Chapter 10
An Overview of the Municipal Solid Waste Management Rules in India

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1 Introduction

Solid waste means any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities. Nearly everything we do leaves behind waste" as per Resource Conservation and Recovery Act, USEPA, 1976. It is important to note that the definition of solid waste is not limited to wastes that are physically solid. Many solid wastes are liquid, semi-solid, or contained gaseous material (Hazra and Goel 2009).

Solid waste management (SWM) means the collecting, treating, and disposing of unwanted solid material. If not disposed or managed properly solid waste can create acute environmental and health hazards. Throughout the globe rapid urbanization is increasingly generating massive amount of municipal solid waste (MSW) the management of which poses intricate technical challenges. Also, the social and economic impacts of this phenomenon can hardly be overlooked. India is one of the swiftly growing economies in the world. Industrialization and population growth have allured people to migrate from villages to cities. As a result, thousands of tons of MSW are being generated daily in most of the cities. This MSW is expected to rise considerably by 2020 as India maintains its industrial and economic development (Shekdar 1999).

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According to Govt. of India, 62 million tons of waste is generated annually in the country at present, out of which 5.6 million tons is plastic waste, 0.17 million tons is biomedical waste, hazardous waste generation is 7.90 million tons per annum and 15 lakh tons is e-waste. It is stated that only about 75–80% of the municipal waste gets collected and only 22–28% of this waste is processed and treated (Cheela and Dubey 2019; PIB 2016).

Environment Protection Act, 1986 confers necessary power upon the government to notify rules regarding solid waste management. The Municipal Solid Wastes (Management and Handling) Rules provides for enabling environment to guarantee methodological disposal of the solid waste generated in dwelling areas. Much of the success on the implementation depends upon multiple factors related with the management plan. The restructuring of the rules on regular basis may not be of immense significance unless the rules are examined in the light of challenges confronted in implementation stage. The nature of challenges could be either technical or regulatory. Therefore, it is incumbent to undertake a study on to contextualize the challenges in the enforcement of the Rules and suggest measures to address the identified challenges.

2 Review of Technical and Social Aspects of Solid Waste Management Rules

It is generally regarded that waste management is the sole duty and responsibility of local authorities, and that the public is not expected to contribute (Vidanaarachchi et al. 2006). Also, the engagement of stakeholders is equally important to bring operation efficiency of the waste management. The decision making process should involve both municipality and other stakeholders such as citizens and private entities (Sharholy et al. 2008). As the generation of solid waste is very domesticated activity, it is also needed to create awareness amongst community members and design possible solutions through broad-based engagement of all affected parties (Moghadam et al. 2009).

The source to meet the expenditure required for carrying out solid waste management is always a matter of concern for the municipalities. Municipalities, generally, fail to generate revenue required to create infrastructure required for giving the services. Municipalities have failed to manage solid waste due to financial factors (Sharholy et al. 2007). Sharholy et al. (2008) indicated that the involvement of the private sector is a factor that could improve the efficiency of the system. Though in India, there is a constitutional provision to allocate revenue to municipalities for carrying out their responsibilities entrusted to them by the 73rd amendment of the Constitution, the financial concern continues to be one of the major bottlenecks in effective discharge of the constitutional responsibilities.

Universities, research centres and centres of excellence have a very important role in preparing professionals and technicians in environmental fields, including waste management. Some developing countries have already seen the positive effects of investing in education and research by having cleaner cities, citizens assuming their responsibilities and higher status of solid waste workers (Guerrero et al. 2013). The lack of financial resources, inefficient institutional arrangement, inappropriate technology, weak legislative measures and unawareness in public towards solid waste management has made the service most unsatisfactory and inefficient. India is a vast country divided into different climatic zones, different food habits, and different living standard thereby producing waste of different types. Till date, no comprehensive study has been conducted to cover almost all cities and towns of India to characterize the waste generated and disposed on landfill. The policy-makers rely on the limited source of information available from few places; thereby are unable to provide appropriate solutions for the kind of waste produced for a region. There is a need to create dedicated group of officers and skilled staff for ULBs with specialization in MSWM. Adequate training and hands-on experiments would enable them to identify bottlenecks at implementation level and take appropriate action (Aditee et al. 2016; Atiq et al. 2016; Joshi and Ahmed 2016; Neha et al. 2015).

3 History of Solid Waste Management (SWM) Policies and Initiatives in India

During 1960s, the Ministry of Food and Agriculture (MoFA), Government of India declared loans for composting of solid waste. In line with the policy developments in waste management across the globe, India has developed Environmental Protect Act during the year 1986. Further, in the year 1989, hazardous waste management rules were drafted. In the year 1994, after the outbreak of plague in Surat, the policy initiatives in the field of SWM gained momentum in India. The planning commission has constituted a committee under the leadership of J.S. Bajaj in the year 1995. The recommendations include segregation of waste at source, collection of waste, composting and landfilling. A National Mission on Environmental Health and Sanitation was initiated by Ministry of Health and Family Welfare. During the year 1998, committee was constituted under the leadership of Barman to draft a policy for the solid waste management in India. The policies developed were notified in September 2000, as Municipal Solid Waste (Management and Handling) rules by Ministry of Environment, Forests and Climate Change (MoEFCC). Parallel to this, draft policy paper on funding, operation manual and requirements for MSWM were developed by Central Public Health and Environmental Engineering Organization (CPHEEO) under MoUD (Fig. 10.1).

Central Pollution Control Board (CPCB) and the State Pollution Control Boards (SPCBs) were identified as the nodal agencies to monitor the implementation of the

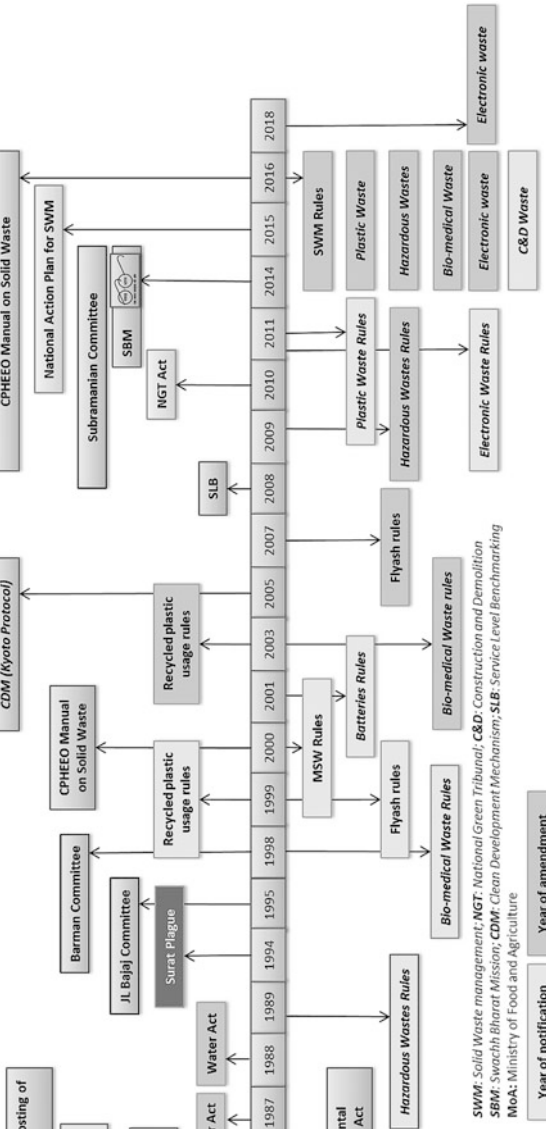

Fig. 10.1 Timeline chart of solid waste management activities in India

waste management policies and regulations across the nation. Clean development missions were initiated across the country in line with the recommendations of the Kyoto protocol in 2005. Further, MoUD has developed a service level benchmarking process to evaluate the progress in the implementation of the waste management services. In the year 2010, National Green Tribunal (NGT) was established under NGT Act, 2010 to mentor, monitor and modulate the environmental protection and conservation of forests and other natural resources. In 2014, a flagship programme namely Swachh Bharat Mission (Clean India Mission) was launched to develop scientific waste management systems and to create awareness among various stakeholders across the nation. Further, MoUD has constituted a high-steered committee under the leadership of Subramaniam to develop recommendation by introspecting the waste management systems being implemented during the past 14 years. Further based on the outcomes of the study, the government has revised the waste management rules during the year 2015. The rules were notified in the year 2016 and termed as Solid Waste Management Rules, 2016 (CPHEEO 2016; CPCB 2015).

4 Overview of Solid Waste Management Rules 2016

India had its laws in the form of the Municipal Solid Wastes (Management and Handling) Rules, 2000 notified under Environment (Protection) Act, 1986. The notification of these Rules was largely the outcome of two landmark decisions of the Supreme Court[1]. Under the Rules major responsibility was given to urban local bodies (ULBs). It was an obligatory function of ULBs to plan and manage solid waste. But in practice, it was given less priority and not much progress was made in terms of collection, segregation, transportation and suitable disposal of waste across the cities and towns. It was also observed that municipalities were short of funds and lack technical capability for proper waste management. Therefore, the need was felt to introduce community-based system where communities would be given primary responsibility to collect, sort and recycle waste.

The new 2016 Rules are aimed to rectify some of the shortcomings of the earlier regime. These Rules are again the part of extended protection umbrella of EPA, 1986 along with five other significant rules. Those are plastic, e-waste, biomedical, hazardous and construction and demolition waste management rules. Apart from municipal areas, 2016 rules are extended to census towns, urban agglomerations, areas that come under the control of Indian Railways, notified industrial townships, airports, SEZs, places of pilgrimage, religious and historical significance and State and Central Government organizations. The Rules particularly focus on segregation at source, collection and disposal of sanitary waste, imposition of responsibility on

[1]Dr. B. L. Wadhera v. Union of India, AIR 1996 SC 2969; Almitra H. Patel v. Union of India (1998) 2 SCC 416.

the brand owners to pull back their packaging waste, user fees for collection. Some other important changes that the new Rules bring are:

- Developing a formal integrated sector for rag pickers, waste pickers and kabadiwalas by the state government who so far work on their own.
- Absolute prohibition on throwing, burning or burying the solid waste on streets, drains and water bodies or open public spaces.
- Processing, treatment and disposal of bio-degradable waste through composting or bio-methanation within the premises as far as possible. Excess waste shall be handed over to the waste collectors or agency as controlled by the local authority.
- For SEZs, industrial estate, industrial park at least 5% of the entire area of the plot or minimum five plots/sheds are to be kept for recovery and recycling facility.
- For local bodies having a population of one million or more, waste processing facilities should be set up within 2 years.
- For census towns having population less than one million or for all local bodies with a population of 0.5 million or more, common, or stand-alone sanitary landfills should be set up within 3 years' time.
- Along with these, common or regional sanitary landfill facilities are also to be developed by all local bodies and census towns having a population under 0.5 million. This task must be completed within 3 years.
- The Rules also contain provisions for bio-remediation or capping of old and abandoned dump sites in 5 years' time.
- The Rules promote composting and ensure promotion of co-marketing of compost.
- The Rules mandate that the landfill site should be located at 100 metres distance from a river, 200 metres from a pond, 200 metres away from highways, habitations, public parks and water supply wells and 20 km away from airports/airbase. However, no landfill facility should be constructed on hilly areas. Such facility should be identified in the plain areas, within 25 kilometres. Although, transfer stations and processing facilities may be active in the hilly areas.
- All fuel-based industries located within 100 km from a solid waste-based Refuse-Derived Fuel (RDF) plant are required to decide within 6 months to substitute at least 5% of their fuel requirement by RDF so produced.
- The Rules further provides that the non-recyclable waste with calorific value of 1500 kcal/kg or more shall be used for producing energy either through RDF not disposed of on landfills or through refuse derived fuel or by giving away as feed stock for preparing refuse derived fuel. Wastes having high calorific value should be utilized for co-processing in cement or thermal power plants.
- It should be the responsibility of the Ministry of New and Renewable Energy Sources to facilitate infrastructure creation for waste to energy plants and provide appropriate subsidy or incentives to such units.
- Further, to observe the implementation of the Rules, the government has constituted a Central Monitoring Committee under the chairmanship of Secretary, MoEF&CC.

5 Challenges in Implementation of SWM Rules 2016

The SWM rules 2016 provided details for better management of solid waste. The following are the points to be addressed for better implementation of rules by the stakeholders. Vide G.S.R 451 (E) of Part II – Sec 3(ii) Part 4.1(a) duties of the generators, source segregation is mandated to channelize the waste wealth. Segregation of waste into three streams is introduced. The literacy rate of India is 65% and socio-economic status being below GDP level. Hence, constant measures should be implemented with proper base line studies before implementation of the rules as per the time-frame provided involves physical, social, economic, legal and technical aspects.

- Base line studies are to be conducted to understand the existing practices in each locality. The emphasis should be given on socio-economic characteristics of the stakeholders involved in the project; infrastructure facilities in terms of human and economic resources; awareness programmes on roles and responsibilities; capacity building; adequate support facilities to address the technical issues in implementation of technologies; regular monitoring and maintenance of records by the ULB's; and implementation of appropriate technologies based on the local conditions.
- In the section 4 of the gazette the roles and responsibilities of the generators were indicated. To make them instrumental technical facility centres, counters at local bodies, constant awareness and education programmes, incentives and rewards for best practices, subsidies for starts, provision of physical and manual infrastructure, and frame-work for collection systems should be developed.
- In the sections 5–10 of the gazette duties of the ministries were formulated. Formulation of Central monitoring committee which reviews the yearly progress has been discussed. As per the duties assigned for Ministry of Urban Development, guidelines are to be developed for formulation of national, state level policy and strategies, promotion of research and development, capacity building, technical guidance, periodic reviews on measures taken by local bodies have been assigned, with interlinking of external agencies for funding.
- The SWM rules mandate setting up of waste processing facilities by all the local bodies having population equal to or more than one lakh within a span of 2 years; Development of sanitary landfill for all local bodies having 0.5 million or more population in a period of 3 years; and Bio-remediation or capping of old and abandoned dump sites in 5-year period. Documented data of waste characteristics, quantities, availability of land, sound knowledge on technical aspects, skilled workers, adequate infrastructure and socio-economic behaviour of stakeholders play vital role in reaching the above goals.
- A framework including the policies should be developed to convert rag pickers as componential feeder source for treatment units or industries.
- Setting up of waste to energy plants, compost units and engineered landfills requires a comprehensive study on the waste composition. The climatic

conditions, socio-cultural behaviours, amount of raw material, technical and skilled human resources play a pivotal role.

- As a part of corporate social responsibility, brand users and manufacturers of products can do awareness programmes. As the accessibility of manufacturers to public is an indirect approach, framework must be developed to involve public private partnerships to build up good educational programmes.

References

Aditee, P., Anju, S., Seema, U., Neelima, N., Mayuri, N. and Indrayani, N. (2016). Innovation in solid waste management through Clean Development Mechanism in India and other countries. *Process Safety and Environmental Protection*, **101:** 160–169.

Atiq, U.Z., Shahidul, M. and Hasan, S. (2016). Performance evaluation and benchmarking of global waste management systems. *Resources, Conservation and Recycling*, **114:** 32–41.

B.L. Wadhera v. Union of India, AIR 1996 SC 2969; Almitra H. Patel v. union of India (1998) 2 SSC 416.

Cheela, V.R.S. and Dubey, B. (2019). Review of Application of Systems Engineering Approaches in Development of Integrated Solid Waste Management for a Smart City. *In:* Rathinasamy, M. et al. (eds), Water Resources and Environmental Engineering II. Springer. pp. 159–177.

CPCB (2015). Report on "The National Action Plan for Municipal Solid Waste Management" dated 5th February 2015.

CPHEEO (2016). Report on "Manual on Municipal Solid Waste Management" http://cpheeo.nic.in/SolidWasteManagement2016.htm.

Guerrero, L.A., Maas, G. and Hogland, W. (2013). Solid waste management challenges for cities in developing countries. *Waste Management*, **33:** 220–232.

Hazra, T. and Goel, S. (2009). Solid waste management in Kolkata, India: Practices and challenges. *Waste Management*, **29:** 470–478.

Joshi, R. and Ahmed, S. (2016). Status and challenges of municipal solid waste management in India: A review. *Cogent Environmental Science*, **2:** 1–18.

Moghadam, M.R.A., Mokhtarani, N. and Mokhtarani, B. (2009). Municipal solid waste management in Rasht City, Iran. *Waste Management*, **29:** 485–489.

Neha, G., Krishna, K.Y. and Vinit, K. (2015). A review on current status of municipal solid waste management in India. *Journal of Environmental Sciences*, **37:** 206–217.

PIB (2016). Report on "Solid waste management rules revised after 16 years: Rules now extend to urban and industrial areas" dated April 5, 2016.

Sharholy, M., Ahmad, K., Mahmood, G. and Trivedi, R.D. (2008). Municipal solid waste management in Indian cities – A review. *Waste Management*, **28:** 459–467.

Sharholy, M., Ahmad, K., Vaishya, R.C. and Gupta, R.D. (2007). Municipal Solid Waste Characteristics and Management in Allahabad, India. *Journal of Waste Management*, **27:** 490–496.

Shekdar, A.V. (1999). Municipal Solid Waste Management: The Indian Perspective. *Journal of Indian Association for Environmental Management*, **26(2):** 100–108.

Vidanaarachchi, C.K., Yuen, S.T.S. and Pilapitiya, S. (2006). Municipal solid waste management in the Southern Province of Sri Lanka: Problems, issues and challenges. *Journal of Waste Management*, **26:** 920–930.