Solid Waste Management

(A Handbook)

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J&K POLLUTION CONTROL COMMITTEE

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सत्यमेव जयते

Message

"Municipal Solid Waste" (MSW) is a term usually applied to a heterogeneous collection of waste produced in urban areas, the nature of which varies from region to region. The characteristics and quality of the solid waste generated in a region is not only a function of the living standard and lifestyle of the region's inhabitants, but also of the abundance and type of the region's natural resources. The collection, transport, treatment and disposal of solid wastes, particularly wastes generated in medium and large urban centres is still an unresolved issue in totality even after series of Rules, Guidelines and strict directions from Hon'ble NGT, right from the 1990 PIL filed in supreme court, titled as "Almitra H. Patel & Anr. vs union of India & ors. regarding to Solid waste Management.

Improving Solid Waste Management (SWM) in India is imperative. Improper SWM presents imminent danger to public health, environment and the quality of life. Materials and energy recovery from wastes is an important aspect of improving SWM. It not only adds value to SWM projects and makes them economically feasible but is also more sustainable. Diverting MSW from landfills and especially from unsanitary landfills to any extent will contribute to the cause. Concerned authorities need to choose those options or a combination of them, which will best address the issue of overall solid waste Management, have the least or no impact on public health and environment, consume minimal resources and economically feasible.

I appreciate the efforts of J&K Pollution Control Committee and concerned editorial team for their tenacity of purpose in bringing out this handbook on Municipal Solid Waste Management in Jammu & Kashmir, related issues, Rules & Hon'ble NGT directions to ensure compliance & best practices adopted for SWM in various cities & towns.

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सत्यमेव जयते

Foreword

Human activities create waste and the unscientific ways and means of the handling of waste, storage, collection and disposal can pose risks to the environment and to public health. Solid Waste Management (SWM) is so essential to the health, environment and quality of life of the people that Urban Local Bodies cannot afford to ignore it. Unscientific waste collection practices and improper solid waste disposal contributes to local explosion of disease, regional sources of pollution and Green House Gases (GHGs).

Climate Change and effect of Green House Gas emissions have made Solid Waste Management one of the most pressing environmental challenges globally as well as locally. It is well understood that inappropriate SWM practices such as improper incineration and uncontrolled disposal of waste are major contribution to greenhouse gas emission; the anaerobic degradation of waste in landfills produces methane, a gas that is 21 times more potent than carbon dioxide.

The Local authorities should practice Scientific and Decentralized Waste Management in PPP mode to promote source segregation, achieve higher percentages of recycling and produce high quality compost from biodegradable waste. Concerned implementing agencies, viz., Urban Local Bodies and Village Panchayats should take a proactive role in leveraging their power to optimize resources.

This handbook on Solid Waste Management in J&K highlights present status of waste management in J&K and the prospects of introducing improved means of disposing solid waste. Efficient delivery of public service and infrastructure are pressing issues for municipalities in most of the areas and scientific disposal of solid waste has to be taken up at top priority in view of the existing scenario.

I am sure that this handbook shall act as torch bearer for concerned stakeholders to replicate best practices in their respective jurisdictions and shall aid in the compliances to be made within stipulated time period as per Hon'ble National Green Tribunal (NGT) directions issued in this regard from time to time.

K. Ramesh Kumar, IFS

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SOLID WASTE MANAGEMENT IN JAMMU AND KASHMIR

CHAPTER - I

INTRODUCTION

Solid waste management is one of the most important aspects of environmental management. The excessive proliferation of solid waste can have serious adverse effects on both public health and the environment. Improper disposal of waste can lead to the emission of dangerous gases like methane (from uncovered landfills) and carbon dioxide (from the burning of large amounts of trash) which contribute significantly to climate change. Toxins from such waste can also leach into soil and water thereby affecting local wildlife. Solid waste can also cause a number of health issues such as infectious diseases, asthma, cancer and cardiovascular disease through the contamination of the surrounding air, soil and water. The populations most vulnerable to these issues are children, communities living near waste dumps, communities whose water supply has been contaminated by waste dumping or leakage from improperly managed landfills, waste workers and workers in facilities producing toxic and infectious material.

Examples of the danger of solid waste:

- If organic domestic waste ferments for a long time in the open, it can lead to the growth of pathogens which lead to infectious and chronic diseases.
- Exposure to medical waste such as used syringes and cotton swabs can lead to the spread of infectious diseases.
- Exposure to hazardous waste containing toxic chemicals such as mercury, asbestos and lead can cause chemical poisoning and burns.
- Improper waste disposal can cause problems such as respiratory diseases (through exposure to carbon dioxide from burning trash) and toxic exposure to metals and chemicals (through lack of proper precautions in the recycling process).
- Exposure to plastic waste can cause serious problems such as cardiovascular disease, cancer, birth defects, developmental problems in children, impaired immunity, etc. since it contains harmful chemicals.

Therefore, the proper management of solid waste is essential for the protection of public health and the environment. However, currently solid waste management is being poorly implemented in India. Large quantities of solid waste are being produced in the country but are not properly treated or processed and are disposed of in unsanitary dumps or left as litter in public spaces.

Municipal Solid Waste Management in India

The proper management of municipal solid waste has long been considered to be an important concern. The poor condition of solid waste management in the country was first highlighted in 1994 as a result of the outbreak of an epidemic in Surat. As a result, a High Powered Committee (known as the Bajaj Committee) was constituted by the Government of India in 1995. The Committee's report made a number of recommendations such as at-source segregation of waste, primary collection of waste, use of proper collection, transportation and processing equipment, emphasis on composting and sanitary landfilling, encouragement to public-private partnerships in waste management, etc.

In spite of these recommendations, the situation of municipal solid waste management in the country did not improve. As a result, a Public Interest Litigation (PIL), Almitra H. Patel & Anr. V. Union of India &Ors, was filed in the Supreme Court in 1996. The PIL sought directions from the Supreme Court to the Government of India, State Governments and Urban Local Bodies for the improvement of solid waste management practices in the country. In 1998, the Supreme Court constituted a Committee under the Chairmanship of Mr. Asim Burman (known as the Burman Committee) to examine the status of solid waste management in Class I cities. The Committee submitted its report titled Solid Waste Management in Class I Cities in 1999. The Committee's report made a number of recommendations on improving solid waste management in these cities and is considered an important document on improving solid waste management practices in the country.

OA 606/2018

The issues of solid waste management is being monitored by Hon'ble NGT as per orders of the Hon'ble Supreme Court order dated 02.09.2014 in Writ Petition No. 888/1996, Almitra H. Patel vs. Union of India & Ors., with regard to solid waste management.

While transferring the issue of solid waste management vide Order dated 02.09.2014 in Writ Petition No. 888/1996, Almitra H. Patel Vs. Union of India & Ors., the Hon'ble Supreme Court observed that

"handling of solid municipal waste is a perennial challenge and would require constant efforts and monitoring with a view to making the municipal authorities concerned accountable, taking note of dereliction, if any, issuing suitable directions consistent with the said Rules and direction incidental to the purpose underlying the Rules such as upgradation of technology wherever possible. All these matters can, in our opinion, be best left to be handled by the National Green Tribunal established under the National Green Tribunal Act, 2010. The Tribunal, it is common ground, is not only equipped with the necessary expertise to examine and deal with the environment related issues but is also competent to issue in appropriate cases directions considered necessary for enforcing the statutory provisions."

In the light of above, the Tribunal has considered the matter for the last eight years as far as solid waste management is concerned. Main orders on the subject include orders dated 22.12.2016, 31.08.2018, 16.01.2019, 12.09.2019, 07.01.2020, 28.02.2020, 02.07.2020, 14.12.2020, 30.11.2021, 14.12.2020 and 31.05.2022.

India currently produces more than 1.5 lakh tonnes per day of solid waste but only a fraction of this is treated or landfilled. In 2019-2020, 150761 TPD of solid waste was generated but only 74.17% of this waste was treated or landfilled and the remaining 25.83%, amounting to 38928 TPD, was unaccounted. In 2020-2021, 160038.9 TPD of solid wastewas generated. However, only 50% of this waste was treated and another 18.4% was landfilled. As much as 50655.4 TPD(31.7% of the total waste) was left unaccounted.

Municipal Solid Waste Management in J&K

In J&K, a State Advisory Board was constituted in 2017. In the same year, the Jammu & Kashmir State Integrated Solid Waste Management Strategy, 2017 was formulated by the Housing and Urban Development Department, Government of J&K. In 2019, in compliance with the direction of the Hon'ble NGT in O.A. 606/ 2018, a Solid Waste Management Action Plan was notified and a District Environment Committee and District Level Task Force Committee were established.

In Jammu and Kashmir, 1518.91 TPD of solid waste was generated in 2019-2020. However, only 35.6% was treated and none was landfilled leaving 978.72 TPD (64.4%) unaccounted. In 2020-2021,1463.23 TPD of solid waste was generated of which 63.1% was treated or landfilled and the remaining 512.73 TPD (36.9%) was unaccounted. Thus, a significant quantity of solid waste remains untreated in large dump sites or as litter in public spaces in J&K.This endangers public health and the environment in the UT.

CHAPTER - II

THE REGULATORY FRAMEWORK

The management of municipal solid waste in India is regulated by the Municipal Solid Waste Management Rules, 2016. These rules extend to all urban local bodies and all outgrowths in urban agglomerations, census towns, notified areas, notified industrial townships, areas under the control of Indian Railways, airports, airbases, ports and harbours, defence establishments, special economic zones, State and Central government organisations and such places of pilgrimage or of religious and historical importance as may be notified by respective State government from time to time. They also extend to every domestic, institutional, commercial and any other non-residential solid waste generator situated in these areas. However, these rules do not extend to industrial waste, hazardous waste, hazardous chemicals, bio medical wastes, e-waste, lead acid batteries and radio-active waste since these are covered under separate rules framed under the Environment (Protection) Act, 1986.

The 2016 Rules provide clear definitions of different types of waste including biodegradable waste, combustible waste, domestic hazardous waste, non-biodegradable waste and sanitary waste. They also clearly lay down the duties of-

- Waste generators;
- Central ministries such as the Ministry of Environment, Forests and Climate Change, the Ministry of Urban Development, the Ministry of Agriculture, etc.;
- Government officials such as the Secretary in-charge, Urban Development in States and UTs, District Magistrates/ District Collectors/ Deputy Commissioners/ etc.;
- Central Pollution Control Board and State Pollution Control Boards/ Pollution Control Committees; and,
- Local Authorities and Village Panchayats.

These rules also lay down standards and criteria for management of different types of wastes.

Other Applicable Acts and Rules include:

- The Construction and Demolition Waste Management Rules, 2016
- Plastic Waste Management Rules, 2016
- The Bio-Medical Waste Management Rules, 2016
- The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- The e-Waste (Management) Rules, 2016.
- The Batteries (Management & Handling) Rules, 2001(as amended vide S.O. 1002(E).
- The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.
- J&K Non-biodegradable Material (Management, Handling and Disposal) Rules, 2009.

In addition to complying with these rules, MSW management facilities including processing, treatment and disposal facilities require the following statutory clearances-

Environmental Clearances: Water (Prevention and Control of Pollution) Act, 1974;

Water (Prevention and Control of Pollution) Cess Act,1977; Air (Prevention and

Control of Pollution) Act, 1981; Environment (Protection) Act, 1986, and Rules;

Environmental Impact Assessment Notification, 2006

Clearance from the State Pollution Control Board/ Pollution Control Committee

Clearance from the Airport Authority

Fertilizer Control Order Clearance for compost based plants

Land use from the Revenue Authority

State Electricity Authority Clearance for providing grid connectivity

Public Liability Insurance Act, 1991 and Rules, 1991

Industries (Development and Regulation) Act, 1951

Factories Act, 1948

Motor Vehicles Act, 1938, amended in 1988 and Rules, 1989

Petroleum Act, 1934

Energy Conservation Act, 2001

CHAPTER - III

TYPES OF MUNICIPAL SOLID WASTE

1) **Biodegradable Waste :** Bio-degradable waste refers to any organic material that can be degraded by micro-organisms into simpler stable compounds including agricultural and dairy waste.

2) **Non- biodegradable Waste :** Non-biodegradable waste refers to any waste that cannot be degraded by micro-organisms into simpler stable compounds.

- **Recyclable Waste :** Recyclable waste refers to waste that can be recycled into new material orproduct or as raw material for producing new products which may or may not be similar to the original products.
- **Non-Recyclable Combustible Waste :** Combustible waste refers to non-biodegradable, non-recyclable, non-reusable, non-hazardous solid waste having minimum calorific value exceeding 1500 kcal/kg and excluding chlorinated materials like plastic, wood pulp, etc.
- **Non-Recyclable Inert Waste :** Inert wastes refer to wastes which are not bio-degradable, recyclable or combustible street sweeping or dust and silt removed from the surface drains
- **Sanitary Waste :** Sanitary waste refers to used diapers, sanitary towels or napkins, tampons, condoms, incontinence sheets and any other similar waste.

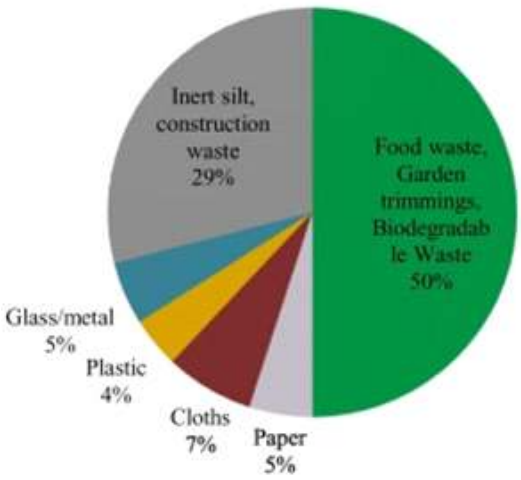
3) **Domestic Hazardous Waste :** Domestic hazardous waste includes discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines, broken mercury thermometers, used batteries, used needles and syringes and contaminated gauge, etc., generated at the household level.

4) **Construction and Demolition Waste :** Construction and demolition waste refers to waste comprising of building materials, debris and rubble resulting from construction, re-modeling, repair and demolition of any civil structure.

5) **Residual Solid Waste :** Residual solid waste refers to the waste and rejects from the solid waste processing facilities which are not suitable for recycling or further processing.

"Dry Waste" is also a term used to refer to all waste other than bio-degradable waste and inert street sweepings and includes recyclable and non-recyclable waste, combustible waste and sanitary waste.

Typical Indian cities



PRINCIPLES OF SOLID WASTE MANAGEMENT

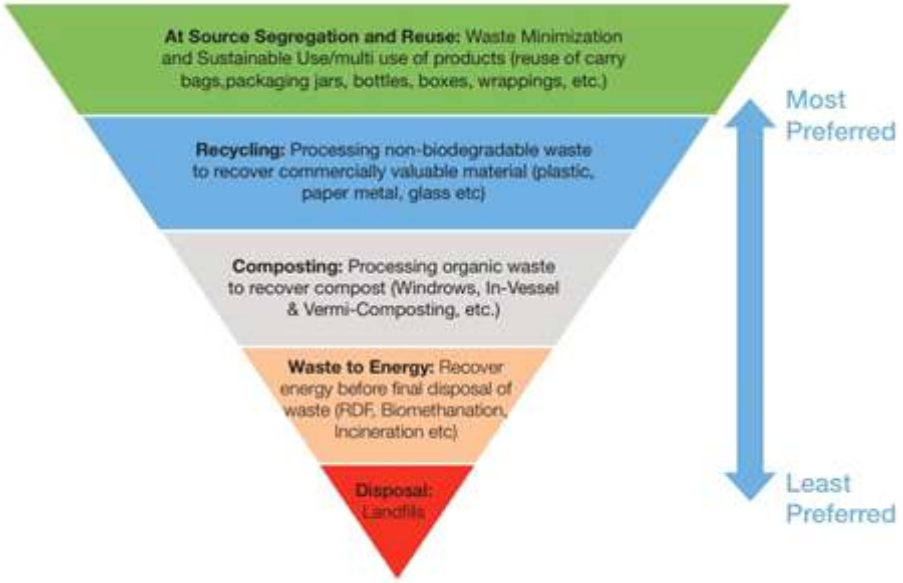
Integrated Solid Waste Management (ISWM)

The Integrated Solid Waste Management Approach has been developed with the aim of sustainable municipal solid waste management through waste reduction and maximisation of resource efficiency. It considers the generation, segregation, transfer, sorting, treatment, recovery and disposal of waste in an integrated manner. The ISWM approach employs a "hierarchical waste management strategy" that grades waste management processes from most preferred to least preferred based on their environment, energy and economic impacts.

This hierarchy, from most preferred to least preferred is as follows-

1) At Source Reduction and Reuse
2) Recycling
3) Composting
4) Waste to Energy
5) Landfills

Fig. 1: Waste Management Hierarchy



Extended Producer Responsibility

An important principle of the SWM Rules is Extended Producer Responsibility (EPR). EPR refers to the responsibility of any producer of packaging products such as plastic, tin, glass and corrugated boxes, etc., for environmentally sound management, till end-of-life of the packaging products. Strategies for implementing EPR can include separate collection (eg., e-waste), reuse (eg., plastic bottles), recycling (eg., used cars) and storage and treatment (eg., batteries).

Decentralised Waste Management Systems

Decentralised Waste Management Systems may be preferred over centralised ones where the climate, social and economic conditions require customisation of waste management systems to local waste generation.

Decentralised systems also reduce waste management costs and provide employment opportunities to informal workers and small businesses. However, limitations like lack of sufficient land in urban areas, uncertain quality of end products need to be taken into account. Preferred strategies for decentralised waste management include community level collection of recyclables, home composting systems and community level composting systems.

Integration of the Informal Sector

Various national and state level policies have recognised the important role of the informal sector in waste collection and processing. A move towards integrating informal sector workers into formal waste management systems is required. This will result in regularisation of the recycling sector and increased security and social acceptance for informal sector workers. Strategies for integration can include creation of Self-Help Groups and co-operatives and entrepreneurial capacity building.

CHAPTER - IV

PROCESS OF WASTE MANAGEMENT

Municipal Solid Waste Management has the following steps-

Step 1: At-Source Minimisation (Reduction and Reuse)

At-source minimisation is the most preferred strategy in the hierarchy of waste management and.Its aim is to reduce the quantity of waste generated thereby reducing the negative effects of solid waste such as greenhouse gas emissions, pollution, energy inefficiency and waste toxicity. At source minimisation is based on the 3R approach and prioritises the reduction and reuse of solid waste. Strategies to achieve this can be implemented at the national, state and local levels based on the nature of the strategy and the type of problem being addressed.

Common waste minimisation strategies include-

- Imposition of EPR for wastes such as batteries, packaging, electronics, etc. (eg., take-back programmes by manufacturers);
- Encouraging voluntary action by commercial enterprises to reduce packaging in their products;
- Framing bye-laws and rules for prohibiting the use or sale of non-reusable, non-recyclable or non-compostable packaging;
- Eco-labelling of products based on their potential for reuse or recycling;
- Public awareness and education programmes in schools, residential associations and commercial and industrial establishments;
- Community waste reduction programmes such as at-home composting systems and community composting systems;
- Green procurement programmes by governments and businesses;

- Consumer rewards programmes by businesses to encourage recycling;
- Material exchange and reuse programmes; and,
- Business assistance programmes for advising businesses on their waste management.

Step 2: Waste Segregation, Collection and Transportation

The second step in effective municipal solid waste management is the segregation, collection and transportation of waste Segregation first occurs at the source (source segregation) by the waste generators themselves where waste is sorted into its different types, i.e., biodegradable, non-biodegradable, hazardous and sanitary waste. Bio-degradable wastes are stored in green bins, recyclable wastes are stored in white bins and domestic hazardous wastes are stored in black bins. Sanitary waste should be wrapped securely and handed over to waste collectors separately.

This segregated waste is then collected by local bodies or their appointed contractors from doorsteps. The collection of waste happens in two ways- primary collection and secondary collection. In primary collection, waste is collected from residences, markets, institutions and commercial establishments and taken to either a storage depot, a transfer station or directly to the disposal site based on city size and current waste management systems.

Where, after primary collection, the waste is deposited in community bins, storage depots or transfer stations, secondary collection takes place. Here, solid waste is taken from community bins, storage depots or transfer stations to waste processing sites or the final disposal site.

Waste is kept segregated during primary and secondary collection as well. Segregated collection is important for maintaining hygienic conditions, cost-effective treatment of waste, deriving optimum advantage from recyclables and enhancing community aesthetics. The type and extent of segregation is dependent on the types of waste generated, available facilities and other factors such as existing informal and community waste management systems.

The transport of solid waste from site to site during collection should be done through vehicles that can keep the waste segregated and that is compatible with existing waste storage facilities.

Step 3: Processing and Treatment of Municipal Solid Waste

Once waste has been collected, the different types of waste will be transported to the appropriate waste processing sites. In case of long distances, the collected waste will be first transported to a transfer station and then sent to the appropriate waste processing sites. Where the waste is not segregated, it will be segregated before being sent to the waste processing sites. Different types of waste processing technologies can be used for biodegradable, non-biodegradable and hazardous wastes.

1) Material Recovery Facility (MRF)

A Material Recovery Facility is a waste processing site used to extract recyclable materials from municipal solid waste for resale. Recycling is beneficial in many ways for local bodies, for the environment and for the economy. It reduces the volume of solid waste that needs to be management and so lessens the strain on waste management systems. It encourages the sustainable use of resources and reduces the negative environmental impact of solid waste. The recycling industry also provides livelihood, especially to the informal sector, and helps in the production of affordable goods made from recycled materials.

In this process, the non-biodegradable or recyclable waste that has been collected from waste generators is brought to MRFs. It is then segregated into various waste streams such as paper, plastic, bottles, etc. This waste is then sold to intermediaries who further sell them to recycling plants. MRFs can be of three types- manual, semi-automatic and mechanised / automatic. This is based on the size of the operation and the level of mechanisation employed.



2) Composting

As per Schedule II (A) of the SWM Rules, 2016, waste processing facilities shall include composting as one of the technologies for processing of bio-degradable waste while adopting standard compliance procedures for composting laid under the Schedule.

Composting is a resource recovery strategy used for segregated organic solid waste. It is a controlled aerobic process that involves the microbial decomposition of organic matter. This decomposed organic matter is then recycled as a plant nutrient, i.e., compost. It can also help in soil remediation and soil recovery.

Composting can be done using various methods in a centralised or/and decentralised manner, based on feasibility considerations. Centralised composting can be done through technologies such as windrow composting, aerated static pile, vermicomposting and in-vessel composting. Decentralised composting technologies include home composting, bin composting, vermicomposting, box composting and in-vessel composting.

3) Incineration

As per Schedule II (C) of the SWM Rules, 2016, waste to be incinerated shall not be chemically treated with any chlorinated disinfectants and incineration plants shall be operated (combustion chambers) with such temperature retention time and turbulence, as to achieve total Organic Carbon (TOC) content in the slag and bottom ash less than 3%, or the loss on ignition is less than 5 % of the dry weight.

Incineration is a "waste-to-energy" technology that can be employed when resource recovery through recycling and composting is not possible. It refers to an engineered process in which solid waste is thermally

degraded through combustion at high temperatures thereby producingash, flue gas and heat. Incineration is generally used for segregated solid waste that has high calorific value or for minimally processed/ unprocessed waste.

The heat produced by incineration plants can be sold for utilisation in thermal applications. However, such plants are economically viable only when large quantities of waste are being produced on a regular basis and where there is sufficient demand for the energy produced.

If the incineration plant is run inefficiently and without proper safeguards, it can cause environmental hazards because of emissions and fly ash. The SWM Rules lay down standards for the use of incineration in waste management. Therefore, incineration plants should be used only when there is no other viable alternative and in strict accordance with the SWM Rules.

If the incineration plant is run inefficiently and without proper safeguards, it can cause environmental hazards because of emissions and fly ash. The SWM Rules lay down standards for the use of incineration in waste management. Therefore, incineration plants should be used only when there is no other viable alternative and in strict accordance with the SWM Rules.

4) Bio-methanation

Bio-methanation is a "waste-to-energy" technology in which methane rich biogas is produced through the enzymatic decomposition of organic matter by microbial action. Biodegradable organic waste is anaerobically digested in an enclosed space under controlled conditions resulting in the production of biogas. Due to the high organic and moisture content of municipal solid waste, bio-methanation is considered particularly suitable. However, like incineration, bio-methanation requires a steady inflow of sufficient degradable organic matter and a viable market for the biogas produced. Based on the quantity of waste and feasibility considerations, bio-methanation can be done in centralised or smaller decentralised plants.

5) Refuse Derived Fuel (RDF)

Refuse Derived Fuel refers to fuel derived from the combustible fraction of MSW. To produce RDF, solid waste like plastic, wood, pulp or organic waste other than chlorinated materials in the form of pellets or fluff produced through drying, shredding, dehydrating and compacting of solid waste. RDF can be used as a fuel for steam and electricity generation or as fuel for industrial use, especially in cement plants.

Step 4: Sanitary Landfilling

As per specifications laid under Schedule I of the SWM Rules, 2016, sanitary landfill site hall be planned, designed and developed with proper documentation of construction plan as well as closure plan in a phased manner and shall be set up as per the guidelines of the Ministry of Urban Development, GOI and CPCB.

Further, the landfill site shall be 100 meter away from river, 200 meter from a pond, 200 meter from Highways, habitations, public parks and water supply wells and 20 km away from Airports or Airbase (In a special case, landfill site may be set up within a distance of 10 and 20 km away from the airport / airbase after obtaining NOC from the civil aviation authority / Air Force).

Sanitary landfilling is the final stage of waste management where solid waste is safely stored on land in a specially designed facility which has protective measures against pollution of ground water, surface water and

fugitive air dust, wind-blown litter, bad odour, fire hazard, animal menace, bird menace, pests or rodents, greenhouse gas emissions, persistent organic pollutants slope instability and erosion. It can be used for non-biodegradable and inert waste, mixed waste that is unsuitable for processing, residual solid waste and non-hazardous waste not-being processed or recycled.

The SWM Rules strictly regulate all aspects of the establishment and operation of sanitary landfills in Schedule I.

The choice of the waste processing technology to be employed is based on the following criteria-

- Location of the facility
- Presence of a Buffer Zone/ No development Zone
- Natural environment
- Land requirement
- Waste quantity
- Requirement of segregation
- Quantity of rejects
- Potential for direct energy recovery
- Available technology
- Capital requirement
- Market for products/ by-products
- Requirement for skilled and unskilled staff
- Toxicity concerns
- Leachate pollution
- Atmospheric pollution

Street Cleaning and Drain Cleaning

Street cleaning is a fundamental service ensuring clean and hygienic urban conditions. Generally, households, commercial entities, and transport operators should be made responsible for garbage minimisation on the streets. Street wastes include paper, plastics, dirt, leaves, and other vegetative matters. Manual sweeping is commonly practiced in India, as many streets are congested and narrow. Inefficient waste collection systems coupled with public littering significantly contribute to waste piles on the streets. A wide variety of tools, equipment, and methods (both manual and mechanical) are available for street sweeping. Through the introduction of efficient methods of combining manual and mechanical sweeping, municipal authorities can achieve significant savings.

Cleaning of Surface drains

Open surface drains along the roadside need to be cleaned regularly to permit free flow of storm water or grey water. Municipal authorities should ensure through campaigning, statutory regulations, and monetary fines that citizens and sweepers do not dispose waste into drains.

The solid waste dumped in storm drains should be collected by drain cleaners up to a depth of 45–60 cm and disposed off, along with drain cleaning and street sweeping material, in a municipal sanitary landfill because of a high possibility of contamination.

Duties and responsibilities of local authorities as per SWM Rules, 2016

(Clause 15)

(k) direct street sweepers not to burn tree leaves collected from street sweeping and store them separately and handover to the waste collectors or agency authorised by local body;

(n) collect separately waste from sweeping of streets, lanes and by-lanes daily, or on alternate days or twice a week depending on the density of population, commercial activity and local situation;

(o) set up covered secondary storage facility for temporary storage of street sweepings and silt removed from surface drains in cases where direct collection of such waste into transport vehicles is not convenient. Waste so collected shall be collected and disposed of at regular intervals as decided by the local body.

Manual handling of wastes is prohibited. However, if unavoidable due to constraints, manual handling should be carried out under proper precautions with due care for health and safety of workers.

Construction and Demolition Waste

As per SWM Rules, 2016 requirements for Construction and Demolition Waste Management are briefed as under:

- **Duties of waste generators**

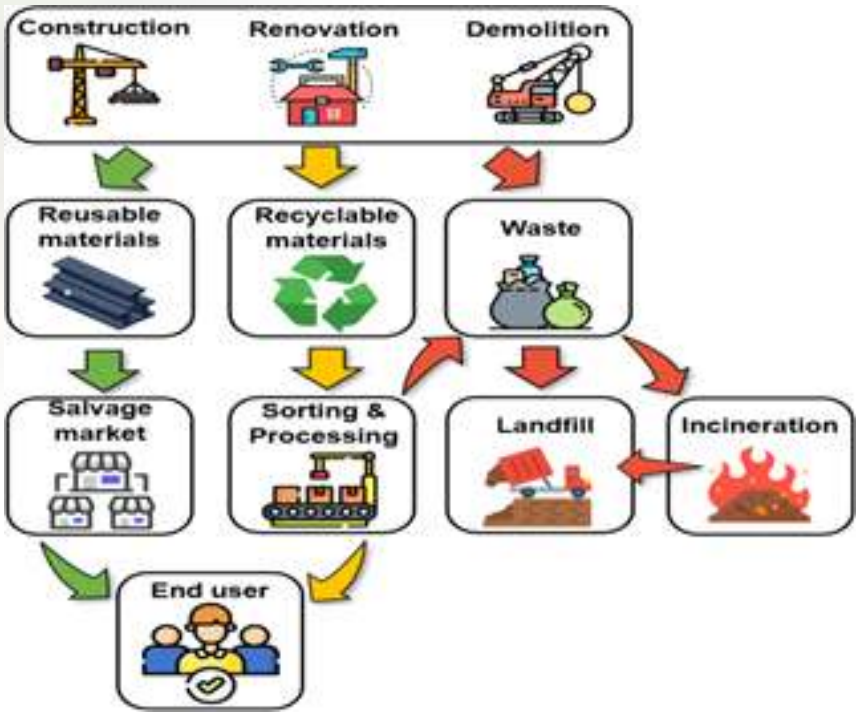
Clause 4 (c) : store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016;

- **Duties and responsibilities of local authorities**

Clause 15 (s) : transport construction and demolition waste as per the provisions of the Construction and Demolition Waste management Rules, 2016.

It is estimated that 25–30 million tonne of C&D waste is generated annually in India. It has been further

estimated that 40–60 kilogram per cubic meter (kg/m3) of C&D waste is generated during construction and minor repair or renovation. During demolition of proper concrete and masonry buildings (locally called pucca building), about 500 kg/m3 of C&D waste is generated whereas 300 kg/m3 is generated for structures with partial concreting and masonry. Presence of excavated soil and silt may change this 330 Manual on Municipal Solid Waste Management composition.



The waste generator, service provider, urban local body (ULB), and State Pollution Control Board (SPCB) and Pollution Control Committee (PCC) are the most important stakeholders for appropriate management of C&D waste. Construction and demolition waste rules, 2016 details out the duties of waste generator, service provider, ULBs, etc., and Schedule I explicitly describes the management of C&D waste.

Schedule I of the construction and demolition waste management rules, specifies the management of construction and demolition waste. It details out guidance on storage, collection, transportation, processing, and disposal and also the use of the recycled products. Reuse, processing, and recycling have been emphasized. Large generators have to be incentivized for setting up in-situ processing facility. For large facilities, say for million plus cities, processing should be done through appropriate technology which minimizes process residues for landfilling, e.g., "wet" process, which can retrieve sand grade material (4.75 mm to 75 μ) from soil and other fine inert material. Schedule II provides for further use of processed C&D products in operation of sanitary landfill. It must be clarified that while processed C&D waste shall be utilized in sanitary landfill for MSW of the city or region, residues from C&D waste processing or recycling industries shall be landfilled in the sanitary landfill for MSW.

CHAPTER - V

CURRENT STATUS OF SWM IN J&K

Approximately 1400-1600 TPD of Municipal Solid Waste is generated in J&K. In 2021-22, A total of 1549.79 TPD of solid waste was generated in J&K. However, waste treatment has not kept up with the quantity of waste being generated. In 2021-22, 1540.44 TPD of waste was collected and only 606.2 TPD was treated.

Total Waste Generation, Collection and Treatment in J&K (2021-2022)			
	Jammu (TPD)	Kashmir (TPD)	Total (TPD)
Waste Generated	674.1	875.69	1549.79
Waste Collected	674.1	866.34	1540.44
Waste Treated	75.7	530.5	606.2

JAMMU

In 2021-22, a total of 674.1 TPD of municipal solid waste was generated in Jammu with 100% collection as reported by concerned department of Urban local bodies and JMC while only 75.7 TPD was treated. Waste generation is less than 50 TPD in the majority of towns with the exception of JMC.

Municipal Authorities Responsible for SWM in Jammu Division	
Municipal Corporation	1
Municipal Councils	9
Municipal Committees	27
Cantonment Board	1

Generation, Collection and Treatment of Waste in Jammu Division (2018-2022)			
	Waste Generated (TPD)	Waste Collected (TPD)	Waste Treated (TPD)
2021-22	674.1	674.1	75.7
2020-21	656.6	645.07	34
2019-20	692.16	673.40	79.19
2018-19	702.2	648.4	4.95

Action Plan: An action plan has been finalised and submitted by JMC and Action Plan to be followed by all Urban Local Bodies in J&K has been submitted by Housing and Urban Development Department.

Waste Collection: 100% collection of waste has been achieved by 21 local bodies; while Partial collection of waste is being done in remaining local bodies including JMC.

The waste from slaughter houses, meat & fish markets, fruit & vegetable market, which are biodegradable in nature, are not collected separately.

Waste Segregation: Source waste segregation has been implemented *partially* by MC, Katra & Jammu Municipal Corporation only.

Secondary Waste Segregation started by Katra town as a pilot project with segregation of approx. 3.5 TPD of waste and channelization for further recycling till now, earning revenue of approx. Rs 13,000 in three months.

Waste Storage: ULBs have only established primary storage facilities such as RCC bins, plastic bins, dumpers/ containers, etc. Community bins are not being maintained and cleared on a regular basis and so attract stray animals and birds. Only a few secondary storage facilities with closed sheds have been established. However, these have no facility for storage.

Waste Transportation: Transportation is carried out by ULBs using heavy vehicles.

Waste Treatment: There is no processing facility in the region except small scale vermin-composting being carried out at MC, Bhaderwah , MC, Doda, MC Sunderbani and Jammu Municipal Corporation.

Waste Disposal: Solid waste is being disposed of in open dumpsites in an unscientific manner. Waste is buried with the help of JCBs by Jammu Municipal Corporation at open dumpsite, Kot Bhalwal.

Legacy Waste:

- JMC- Bio-remediation of one legacy waste site (Bhagwati Nagar, Jammu) having approx. 1,20,000 Tons of legacy waste has been completed.
- Bio-remediation for 2nd legacy waste site, at KotBhalwal site is under process of technical vetting.
- Other Urban Local Bodies: A total of sixdump sites have been considered for bio-remediation of legacy waste. These are in Municipal Committees of Katra, Bhaderwah, Doda and Municipal Councils of Kathua, Udhampur, Samba. A total of 1.55 MT of legacy waste has been identified. Tendering for bioremediation of legacy waste has been initiated by MC, Katra.

Development of Facilities

- 23 Solid Waste Management Facilities have been identified for establishment of solid waste management plants by the Department of Urban Local Bodies. Further, site identification process is in progress for left out local bodies, where problems are being faced due to hilly terrain.
- 132 sites have been identified for establishment of SLWM (Solid Liquid Waste Management) as per Rural Sanitation Department. Further, 115 sites have been identified for Cattle dung management (Gobardhan sites).
- 26 MRFs are proposed to commence by 31st of January, 2022 while site identification is under process for nine local bodies which are MCs, Ghou-manhasan, Bishnah, Nowshera, Thanamandi, Surankote, Basohli, Thathri, Chenani and Banihal. 10-15 No. of MRFs are expected to be operational by 31st March, 2023.

KASHMIR

Municipal Authorities Responsible for SWM in Kashmir Division	
Municipal Corporation	1
Municipal Councils	10
Municipal Committees	30
Cantonment Board	1

Generation, Collection and Treatment of Waste in Kashmir Division (2018-2022)				
	Waste Generated (TPD)	Waste Collected (TPD)	Waste Treated (TPD)	Waste Landfilled (TPD)
2021-22	875.69	866.34	530.5	390
2020-21	806.63	792.21	513.5	376
2019-20	826.75	791.25	461	350
2018-19	828.33	804.46	454.5	350

Waste Collection: Srinagar Municipal Corporation (SMC) has achieved door-to-door collection of solid waste for 80% of the households in Srinagar. 90% of Non-Residential premises are covered including commercial establishments, hotels, restaurants, educational institutions/offices etc. However, in the suburbs and interior areas of Srinagar city improvement/ enhancement for secondary storage is required as most of the waste is dumped on road sides. Out of the total number of urban local bodies, all except 12 Municipal Councils/ Municipal Committees are conducting door-to-door collection.

Waste Segregation: There is no source waste segregation of solid waste being conducted by ULBs in Kashmir. Segregation is only being carried out by SMC. There is no separate provision for dairy waste. However, construction and demolition waste is separately collection and disposed of.

Waste Storage: In most areas, waste is being dumped on open roads. Only a few localities within Srinagar are storing waste in covered storage containers. To cater to such huge volumes of solid waste, covered, separate wet, dry and hazardous waste storage containers are required to be installed.

Waste Transportation: SMC is transporting waste in specialised waste disposal transporting vehicles. These are covered which reduces spread of litter during transportation. However, separate transport systems for different types of waste are required. The number of dumpers also needs to be increased to cater to the huge volume of the municipal solid waste generated.

Processing of Waste: SMC has waste treatment facilities including mechanical segregator, composting plant, bailing of RDF, resource recovery by rag pickers and a leachate treatment plant. Gulmarg Development Authority

has developed Solid Waste Management Facility. The processing facilities installed include Auto-Composter and Disintegrator. The Pahalgam Development Authority has developed Solid Waste Management Facility at Sarbal. The processing facilities installed include Auto-Composter, Disintegrator and Segregator. Other municipal bodies have no facility available for scientific processing of municipal solid waste. No ULB is processing waste for reuse.

Disposal of Waste: There is only one sanitary landfill set up by the SMC in Saidapora, Achan.

Development of Facilities

- SMC has finalized setting up of 12 Garbage Transfer Stations (GTS) throughout the city, for efficient waste collection, transportation and its disposal. These GTSs shall be equipped with state-of-the-art facilities such as separate bins for segregated waste, compaction unit, weigh bridge, Organic waste convertors, compounding unit etc.
- An ICT based solution on Solid Waste Management which is aimed at tracking waste from source till the dumping site, including digital monitoring of door to door collection and monitoring of transportation of waste through robust a Vehicle tracking System is being developed.

CHALLENGES BEING FACED

- Lack of accurate and systematic data on waste generation, composition and disposal.
- Rapid and unplanned urban growth.
- Logistic problems caused by hilly terrains.
- Lack of technical expertise in local bodies.
- Lack of co-operation by citizens.

CHAPTER - VI

STAKEHOLDERS AND THEIR DUTIES

Important stakeholders in effective management of municipal solid waste in Jammu and Kashmir include-

- Waste Generators
- Urban Local Bodies
- Panchayat Raj Institutions
- Central Pollution Control Board
- The J&K Pollution Control Committee
- Various government departments

The duties of all stakeholders have been listed in detail in the 2016 Rules. Compliance with these duties is essential for effective management of municipal solid waste.

Duties of Waste Generators

Waste generators include all persons or groups of persons, all residential premises and all non-residential establishments which generate solid waste. It includes Indian Railways and defence establishments.

The duties of waste generators are-

- Segregate and store waste in three separate streams namely bio-degradable, non- biodegradable and domestic hazardous wastes in suitable bins
- Handover segregated wastes to authorised waste pickers or waste collectors as per the direction or notification by local authorities from time to time;
- Securely wrap used sanitary waste like diapers, sanitary pads etc., in the pouches provided by the manufacturers or brand owners of these products or in a suitable wrapping material as instructed by the local authorities and place the same in the bin meant for dry waste or non- bio-degradable waste;
- Separately store construction and demolition waste, as and when generated, in their own premises and dispose it as per the Construction and Demolition Waste Management Rules, 2016;
- Store horticulture waste and garden waste generated from their premises separately in their own premises and dispose of as per directions issued by the local body from time to time;
- Do not throw, burn or bury solid waste on streets, open public spaces or outside their premises or in drains or water bodies; and,
- Pay such user fee for solid waste management as specified in the bye-laws of the local bodies.
- Do not organise an event or gathering of more than one hundred persons at any unlicensed place without intimating the local body at least three working days in advance and ensure segregation of waste at source and handing over of segregated waste to waste collector or agency as specified by the local body.

Specific duties have also been imposed on certain types of waste generators. These are-

- **Street Vendors**
  - Keep suitable containers for storage of waste generated during the course of their activitysuch as food waste, disposable plates, cups, cans, wrappers, coconut shells, leftover food, vegetables, fruits, etc., and,
  - Deposit such waste at a waste storage depot or container or vehicle as notified by the local body.

- **Resident Welfare and Market Associations**
  - Ensure segregation of waste at source by the generators in partnership with the local body;
  - Facilitate collection of segregated waste in separate streams;
  - Handover recyclable material to either authorised waste pickers or authorised recyclers;
  - Process, treat and dispose of bio-degradable waste through composting or bio-methanation within their premises as far as possible; and,
  - Give residual waste to waste collectors or an agency as directed by the local body.

- **Gated Communities and Institutions with more than 5,000 sqm area**
  - Ensure segregation of waste at source by generators;
  - Facilitate collection of segregated waste in separate streams handover recyclable material to either the authorised waste pickers or the authorized recyclers;
  - Process, treat and dispose of bio-degradable waste through composting or bio-methanation within their premises as far as possible; and,
  - Give residual waste to waste collectors or an agency as directed by the local body.

- **Hotels and Restaurants**
  - Ensure segregation of waste at source as prescribed in these rules in partnership with the local body;
  - Facilitate collection of segregated waste in separate streams;
  - Handover recyclable material to either the authorised waste pickers or the authorised recyclers;
  - Process, treat and dispose of bio-degradable waste through composting or bio-methanation within their premises as far as possible; and,
  - Give residual waste to waste collectors or an agency as directed by the local body.

- **Manufacturers of Disposable Products such as Tin, Glass, Plastics Packaging, etc., o rBrand Owners Who Introduce Such Products in The Market**
  - Provide necessary financial assistance to local authorities for establishment of waste management system; and,
  - Put in place a system to collect back the packaging waste generated due to their production.

- **Manufacturers or brand owners or marketing companies of sanitary napkins and diapers**
  - Explore the possibility of using all recyclable materials in their products or provide a pouch or wrapper for disposal of each napkin or diapers along with the packet of their sanitary products; and,

- ⇨ Educate the masses for wrapping and disposal of their products.

- ❖ **Industrial Units Located within One Hundred Km from Refuse Derived Fuel and Waste to Energy Plants Based On Solid Waste**-Make arrangements to replace at least five percent of their fuel requirement by refused derived fuel so produced.

Local Bodies

Overall responsibility for municipal solid waste management rests with local bodies. Local bodies include Municipal Corporation, Nagar Nigam, Municipal Council, Nagar palika, Nagar- Palika parishad, Municipal Board, Nagar Panchayats and Town Panchayats, Census Towns, Notified Areas and Notified Industrial Townships with whatever name they are called.

The duties of local bodies are-

- ❖ Prepare a solid waste management plan as per state policy and strategy on solid waste management and submit a copy to respective departments of State Government or Union Territory Administration or agency authorised by the State Government or Union Territory Administration;
- ❖ Arrange for door-to-door collection of segregated solid waste from all households including slums and informal settlements, commercial, institutional and other non-residential premises.
- ❖ Arrange for collection of segregated solid waste from multi-storage buildings, large commercial complexes, malls, housing complexes, etc. from the entry gate or any other designated location;
- ❖ Establish a system to recognise organisations of waste pickers or informal waste collectors and promote and
- ❖ Establish a system for integration of authorised waste-pickers and waste collectors to facilitate their participation in solid waste management;
- ❖ Facilitate formation of Self-Help Groups, provide identity cards and thereafter encourage integration in solid waste management;
- ❖ Frame bye-laws incorporating the provisions of these rules and ensure timely implementation;
- ❖ Prescribe from time to time user fee as deemed appropriate and collect the fee from the waste generators on its own or through authorised agency;
- ❖ Direct waste generators not to litter i.e., throw or dispose of any waste such as paper, water bottles, liquor bottles, soft drink canes, tetra packs, fruit peel, wrappers, etc., or burn or burry waste on streets, open public spaces, drains, water bodies and to segregate the waste at source as prescribed under these rules and hand over the segregated waste to authorised waste pickers or waste collectors;
- ❖ Setup material recovery facilities or secondary storage facilities with sufficient space for sorting of recyclable materials to enable informal or authorised waste pickers and waste collectors to separate recyclables from the waste and provide easy access to waste pickers and recyclers for collection of segregated recyclable waste such as paper, plastic, metal, glass, textile from the source of generation or from material recovery facilities;
- ❖ Establish waste deposition centres for domestic hazardous waste for every area of twenty square kilometres, or part thereof, and give directions for waste generators to deposit domestic hazardous wastes at this centre for its safe disposal;
- ❖ Ensure safe storage and transportation of the domestic hazardous waste to the hazardous waste disposal facility;

- Direct street sweepers not to burn tree leaves collected from street sweeping and store them separately and handover to the waste collectors or agency authorised by local body;
- Provide training on solid waste management to waste-pickers and waste collectors;
- Collect waste from vegetable, fruit, flower, meat, poultry and fish markets on day-to-day basis and promote setting up of decentralised compost plant or bio-methanation plant at suitable locations in the markets or in the vicinity of markets;
- Collect separately waste from sweeping of streets, lanes and by-lanes daily, or on alternate days or twice a week depending on the density of population, commercial activity and local situation;
- Set up covered secondary storage facility for temporary storage of street sweepings and silt removed from surface drains in cases where direct collection of such waste into transport vehicles is not convenient and dispose it of at regular intervals;
- Collect horticulture, parks and garden waste separately and process in the parks and gardens, as far as possible;
- Transport segregated bio-degradable waste to the processing facilities like compost plant, bio-methanation plant or any such facility with preference for on-site processing of such waste;
- Transport non-bio-degradable waste to the respective processing facility or material recovery facilities or secondary storage facility;
- Transport construction and demolition waste as per the provisions of the Construction and Demolition Waste Management Rules, 2016;
- Involve communities in waste management and promotion of home composting, bio-gas generation, decentralised processing of waste at community level, subject to control of odour and maintenance of hygienic conditions;
- Phase out the use of chemical fertilizer use compost in all parks and gardens maintained by the local body and wherever possible in other places under its jurisdiction.
- Facilitate construction, operation and maintenance of solid waste processing facilities and associated infrastructure on their own or with private sector participation or through any agency for optimum utilisation of various components of solid waste adopting suitable technology and adhering to the guidelines issued by the Ministry of Urban Development and standards prescribed by the Central Pollution Control Board.
- Undertake, on their own or through any other agency, construction, operation and maintenance of sanitary landfills and associated infrastructure in a manner prescribed under these rules;
- Make adequate provision of funds for capital investments as well as operation and maintenance of solid waste management services in the annual budget ensuring that funds for discretionary functions of the local body have been allocated only after meeting the requirement of necessary funds for solid waste management and other obligatory functions of the local body as per these rules;
- Prepare and submit annual report on or before the 30th April of the succeeding year to the Commissioner or Director, Municipal Administration or designated Officer;
- Send the annual report to the Secretary -in-Charge of the State Urban Development Department or Village Panchayats or rural development department and to the respective State Pollution Control Board or Pollution Control Committee by the 31st May of every year;

- Educate workers including contract workers and supervisors for door-to-door collection of segregated waste and transporting the unmixed waste during primary and secondary transportation to processing or disposal facility;
- Ensure that the operator of a facility provides personal protection equipment including uniform, fluorescent jacket, hand gloves, raincoats, appropriate foot wear and masks to all workers handling solid waste and that the same are used by the workforce;
- Ensure that provisions for setting up of centres for the collection, segregation and storage of segregated wastes, are incorporated in building plans while granting approval of building plans of a group housing society or market complex;
- Frame bye-laws and prescribe criteria for levying of spot fine for persons who litter or fail to comply with the provisions of these rules and delegate powers to officers or local bodies to levy spot fines as per the bye laws framed;
- Create public awareness through information, education and communication campaign and educate the waste generators to comply with solid waste management rules and standards;
- Stop land filling or dumping of mixed waste soon after the timeline as specified in rule 23 for setting up and operationalisation of sanitary landfill is over;
- Allow only the non-usable, non-recyclable, non-biodegradable, non-combustible and non-reactive inert waste and pre-processing rejects and residues from waste processing facilities to go to sanitary landfill;
- Ensure that sanitary landfill sites meet the specifications as given in Schedule–I of the 2016 Rules;
- Make every effort to recycle or reuse the rejects so as to achieve the desired objective of zero waste going to landfill;
- Investigate and analyse all old open dumpsites and existing operational dumpsites for their potential of bio-mining and bio-remediation and where so ever feasible, take necessary actions to bio-mine or bio-remediate the sites; and,
- Scientifically cap dumpsites as per landfill capping norms to prevent further damage to the environment where bio-mining and bio-remediation are not possible.

In addition to these general duties, additional duties have been imposed on local bodies in hilly regions-

- Do not construct landfills on hills;
- Setup transfer stations at suitable enclosed locations to collect residual waste from processing facilities and inert waste;
- Identify a suitable location in the plain areas down the hill within 25 kilometers for setting up sanitary landfills. and dispose of the residual waste from the transfer station at such sanitary landfill or, in case of lack of suitable land, set up regional sanitary landfills for inert and residual waste;
- Frame bye-laws to prohibit citizens from littering on the streets and give strict directions to tourists not to dispose any waste on the streets or down the hills and instead deposit such waste in litter bins;
- Place litter bins at all tourist destinations;
- Arrange to convey the provisions of solid waste management under the bye-laws to all tourists visiting the hilly

areas at the entry point in the town as well as through the hotels, guest houses or like where they stay and by putting suitable hoardings at tourist destinations;

- Levy solid waste management charges from tourists at the entry point to make the solid waste management services sustainable, if needed; and,
- Set up decentralised waste processing facilities.

Role of J&K PCC in Solid Waste Management

The J&K PCC is the primary regulatory body for municipal solid waste management in the UT and is a key stakeholder in this process.

The duties of SPCBs/PCCs are listed in Rule 16 of the SWM Rules. These duties are-

- Enforce the SWM Rules through local bodies and review implementation of these rules at least twice a year in close coordination with the Directorate of Municipal Administration or Secretary-in-charge of State Urban Development Department;
- Monitor environmental standards and adherence to conditions as specified by the SWM Rules for waste processing and disposal sites;
- Grant or refuse authorisation under SWM Rules to local bodies or other agencies authorised by the local body after due examination of the proposal for authorisation, making such inquiries as deemed fit and taking into account the requirement of consents under respective enactments and views of other agencies;
- Issue authorisation within a period of sixty days in Form II to the concerned local body or an operator of a facility or anyother agency authorised by local body stipulating compliance criteria and environmental standards as specified in Schedules I and II of the SWM Rules including other conditions, as may be necessary;
- Synchronise the validity of said authorisation with the validity of other consents;
- Suspend or cancel the authorization issued if the local body or operator of the facility fails to operate the facility as per the conditions stipulated, provided that no such authorization shall be suspended or cancelled without giving notice to the local body or operator;
- On receipt of application for renewal, renew the authorisation for next five years, after examining every application on merit and subject to the condition that the operator of the facility has fulfilled all the provisions of the rules, standards or conditions specified in the authorisation, consents or environment clearance;
- Approach Central Pollution Control Board for getting standards specified in case of new technologies for which no standards have been so prescribed;
- Monitor compliance with the standards as prescribed or laid down and treatment technology as approved and the conditions stipulated in the authorisation and the standards specified in Schedules I and II to the SWM Rules at least once in a year;
- Give directions to local bodies for safe handling and disposal of domestic hazardous waste deposited by the waste generators at hazardous waste deposition facilities; and,
- Regulate inter-state movement of waste.

WAY FORWARD

Effective Solid waste management can be ensured by:

- Adopting integrated approach towards management of specific types of waste as per the waste characteristics, cost effectiveness and topographical constraints.
- Bio-methanation / composting to be preferred as a technological solution for dairy waste / Fruit & Vegetable Market waste / hotel / restaurant waste.
- Garden waste should be preferably composted within parks / gardens.
- Material Recovery Facilities should be established in decentralized manner to ensure maximum dry waste collection and segregation.
- Bulk Waste Generators should be identified and compliance under SWM Rules should be ensured by concerned local bodies, so that quantity of bulk waste generated by them is minimized.
- Small scale projects on PPP mode (involving NGOs/voluntary organization, etc) should be invited by local bodies.
- IEC activities should be taken up vigorously to ensure household level segregation and composting.

ANNEXURES
COMPLIANCE WITH THE DIRECTIONS ISSUED BY HON'BLE NGT IN O.A. 606/ 2018

DATE OF DIRECTIONS ISSUED	ACTION POINTS	ACTION TAKEN
23-12-2016 (Final directions on Solid Waste Management in OA 199 of 2014-SPCB)	Enforcement and Implementation of Solid Waste Management Rules, 2016	Under Process
31-08-2018	Constitution of Apex Monitoring Committee, Regional Monitoring Committees and State Level Committees to oversee the steps to be taken to give effect to the directions of the Tribunal	• **SLMC** constituted vide Govt. Order no. **191- GAD** of **2019** dt. **07-02-2019**. • Alternate Monitoring Mechanism by constituting **State Level Apex Committee**, order no. **882-GAD of 2019**, dt. **26.07.19.**
16-01-2019	Rule 11(1) State Policy and Solid Waste Strategy	J&K State Policy and Solid Waste strategy, 2017 formulated.
-do-	**Rule 12 of SWM Rules-** Monthly meetings by Deputy Commissioners	i) **District Environment Committee** constituted vide Govt. Order No. 81 – JK (GAD) of 2019 dated 25.11.2019 in pursuance to NGT Order dated 16-01-2019, passed in O.A No. 606/2018. ii) **District Level Task Force Committee** constituted vide Govt. Order No. 192 –GAD of 2019 dated 07.02.2019 in pursuance to NGT Order dated 16-01-2019., passed in O.A No. 606/2018.
-do-	**Rule 22 of SWM Rules-** ✔ Time frame for implementation of infrastructure by ULBs, viz., ✔ Identification and procurement of suitable sites for solid waste processing facility ✔ Implementation of provisions for bulk waste generators, ✔ Implementation of primary elements of waste management, ✔ Setting up of SWM facilities / sanitary landfill sites,	**23 nos. of Solid Waste Management Facilities** have been identified. House-to-house collection: 100% collection – 21 local bodies Partial collection – 17 local bodies Negligible segregation- 29 local bodies Partial Segregation – 04 local bodies Nil segregation - 05 local bodies i) **Three Vermi-composting facilities** (Bhaderwah, Sunderbani and Doda). ii) Material Recovery Facilities (MRF) established by **05 N**o. of local bodies, viz., Municipal Committee Katra,

	✔ Bio-remediation of old dumpsites	Doda, Bhaderwah, Sunderbani and Municipal council Udhampur. iii) Establishment of 02 no. of Material Recovery Facilities by JMC (05 TPD Capacity each). **i) Jammu Municipal Corporation** Bioremediation of one legacy waste site (**Bhagwati Nagar, Jammu)** having **approx. 1,20,000 Tons** of legacy waste is under Progress since September, 2020 and approx. 77,300 MT waste processed till now. Expected time period for completion of project is 31-03-2022. While capping technique for 2nd legacy waste site, i.e., **Kot Bhalwal** site is under process of technical vetting. **ii) Urban Local Bodies** Total 06 No. of old dump sites in Municipal Committee Katra, Bhaderwah, Doda and Municipal councils Kathua, Udhampur , Samba have been considered for bio-remediation of legacy waste with total 1.55 MT of legacy waste in local bodies identified. Tendering for bioremediation of legacy waste has been initiated by MC, Katra.
-do-	**Rule-23 of SWM Rules-** State Level Advisory Body	**i) State Level Advisory body** constituted Vide Government Order No. 594 -GAD of 2017 Dated: 15.05.2017 and the body has prepared action plan for waste management with cluster approach and 17 clusters have been identified so far. (No action plan / DPR submitted by any local body)
-do-	**Action Plan for SWM J&K**	Action Plan for SWM J&K notified vide Govt. Order No. 25 –HUD of 2019 dt. 21-01-2019.

-do-	**District Level Special Task Force (DLSTF) for awareness generation**	**District Level Task Force Committee** constituted vide Govt. order No. 192 –GAD of 2019 dated 07.02.2019 in pursuance to NGT Order dated 16-01-2019., passed in O.A No. 606/2018.
-do-	**Model Solid Waste Management Bye-laws, 2019**	**Solid Waste Management Bye-laws, 2019** have been published vide Govt. Order No. 168-HUD of 2019, Dated 31-07-2019.
18-07-2019	**a) Identification and development of Model cities and towns in the State / UT.** **b) Atleast three villages in every district of the state be notified on the website of the State within two weeks which will be made fully compliant with Environment norms within next six months.** **c) Remaining cities, towns and villages in the State may be made fully compliant in respect of environment norms within one year (i.e., by July, 2020).**	Pahalgam and Katra identified vide No. 135-HUDD of 2019; dt: 23-05-2019. Notified vide No. 10-RD &PR of 2020 dt.10-01-2020, to have been completed by 30-06-2020. To have been completed by 30-06-2020.
-do-	**The Chief Secretary may personally monitor the progress atleast once in a month with all the District Magistrates.**	Ongoing
-do-	**District Magistrates may monitor the status of compliance of environmental norms, atleast once in two weeks.**	**District Environment Committee** constituted vide Govt. order No. 81 – JK (GAD) of 2019 dated 25.11.2019 in pursuance to NGT Order dated 16-01-2019., passed in O.A No. 606/2018.
-do-	**District Magistrates or other Officers may be imparted requisite training.**	Imparted on 28-01-2020 and 04-02-2020.
-do-	**Polluter Pays Principle / Environment Compensation levied**	i) Environmental compensation imposed by JKPCC on **MC, Udhampur** based on Hon'ble NGT directions to the tune of 1.39 crore for violation of SWM Rules, 2016 vide

		Order No. 25 SPCB of 2019, Dated 21.11.2019. ii) Environmental compensation imposed by JKPCC on **MC, Ramban** to the tune of Rs. 12.88 lacs vide order No. 32 PCB of 2020 dt.10/09/2020 for violation of SWM Rules, 2016. iii) Environmental compensation imposed by JKPCC on **MC, Kathua** to the tune of Rs. 82.40 lacs vide order No. 17 -PCC of 2021 dt.21/12/2021 for violation of SWM Rules, 2016. iv) Environmental compensation imposed by JKPCC on **MC, Rajouri** to the tune of Rs. 61.80 lacs vide order No. 19 -PCC of 2021 dt.17/01/2022 for violation of SWM Rules, 2016. v) Environmental compensation imposed by JKPCC on **MC, Bandipora** to the tune of Rs. 64,21,000/- vide order No. 45 JK PCB of 2021 dated 09-02-2021 for violation of SWM Rules, 2016. vi) Environmental compensation imposed by JKPCC on **MC, Sopore** to the tune of Rs. 130.46 lacs vide order No. 36 PCB of 2020 dated 24-11-2020 for violation of SWM Rules, 2016.
24-02-2020	**Every local body to pay compensation for failure after 31-03-2020.** **Adverse entry in ACRs of CEO of ULBs and others of Deptt. of Urban Development, responsible for compliance.**	To be done by HUDD
-do-	**Legacy waste remediation was to commence from 01-11-2019. Failure to commence work of remediation from 01-04-2020 shall be liable for compensation and will be liability of State Govt.**	**Jammu Municipal Corporation** Bioremediation of one legacy waste site (**Bhagwati Nagar, Jammu)** having **approx. 1,20,000 Tons** of legacy waste is under Progress since September, 2020 and approx. 77,300 MT waste processed till now. Expected time period for completion of project was 31-03-2022. While capping technique for 2nd legacy waste site, i.e., **Kot Bhalwal** site is

		under process of technical vetting. **ii) Urban Local Bodies** Total 06 No. of old dump sites in Municipal Committee Katra, Bhaderwah, Doda and Municipal councils Kathua, Udhampur , Samba have been considered for bio-remediation of legacy waste with total 1.55 MT of legacy waste in local bodies identified. Tendering for bioremediation of legacy waste has been initiated by MC, Katra.
02-07-2020	a) **Quarterly Report** to continue be filed, with separate columns showing compliance of direction for **modern compliant cities**, towns and villages in every state.	**Compliance being made**
-do-	b) **Quarterly Report** to be submitted to CPCB / NGT, **15 days** in advance of date of appearance	
-do-	**Report of Niti Ayog :-** Tool kit for preparation of DPRs, tendering guidelines, evaluation of DPRs by empanelled institution w.r.t. SWM, Liquid Waste Management and availability of all such documents on **GeM Portal.**	HUDD
14-12-2020	Separate account for Environmental Compensation	Opened separate EC fund account no. **0023040510000001**
-do-	Compliance of SWM Rules by all concerned stakeholder departments including implementing agencies	All Stakeholder departments
31-11-2021	The Chief Secretaries of all States / UTs may personally monitor the progress atleast once every month	
-do-	All the legacy waste dump sites in the country need to be remediated to reduce methane gas, foul smell nad leachate and also to release valuable land occupied by such sites....	JMC has completed bioremediation of legacy waste at Bhagwati Nagar, while it is in the process of technical vetting at Kot Bhalwal. SMC is in process to initiate bioremediation.

-do-	Continued failure of Rule of Law must be remedied in terms of mandate of orders of the Hon'ble Supreme Court in Writ Petition No. 886/1996, Almitra H. Patel Vs. Union of India & Or. And Parayavaran Suraksha vs. Union of India, followed by orders of this Tribunal.	-
20.10.2022	**UT of Jammu & Kashmir will take further measures in the matter by innovative approach and stringent monitoring, ensuring that gaps in solid and liquid waste generation and treatment are bridged at the earliest, shortening the proposed timelines, adopting alternative / interim measures to the extent and wherever found viable**. Environment compensation for restoration can be dovetailed with the UT budget. Bigger towns with population of more than one lakh like Srinagar, Jammu and Anantnag may need to be dealt with on separate footing for sewage and solid waste management while separately designing appropriate implementable programmes for towns having population less than one lakh.	-

BEST PRACTICES

Best practices adopted for Solid Waste Management by Urban Local Bodies, Jammu

An organic waste convertor has been installed by M/s Excel Industries Pvt. Ltd. for Municipal Committee Katra, as a demo machine for composting of wet waste. Around 200 kg of wet waste is being collected from Municipal Committee Katra every day and processed in the organic convertor to produce organic compost.



ORGANIC WASTE CONVERTOR MACHINE INSTALLED AT MUNICIPAL COMMITTEE, KATRA


BAILING MACHINE HAS BEEN INSTALLED IN MUNICIPAL COUNCIL UDHAMPUR AT SUI-CHAKAR FOR SCIENTIFIC DISPOSAL OF SEGREGATED PLASTIC WASTE



VERMI-COMPOSTING PLANTS HAVE BEEN SETUP FOR COMPOSTING OF WET WASTE (05 TPD CAPACITY EACH) AT MUNICIPAL COUNCIL / COMMITTEES OF DODA, BHADERWAH AND SUNDERBANI

SANITARY WASTE DISPOSER UNITS, 02 NOS. BASED ON NO FUEL TECHNOLOGY INSTALLED THROUGH JKPCC BY M/S ORNATE NATURALE, AS DEMO MACHINES AT WOMEN COLLEGE, GANDHI NAGAR AND AGRICULTURE UNIVERSITY, CHATHA

TRAINING PROVIDED BY CSIR- CIMAP INSTITUTE, LUCKNOW THROUGH JKPCC TO SELF HELP GROUPS, SMVDSB AND SELF HELP GROUP UNDER UMEED, KOL KANDOLI, FOR MANAGEMENT OF FLOWER WASTE AND GENERATING EMPLOYMENT. THE SKILL IS BEING REPLICATED IN VARIOUS BLOCKS UNDER STATE RURAL LIVELIHOOD MISSION (NRLM)

TRANING PROVIDED FOR MAKING REUSABLE CLOTH PADS TO SELF HELP GROUP, NRLM AT BHALWAL BLOCK, JAMMU, USING COCONUT FIBRES BY SHRI MATA ANANDAMAYI MATH WITH THE OBJECTIVE TO ADOPT REUSABLE AND ENVIRONMENT FRIENDLY INNOVATIVE PRODUCTS, MINIMIZING HEAPS OF SANITARY WASTE GOING TO LANDFILLS AND ASSOCIATED HEALTH EFFECTS OF CHEMICALS PRESENT IN COMMERCIAL SANITARY PADS

LIST OF BEST PRACTICES / SUCCESS STORIES WITH REGARD TO SOLID WASTE MANAGEMENT IN INDIA

S.No.	State	Title	Description	Created On
1	Maharashtara	Model Template of RFP for Selection of Contractor for Bio-mining of solid waste dumpsite	Model Template of RFP for Selection of Contractor for Bio-mining of solid waste dumpsite	Mar 19 2020
2	Maharashtara	Model Tender Document for Local bodies regarding SWM by Maharashtara PCB	Model Tender Document for Local bodies regarding SWM by Maharashtara PCB	Mar 19 2020
3	Tamilnadu	Clean & Green Madukkarai	Gram Panchayat:Madukkarai gven special grade:The community dust bins are shifted to dump yard where the wet garbage is being converted into organic manure by vermin compost pits. The plastic and recyclable wastes are segregated and send to ACC Cement Works which they are used under waste co-processing	Mar 06 2020
4	Chhattisgarh	Garbage Clinic	166 Municipal Authorities have Garbage Clinic (Solid Liquid Resources Management Centers) for secondary segregation of MSW and 166 Municipal Authorities are operating their own Composting Plant	Mar 04 2020
5	Maharashtara	Waste segregation	**a. Shirdi Municipal Council.....** Shirdi Municipal Council along with Shri Saibaba Sansthan set up waste flower processing unit to convert it Agarbatti.which handle approx. 2.5 tons of flower waste on daily basis. **b. Achalpur : Segregation at source.....** Every household received a coupon after giving segregated waste. The coupon could be entered in the weekly lucky draw that took place at a ward level. The winning household/housewife received a silver coin. **c. Kagal : BioGas Plant.....** The project has been implemented as a Public-Private Partnership (PPP) model. The project process 4 MT of waste everyday in the CSTR technology Waste-to-energy plants which is used to illuminate 100 street-lamps in the city. **d. Ballarpur: Plastic in Road.....**	Mar 04 2020

6	Madhya Pradesh	Biomining & Bioremediation of legacy waste	Bhopal has reclaimed 37 acres of land that was once a dumpsite for the entire city. Waste was dumped in this area for over 30 years and contained over 750,000 tonnes of legacy waste.	Mar 03 2020
7	Madhya Pradesh	Jabalpur, MSW Pvt. Ltd., Kathoda	Municipal Corporation Jabalpur has installed 11.5MW Waste to energy plant by treating 600 TPD MSW which is collected from the Jabalpur city generating 11.5 MW Power at village Kathoda, Jabalpur, Madhya Pradesh	May 09 2018
8	Madhya Pradesh	Ambikapur (Chhattisgarh) MSW Management Project - RD Bhopal	The success story of Ambikapur Town in Chhattisgarhwhere MSW is being collected from Door-to-Door and completely segregated with no leftout. The project has not only reduced the MSW Management Cost but also givenan opportunity of earning to the females of Ambikapur.It is being implemented in 165 ULBs of Chhattisgarh.	Apr 26 2018
9	Puducherry	Swacch Karaikal, the initiative from Karaikal municipality in solid waste management	The success story of solid waste management in Karaikal, Puducherry:The processing of different wastes takes place at the Resource Recovery Park (RRP) situated at Paravaipet.At the RRP unit, the waste is managed and processed according to their types.Presently, the RRP has a compost sieving machine, bio gas unit, vermin compost shed, recycle storage room and a platform for window etc.	Apr 26 2018
10	West Bengal	Bio-gas Plant at Swami Vivekananda State Police Academy, Barrackpore, West Bengal	A Venture done by West Bengal Pollution Control Board a waste to energy project at Swami Vivekananda State Police Academy, Barrackpore, West Bengal	Dec 12 2017
11	Bhopal	Municipal Solid Waste to Energy Power Plant at Jabalpur	Municipal Corporation Jabalpur has installed 11.5MW Waste to energy plant by treating 600 TPD MSW which is collected from the Jabalpur city generating 11.5 MW Power at village Kathoda, Jabalpur, Madhya Pradesh	Jul 27 2017

12	Goa	Solid Waste Treatment Facility at Saligao - Goa	The State of Goa has one of the largest SWM plant is Asia and is located at Saligao / Clangute, Bardez taluka, North Goa district with 250 TPD capacity.The Solid Waste Management Facility is one of its kind integrated facility in the country. The facility receives waste from the northern coastal belt village panchayats & ULB's and scientifically manages the waste on day-to-day basis.Post construction of the plant a noticeable change in the surrounding natural environment is observed with different species of plants along with fruit/vegetable bearing plants growing and increase in the butterfly species and migratory bird count.	Jun 28 2017

November-April
Parivesh Bhawan, Gladini, Narwal,
Jammu-180006

May-October
Behind Silk factory, Sheikh-ul-Alam complex,
Rajbagh, Srinagar- 190008