Decentralization of solid wastes: a sustainable step towards Swachh Bharat Abhiyan

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ABSTRACT

The article illustrates the mounting challenges in the area of solid waste management with focus on imperatives needed for decentralized waste management and various methods for minimizing waste accumulation at landfill sites. The growing population density in metro cities like Delhi is putting tremendous pressure on land availability for waste disposal. The available landfills are already overflowing with heights growing > 50 mts from approved design of 30 mts. This is creating pollution in various forms to all three natural bodies: air, water or land. As per government data>10000 MT of solid waste is generated in Delhi, and approximately 30% of this solid waste is not managed at all. At present almost all waste produced is dumped to dhalao and from there to landfill sites; some are being taken to WSE plants for processing. Large amount of waste is still being dumped at unauthorized area. Further transportation and processing of waste at landfill sites is cost intensive, causing pollution and hazards. As per CSE, estimated cost for disposal of per MT of waste will be Rs 14500/MT. Municipal solid waste management includes number of sequential steps like segregation, storage, collection, relocation, carriage, processing and disposal. Each step is crucial and significant in overall management of solid waste. Authors stress on separation of waste at source and various treatments and recycling process at unit level rather than centralized one. This will lead to significant reduction in daily waste transfer from waste generation point to landfill sites leading to less traffic for garbage trucks, fossil fuel consumption, and landfill site requirement and associated hazards and in turn having huge impact on overall environmental conditions of the city.

Keywords: landfill, waste segregation and disposal, environment, pollution.

INTRODUCTION

Swachh Bharat Abhiyan is a mission to make India a clean country. It aims to achieve this through involvement of citizens and one of the goals is to sensitize citizens for managing waste generated from household as well as preventing littering of public places. As a part of that this paper deals with present status of solid waste generated from houses, small commercial establishments and how each can contribute to the effective solid waste management of mega cities like Delhi. The focus of the paper is on imperative need for decentralized waste management and various methods for minimizing waste accumulation at landfill sites. Growing population density in metro cities like Delhi is putting tremendous pressure on land availability for waste disposal. With the increased population, urbanization and consumptive patterns the demand for goods has grown exponentially, the growth in waste generation has been commensurate with the same. The available landfills are already overflowing with heights growing > 50 meters from design of 30-35 meters. This is causing pollution in various forms to all three natural bodies be it air, water or land and posing hazard too. Recent death from overflowing landfill site has brought the

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issue to fore. At present three out of four landfill sites have saturated capacities long back (Table 1). Narela-Bawana landfill site is the first scientific landfill site of Delhi that is operating as per Solid Waste management rules.

If we go by the rate of solid waste generation in Delhi then by year 2021 we will need 28 sq km (approx. 7000 acres) of area for landfill sites.

Table 1: Status of landfill sites in Delhi1

<table>
<thead>
<tr>
<th>S.No</th>
<th>Landfill Site</th>
<th>Operational Year</th>
<th>Area of landfill (acres)</th>
<th>Permissible height (meters)</th>
<th>Present height (meters)</th>
<th>Year of saturation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Okhla</td>
<td>1994</td>
<td>32</td>
<td>30</td>
<td>55</td>
<td>2010</td>
</tr>
<tr>
<td>2</td>
<td>Ghazipur</td>
<td>1984</td>
<td>70</td>
<td>20</td>
<td>50</td>
<td>2002</td>
</tr>
<tr>
<td>3</td>
<td>Bhalswa</td>
<td>1993</td>
<td>50</td>
<td>35</td>
<td>50</td>
<td>2008</td>
</tr>
<tr>
<td>4</td>
<td>Narela-Bawana</td>
<td>2011</td>
<td>100</td>
<td>---</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

SOURCES OF GENERATION OF SOLID WASTE

Following are the major sources of generation of solid waste:

- **Waste from residential areas** like food wastes, plastics, paper, glass, leather, cardboard, metals, yard wastes, ashes and special wastes like bulky household items such as electronics, tires, batteries, old mattresses and used oil.

- **Waste from Industries**: Industrial wastes are usually a combination of compounds which may be hazardous; for example, used pickling solution from a metal processor can also contain residual acids and metal salts. Other hazardous wastes include solvents, paints, cleaners, stains, varnishes, pesticides, motor oil, and car batteries.

- **Waste from Commercial building such as hotels, markets etc** include plastics, food wastes, metals, paper, glass, wood, cardboard materials, special wastes and other hazardous wastes.

- **Waste from Institutional centers**: These include glass, rubber waste, plastics, food wastes, wood, paper, metals, cardboard materials, electronics as well as various hazardous wastes.

- **Construction and Demolition areas**: Solid wastes produced in these places include steel materials, concrete, wood, plastics, rubber, copper wires, dirt and glass etc.

- **Radioactive waste** is usually a by-product of nuclear power generation and other applications of nuclear fission or nuclear technology,²,³ such as research and medicine.

- **Municipal services**: Some of the solid waste brought about by the municipal services include wastes from recreational areas, street cleaning, wastes from parks and beaches, wastewater treatment plants etc.

- **Agriculture wastes**: These include spoiled food, pesticide containers and other hazardous materials.

- **Biomedical wastes**: These solid wastes include syringes, bandages, used gloves, drugs, nanodrugs,⁴,⁵ paper, plastics, food wastes and chemicals.⁶

- **E-waste**: Discarded computers, televisions, VCRs, stereos, copiers, fax machines, electric lamps, cell phones, audio equipment and batteries if improperly disposed all comes under E-waste.⁷

EFFECTS OF POOR SOLID WASTE MANAGEMENT

Due to improper waste disposal systems by municipal waste management teams, individual and business establishments⁸ etc. wastes are dumped and disposed improperly thus causing hazards. People clean their homes, places of work; shops etc. and litter their surroundings which affect the environment and the community. This is clearly visible with heaps of garbage lying in open spaces all around. Solid wastes if not managed properly have huge ecological, environmental and health impact on population leaving in and around the dumped wastes.⁷ When released to the environment, the solid wastes can cause biological and physicochemical problems to the environment and may affect or alter the productivity of the soils in that particular area.⁸ Toxic material and chemicals may seep into the soil and pollute the ground water. When hazardous wastes like pesticides, batteries containing lead, mercury or zinc, cleaning solvents, radioactive materials, e-waste and plastics are mixed up with paper and other scraps are burned they produce dioxins and gasses. These toxic gases have a potential of causing various diseases including cancer.

METHODS OF SOLID WASTE MANAGEMENT

Municipal solid waste management includes number of sequential steps like segregation, storage, collection, relocation, carriage, processing and disposal. Each step is crucial and acts as a pre-cursor for the next step. Thus each process is significant in overall management of solid waste. Some of the common waste management practices include Sanitary Landfill, modern landfilling, Incineration, Recovery and Recycling, Composting and Pyrolysis.
CURRENT SITUATION & CHALLENGES IN SOLID WASTE MANAGEMENT:

As per recent survey conducted by Delhi Government Environment department along with NGO Chintan and German NGO GIZ, about 78% of Delhi residents dump garbage on roadside or open plots in their neighborhood. The survey also pointed out that almost 17% of North Delhi population has no access to community dump or dhalao. Of about total garbage of approx. 10000 MT, 50% is fit for composting and 30% recyclable and only about 20% should reach landfills. Knowledge and education about the kind of waste which are bio degradable & recyclable is also very poor. About 76% believe that glass & metal are recyclable. More than 90% household have no daily access to garbage collection and 44% pay for door step collection. The growing population, housing, commercial & other activities are complicating the situation with more waste generation and less collection.

WAY FORWARD FOR SUSTAINABLE SOLID WASTE MANAGEMENT:

The paper focuses on participatory waste management as a key to achieve the goal of Swachh Bharat. The key stake holders are:

1. Citizens and households
2. Industrial & commercial establishments.
3. Waste collectors from individual houses & carrying them to Dhalao.
4. Municipal trucks carrying garbage from Dhalao to disposal.

For proper management of the solid waste disposal process all need to work in tandem to get the desired benefits of the whole process. Decentralized waste management starting at the generation point can provide better approach to the present system of centralized one.

This decentralized approach is a key to participatory waste management practices. Each individual has to start with waste segregation process as compostable, recyclable and hazardous. The compost forming waste can be used to make compost manure in residential colonies, Institutions & other common area generating such wastes. Similarly segregated recyclable waste can be collected from such common locations and taken for treatment rather than being carried to Dhalao and mixed with other wastes. Small collecting and disposal bins can be located at sites to collect recyclable and hazardous waste too. Such steps will lead to significant reduction in daily waste transfer from waste generation point to landfill sites leading to less traffic for garbage trucks, fossil fuel consumption, and landfill site requirement and associated hazards and in turn having huge impact on overall environmental conditions of the city.

Authors also showed their concern over all these steps and suggest how the solid waste management is the responsibility of every citizen along with urban government. Following are the suggestions made by the authors:

A. The 53% of the city waste can be minimized at home by the following ways:
   1. Recycling of the wastes
   2. Best out of waste (eg; Reuse of the empty containers)
   3. Say no to plastic bag
   4. Proper meal plan (It will lead to avoid excess food)
   5. Composting
   6. Minimize the use of disposable plates
   7. Avoid the use of plastic bottles
   8. Try to buy in bulk so that the amount of packaging can be reduced.

B. Proper training of the Safai Karamcharis
   This includes educating the sweepers about the type of solid waste and their proper disposal. The waste should be collected separately in different bins. They should also be kept aware about the health problems related to improper solid waste management.

C. Proper segregation of wastes into biodegradable and no biodegradable should be done.

D. Dhalao: There should be two types of Dhalao, one for biodegradable and one for non-biodegradable wastes so that lands fill can be minimized.

E. Wastes from the educational institutions (such as science laboratories e.g.: Chemistry, Botany, Zoology) which also contribute in solid wastes should be examined and managed properly.

F. Every citizen should always keep in mind the four R’s of Solid waste management: Reduce, Reuse, Recycle and Rethink.

G. Every society should have its own waste treatment plant.

Key Point: There is no space for fresh garbage & waste dump in existing landfill sites, also new sites can’t be developed due to scarcity of land. Out of present >10000 MT of waste generated, only fraction reaches to landfill and rest are dumped all around in the city area. Landfills create a threat to human health and environment from the hazardous contaminated air.
emissions, continuous smoke emission due to fire and soil contamination due to leaching. Key take is awareness and individual action to implement the philosophy of Reduce, Reuse & Recycle. Segregation and treatment of waste at source as much as possible in order to reduce the amount of waste requiring disposal is the need of the hour because a city cannot be clean if it is not able to manage its waste. Clearly, a Swachh Bharat (or Clean India) is possible only when waste management and related issues are dealt in a holistic manner. With this overall aim, this paper seeks to sort out waste management methods that ensures disposal, segregation and recycle.9,19

SUMMARY

Solid Waste Management is the need of the hour which should be seriously taken care of by government and municipalities to provide SWM service properly to the public. Stringent laws should be passed in this regard for proper disposal and treatment of waste. No new plan of any residential, commercial site should be passed until and unless it has proper place for disposal and treatment of its waste.

In summary, proper solid waste management is necessary to conserve our environment and that should be the responsibility off each and every individual along with urban government. This will keep the environment clean and reduce health and settlement problems and then only we can say that SWACH BHARAT ABHIYAN is a successful mission.

REFERENCES


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Dr. Suruchi is presently working as Assistant Professor at Ramjas College of Prestigious Delhi University. She has a vast teaching experience for Undergraduate students of more than 15 years. She has done her graduation, post-graduation and doctorate from Delhi University and is author of numerous papers in national and international journals. She has also authored books on phase rule and has also reviewed books of other authors. She has attended various conferences, workshops and presented papers and posters. She has organized national workshops and conferences in college as convener and has also held various positions in college committees. Presently her keen area of interest is environmental pollution and renewable on which she has presented papers in National and International conferences.

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