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Status of Solid Waste Management in India: A Review

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Abstract

Solid waste management (SWM) has emerged as one of the most massive development challenges in urban India. Solid waste management is the basic service provided by the municipal authorities to clean the environment. Solid wastes are used materials that are generated from domestic, industrial, commercials purposes. Solid waste management eradicates the adverse impacts on environment and human health for the improved quality of life. In this context, the present study has made an attempt to review the current solid waste management practices in India. The study has used secondary data sources collected from various annual reports of central pollution control board and Ministry of Housing and Urban Affairs (MHUA), Government of India. To an extent, the study also provides policy to strengthen the waste management in India.

Keywords: *Solid waste, urban, municipality, pollution*

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Introduction:

Solid waste management (SWM) has emerged as one of the most massive development challenges in urban India. Numerous studies indicate that the unsafe

disposal of waste generates dangerous gases and leachates, due to microbial decomposition, climate conditions, refuse characteristics and land-filling operations (Satphal, 2020). India has already exhausted all available landfill sites, and the concerned ULBs do not have resources to acquire new land. Moreover, finding new landfill sites is a difficult task as local officials are averse to setting aside land in their jurisdiction for waste that comes from other areas (Mani and Singh, 2015). Solid wastes are used materials that are generated from domestic, industrial, commercials purposes. Solid waste management eradicates the adverse impacts on environment and human health for the improved quality of life.

Waste management market comprises of four segments - Municipal Waste, Industrial Waste, Bio- Medical Waste and Electronic Waste Market. All these four types of waste are governed by different laws and policies as is the nature of the waste. In India waste management practice depends upon actual waste generation, primary storage, primary collection, secondary collection and transportation, recycling activity, treatment and disposal. In India, municipality corporations play a very important role in waste management in each city along with public health department (Raveesh et.al. 2015).

The quantum and type of waste generated in any urban centre are functions of the size and character of the urban centre. As two broad categorization, the different form is of waste generated in any urban centre would be (a) Household/ commercial refuse; (b) Street sweepings; (c) Construction and demolition debris; (d) Hospital waste; and (e) Industrial waste. Intra-city differences in the composition and quantum of waste are likely to be considerable - slum settlements are likely to have a higher degree of organic matter in household waste and street sweepings than higher or even middle income areas (Sandhya, 1994).

Indian cities which are fast competing with global economies in their drive for fast economic development have so far failed to effectively manage the huge quantity of waste generated. There are about 593 districts and approximately 5,000 towns in India. About 27.8 percent of India's total population of more than 1 billion (Census 2001) lives in urban areas. The projected urban population percentage is 33.4 percent by the year 2026. The motive of the solid waste management is to promote the ecological management with the 4R principles i.e. Reduce, Reuse, Recycle and Recover. Solid waste management is the major challenge in developing countries due to lack of proper planning, inadequate management of resources, improper disposal, poor infrastructure (Balasubramanian, 2019). In India, 1, 27,486 tons of municipal solid wastes are generated from stakeholders such as household, commercial and industrial (Central Pollution Control Board, 2012).

Review of Literature:

Some of the existing literatures on solid waste management in India/ Tamil Nadu are as follows:

Balasubramanian et.al. (2012) on solid waste management in Madurai district. The study examined the economics of solid waste management. Primary data were collected from 37 solid waste contractors with the help of random sampling technique. Gross margin and multiple regression were used for the analysis. It has been found that, the average

of 394 tonnes of waste collected per day and the waste containers collected 4 to 5 trips of waste per day. It concludes that, public private participation needs to be strengthened and government should increase the allocation of funds in solid waste management.

Sangeetha and Jamuna (2018) on a solid waste management in Nagapattinam. The purpose of the study is to examine the methods of disposal and types of waste generated in the study area. The primary data were collected from 94 sample respondents on the basis of stratified random sampling technique. It has been found that, majority of 48% of the people dumped the waste in open place; out of total respondents only 3 respondents are using recycling method of their wastages. Therefore, the study suggests to improve the policy to safeguard environmental resources.

Nathiya and Thandapani (2019) on solid waste management in Tamil Nadu. They analyzed the infrastructure facilities by government for managing solid waste and process of waste generation. It found that, solid waste generation in Tamil Nadu is around 51% per day and per capita generation of disposal is around 250 g/day. It is also interesting to note that, awareness of recycling technique is very less i.e. 1%. Therefore, the study suggests that awareness on solid waste management among public should be encouraged to overcome indiscriminate dumping of wastes.

Shyamala Mani and Satpal Singh (2016) on sustainable municipal solid waste management in India: a policy agenda. Authors pointed out that, Indian cities are facing problem in lack of availability of land for disposal, insufficient funds, infrastructure,

and resources. Recycling techniques and transformation of wastages into energy should be implemented by authorities to enhance the improved solid waste management system.

OECD (2015) estimated the global level urban solid waste generation. It found that, China is the highest urban waste generated country in the world with the quantity of 264 million tonnes per year followed by European unions. It has also to be noted that, United States has the highest which constitutes 497 kg of per capita waste generation per year.

Objectives:

1. To review the current status of solid waste management in India.
2. To assess the state level solid waste generation rates in India.

Methodology:

The study used secondary data as a major source; that are collected from various annual reports of Central Pollution Control Board (CPCB), State Pollution Control Boards (SPCBs) and Ministry of Housing and Urban Affairs (MHUA), Government of India.

Results and Discussion:

This section describes about the results and discussion part of this paper. Collected secondary data were discussed in detail to assess the waste generation and waste processing of Indian states.

Table-1 shows the different types of waste sources such as waste from residential sector, industrial sector, commercial sector, institutional sector, construction sector, medical sector and agricultural sector.

Table-1 Major Sources of Waste

Category	Sources
Residential	Food wastes, plastics, paper, glass, leather, cardboard, metals, yard wastes, ashes, tires, batteries and old mattresses.
Industrial	Packaging wastes, ashes, chemicals, cans, plastics, metal parts
Commercial	Thin and thick plastics, food wastes, metals, paper, glass, wood, cardboard materials.
Institutional	Wood, paper, metals, cardboard materials, electronics.
Construction and Demolition	Steel materials, concrete, wood, plastics, rubber, copper wires, dirt and glass.
Agriculture	Agricultural wastes, spoiled food, pesticide containers.
Biomedical	Syringes, bandages, used gloves, catheter, urine bags, drugs, paper, plastics, food wastes, sanitary napkins and chemicals.
E- Waste	TVs, transistors, tape recorders, computer cabinets, mother boards, CDs, cassettes, mouse, wires, cords, switches, chargers.

Source: Developed by authors

Table-2 shows the state wise solid waste generation in India for the year 2020. The data reveals that among the states in India, Maharashtra state generates 22080 MT of solid waste per day followed by Uttar Pradesh, Tamil Nadu and Delhi with the quantity of 15,500 MT/D, 15,437 MT/D and

10,500 MT/D respectively. On the other hand, states like Arunachal Pradesh, Manipur, Andaman and Nicobar, Sikkim, D & D Haveli and Daman & Diu generate less solid waste. It can be noted that, north eastern states of India performing well in terms of waste management.

Table-3 shows the state wise 100% of source segregation in India. It reveals that India achieved 100% source segregation of waste at 84, 475 wards out of which 12, 814 wards from Tamil Nadu. Proper planning and management of Tamil Nadu municipal corporations may be an effective reason to get top place in source segregation; followed by states like Uttar Pradesh, Maharashtra and Madhya Pradesh achieved 100% source segregation in 12,007 wards, 7,322 wards and 7,115 wards respectively.

Table-4 shows the state wise wards with 100% door to door collection in India. It has been found that, In India the total of 81,135 wards achieved 100% door to door collection out of which the majority 12, 429 wards from Tamil Nadu, 11,872 wards from Uttar Pradesh, 7,115 wards from Madhya Pradesh, 6,590 wards from Maharashtra and 6,464 wards from Karnataka. It can be observed that, the above mentioned states are performing well in all the waste management practices.

Table-5 shows the state wise total waste processing in India for the year 2020. It reveals that, India achieved 60% of total waste processing out of which states like D & D Haveli, Andaman and Nicobar, Chandigarh are achieved more than 95% of total waste processing. It has to be noted that, the major states such as Tamil Nadu, Madhya Pradesh, Maharashtra and Karnataka have achieved only 68%, 87%, 58% and 54% respectively.

It is suggested that, especially municipal corporations of Tamil Nadu, Madhya

Pradesh, Maharashtra and Karnataka need to concentrate more on the waste processing in their respectively municipalities.

Table-2, State wise Solid Waste Generation in India for the year 2020

States/Uts	Total Wards	Total Waste Generation (MT)
Andhra Pradesh	3,409	6,141
Andaman and Nicobar	24	90
Arunachal Pradesh	75	181
Assam	943	1,432
Bihar	3,377	2,272
Chandigarh	26	479
Chhattisgarh	3,217	1,650
Daman & Diu	28	32
Dadra & Nagar Haveli	15	55
Delhi	294	10,500
Goa	217	250
Gujarat	1,427	10,274
Haryana	1,496	4,783
Himachal Pradesh	497	377
Jammu &Kashmir	1,081	1,489
Jharkhand	932	2,135
Karnataka	6,464	10,000
Kerala	3,536	2,696
Madhya Pradesh	7,115	6,424
Maharashtra	7,322	22,080
Manipur	306	174
Meghalaya	114	268
Mizoram	264	236
Nagaland	234	461
Odisha	2,024	2,721
Puducherry	122	415
Punjab	3,123	4,100
Rajasthan	5,389	6,500
Sikkim	53	89
Tamil Nadu	12,814	15,437
Telangana	2,112	8,634
Tripura	310	450
Uttar Pradesh	12,007	15,500
Uttarakhand	1,170	1,589
West Bengal	2,938	7,700
Total	84,475	1,47,613

Source: Ministry of Housing and Urban Affairs, Government of India.

Table-3, State wise 100% source segregation of waste in India for the year 2020

States/Uts	Total Wards	Ward with 100% Source Segregation
Andhra Pradesh	3,409	3,409
Andaman and Nicobar	24	24
Arunachal Pradesh	75	75
Assam	943	943
Bihar	3,377	3,377
Chandigarh	26	26
Chhattisgarh	3,217	3,217
Daman & Diu	28	28
Dadra & Nagar Haveli	15	15
Delhi	294	294
Goa	217	217
Gujarat	1,427	1,427
Haryana	1,496	1,496
Himachal Pradesh	497	497
Jammu &Kashmir	1,081	1,081
Jharkhand	932	932
Karnataka	6,464	6,464
Kerala	3,536	3,536
Madhya Pradesh	7,115	7,115
Maharashtra	7,322	7,322
Manipur	306	306
Meghalaya	114	114
Mizoram	264	264
Nagaland	234	234
Odisha	2,024	2,024
Puducherry	122	122
Punjab	3,123	3,123
Rajasthan	5,389	5,389
Sikkim	53	53
Tamil Nadu	12,814	12,814
Telangana	2,112	2,112
Tripura	310	310
Uttar Pradesh	12,007	12,007
Uttarakhand	1,170	1,170
West Bengal	2,938	2,938
Total	84,475	84,475

Source: Ministry of Housing and Urban Affairs, Government of India.

Table-4, State wise wards with 100% Door to Door Collection in India for the year 2020

States/Uts	Total Wards	Wards with 100% Door to Door Collection
Andhra Pradesh	3,409	3,409
Andaman and Nicobar	24	24
Arunachal Pradesh	75	75
Assam	943	698
Bihar	3,377	3,276
Chandigarh	26	26
Chhattisgarh	3,217	3,217
Daman & Diu	28	28
Dadra & Nagar Haveli	15	15
Delhi	294	294
Goa	217	217
Gujarat	1,427	1,427
Haryana	1,496	1,401
Himachal Pradesh	497	490
Jammu &Kashmir	1,081	809
Jharkhand	932	897
Karnataka	6,464	6,464
Kerala	3,536	3,022
Madhya Pradesh	7,115	7,115
Maharashtra	7,322	6,590
Manipur	306	270
Meghalaya	114	27
Mizoram	264	264
Nagaland	234	148
Odisha	2,024	2,009
Puducherry	122	122
Punjab	3,123	3,064
Rajasthan	5,389	5,389
Sikkim	53	53
Tamil Nadu	12,814	12,429
Telangana	2,112	2,020
Tripura	310	277
Uttar Pradesh	12,007	11,872
Uttarakhand	1,170	1,170
West Bengal	2,938	2,527
Total	84,475	81,135

Source: Ministry of Housing and Urban Affairs, Government of India.

Table- 5, State wise total waste processing in India for the year 2020

States/Uts	Total Wards	Total Waste Processing %
Andhra Pradesh	3,409	63
Andaman and Nicobar	24	95
Arunachal Pradesh	75	0
Assam	943	53
Bihar	3,377	51
Chandigarh	26	95
Chhattisgarh	3,217	90
Daman & Diu	28	75
Dadra & Nagar Haveli	15	100
Delhi	294	55
Goa	217	70
Gujarat	1,427	87
Haryana	1,496	48
Himachal Pradesh	497	78
Jammu &Kashmir	1,081	16
Jharkhand	932	60
Karnataka	6,464	54
Kerala	3,536	71
Madhya Pradesh	7,115	87
Maharashtra	7,322	58
Manipur	306	58
Meghalaya	114	4
Mizoram	264	35
Nagaland	234	60
Odisha	2,024	48
Puducherry	122	13
Punjab	3,123	61
Rajasthan	5,389	72
Sikkim	53	70
Tamil Nadu	12,814	68
Telangana	2,112	78
Tripura	310	53
Uttar Pradesh	12,007	58
Uttarakhand	1,170	46
West Bengal	2,938	9
Total	84,475	60

Source: Ministry of Housing and Urban Affairs, Government of India.

Conclusion:

Solid waste management still exists as a serious problem in urban areas of India. The study found that, lack of awareness among households, lack of appropriate funding are the major problems. Especially, major cities of India have been facing several issues in the proper management of solid waste. The study suggests, proper segregation would lead to better options and opportunities for disposal of waste, awareness campaign for public on waste management and segregation of waste at household level, funding should be utilized and audited regularly. It also suggested that, central and state government should have coordination on proper planning and implementation; central should monitor the states periodically on implementation of Solid Waste Management rules to understand the ground level issues, municipalities should adopt new technologies in waste management and waste recycling and resource recovery should be encouraged to achieve zero waste concept.

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