

Waste Identification and Strategies for Better Implementation of Solid Management, U.P.

Prachi Gupta¹, Sandeep Kumar Yadav², Gaurav Sumer Singh³

F.O.A., M.Arch. student, Lucknow¹, Ex. Assistant Professor, R.R.I.T.M., Lucknow², Assistant Professor, F.O.A. Lucknow³

prachi2709@gmail.com¹, sandeep180593yadav@gmail.com² and arcgaurv@gmail.com³

Abstract— Municipal solid waste is a major environmental issue of developing countries like India because of its increasing population, rapid economic growth and due to the standardised living standards of the human beings. Solid waste management (S.W.M.) being one of the severe issues obstructs the development of the city which overall degrades the development of the Country and harms the environment. In this paper an attempt has been made to understand the characteristics, generation, collection, transportation, segregation, disposal and treatment technologies of municipal solid waste in different cities of Uttar Pradesh. An analysis is carried out on how the cities are practicing their waste management and how it can be improvised. It deals with the issues faced by the cities in managing their municipal solid waste and the paper is concluded with the recommendation, which may be beneficial to the competent authorities for improving their present condition.

Keywords:- Municipal Solid Waste, generation, collection, transportation, segregation and treatment, disposal.

I. INTRODUCTION

India is second largest country after china with more than 1.27 billion population contributing 17.6% of world's total population. Out of the total population 68% lives in rural areas, while 32% lives in urban areas. (*world bank, 2014*). Rapid industrialization and migration of humans from villages to cities have resulted in generation of thousands of tonnes waste per day. The MSW amount is increasing significantly, as of now, the total MSW generated by India is over 150,000 tonnes per day which is expected to reach by 377,000 tonnes by 2025. It is an high time to consider this as a major issue and try to reduce and manage the municipal solid waste. Improper collection of waste and inadequate transportation lead to the accumulation of MSW at every nook and corner. Even today large quantity of solid waste is dumped on the periphery of the towns and cities without any prior treatment which leads to contamination of ground water due to leachate percolation and air pollution due to release of poisonous substances like toxins, dioxides, ashes etc. Thousands of tonnes of waste are discharged into sea which affects human health and sea animals and disturbs the ecosystem.

Current scenario: - The present condition of cities of Uttar Pradesh are pathetic. The cities are not able to manage their solid waste due to lack of governance, infrastructure, financial, awareness and other factors. On an initial stage the waste is not segregated due to which it becomes difficult for the management to process and treat the waste and is directly dumped in the landfill sites or on the urban fringes of the city without any prior treatment which increases the overall weight on the nearby land. If the citizens try to segregate the waste during the waste collection by the management the waste are mixed up due to lack off 2 hopper vehicles and hence, it is still not segregated for processing. The management are failed in collecting waste from each doorstep of the city due to which the citizens have to dump their waste in the nooks and corners. In certain cities of the state the management tried to incorporate the PPP mode but due to lack of finance and infrastructure it all failed. Due to undefined tools and techniques the different categories of waste cannot be quantified which again lacks in the management of S.W.M. New technologies like Aerobic composting unit, Material recovery facility, Weighbridge, Bio remediation plant, Construction and demolition waste plant are not integrated in the city for the waste management hence, it all needs to be implemented for better management. Transportation of waste is a major issue, the waste are transported in an open vehicles due to which it litters in the city which makes city tidy and the total quantity of waste to be transported reduces. The rag pickers play an important role in collecting the segregated waste, they buy the dry waste from the residential areas and sell it to the factories or recovery centers for recycling.

II. DATA ANALYSIS

Data from different sources were collected for parameters framed by the author to analyse. For each parameter the mean value was calculated and the deviation from the mean value by which the prioritization of the waste management can be drawn. If the deviation from the mean value is positive i.e. the city is practicing a good value for the particular parameter and if it is showing negative deviation from mean the city needs to improve it for a good S.W.M.

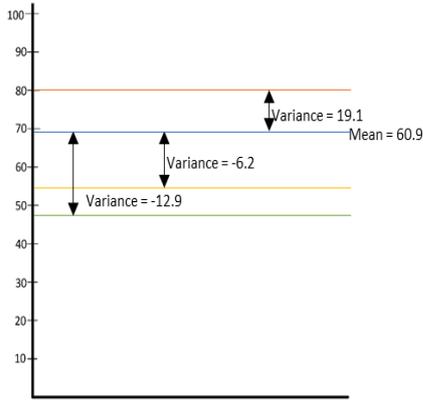


Fig 1: Deviation in Door to door collection

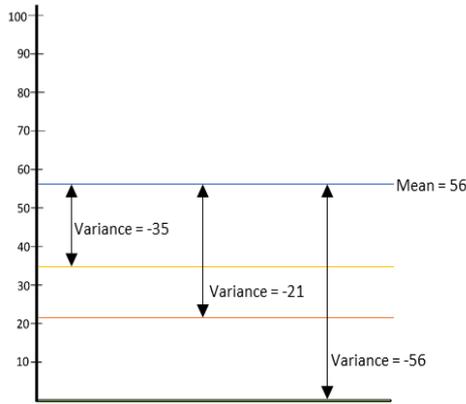


Fig 2: Deviation in Segregation

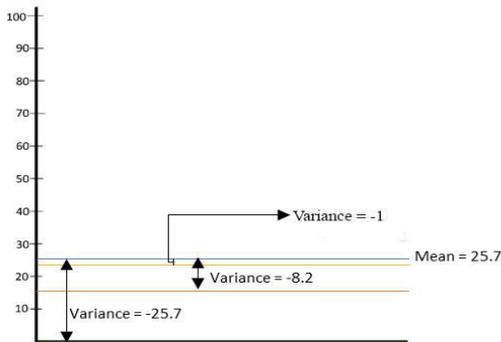


Fig 3: Deviation in Transportation



Fig 4: Deviation in Disposal

Calculations: (Door to door collection: same methodology for all)

% of samples saying yes

Aligarh: 80

Lucknow: 54.7

Gonda: 48

Mean = % of samples saying yes for all 3 cities / 3

Mean (Σ) = (80+54.7+48) / 3 = 60.9

(% of Aligarh – Mean) = (80-60.9) = 19.1

(% of Lucknow – Mean) = (54.7-60.9) = -6.2

(% of Gonda – Mean) = (48-60.9) = -12.9

From the above we can conclude, the cities are lacking in major factors of solid waste which needs to be taken in action before it becomes too late to manage. Segregation is a major factor which helps in managing solid waste and it should be practiced for better implementation of the management. Some cities are not practicing any waste management process which needs to be taken in action.



Fig 5: S.W.M. for 3 selected cities

Table 1: Analysis of solid waste management for 3 different cities of U.P.

SOLID WASTE MANAGEMENT (for 3 different cities of U.P.)					
S.N o.	PARAMETER's	CITIES			
		Aligarh	Lucknow	Gonda	
1	POPULATION (Census 2011)	15,73,889	28,89,838	1,19,971	
2	AREA (Sq. Km.) (Census 2011)	1,538	2,528	51	
3	DENSITY (/Km ²) (Census 2011)	1,007	1,816	651	
4	LITERACY RATE (Census 2011) (%)	67.53	77.29	58.71	
5	No. OF WARDS	70	110	27	
6	TIER CITY	Tier II	Tier II	III tier	
7	TYPE OF WASTE GENERATION (ANY SPECIFIC)	Municipal solid waste	Municipal solid waste	Agriculture waste	
	MANAGEMENT	PPP mode & Municipal corporation.	PPP mode & Municipal corporation	Municipal corporation	
8	SOLID WASTE MANGEM	DOOR TO DOOR COLLECTION	80	54.7	48

	ENT PROCESS	(%)			
9		STORAGE (%)	80	54.7	Nil
10		SEGREGATION (%)	21	35	Nil
11		TRANSPORTATION (%)	80	24.7	Nil
12		TREATMENT (%)	17.5	24.7	Nil
13		DISPOSAL (%)	80	75.3	48
14		DISPOSAL (SCIENTIFIC)	Unscientific	Unscientific	Unscientific
15		PLASTIC WASTE MANAGEMENT	Nil	Nil	Nil
16	QUANTITY OF WASTE GENERATED (TPD)		415	769.13	65
17	WET (TPD)		280	284.58	Data not available
18	DRY (TPD)		135	484.55	
19	HAZARDOUS / SANITARY WASTE (TPD)		Nil	Nil	
20	No. OF GARBAGE STATION		4	12	0
21	No. OF SWEEPER'S		867	1654	380
22	No. OF VEHICLES	SMALL VEHICLES	267	487	12
23		CYCLE RICKSHAW	152	369	8
24		WHEEL BARROWS	453	210	200
25		TIPPER	48	62	4
26		LOADER	2	4	1
27		ROAD CLEANER	Nil	Nil	Nil
28	SEGREGATED WASTE COLLECTION		Partial collection	Partial collection	No
29	CLEANING OF COMMERCIAL AREAS		With in 3-4 day	Occasionally	No
30	TECHNOLOGY USED	Biometric attendance system	No	No	No
31		G.P.S. tracking in vehicles	No	No	No
32	WASTE GENERATED	Residential	280	No segregated waste collection	No segregated waste collection
33		Commercial	60		
34		Recreational			
35		Construction & demolition	Nil		
36		Hospital/Nursing home/Industrial	75		
37	STREET SWEEPING		Occasionally	Occasionally	Occasionally
38	DUSTBINS (TWIN/SINGLE)		Both	Twin	Single
39	No. of dustbins in the residential areas		One in each colony	One in each colony	24
40	No. of dustbins in Commercial areas		1-2 bins in the commercial areas. Very few areas have 3-4 twin bins.	4-5 bins in each commercial area	31
41	WASTE COLLECTION FROM SLUM AREAS		Not collected	Not collected	Not collected
42	OPTIMIZATION OF TRANSPORT ROUTE		No	No	No

III. RECOMMENDATIONS

- a. Compost pits to be designed in each zone or ward, biodegradable waste can be recovered as compost which can be used in the horticulture over the area. It will save the time cost for the transportation. Compost pits to be designed in less habitable areas, to reduce its harmful effects.
- b. Segregated waste to be collected from all the areas, Compost plants to be installed in each zone or garbage station. Each vegetable and fruit market to have installed compost or methane gas plant for recycling of organic waste and can be used for other purpose.
- c. Road maps to be designed for each ward or zone of the city, for 100% door to door waste collection of the city. Each residence/commercial area gets the service of solid waste management.
- d. G.P.S. tracking device to be installed in all the vehicles for tracking of vehicles and 100% work process from these.
- e. Before dumping of waste, it should be treated so as to reduce its harmful effects, it should be practiced that minimum waste should be dumped in landfill.
- f. Landfill sites to be well fenced from all the sites, landscaped from all the sides and designed road map for movement of vehicles. Develop a green belt of appreciable thickness around in waste processing / disposal sites. The species chosen for green area should be able to provide excessive nutrients, toxic gases etc. which reduces the concentration of pollutants in the environments.
- g. ICE activity to be incorporated and citizens to be made aware of the harmful effects caused by. Organise mass awareness programmes among students, business people and local inhabitants, targeting source reduction, reuse and recycling of waste

IV. CONCLUSIONS

Municipal solid waste is a major issue which needs to be taken in action. The present policy framework does not provide a good direction for the solid waste management. Not only at the policy level it should be implemented but also on the ground level and should be checked by the heads of the ULB's on a regular basis. While analysing the solid waste management of different cities it was concluded that the bottom ranking cities are facing: Management issues, Infrastructure issues, Awareness issues, Lack of adequate and operational disposal site, Integration of new technological devices. The cities, should organise methods of waste collection, from all the areas of the city in a segregated way, processing of waste, scientific treatment of waste and disposal in a scientific way. Organic waste can be composted at their household level which will reduce the quantity of waste generated and helps the management in the processing. The 3R system should be followed which will help in reducing the

quantity of waste generated and dumping of waste in the landfill. The Plastic bags to be banned and cloth or paper bags to be used. Awareness is a key factor for keeping any area clean. Finally, the citizens should take a pledge of keeping their cities clean and thinking their cities as their own home and we will be able to keep it clean and save from the harmful effects caused by it.

. REFERENCES

- [1] MoUD. (2017). Annual report by Municipal Corporation Aligarh. (India).
- [2] MoUD. (2017). Annual report by Municipal Corporation Lucknow. (India).
- [3] Nandan, A., Yadav, A., &Baksi, S. "Recent Scenario of Solid Waste Management in India", in World Scientific News, 2017. Retrieved from [www.worldscientificnews .com](http://www.worldscientificnews.com)
- [4] Sharholly, M., Ahmad, K., Mahmood, G., &Trived, R.C. "Municipal Solid Waste Management in Indian Cities", Science direct, (459-467).2007. Retrieved from www.sciencedirect.com.
- [5] Singh, R., Yadav, D., Ayub, S., & Siddiqui, A. "Status and Challenges in Solid Waste Management: A Case Study of Aligarh City", Civil Engineering and Environmental technology, 2014.
- [6] Talla, M., & Krishna, I. V. "Comparative Analysis for the Major Cities of National and International Scenario of Solid Waste Management", International journal of Advance Research in Science and Engineering, 2015.
- [7] Thyberg, T. &Tonjas, D. "A Management Framework for Municipal Solid Waste Systems and Its Application to Food Waste Prevention", Systems, 2015.