced all over India due to reasons like, open burning by waste-pickers for recovery of metals from mixed wastes, open burning in bins by municipal workers or residents to empty MSW collection bins, open burning of plastic wastes by street dwellers for warmth at night (Joshi and Ahmad 2016).

The occupational health hazards of waste pickers arise from two aspects – poverty and their occupation itself. Since they belong to the poorest and most deprived section of the urban population, under nutrition, growth retardation, anaemia, tuberculosis and other bacterial and parasitic diseases are very common amongst waste pickers. These make them all the more susceptible to occupational health hazards. In the hope of discovering some saleable item the waste pickers rummage through putrefying waste heaps including toxic medical waste using their bare hands and feet and hence come in direct contact with waste material. Infections and infestations results due to such contact with human and animal excreta, sputum, dead animals and potentially infectious hospital waste dumped in refuse dumps This makes them highly susceptible to a number of health hazards.(Suresh et al. 2003)

7. Conclusion

Raising awareness amongst the residents and waste collectors to prepare them to anticipate in the community based solid waste management programme. Waste Segregation, segregation of organic and non-organic waste should be maintained through the societies. Material recovery facilities can be set up at community level with space allocation for segregation by workers. These facilities can hold the segregated waste for further collection or reuse by different dealers like paper, textile, metal, glass, plastics etc. Door to door waste collection of segregated waste, Abolition of open storage, daily sweeping of the street, Transportation of waste to disposal place should be in covered, Capacity building of waste pickers and inclusion of scrap dealers in organized way.

Wastes processing by energy recovery or composting, Composting pits are a low budget, practical solutions to convert large amount of Organic waste being produced by residential population through kitchen and gardens (about 40% of the total waste generated is organic) into rich organic manure/ fertilizer which can be then sold into the open market or utilization in terrace gardens or local parks

for horticulture. Training the workers for the required skills and also improves their earning capacity. Therefore, by adopting all these methods and precautions, we are able to achieve sustainability towards the solid waste management.

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