

Public Policies and Programmes on Municipal Solid Waste Management: The Indian Context

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Abstract

Living in a pollution free environment with health and hygiene is considered as one of the basic rights of both human and non human being. Industrialization, substantial population growth due to rapid urbanization, economic development, changing living style with a modern consumer pattern are considered as the key factors contributes to generation of the huge quantity of waste in urban areas. Improper handling of solid waste leads to health causes, environment degradation and ozone depletion. Handling of waste (solid, liquid etc.) is now becoming crucial problem in regional, national and international level. Almost all cities in India facing solid waste related challenges. In India, historically solid waste management was a neglected area. After the Supreme Court intervention on Solid Waste Management, the Government of India started to undertake some initiatives on waste management. In India, Urban Local Bodies are responsible for the handling of solid waste including segregation, collection, transfer, storage, treatment and disposal of waste. Waste management services in India guided by the various manuals including laws, policies, missions etc (Municipal Solid Waste (Management & Handling) Rules , 2000, Solid Waste (Management & Handling) Rules 2016, National Urban Sanitation Policy Jawahar Lal Nehru National Urban Renewal Mission, Swachh Bharath Mission etc.) . This paper tries to make a brief analysis on policies, programmes and other legal developments behind solid waste management services in India.

Keywords: Solid waste, Municipal solid waste, Zero waste, Swachh Bharath, SwachhSurvekshan, etc.

Introduction

Globally, waste management is now becoming an immediate issue. Waste is an unavoidable outcome in human life and also in development activities. Quantity of waste is increasing quickly- even faster than the rate of urbanization (Hoornweg and Bhada-Tata 2012,10) Industrialization, substantial population growth due to rapid urbanization, economic development, changing living style a with modern consumer pattern are considered as the key factors contributes to generation of the huge quantity of waste in urban areas. Solid waste management is one of the basic services provided by the urban government in order to protect the basic right of humans.If, the urban government failed to provide an effective waste handling service makes direct threat to public health and the environment. Waste management services vary from region to region, developed nation to developing nation according to the different waste management mechanisms adopted by the regional and national governments. Waste minimization, reuse, recycle, and recovery are considered as the core objectives of solid waste management. In India, Urban Local Bodies are responsible for the handling of solid waste including segregation, collection, transfer, storage, treatment, and disposal of waste.

India is the second-largest populated country in the world with 1.21 billion (Census, 2011).According to Census 2011, 31.2 percent of the Indian population is living in urban areas (Census, 2011).Waste generation quickly increasing in nature in cities in India. According to the Central Pollution Control Board, the total quantity of waste generation in India is around 1.43 lakh metric tons per day. Out of which 82 percent are being collected and remaining 18 percent is littered. And only 28 percent of the collected waste is being treated (CPCB, 2016).

Planning Commission Report (2014) reveals that the urban area in India generated 62 million tones of solid waste per annum currently. The report projected that by 2031 these urban centers will generate 165 tons million tons of waste annually and by 2050 it will be 436 million tons (Planning Commission, 2014). Waste management services in India governed by the various manuals including laws, policies, missions, etc. History of solid waste management in India can understand through the comparative study of various laws, policies, and programs adopted by the Government of India.

In India, historically solid waste management was a neglected area. The policy intervention on municipal solid waste management can be traced back to the 1960s when the Ministry of Food and Agriculture of Government of India announced loans for composting of solid waste (MoUD, 2016; 14). After the plague outbreak in Surat (1994), Planning Commission constituted the J. S. Bajaj Committee in 1995 for study of waste management status in India and the committee made wide-range recommendations including waste segregation at source level, primary collection, levy of user charges, use of appropriate equipment, vehicles and focusing on composting and landfilling. In line with recommendation of Bajaj Committee, the Ministry of Health and Family Welfare initiated a National Mission on Environment Health and Sanitation while the Central Public Health Environmental Engineering Organisation (CPHEEO) under Ministry of Urban Development draft a policy paper that detailed a funding issues and requirements of municipal solid waste management (MoUD, 2016; 14-15). Half of the 1990's number of public interest litigation (PIL) filed in the Supreme Court of India against central, state and urban governments for their failure in solid waste management service. The result was that the Supreme Court-appointed an executive committee to the study of all aspects of solid waste management and to make appropriate recommendations for the improvement of waste management service. The committee submitted a final report to Supreme Court in 1999; the report consists of detailed recommendations regarding the action taken by the governments-central, state, urban to address all solid waste effectively. On the basis of this report, Supreme Court gives direction to the Central Government to take necessary steps regarding solid waste management in urban areas. The result was that the Ministry of Environment and Forest of the Government of India enacted Municipal Solid Waste (Management & Handling) Rules in 2000 under the Environment Protection Act, 1986. In lines with the Supreme Court intervention on solid waste management, the Government of India implemented various policies and programmes in the first and second decade of the twenty-first century like National Urban Sanitation Policy, Jawaharlal Nehru National Urban Renewal Mission, Swachh Bharath Mission, etc. In 2016 Government of India revamped Municipal Solid Waste (Management & Handling) Rules, 2000 under the name Solid Waste Management (Management & Handling) Rules, 2016. Therefore before learning the execution of solid waste management service in India It is necessary to understand what are legal frameworks and manuals behind it.

High Power Committee

The Planning Commission constituted a High Power Committee on Solid Waste Management (Bajaj Committee) under the chairmanship of J. S. Bajaj in 1995. The committee made an in-depth review of multidimensional issues concerning solid waste management in India and suggested suitable models for the development of cost-effective and environmentally friendly approaches to the improvement of solid waste management methods (Bajaj Committee, 1995).

Major Recommendation of Bajaj Committee

- ❖ Urban Solid Waste Management is a prime social service for the protection of the environment and public health. To develop cost-effective and appropriate options for safe management of solid waste. And to ensure safe management through the cooperation of municipal authorities with citizen, non- governmental organizations, institutions, and industries
- ❖ To ensure effective municipal solid waste management through;
 1. To segregate waste into biodegradable and non- biodegradable.
 2. To provide house to house waste collection in every day. Private agencies, non-governmental organizations, rag pickers or their cooperative may be involved in the primary collection of waste from household.
 3. For providing house to house collection service, every household may be charged on a monthly basis, which should be affordable. It may be vary with the status of property from where the refuse is collected.
 4. The pedal tricycle of appropriate design should be promoted for the house to house collection
 5. Community bins should have two separate compartments, one for organic and other for recyclable materials.
 6. Daily collection and transport of waste to the disposal site is essential
 7. Organic waste from markets should be collected at least twice a day and transported to composting facilities. To establish a biogas plant for the management of organic

waste. Construction and demolition waste should be collected separately and dumped at landfill sites.

8. Vehicles used for the transportation of solid waste should be covered

9. To dispose of waste through the landfill, composting, etc in environment-friendly

- ❖ To ensure safe handling of hazardous waste through incineration
- ❖ To ensure safe management of hospital waste
- ❖ To use available resources for safe waste management. And to the generated fund from recycle and reuse of solid waste
- ❖ To provide adequate and appropriate technical information to staffs for municipal solid waste management through training (Human Resource Development)
- ❖ Municipal authorities, non- governmental organizations and citizen organizations should be involved in a multimedia campaign to create awareness on the crucial role of citizens in ensuring the cities and its environment clean and appropriate solid waste and segregation and disposal practice.
 1. To providing awareness programmes to the citizen, administrators, and decision-makers about the health consequences of poor management of municipal solid waste.
 2. Municipal Solid Waste Management can be introduced in school and college curricula.

(Source: Bajaj Committee Report, 1995)

Municipal Solid Waste (Management& Handling) Rules, 2000

Municipal Solid Waste (M&H) Rules, 2000 enacted by the Government of India for ensuring the effective handling of municipal solid waste. As per these rules every municipal authority responsible for the collection, segregation, storage, transportation, processing, and disposal of municipal solid waste. The secretary in charge of the Department of Urban Development of the concerned state or the urban territory shall have the responsibility for the enforcement of the provisions of the Municipal Solid Waste (M&H) Rules 2000 in metropolitan cities. In the district level, District Magistrate or the Deputy Commissioner of the concerned district shall have the overall responsibility for the enforcement of the provisions within the

territorial limits of their jurisdiction. In lines with rules State Pollution Control Board before Committee has to authorize standards of waste handling and management, pollution control, quality control, etc. Central Pollution Control Board shall co-ordinate with State Board with particular reference to implementation and review of standards and guidelines and compilation of monitory data (MSW (M&H) Rules, 2000).

Waste Management under Municipal Solid Waste (M&H) Rules, 2000

- Collection of municipal solid waste:

According to Municipal Solid Waste (M&H) Rules, 2000, littering and burning of municipal solid waste is prohibited. The collection of waste in urban areas is to be organized house-to-house, community bins, etc. And the waste generator is to responsible for avoiding littering and ensure delivery of waste in accordance with collection and segregation system to be notified by the municipal authority

- Segregation of municipal solid waste:

The municipal authority has to organize awareness programmes for the segregation of waste and promoting recycling and reuse of segregate materials. And also ensure effective community participation (residential association and nongovernment organization) in waste segregation.

- Storage of municipal solid waste:

Storage facilities for waste management should be based on population densities and their waste generating potential. These should be aesthetically acceptable, covered and user-friendly. Storage facilities or bins should be easy to operate design for handling, transfer, and transportation of waste. Bin for storage of biodegradable was shall be painted green, white for recyclable waste and black for other waste. Manual handling of solid waste shall be prohibited; otherwise, proper precaution must be taken.

- Transportation of municipal solid waste:

As per these rules, only covered vehicles are to be used and multiple handing of waste, prior to final disposal to be avoided. Daily cleaning of solid waste is mandatory.

▪ Processing of municipal solid waste:

The municipal authority shall take suitable technology and or combination of technologies to make use of waste, so as to minimize the burden of landfill. For the disposal of biodegradable waste, composting, vermin composting, anaerobic digestion or any other appropriate biological processing are recommended. Mixed waste containing recoverable resources shall be recycled. Incineration of waste with or without energy is allowed only in specific cases.

▪ Disposal of municipal solid waste:

Landfilling is restricting only to non-bio degradable waste, inert, and other waste not suitable for recycling or biological processing.

Municipal Solid Waste (M&H), Rules, 2000 detailed implementation schedule. Setting up waste processing and disposal facilities and to be completed by December 31, 2003. Monitoring of waste processing and disposal facilities to be done once in six months. Improvement of existing landfills to be completed by December 31, 2001. The identification of future landfill sites was to be completed by December 31, 2002.

Source: MSW (M&H) Rules, 2000.

Solid Waste Management(Management & Handling) Rules,2016

In 2016, the Ministry of Forest and Climate Change revised the Municipal Solid Waste(M&H) Rules,2000 and renamed as Solid Waste Management(Management & Handling)Rules,2016 on 8 April 2016. The jurisdiction of Rules, 2016 have been extended beyond municipal area to cover, outgrowth in urban agglomeration, census town, notified industrial townships, areas under the control of Indian Railways, airport, airbase, port and harbor, defense establishment, special economic zone (SEZ), state and central government organization, place of pilgrims religious and historical importance. Municipal Solid Waste (Management & Handling) Rule 2000 only applies to every municipal authority. Through the effective

implementation of solid waste management, Rule, 2016, the objectives of Swachh Bharat can be achieved. And this rule emphasis segregation of waste at source, need for channelizing the waste to wealth by recovering, reverse and recycle. It helps in the reduction of landfill. Waste generators like households, event organizers, Resident welfare and market Association, etc have the responsibility to segregate waste at source in separate has and hand over to authorize waste collectors. Municipal Solid Waste (Management & Handling), 2000 did not address the collection and disposal of sanitary waste like diapers, sanitary pads, and other disposed items. (MSW (M &H) Rules, 2000) (SWM, Rules, 2016).

Ministry of Urban Development (MoUD) considered as the nodal ministry on solid waste management, shall frame National policy on Solid Waste management and coordinate with state, union territories provide, technical guidelines financial support, training to local bodies. Along with MOUD, Ministry of Environment, Forest and climate change (MoEF& CC), Ministry of Agriculture, Ministry of power, Departments of Fertilizers and Chemicals and Ministry of New and Renewable Energy are government authorities have the responsibility to solid waste management in India(SWM (M&H), Rule, 2016).

Ministry of Environment Forest& Climate Change (MoEF&CC) shall responsible for constitute the Central Monitoring Committee on Solid Waste Management to monitor and review every year. Ministry of Agriculture shall make flexible fertilizer control order, and also have the duty to promote utilization of compost, testing facility for compost and issue guidelines (SWM (M&H) , Rule, 2016).

Ministry of Power shall fix the tariff of power generation brown waste to energy projects and ensure distribution through companies. This will make the waste to energy plants economically viable and improve the gainful utilization of waste. Based on Solid Waste (Management and Handling)Rules, 2016 Ministry of New and Renewable energy source shall facilitate infrastructure creation for waste to energy plants and provide appropriate subsidy or incentives for such waste to energy plants. And this rule calls for the need for refund derived fuel. (SWM(M&H), Rule, 2016).

Solid waste management(M&H) Rules, 2016 provide the provisions regarding the imposition of user charge and fine, it will helpful for the improvement of waste collection and management and also strengthen the financial position of the local authority. Revised SolidWaste Management(M&H) Rules, 2016 detailed the duties of secretary, state Urban Development, the commissioner, Municipal Administration, Director of Local bodies, local authorities and village panchayats of census town and urban agglomerations. The Rule 2016, ensures that people participate in decision-making process stakeholders like waste pickers, Self Help Groups, Non-Governmental Organisations, have a significant role in policymaking level Solid Waste Management(M&H) Rules, 2016 is completely based on the sustainable development strategy. The Government of India undertakes many initiatives on municipal solid waste management since,2000 which include various policies and missions like JNNURM,UIDSSMTs, etc.

Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

JNNURM was launched by the Government of India in 2005. It is a reform-driven, fast track programme to ensure planned development of identified cities with a focus on efficiency in urban infrastructure, service delivery through the community participation and enhanced accountability of Urban Local Bodies. Under the flagship of JNNURM along with the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT), the Government of India sanctioned the 12th and 13th Finance Commission grants and funds were allocated for the improvement solid waste management(MoUD,2016).

A National Urban Sanitary Policy (NUSP), Plastic waste (Management and Handling) Rules, 2011 Biomedical Waste (Management and Handling) Rules, 2009 E-waste (M & H) Rules, 2011 etc considered as other rules and to give guidelines for the regulation of management of solid waste in the beginning of second decade of the twenty-first century.

National Urban Sanitation Policy

In 2008, the Government of India introduced National Urban Sanitation Policy. The policy broadly covers aspects of urban sanitation and municipal solid waste management. Under National Urban Sanitation Policy, municipal solid waste management should also be covered in the state sanitation strategy (SSS) and the city sanitation plan (CSP).

Swachh Bharat Mission (SBM)

The government of India launched Swachh Bharat Mission on 2 October 2014 with the objective of clean and development India. The mission will be tribute to Mahatma Gandhi on his 150th birth anniversary to be celebrated in the year 2019. Swachh Bharat Mission is being implemented by the Ministry of Urban Development and by the Ministry of Drinking Water and Sanitation for urban and rural respectively. The mission aims to provide basic infrastructural and service delivery with respect to sanitation facilities to every family, including toilets and adopting the scientific methods to collect, process and disposal of solid waste. And also focuses on quality and sustainability of the service provider as well as emphasizing the commitment on every stakeholder to bring about a visible change in society (MoH&UA, 2017).

Swachh Bharat Mission stipulates to build the capacities of urban local bodies strong in order to design, execute and operate all systems related to service provision. This requires a close linkage between planning, operationalizing and sensitizing of the sanitation and waste management service within the departments as well as the citizen for achieving the overall goal of Swachh Bharat Mission. Individual household toilets, community toilets, public toilets, solid waste management, IEC and public awareness, capacity building and administrative office expensive are the important components of Swachh Bharat Mission (MoH&UA, 2017).

Objectives of Swachh Bharat Mission

- Elimination of open defecation
- Eradication of Manual scavenging
- Modern and scientific municipal solid waste management
- To effect behavioral change regarding healthy sanitation practice
- Generate awareness about sanitation and its linkage with public health

- Capacity Augmentation for urban local bodies to create an enabling environment for private sector participation in capital expenditure and operation and maintenance

(Source: Ministry of Housing and Urban Affairs, 2017)

In addition to these objective other established goals are ;

- Start cleanliness from home
- Keep surrounding clean and green
- Keep the workplace neat and clean
- Dispose of garbage in the designated place
- Do not dump garbage in drainage and water bodies

Formulation of Detailed Project Report(DPR) is the outline and also one of the prime steps in solid waste management. Solid Waste Management Rules, 2016, National Urban Sanitation Policy, etc. are considered as the references or manuals for the preparation and implementation of Detailed Project Report. DPR consists of detailed technical and financial appraisal of concerned municipal authority and it will sanctioned by state-level High powered Committee. Projects in DPR will be sanctioned by state High-level committee and Ministry of Housing and Urban Affairs states will contribute a minimum of 40 percent share of funds for SWM projects to match 60% central share. Government of India releasing mass campaign through – various means including – radio, social media, document arise, plays workshop for public health and hygiene environment. The estimated cost of implementation of Swachh Bharat Mission in urban areas based on unit and per capita costs for its various components is Rs.62,009 crore(MoH&UA,2017).

SwachhSurvekshan

The Ministry of Urban Development of Government of India launched the SwachhSurvekshan to the study of the progress of Swachh Bharat Mission. The first study conducted in 2016, in which MoUD selected 73 cities for ranking in a timely and innovative manner. It is conducting annually, through which the Government of India declared the ranking position of selected urban cities or towns. The SwachhSurvekshan also intends to foster a spirit

of healthy competition among towns and cities to improve their service delivery to citizen, towards cleaner cleaning cities. Participation of citizen in these surveys considered as the effectiveness of Swachh Bharathabhiyan, which helps for the improvement citizen awareness on waste management. The social media and other traditional media are using at the national level, state level, city level in order to educate citizen about the swachhsurvekshan, and its methodology(MoUD,2017).

Source and Methodology of Data Collection for SwachhSurvekshan

Data for swachhsurvekshan mainly collected from three areas:

- A. Data collected from municipal bodies and interaction with officials
- B. Collection of data from direct observation; and
- C. Data collected from citizen feedback (MoUD,2017)

Collection of data from municipal bodies and interaction with officials:

Ministry of Urban Development (MoUD) shall ensure that the preliminary data needs to be collected in advance by a self-assessment from the municipal and other related agencies with regard to toilets and solid waste management.

Interaction with officials: With regard to the situation assessment is also part of this protocol. Care needs to be taken by the survey agencies that they collect and systematically analyze the data following the protocol set out below, and the process is independent and unbiased(MoUD,2017).

Collection of data from Direct Observation:

The collection of data from direct observation shall be based on physical observation of the survey agency. The questionnaire shall be used as a tool for data collection. The survey firm will use maps and simple handheld recording formats to record their observations and findings along with Photographs documentation will be undertaken. The survey agency will systematically collect photos as evidence for field observations. These must be properly documented with date or time or location parameters and presented to the MoUD as a part of

their contractual submissions, along with data and reports for each of the cities (MoUD, 2017). As a part of direct observation the survey agency shall be visiting the following places:

- Slum areas
- Neighborhoods including planned colony and unplanned colony
- Commercial or main public location including the main market area, religious place, main bus station, and main railway station
- Bulky waste generators including hotels, vegetable markets, banquet hall, etc.
- Community toilets
- Public toilet

Collection of data from Citizen Feedback:

Sample size to be 1000 citizens in the city or 0.1% of the city population, whichever is less. Discussions with local citizens to be carried out to ascertain and confirm data on certain indicators. The questionnaire shall be used as a tool for data collection. The database of phone numbers (ward wise) shall be provided by the urban local bodies. In the absence of sufficient data from the urban local body, a third-party vendor's database may be used for the town or city. Feedback from citizens can be obtained using tools such as IVR based surveys, social media, etc.(MoUD, 2017).

Cities are evaluated based on the mark given in each area. The weightage of citizen feedback has been 30 percent, the weightage of urban local body response has been 45 percent and the weightage for the independent observation has been 25 percent (MoUD,2017).

Swachhsurvekshan used six parameters for evaluation of effective waste management (MoUD, 2017).

- ✓ Open Defecation Free (ODF) town and integrated solid waste management(ISWM)
- ✓ Information, Education and Behavioral Change Communication(IEBC)
- ✓ Processing and Disposal
- ✓ Public and Community Toilet Provision
- ✓ Individual Toilets

Swachhsurvekshanis mainly focused on centralized solid waste management system rather than decentralized system because the evaluation in solid waste management is mainly based on the percentage of house to house waste collection, its transportation with Global Positioning System(GPS) or Radio Frequency Identification (RFID) based tracking technologies for monitoring, and its treatment before final disposal(G. Prathibha(2017);27).

Waste Management Rules, 2016, Comprising of Solid Waste Management Rules, Plastic Waste Management Rules, 2016, Bio-Medical Waste Management Rules 2016, E-Waste Management Rules, 2016, Hazardous and Other Wastes (Management and Trans Boundary Movement) Rules, 2016 and Construction and Demolition Waste Management Rules, 2016 are the other legal framework of Government of India on waste management.

Conclusion

Solid waste handling is as old as human history. And now, solid waste handling is becoming cross-cutting problem. Authorities at regional, national and international levels give prime importance to solid waste management, in order to seek to reduce the environmental causes (air, water, soil, etc.), public health causes and ozone depletion. Unscientific management of solid waste both at primary and secondary level create a worse situation. Waste minimization, reuse, recycle, and recovery are considered as the objectives of solid waste management, through the attainment of these objectives environmental and health causes can be reduced.

Historically solid waste management in India was a neglected area. After the Supreme Court intervention on Solid Waste Management, the Government of India started to undertake some initiatives. The first initiative from the part of Ministry of Environment Forest and Climate Change enacted Municipal Solid Waste (Management& Handling) Rules, 2000, and this rule give guidelines to municipal authorities on municipal solid waste service. Environment Protection Act.1986 is considered as the basis of all rules, policies, and programmes on waste management. Jawaharlal Nehru National Urban Renewal Mission, National Urban Sanitation Policy, Urban Infrastructure Development Scheme for Small and Medium Towns are other manuals launched by the Government of India for the infrastructural improvement of waste management in urban cities.

Waste management vision of India now comes under the Swachh Bharat Mission, it is a mass campaign programme launched in 2014. The mission framed based on Mahatma Gandhi's views on clean and developed India and aim to make clean India within the mission period of 2nd October 2019. As a part of this mission Ministry of Urban Development conducted 'SwachhSurvekshan', it is a survey to study the progress of Swachh Bharat Mission through the evaluation of the delivery of waste management service in selected cities in India. In 2016, the Government of India revamped Municipal Solid Waste (Management& Handling) Rules, 2000 and renamed Solid Waste (Management& Handling) Rules, 2016. The Rules 2016 ensure effective implementation of established objectives of the Swachh Bharat Mission. Solid Waste (Management& Handling) Rules, 2016 differs from the earlier rule, the new rule, call for segregation of waste at resource level and innovation of economically viable technologies for utilization of non-organic materials.

The government of India introduces a number of initiatives on waste management from time to time. Yet India didn't have 100 percent successive economic viable, and eco-friendly solid waste management mechanism. Almost all urban local bodies in India failed to ensure house to house collection of waste due to lack of adequate land. Public apathy towards solid waste management leads to generation of mixed waste and its illegal disposal of waste at roadsides, water bodies, open area, etc. releasing environmental pollution and health hazardous. Responsible authorities failed to take necessary steps on illegal disposal of waste and not charge punishment. Segregation of mixed waste before final disposal is very labor-intensive and also very expensive. Lack of coordination, administrative inefficiency, scarcity of finance, lack of adequate land for safe disposal of waste are the main constraints on implementation of effective solid waste mechanism throughout India. Almost all municipal authorities are not following the available guidelines and there existed a wide gap between existing solid waste practice and rules.

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