

Municipal Solid Waste Management by NMSHS

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Abstract: Solid waste management systems adopted in Indian cities/towns are highly inefficient and outdated, lacking public participation. This paper presents urbanization challenges in India and initiatives taken to address them and to highlight one of the initiative i.e. National Action Plan for Climate Change (NAPCC) 2010 which is categorized into eight missions and one of the eight missions is the National Mission for Sustainable Habitat Standards (NMSHS) which address solid waste management issue to make it sustainable and give legal recognition to the informal sector on the other hand one of the deliverables of the Mission is the formulation of National Sustainable Habitat Standards. For improving solid waste management practices in urban areas, it is essential to incorporate suitable mandatory provisions in the state laws and frame municipal bye laws to ensure Stake Holders' active participation and minimum level of service delivery by Municipal Authorities.

Keywords: Solid Waste; Standard; Services; Mission; Habitat; Sustainable.

INTRODUCTION

Urban India is facing a huge challenge to cope with the infrastructural requirements of the everincreasing population. According to the 2011 census, population of India was 121 crores (1.21 billion) of which 31% live in cities. It is projected that by 2050 half of India's population will live in cities Municipal Solid Waste Management (MSWM) remains a major infrastructure requirement that needs to be improved. Approximately 50 million metric tonnes (115,000 metric tonnes per day) of solid waste is generated every year by the urban population in India. The per capita generation of waste in

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Indian cities ranges from 0.17 kg to 0.62 kg/capita/day depending upon population size and its socio-economic profile. Segregation at source, collection, transportation, treatment and scientific disposal of waste is largely insufficient leading to degradation of environment and poor quality of life.

India generates more than 40 million tonnes of municipal waste annually from urban centers¹ which is collected poorly (average collection efficiency is 72%, **Figure-1**), transported inadequately (70% cities lack required transportation capacities) and disposed unscientifically (no sanitary landfill for municipal wastes exists, **Figure-2**)². Considered as a low priority area, solid waste management (swm) was never taken seriously, either by public or by concerned agencies. Prevailing swm systems in Indian cities are publically operated through municipalities, which are already overburdened and have not been very effective as far as services are concerned. People involvement is normally limited to payment of some obscure and indirect taxes. Moreover, there is an absence of well-formulated guidelines and policies regarding waste management services³.



Figure-1: Solid waste collection efficiency in different states of India. Source: Data sourced from Sharholy *et al.*⁴



Figure -2: Municipal waste disposal practices in Indian cities. Source: Data sourced from Kumar *et al.*⁵.

OBJECTIVE

The primary objective of this paper is to discuss and highlight the Government of India policies initiatives which are highly beneficial for the urban local bodies and municipal authorities to incorporate laws and by-laws more systematically while planning, designing and implementing a comprehensive solid waste management system to achieve service level benchmarks.

Government of India Initiatives for Solid Waste Management:

Jawaharlal Nehru National Urban Renewal Mission (JNNURM): As a response to the increasing stress on urban infrastructure and basic services for poor, the Government of India launched a massive investment and reform programme in December 2005. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) provides infrastructure improvements in 65 Indian cities including seven mega cities. The primary objective of the JNNURM is to create economically productive, efficient, equitable and responsive cities. The reform programme has two major components. The first component is substantial investment in urban infrastructure wherein 50% of the investment is contributed by the Central Government and the remaining 50% is jointly contributed by the respective State Governments and the Urban Local Bodies (ULBs) depending on their population. The second component comprises of mandatory reforms to be undertaken at the respective State and ULB level to ensure good governance and financial sustainability of the proposed interventions. Municipal Solid Waste Management is one of the key issues being addressed under the JNNURM reform programme⁶.

Municipal Solid Waste Management and Handling Rules, 2000: In 2000, the MoEF notified the Municipal Solid Waste (Management and Handling) Rules (MSW (M&H) Rules) for all Indian cities⁷. The Rules contained directives for all ULBs to establish a proper system of waste management including a timeline for installation of waste processing and disposal facilities by end of 2003.

To improve the MSWM systems in the cities the following seven directives were given:

- 1. Prohibit littering on the streets by ensuring storage of waste at source in two bins; one for biodegradable waste and another for recyclable material.
- 2. Primary collection of biodegradable and non-biodegradable waste from the doorstep, (including slums and squatter areas) at pre-informed timings on a day-to-day basis using containerized tricycle/hand carts/pick up vans.
- 3. Street sweeping covering all the residential and commercial areas on all the days of the year irrespective of Sundays and public holidays.
- 4. Abolition of open waste storage depots and provision of covered containers or closed body waste storage depots.
- 5. Transportation of waste in covered vehicles on a day to day basis.
- 6. Treatment of biodegradable waste using composting or waste to energy technologies meeting the standards laid down.
- 7. Minimize the waste going to scientifically engineered landfills (SLFs) and dispose of only rejects from the treatment plants and inert material at the landfills as per the standards laid down in the rules.

Government of India has started to generate competition through service level benchmarks amongst cities and states. The MoUD has formulated Service Level Benchmarks for the basic urban services of SWM, water supply, sewerage and storm water drainage with an aim to improve performance of the ULBs and therefore the service delivery to the community. The SWM benchmarks include 8 aspects:

- 1. Household level coverage of SWM services
- 2. Collection efficiency
- 3. Extent of source segregation at consumer level
- 4. Extent of waste reused/recovered/recycled
- 5. Extent of scientific disposal
- 6. Extent of cost recovery
- 7. Efficiency in redressal of customer complaints and
- 8. Efficiency in collection of user charges.

However, by end of 2003, the goal was still far away. A survey was conducted in 2004 in order to assess the nature of compliance to MSWM&H Rules, in urban areas and 128 Class I cities responded.

Figure-3 presents an overview of the study and the nature of compliance achieved. It is evident that the Rules had not resulted in proper infrastructure development for scientific treatment and disposal of waste. Unavailability of funds was largely blamed for non-compliance of the rules.



Source: Asnani. P.U., 2004

Figure-3: Nature of compliance achieved in Solid waste management

National Mission for Sustainable Habitat Standards (NMSHS): This National Action Plan for Climate Change, 2010 (NAPCC) is categorized into eight Missions⁸. One of the eight Missions is the 'National Mission on Sustainable Habitat'. A part of this Mission is to address solid waste management to make it sustainable. The NAPCC stresses the provision in the NEP for giving legal recognition to the informal sector, which it recognizes as the "backbone of India's highly effective recycling system". One of the guiding principles of the NAPCC is also "Protecting the poor and vulnerable sections of society through an inclusive and sustainable development strategy, sensitive to climate change."

The NEP and NAPCC are exceptional in their recognition of the informal sector and the need for inclusive growth. The planning documents prepared by the Ministry of Urban Development in furtherance of these policies however have fallen short on this count. For example, the Plan for Implementation of National Mission on Sustainable Habitat (2011), the National Sustainable Habitat Standards for Municipal Solid Waste Management (Nov 2011) and the Guidance Note on Solid Waste Management at a Regional Level, all suggest public private partnerships and the use of technology, relegating to the side-lines the provisions relating to the informal sector. This stands true for the JnNURM or Jawaharlal Nehru National Urban Renewal Mission as well⁶.

Keeping the above background in mind, the committee recommends that the following principles be incorporated in legal provisions/ bye laws by the Union, State Governments and Municipal Authorities. At Govt. of India level, the MSW Rules 2000 need to be amended in consultation with various stakeholders with a view to remove the barriers in implementation of MSW Rules, 2000. Adequate provision should be made in the MSW Rules, 2000 to initiate legal action against the Municipal Authorities under provisions of Environmental Protection Act, 1986 and the MSW Rules, 2000. The State

Govt. may modify the State laws with a view to impose penalty on the Municipal Authority in the form of deduction of Govt. grants (State/Central) till they comply with the aforesaid directions and those contained in the MSW Rules, 2000. The ULBs shall modify their municipal by-laws in the context of MSW Rules suitably incorporating the provisions made therein after amendment of MSW Rules, 2000. Apart from this the following rules and guidelines are applicable for management of waste which is depicted in **Table-1**.

S.	Legal Provision	Duty of ULB/Municipal Authority
No.		
1	Duty of occupiers of premises to store solid waste at source of generation	It shall be incumbent on the occupiers of all premises to keep two receptacles, one for the storage of food/organic/bio-degradable waste and another for non bio-degradable/ recyclables and other types of solid wastes generated at the said premises. The hazardous waste generated by households to be notified by State Government from time to time, shall however be kept separately in a suitable container as and when such waste is generated.
2	Duty of municipal Authority to collect domestic, trade and institutional waste from the source of waste generation	Municipal Authority shall arrange for door to door collection and/or community bin collection of domestic, trade and institutional waste stored by waste generators in a segregated manner through its own staff or NGO/CBO/RWA/Private Sector on a day to day basis; and may levy and collect. or permit to collect, user charges to meet the cost of providing this service.
3	Municipal authority to identify & allocate suitable locations to facilitate sorting of recyclable waste.	The Municipal Authorities may identify and allocate suitable pieces of land in their Jurisdiction to facilitate sorting of various components of recyclable material collected by waste collectors and prevent such activities being carried out on the footpaths, road side, etc.
4	Duty of occupier of households / shops / establishment to hand over the bio – degradable,	It shall be incumbent on households / shops / establishments and all other waste generators to hand over their segregated bio – degradable, recyclable waste and Non-bio-degradable wastes to waste collectors of the municipal authorities, or any agency fixed by the municipal authorities as may be notified by the Municipal Authorities from time to time, and pay the user fees as may be prescribed by Municipal Authority. Such waste shall not be

Table-1: Legal Provisions for Management of Solid Waste

	recyclable	disposed of on the streets, open spaces, water bodies etc.
	material / non-	
	bio-degradable	
	waste to the	
	waste collectors	
5	Duty of	In a situation where door to door waste collection system could not be
	Societies/Associa	introduced, by the municipal authority, it shall be incumbent on the
	tions/Managemen	management of Co-operative Societies, Associations, Residential and
	t to provide	Commercial Complexes, Institutional buildings, markets and the like to
	community bins	provide community bins of appropriate size in a manner as may be
		prescribed by Municipal authority, for the temporary storage of bio -
		degradable waste as well as recyclable waste and domestic hazardous waste,
		to facilitate primary collection by the municipal authorities.
6	Receptacles to be	Receptacles community bins shall at all times be kept in good repair and
	kept in good	condition and shall be provided in such number and at such places as may be
	repair	considered adequate and appropriate to contain the waste produced by the
		citizens supposed to be served by the community bins.
7	Duty of occupiers	It shall be incumbent on occupiers of all premises for whom community bins
	to deposit solid	have been provided as per 5 above, to cause all segregated domestic solid
	waste in	waste, trade waste, institutional waste from their premises to be deposited in
	community bins	the appropriate community bins.
8	Duty of	It shall be incumbent on the Municipal Authorities to either Provide and
	Municipal	hygienically maintain adequate covered waste storage depots in the city or
	Authorities to	place at such depots large mobile covered Containers / receptacles of green
	provide	colour for Separate storage of Organic/ bio- degradable waste collected from
	temporary Waste	households, shops and establishments and black containers for storage of
	storage depots	waste collected from streets and public spaces until the waste is transported
		to processing and disposal sites or arrange for direct transportation of such
		segregated waste from the source of generation to the treatment or disposal
		site. They shall also make adequate provision for the safe deposition of
		domestic hazardous waste material by the citizens as may be notified and
		arrange for their collection and safe disposal.
9	Duty of	At places where waste is stored in community bins shall be incumbent for
	Municipal	Municipal Authorities, or an appropriate party contracted by the Authority,
	Authorities to	to remove all solid waste deposited in community bins on a daily basis and
	collect waste	transfer it to the temporary Waste Storage depots/containers identified in the
	from community	city or make suitable arrangement for direct transportation of organic/bio –
	bins and to	degradable waste to the transfer station or treatment plant and non-
	deposit it at Bulk	Biodegradable/ inert waste to the disposal sites.
	Waste Storage	
	depots for	
	onward transport	
10	Duty of	It shall be incumbent on Municipal Authorities to arrange for sweeping of all
	Municipal	public streets having habitation/commercial activity on both or either side
	Authorities to	and all slums on all days of the year including Sundays and public holidays.
	arrange sweeping	The Municipal Authorities shall also arrange cleaning of all public spaces at
	of all public	regular intervals and keep them clean.

	streets and slums	
11	Duty of	It shall be incumbent for the Municipal Authorities to arrange for the
	Municipal	transportation of waste stored at waste storage depots on a daily basis and
	Authorities to	ensure that waste is transported before the waste storage containers start
	transport the	overflowing at places where covered containers are placed.
	waste stored at	
	the waste storage	
	depot regularly.	
12	Municipal	Municipal Authorities shall undertake construction of engineered landfills on
	Authorities to	priority as per the provisions of MSW Rules 2000 and ensure that no MSW
	construct	is disposed of at any place other than engineered landfill. This shall be done
	engineered	in a time bound manner in conformity with Municipal Solid waste
	landfills and	(Management & Handling) Rules 2000 Municipal Authorities shall
	sotup trootmont	simultaneously promote the processing of Municipal Solid waste and shall
	facilities to	simultaneously promote the processing of white par solid waste and shall raduate the weste going to lendfill by adopting the concept of Paduae Pause
		reduce the waste going to land in by adopting the concept of Reduce, Reuse,
	minimize the	recover & Recycle (RRRR). The Municipal Authorities shall reduce the
	waste going to	waste going to landfills each year in phased manner (at-least 15% each year)
	landfills.	to achieve not more than 20% waste to be landfilled after a 5 year period.
10		
13	Municipal	It shall be the discretion of the Municipal authority, depending on the
	Authority to have	physical and chemical characteristics of the waste, to determine the treatment
	freedom to select	of Municipal Solid waste either through composting or waste to energy
	appropriate	technology, or integrated technologies in accordance with Municipal Solid
	technology	Waste (Management & Handling) Rules 2000.
14	Bio-degradable	a) Municipal Authorities shall ensure that the street sweepings and Bio –
	waste not to mix	degradable waste collected during door to door collection are not allowed to
	with inert wastes	mix with inert wastes such as street sweepings, Construction debris, Bio –
	such as street	Medical Wastes. The domestic, trade and institutional waste collected from
	sweepings,	the door step, (other than recyclable material, if allowed to be taken away by
	Construction	waste Collectors), kept in separate bins, should be taken to treatment plants;
	debris, Bio –	and street sweepings, dust and silt from the drains, which are generally inert,
	Medical Wastes	stored separately in black bins should be taken directly to disposal site to
	etc.	minimize the burden of segregation of inert waste at the treatment facility.
		b) The construction debris should be collected separately and should not to
		be allowed to mix with the waste stream leading to treatment facility, nor
		should it be taken to the engineered landfill. Such inert waste may be used
		for filling in low lying areas or may be recycled or used for other profitable
		purposes as deemed fit. Construction debris may however be used as a cover
		material at the landfills to the extent it is considered necessary.
		c) The Bio-medical waste and industrial hazardous waste should not be
		allowed to mix with Municipal solid waste. They should be dealt with
		according to the Rules framed for management & handling of such wastes by
		MOEF, GOI. An appropriate framework for reporting of incidents of mixing
		of bio-medical and / or industrial hazardous waste with municipal solid
		waste should be formulated, so that they may be controlled.
15	Prohibition	No person shall deposit or cause or permit to be deposited any building
	against	rubbish in or along any street, public place or open land except at a place

	deposition of	designated for the purpose and in conformity with conditions laid down by
	building rubbish	the municipal Authorities.
16	Prohibition on	No person shall deposit or otherwise dispose of the carcass or parts of any
	disposal of	dead animal at a place not provided or appointed for this purpose.
	carcasses etc.	
17	Penalty for non-	Whosoever fails to segregate Bio-degradable & non bio degradable wastes
	segregation of	from domestic, trade and institutional waste at Source or litters the streets /or
	waste or littering	public places or deposits or throws or causes or permits to be deposited or
	on streets and	thrown any solid waste or construction debris or carcasses at any place in
	depositing or	contravention of the provisions of this Act/ Bye Law or permits the flow of
	throwing any	any filthy matters from his premises shall be punished on the spot with a fine
	solid waste in	in the range of Rs.100 to 5000 as may be prescribed under the Rules framed
	contravention of	by the State Govt. or by the Municipal Authorities under the byelaws for
	the provisions of	various types of waste generators from time to time. Such spot fines may be
	this Act/Bye	imposed and collected by officers and Supervisory Staff authorized by the
	Law.	Municipal Authorities including Police personnel. The amount of fine
		imposed, if not paid on the spot, shall be recoverable as arrears of Property
		Tax or in any other manner deemed appropriate by the Municipal Authority.
		The Municipal Authority may also recover the cost of removal such waste
		from the defaulter in addition to fine imposed. The amount of fine shall be
		kept higher for repeat offences.
18	Sanctions against	If the Municipal Authority fails to discharge its obligatory functions under
	municipal	MSW Rules, 2000 or the direction given in aforesaid provisions of the Act,
	authority failing	on the recommendation of the State Pollution Control Board, or on its own,
	to comply with	the State Govt. may impose penalty on the Municipal Authority in the form
	MSW Rules,	of deduction of Govt. grants (State/Central) ranging from Rs. 50000 to 5 lacs
	2000 or Provision	per month till they comply with the aforesaid directions and those contained
	of this Act.	in the MSW Rules, 2000. This would be besides the legal action that could
		be taken against the Municipal Authorities under provisions of
		Environmental Protection Act, 1986 and the MSW Rules, 2000. The
		Municipal Authorities, may in turn, fix the responsibility of officers and staff
		for non-performance and impose punishment as deemed appropriate.
19	District	In absence of availability of suitable land for construction of municipal solid
	Collector/Deputy	waste treatment and disposal facilities, and on request from a municipal
	Commissioner to	authority to allot suitable land for the aforesaid purpose, the district
	allot suitable	collector/deputy commissioner of the district shall identify and allot suitable
	parcels of waste	parcels of waste lands, (and in absence of waste land, relatively less
	land/less	productive land), for setting up waste processing/treatment facility and
	productive	engineered landfill for the municipal authority at a price that may be
	agriculture land	determined by the State Govt. In order to optimize the use of the land for the
	for setting up	benefit of several such Authorities, the State Govt. may also identify a
	municipal solid	suitably large parcel of land, using satellite imagery, for setting up regional
	waste treatment	(common) landfill for clusters of cities / towns, within a reasonable travel
	and disposal	distance from the Town/Cities. As a preferred course of action, the State may
	facilities.	direct all the Municipal Authorities below 10 Lac populations falling in the
		clusters so determined to set up a common waste disposal facility on such
		land on a cost sharing basis. It is desirable for State Governments to create a

		suitable policy framework to enable shared facilities to be implemented. The
		modus-operandi for construction & O & M of such common facility may be
		determined by State Govt.
20	Planning	The Planning authority of the State / region/ District/ City shall reserve
	authorities to	suitable land for treatment and disposal of municipal Solid waste in the
	reserve suitable	development plan/ land use plan of the city / district /region and state, as and
	land for treatment	when prepared / approved by them.
	and disposal of	
	Municipal Solid	
	wastes.	

Policy Implications: Managing waste is a complex task that requires changes in consumption and waste production patterns, appropriate technology, organizational capacity, and co-operation among a wide range of stakeholders⁹. Data on waste management should be collected, although complete and reliable data are extremely difficult to obtain¹⁰. Municipal and national governments can help fill data gaps by developing waste data strategies, as produced by the Scottish Environment Protection Agency, and by ensuring statutory reporting requirements are met. Research institutions and universities have a role to play — finding cleaner, greener ways to process waste and discovering viable ways to extract energy from waste.

Ultimately, waste management presents an opportunity, not only to avoid the detrimental impacts associated with waste, but also to recover resources, realise environmental, economic and social benefits and to take a step on the road to a sustainable future. Decision makers, responsible for planning and policy making, need to be well informed in order to develop integrated waste-management strategies adapted to the needs of citizens¹¹. When informed decisions about waste management are made and applied to the circumstances that prevail, waste can even provide economic value.

MSW management has not always been a high priority for local and national policy makers and planners, especially in developing countries. Other issues with more social and political urgency might take precedence and leave little budget for waste issues¹². Thus, in many cities around the world, effective, functioning policy measures have been elusive and the resources invested in the sector inadequate¹³. National governments can make a critical contribution by making waste management a national priority. They can also ensure the availability of skills, knowledge, and capacity to implement waste management programs effectively, especially at the local level, helping turn garbage to "gold."

CONCLUSIONS

Implementation under MSWM Rules 2000 it was felt that urban bodies face challenges in zeroing down methods of collection and transportation, treatment technology selection and disposal methods. Also, it was felt that many urban local bodies are unaware of the applicable rules and regulations in Municipal Solid Waste Management. This shortcoming also retards SWM progress as implementers take time to gather information from various sources to understand the sector as there is no nutshell document that provides comprehensive information about the sector. This toolkit is an attempt by the Ministry of Urban Development to provide a simple, yet comprehensive document about the sector, applicable rules and regulations, methods of project implementation, etc., which will ease understanding of the sector and hence improve SWM progress. For improving solid waste management practices in urban areas, it is essential to incorporate suitable mandatory provisions in

the state laws and frame municipal by laws to ensure Stake Holders' active participation and minimum level of service delivery by Municipal Authorities. It is observed that, besides educating the masses to effectively participate in SWM services, some punitive actions need to be taken against those who do not adhere to the direction given to protect public health and environment.

REFERENCES

- 1. World Bank. "Improving Management of Municipal Solid Waste in India: Overview and Challenges." 2006.
- 2. A. Kansal. "Solid waste management strategies for India." *Indian Journal of Environmental Protection*, 2002, 22, no.4, 444–448.
- 3. A. Kansal. "Critical appraisal of solid waste disposal technologies." *Indian Journal* of *Environment Protection*, 2001, 19, no.3, 83–96.
- 4. M. Sharholy, K. Ahmad, G. Mahmood and R. C. Trivedi. "Municipal solid waste management in Indian cities A review." *Waste Management*, 2008, 28: 459–467.
- S. Kumar, J. K. Bhattacharyya, A.N. Vaidya, T. Chakrabarti, S. Devotta, and A. B. Akolkar. "Assessment of the Status of Municipal Solid Waste Management in Metro Cities, State Capitals, Class I Cities and Class II Towns in India: An Insight Central Pollution Control Board (cpcb), National Environmental Engineering Research Institute (neeri)." *Waste Management. 2009*, 29: 883–895.
- 6. JNNURM, Jawaharlal Nehru National Urban Renewal Mission, Toolkit for Solid Waste Management, Ministry of Urban Development, Government of 2012, 2-5.
- 7. Municipal Solid Waste Management and Handling Rules, Ministry of Environment and Forests Notification, New Delhi, September, 2000. 5-6.
- NAPCC National Action Plan on Climate Change, National Mission on Sustainable Habitats, A report by CII –ITC Centre of Excellence for Sustainable Development and Digital Energy Solutions Consortiums., 2010, 35-38.
- M. Zarate, J. Slotnick, M. Ramos. Capacity building in rural Guatemala by implementing a solid waste management program. *Waste Management*, 2008, 28(12), 2542-2551.
- D. Wilson, L. Rodic, A. Scheinberg, C. Velis and G. Alabaster. Comparative analysis of solid waste management in 20 cities. *Waste Management & Research*, 2012, 30, 237-254.
- 11. L. Guerrero, G. Maas, W. Hogland. Solid waste management challenges for cities in developing countries. *Waste Management*, 2013, 33(1), 220–232.
- 12. M. Memon. Integrated solid waste management based on the 3R approach. *Journal* of Material Cycles and Waste Management, 2010, 12, 30–40.
- 13. F. Konteh. Urban sanitation and health in the developing world: reminiscing the nineteenth century industrial nations. Health & Place, 2009, 15, 69–78.

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