Muncipal Solid Waste: Challenge of 21st Century

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Abstract

Rapid population growth, urbanization and economic development in India, there have been a significant increase in Municipal Solid Waste generation. Municipal Solid Waste Management has become a major environmental issue in urban areas. The urban population of 582 million is expected to reach 852 million by 2020. The waste generated to increase from 65 million tons to 85 million tons in 2020. About 90% of the generated wastes are land filled requiring about 1200 hectares of land every year. Because of the lack of civic awareness among city residents it is proving to be a major hurdle to maintain their streets clean. The problem is more acute in slums and low and middle income group areas. To keep the environment clean, the residents should deposit the waste into the municipal bins and stop the practice of throwing garbage on the road sides.

The municipal authorities should also adopt scientific methods to collect, transport and dump into the properly planed landfills to avoid contaminations and the way to global warning.

Key words : Urbanization, Population growth Municipal Solid Waste, and landfills.

Introduction

India, the world's second highest populated country and one of the fastest urbanizing Countries in the world. Because of rapid population growth and economic development in the country, there has been a significant increase in Municipal Solid Waste Generation in India. It is estimated that Solid Waste generated in Small medium and large towns and cities in India is about 100 grams, 300-400 grams and 500 grams per capita per day respectively. National Environmental Engineering Research Institute (NEERI), Nagpur, has provided extensive services to municipal bodies in India to improve their Municipal Solid Waste Management (MSWM) System. MSWM continues to remain one of the most neglected areas of urban development in India. However, Shekdar ef of. (1991) Suggested several steps to improve MSWM system.

The present paper deals with the present practices of MSWM, Problems, best practices, future scenario, National Plan and the recommendations of Expert Committee (l959). Also discusses the impact on the environment and health.

Practics Present Management:

The estimated annual increase in per capita waste quantity is about 1.33% per year. The quantities of Municipal Solid Waste generation in metro cities of India are detailed in table-1 (CPCB, 2019). The physical composition of the waste is obtained as a percentage of the different constituents as detailed in table-2 (CPCB; 2019). According to Jalan et al., (1995) the metals, paper, plastics, glass, cardboard etc. are readily marketable for recycling, are picked up by Rag-pickers.

The community storage system is usually Practiced in India. Domestic Waste generated at households is generally accumulated in small containers of different types and sizes. These waste dumped in the large bins located at street corners. Most of the times either due to the absence of adequate storage facility or lack of awareness the waste generated and poor discipline among the generators, the wastes are continually dumped on the road sides (Boyar et.al., 1996). Now the rag-pickers, stray animals and domestic animals visit these sites to pickup their requirements available in the waste.

Municipal Vehicles (tractor-trailers, trucks or compactors) are used to lift the waste and transported to the dumping sites.

According to Kurian Joseph (2002), municipal authorities feel that the lack of civic awareness among city residents is proving to be a major hurdle to maintain the city clean. The problem is most acute in slums and low and middle income group areas. It will be nearly impossible for the civic bodies to provide better and healthy surroundings if residents do not take efforts to deposit the waste into the municipal bins and stop the practice of throwing garbage on the roads.

TABLE – I Solid Waste Management in Class I Cities in India.

Status of Municipal Solid Waste Generation in Metro Cities in India (CPCB, 2019)

Sl.No.	Metro City	Municipal Population	Municipal Solid Waste (tones/ day)	Per capita generated (Kg day)
1	AHMEDABAD	28,76,710	1683	0.585
2	BANGALORE	41,30,Z88,	2000	0.484
3	BHOPAL	1062,771	546	0.514
4	MUMBAI	1,22,88,519	2355	0.436
5	KOLKATA	1,06,43,211	3692	0.347
6	COIMBATORE	8,16,321	350	.0.429
7	DELHI	84,19,084	4000	0.475
8	HYDERBAD	40,98,734	1566	0.382
9	INDORE	10,91,674	350	0.320
10	JAIPUR	14,58,483	580	0.398
11	KANPUR	18,74,409	1200	0.640
12	KOCHI	6,70,009	347	0.518
13	LUCKNOW	16,19,115	1010	0.624
14	LUDHIANA	10,42,740	400	0.384
15	CHENNAI	47,52,976	3124	0.657
16	MADURAI	9,40,989	370	0.393
17	NAGPUR	16,24,752	443	0.273
18	PATNA	9,17,243	330	0.360
19	PUNE	22,44,196	700	0.312
20	SURAT	14,98,817	900	0.600
21	VAODODARA	10,31,346	400	0.388
22	VARANASI	10,30,863	412	0.400
23	VISAKHAPATNAM	7,52,037	300	0.399
	Total/Average	6,68,85,287	30058	0.449

TABLE-2

Characteristics of Municipal Solid Waste generated by Metro cities (CPCB, 2019)

Sl. No.	Metro City	Characteristics (% by Weight)							
		Paper	Textile	Leather	Plastic	Metal	Glass	Ash, fine earth and others	Compo-stable matter
1	AHMEDABAD	6.0	1.0	-	3.0	-	-	50.0	40.00
2	BANGALORE	8.0	5.0	-	6.0	3.0	6.0	27.0	45.00
3	BHOPAL	10.0	5.0	2.0	2.0	-	1.0	35.0	45.00
4	MUMBAI	10.0	3.6	0.2	2.0	-	0.2	44.0	40.00
5	KOLKATA	10.0	3.0	1.0	8.0	-	3.0	35.0	40.00
6	COIMBATORE	5.0	9.0	-	1.0	-	-	50.0	35.00
7	DELHI	6.6	4.0	0.6	1.5	2.5	1.2	51.5	31.78
8	HYDERBAD	7.0	1.7	-	1.3	-	-	50.0	40.00
9	INDORE	5.0	2.0	-	1.0	-	-	49.0	43.00
10	JAIPUR	6.0	2.0	-	1.0	-	2.0	47.0	42.00
11	KANPUR	5.0	1.0	5.0	1.5	-	-	52.5	40.00
12	KOCHI	4.9	-	-	1.1	-	-	36.0	58.00
13	LUCKNOW	4.0	2.0	-	4.0	1.0	-	49.0	40.00
14	LUDHIANA	3.0	5.0	-	3.0	-	-	30.0	40.00
15	CHENNAI	10.0	5.0	5.0	3.0	-	-	33.0	44.00
16	MADURAI	5.0	1.0	-	3.0	-	-	46.0	45.00
17	NAGPUR	4.5	7.0	1.9	1.25	0.35	1.2	53.4	30.40
18	PATNA	4.0	5.0	2.0	6.0	1.0	2.0	35.0	45.00
19	PUNE	5.0	-	-	5.0	-	10.0	15.0	55.00
20	SURAT	4.0	5.0	-	3.0	-	3.0	45.0	40.00
21	VAODODARA	4.0	-	-	7.0	-	-	49.0	40.00
22	VARANASI	3.0	4.0	-	10.0	-	-	35.0	48.00
23	VISAKHAPATNAM	3.0	2.0	-	5.0	-	5.0	50.0	35.00
	Total/Average	5.7	3.5	0.8	3.9	2.1	2.1	40.3	41.80

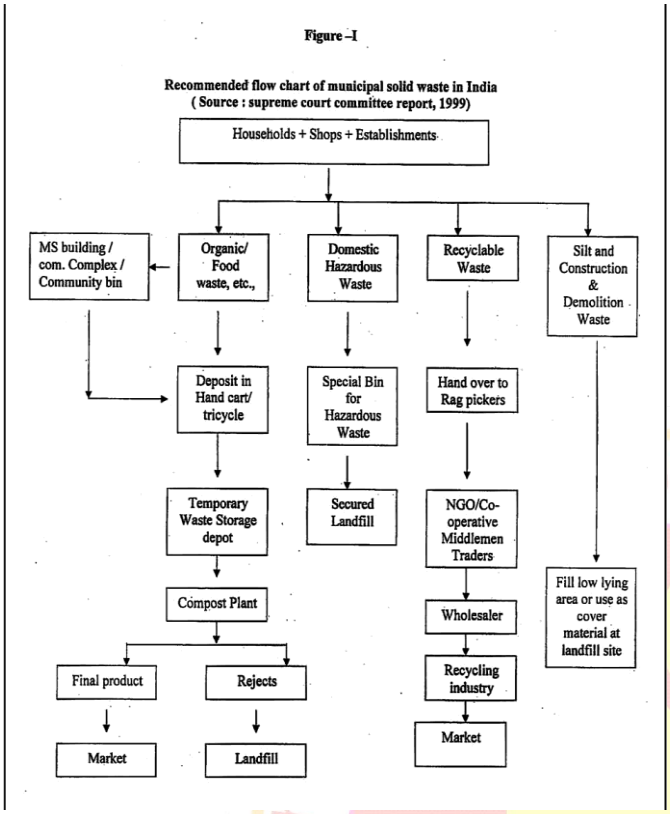

Figure –I

Recommended flow chart of municipal solid waste in India
(Source : supreme court committee report, 1999)

In majority of the urban areas, waste is being disposed of by depositing the waste in low-lying areas. The disposal / dumping sites are selected on the basis of their closeness to the collection area sand new sites are normally identified only when the existing sites are completely filled. Open firing of MSW at disposal sites is most common (Luis et a;., 1997). MSW workers handle the waste without any protective measures and are prone to infections. Finally manual composting is carried out in some of the urban centers. Mechanical composting plants failed, as a result bio-degradation of waste continues with a foul odor around the disposal sites.

Future Scenario:

The urban population of 582 million is concentrated in 23 metropolitan cities and few other large cities are accounting for 34.5 percent of the urban population that is expected to reach 852 million by 2020. The waste generated to increase from 65 million tons in 2011 to 85 million tons in 2020 (Kumar and Gaikwad, 2004). According to Singhal and Pandey (2001) the total waste generated in 2020 would be approximately above 110 million tones and the land required for disposal would be more than 400 km' by 2020. The present practices and estimates of waste generation, about 90 % of the generated are land filled requiring about 1200 hectare of land every year with are average of 3 meter depth.

Indiscriminate land filling leads to deterioration of water quality in surrounding areas of land fill sites due to the contamination by leaches from the landfills. Land fill gas, which is 50% to 60% methane contribute significantly to the Global warming. Methane emission from landfills would increase to more than 15 million tons in 2020.

National Plan For MSWM:

Considering the present status of MSWM in India, the committee constituted by the Supreme Court of India (1999) has summarized in a flow chart as depicted in Figure-1. Severer attempts are underway to improve MSWM (Singhal and Pandey, 2001).

They highlights of recommendations of expert committee constituted by the Supreme Court of India (1999) are as follows.

1. Bar on throwing wastes on streets and levy of administrative charges front those who litter the streets.
2. Segregation of wastes at Source
3. Doorstep Collection of Waste
4. Sweeping Streets on all days of the year
5. work Norms for Sweeping of Streets
6. Provision of Litter bins at public places
7. Abolition of open Waste Storage sites and manual collection.
8. Conversion of organic waste into compost
9. Up gradation of existing dumpsites
10. Sitting, Construction and operation of sanitary Landfills.
11. institutional strengthening and capacity building
12. NGO Participation in SWM practices
13. Public awareness Strategies.
14. Financial strengthening of Local Bodies.

Effects on Environment and Health:

Municipal Solid Waste and its disposal has become a challenge of 21" Century causing hazards in the environment and on health as detailed below:

1. Throwing the garbage on the road sides pollute the whole street.
2. If the waste is not lifted daily, because of the biodegradation the foul odor pollutes the air.
3. The rag-pickers and municipal workers develop the skin and respiratory diseases.
4. The garbage lying on the road side is responsible to spread many diseases.

5. Leaches form the landfills pollute ground water.
6. Area around the landfills is highly polluted.
7. Land fil1 gas containing 50% to'60Ps methane contribute significantly to the global warning.

Conclusion:

Every year increase in the MSW production is mainly due to the population growth and urbanization. The country is facing MSWM, for which all the elements of society are responsible. The efforts made by the municipals are insufficient. The community sensitization and public awareness is almost Zero. There is no system of segregation of organic inorganic and recyclable waters at household level. Even though the legal frame work is exhausting in the country to monitor MGWM, we have failed to implement them scientifically. Public awareness, political will and public participation are essential for the successful implementation of recommendations to improve MSWM System, which will help to avoid ill effects of MSW.

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