

# Solid Waste Management: The Way Forward

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The main objective of an efficient Solid Waste Management (SWM) system is to maximise resource recovery and energy generation from waste in the processing facility and minimise waste disposal in landfills, which weighs heavily on our ever-shrinking land resources and also is a potential source of air, soil, and water contamination. The responsibility of the waste generator lies essentially in proper segregation of the waste which is the core requirement of effective solid waste management.

**S**olid Waste Management is a major problem in India, where urbanisation, industrialisation, and economic growth have resulted in increased municipal solid waste (MSW) generation. The burgeoning population and the improvement in living standards of the people have only compounded this problem. Ministry of Environment, Forests & Climate Change (MoEF&CC) notified MSW (Management and Handling) Rules, 2000 and the revamped Solid Waste Management Rules in 2016 to ensure proper solid waste management in India. Various initiatives are being taken in different parts of the country, however, a lot still remains to be done to comprehensively address the issue related to Solid Waste Management.

This article reflects upon the legal framework, key components, status, initiatives taken, challenges faced, and the way forward for effective solid waste management in the country.

## Legal Framework

Solid Waste Management Rules, 2016 delineate the responsibility of the different stakeholders including

the MoEF&CC, Ministry of Housing and Urban Affairs, (MoHUA), Central Pollution Control Board (CPCB), State Pollution Control Boards (SPCBs), State Urban Departments, Urban Local bodies, Gram Panchayats, as well as the waste generators. Whereas MoHUA, State Urban Departments and Local Bodies have mainly been entrusted with the responsibility of development of infrastructure related to waste management, MoEF&CC, CPCB, SPCB, and Pollution Control Committee (PCC) have been entrusted with the responsibility of monitoring the enforcement of the Rules. The responsibility of the waste generator lies essentially in proper segregation of the waste which is the core requirement of effective solid waste management. The Rules demarcate the requirements of the key components of the solid waste management system besides fixing the timeline for achieving the same.

## SWM- Key Components

The key components of SWM system include the following:

**Stage 1:** Segregation of waste by waste generator into dry and wet waste;

**Stage 2:** Door-to-door collection of waste and transportation of segregated waste;

**Stage 3:** Setting up of material recovery facilities for dry waste to recover recyclables like plastic, paper, metal, glass, etc.;

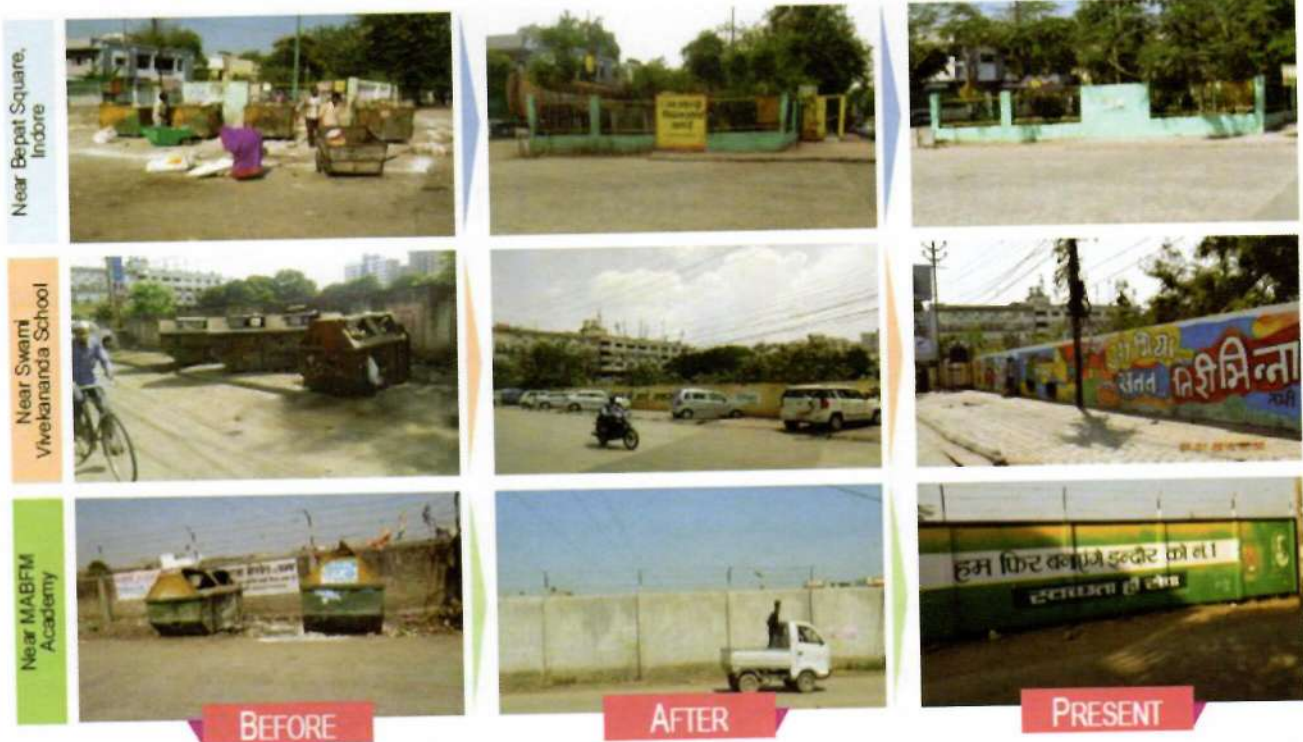
**Stage 4:** Setting up of waste processing facilities, viz., compost, bimethanation and waste-to-energy plants for resource recovery and energy generation; and

**Stage 5:** Setting up of waste disposal facilities – Landfills.

The main objective of an efficient SWM system is to maximise resource recovery and energy generation from waste in the processing facility (Stage 4) and minimise waste disposal in landfills, which weighs heavily on our ever-shrinking land resources and also is a potential source of air, soil, and water contamination. The primary requirement of all waste processing facilities (Stage 4) is segregation of waste into wet and dry waste. If the waste is not being collected, segregated, and transported properly, recycling of waste is not feasible and the waste ends up at landfills (Stage 5). Also, the waste processing plants are

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Depiction of Bin-free Waste Management Initiative in Indore, Madhya Pradesh

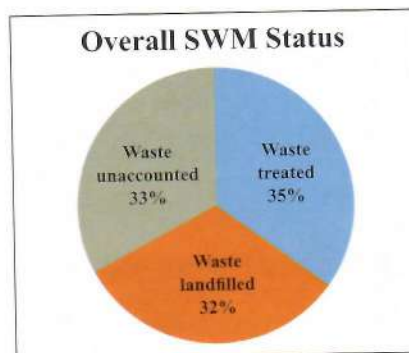
not able to function at optimum level if they have to process mixed waste including C&D (Construction & Demolition) waste. The segregation, collection, and transportation scheme is to be further synchronised to meet the requirement of the waste processing facilities catering to the area (See Table).

#### Status of Solid Waste Management

The overall solid waste generated in the country has been estimated to be 1,52,076 Tons per day (TPD) as per the Annual Report 2018-19 submitted by the SPCBs/PCCs. Of this, 1,49,748 TPD of waste is collected which is 98.5% of the total waste generated. However, only 55,759 TPD (35%) of waste is treated, and 50,161 TPD (33%) of waste is landfilled and 46,156 TPD of waste which is one-third of the total waste generated in the country remains unaccounted.

An overview of SWM status in the country is given as:

- Source segregation initiated in 24 States/UTs;



- Operational in 22 States/UTs;
- 25 States/UTs procured land for waste SWM facilities;
- Waste processing facilities set up – 2028; Waste processing operational – 160; and
- Landfill sites identified – 1161/ Operational – 37.

The unaccounted waste is littered on streets or lands up in dumpsites. There are presently 3,159 dumpsites in the country which are a major source of groundwater contamination and air pollution.

Also, they have issues related to fires, stability, and depreciated aesthetics. Recently, with National Green Tribunal's (NGT) intervention, biomining (a method for stabilisation of waste so as to minimise its adverse environmental impact) of these dumpsites, has been initiated in 11 States.

#### SWM Initiatives

##### (i) Initiatives taken by CPCB

CPCB has prepared the following guidelines which are uploaded on its website:

- Guidelines on Legacy Waste;
- Guidelines on Buffer Zone;
- Guidelines for Management of Sanitary Waste; and
- Selection Criteria for Waste Processing Technologies.

Further, CPCB has issued directions to concerned authorities for SWM Rules compliance and imposed environmental compensation on defaulting Authorities.



Table

Collection of waste	Through door-to-door collection by Urban Local Bodies (ULBs)	Source segregation mandatory for waste processing
Waste treatment	Composting	Take off of compost
		Odour issues and leachate generation potential
	Biomethanation	End product take off; Homogenous waste required
Landfill	Incineration	Emissions: Acid gases, dioxins, and furans
		Inadequate capacity; O&M issues; Land issues

**(ii) Initiatives taken by States/ Union Territories**

Some of the States and UTs such as Chhattisgarh, Madhya Pradesh, Daman & Diu, and Goa have achieved maximum compliance with respect to provisions of SWM Rules, whereas a lot needs to be done in case of the remaining States/UTs. Initiatives taken by Chhattisgarh State are as follows:

- Door-to-door collection, waste segregation, and transportation in covered vehicles completed in all ULBs;
- Land for waste processing facilities identified in all 168 ULBs;
- No sanitary landfills planned- 166 ULBs have Solid and Liquid Resource Management (SLRM) centres and 2 ULBs have Compost/Refuse-derived fuel (RDF) facilities;
- SLRMs planned for Gram Panchayats;
- Bioremediation/capping completed in 160 ULBs/Remaining 8 to be covered by 2021; and
- Municipal bye-laws for levying spot fine for littering framed.

**(iii) Setting up of Waste-to-Energy Plants:** Four waste-to-energy plants have been set-up in the country of which three plants are in Delhi. Electricity generated by these plants is purchased by the power

regulators and is fed to the national grid. Several other such plants are in the pipeline in different parts of the country.

**(iv) Development of Model Cities:** Model cities which include Pune (Maharashtra), Indore (Madhya Pradesh), and Ambikapur (Chhattisgarh) have been developed which have implemented efficient methods for collection, segregation, and waste processing facilities. They have also implemented efficient

methods for remediation of dumpsites and reclaimed land from the same.

**(v) Increased Judicial Intervention**

After the enactment of the NGT Act 2010, in past few years we have seen increasing judicial intervention in ensuring compliance with the provisions of SWM Rules by the various stakeholders, specifically the State authorities. Some of the major Orders issued by the NGT include:

(a) Vide order dated 22-12-16 in OA 199/2014, Almitra H. Patel and Anr. Vs. Union of India and Ors., NGT directed as follows:

- Every State and Union Territory shall enforce and implement the Solid Waste Management Rules, 2016 in all respects and without any further delay.
- All the State Governments and Union Territories shall prepare an action plan in terms of the Rules of 2016 and the directions in this judgment, within four weeks from the date of pronouncement of the judgment.



Sangam



IT Park



Star Square



Lalbag

Ultra-modern Mechanised Transfer Stations in Indore



- It shall be mandatory to segregate prior to incineration relatable to the quantum of the waste.
- It shall be mandatory to provide for a buffer zone around plants and landfill sites.
- It will be obligatory on the part of the State, local authorities to create a market for consumption of RDF.
- The landfill sites shall be subjected to bio stabilisation within six months from the date of pronouncement of the order.
- There shall be complete prohibition on open burning of waste on lands, including at landfill sites.

(b) NGT vide order dated 5.3.19 in OA 606/2018 directed Chief Secretaries of all States/Union Territory for the following:

- Steps for compliance of Rules 22 and 24 of SWM be now taken within six weeks to the extent not yet taken. Similar 23 steps be taken with regard to Bio-Medical Waste Management Rules and Plastic Waste Management Rules.
- At least three major cities and as many major towns as possible in the State and at least three Panchayats in every District may be notified on the website within two weeks from today (22-12-16)... as model cities/towns/villages which will be made fully compliant within next six months (from 22-12-16).
- The remaining cities, towns and Village Panchayats of the State may be made fully compliant in respect of environmental norms within one year.
- A quarterly report be furnished by the Chief Secretary, every three months. First such report shall be furnished by July 10, 2019.
- The Chief Secretary may personally monitor the progress,

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at least once in a month, with all the District Magistrates.

- The District Magistrates or other officers may be imparted requisite training.
- The District Magistrates may monitor the status of compliance of environmental norms, at least once in two weeks.
- Performance audit of functioning of all regulatory bodies may be conducted and remedial measures be taken, within six months.

(c) Vide Order dated July 17.7.19 in OA No. 519/2019 with Original Application No. 386/2019, Hon'ble NGT has ordered Biomining of all three dumpsites in Delhi namely Ghazipur, Bhalsawa, and Okhla.

#### Challenges

The various challenges faced in implementation of SWM Rules include the following:

- Segregation of waste at source by waste generators;
- Lack of infrastructure for collection and transportation of waste;
- Availability of land for setting up of waste collection and transportation facilities;
- Budgetary provisions for (ii & iii) above;

- Techno-economically viable solutions for fresh & legacy Waste;
- Management of legacy waste;
- Rural areas not covered in most of the States/UTs; and
- Enforcement issues.

#### Way Forward

As availability of land, lack of infrastructure, and availability of financial resources serve as a major impediment for SWM, focus of the SWM is to maximise resource recovery from waste so as to facilitate availability of these resources for efficient SWM. The major steps in this direction would include:

- Creating public awareness for involvement of different stakeholders for SWM;
- Development of ULB-wise action plan for collection, segregation, transportation and processing of waste. Inputs from model cities like Indore, Ambikapur, and Pune may be taken for development and implementation of these plans;
- Emphasising on setting up of waste processing facilities rather than waste disposal facilities as in the case of Chhattisgarh;
- Giving fillip to research & development activities with focus on resource recovery from waste;
- Capacity building in various regimes of SWM;
- Laying down of an appropriate governance framework at State and district levels;
- Clear allocation of responsibility to ULBs and waste generators for setting up of infrastructure and for involving informal sector in waste collection/segregation; and
- Adequate technical support to ULBs for processing technology and best practices in waste management. □