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Status and Challenges of Solid Waste Management in Meerut Municipal Corporation

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***Abstract*:- The Burgeoning urbanisation has led researchers to think upon solid waste management (SWM). A proper SWM is one of the most important obligatory functions of Urban Local Bodies (ULB) in India. The collection, transportation and disposal of solid waste has become a challenging task of most of the ULBs. Improper disposal of solid wastes causes environmental degradation and health hazards to the residents of ULBs. The present paper discusses the solid waste management system as adopted by Meerut Municipal Corporation (MMC). Three Rs-Reuse, Reduce, and Recycle are the challenging factors of the SWM policy of MMC. This paper attempts to analyse the activities undertaken by MMC for SWM in its Gowdi dumping site and ends with the suggestions to improve the SWM system.**

Keywords: Biodegradable, Non-biodegradable, user charges, waste disposal, recycling

The migration of a large number of people from rural to urban area in search of employment avenues has resulted in the speeding up of urbanisation. Rapid urbanization has led to an increasing problem of solid waste management (SWM). Solid waste is the undesired and released solids generated from various materials by different entities including the household sector, industrial and commercial sector, and health sector in a particular area. Solid waste can also be defined as the organic and inorganic waste materials produced by households, commercial & industrial establishments that have no economic value to the owner. Further, as per biodegradability, solid waste can be classified as "biodegradable" and "nonbiodegradable" waste (SBM(U)Manual, 2017). Indian Constitution puts SWM within the purview of the state government. The activities involved are said to be local ones and are entrusted to urban local bodies (ULBs) through state legislation. Since these activities are nonexclusive, non-rival, and essential, the responsibility lies within the public domain and ULBs accordingly undertake the task of SWM (Ohri and Singh, 2009). Indian urban centres are creating more than 50 million metric tons of municipal solid waste annually. Solid waste management is an obligatory function of Municipal corporations and with the burgeoning urbanisation, there has been pressure on municipal budgets. Very few ULBs are imposing user charges to cover the cost incurred on collection, transportation and disposal of solid wastes. Waste management is the process to convert solid waste into a valuable resource. The process of waste management involves treating solid, liquid, gaseous and hazardous waste substances. Improper disposal of solid waste may result in the pollution of the environment and outbreak of diseases spread by rodents and insects in the community. Waste disposal includes a myriad of processes such as collection, transportation, dumping, recycling. Eco-responsibility pertains to the three Rs—Reuse what we can, Reduce by refusing unnecessary packaging etc, and recycle the waste for making useful items.

OBJECTIVE OF THE PAPER:

A lot of studies have emphasized that there is an urgent need to conduct the research on solid waste management undertaken by ULBs. The present paper is an attempt to analyse the solid waste management system of Meerut Municipal Corporation. The paper tries to attain following objectives:

- To characterise the composition of solid waste generated from different sectors in the Meerut Municipal Corporation (MMC)
- To identify the major sources of solid waste in MMC, their trend of generation and approaches of management
- Assess the current problems faced by the waste management system

Methodology: Present paper is based on secondary data collected from the office of Meerut Municipal Corporation, government and semi-government publication including Meerut Statistical Handbook, Census of India, Handbook of Urban Statistics, Uttar Pradesh Solid Waste Management Rules 2019 etc. Site visit and interview to the staffs at the Gawdi plant where segregation of solid waste is done by MMC has been undertaken to gather information of solid waste management.

Composition of Solid waste and major generators of solid waste

Organic waste or biodegradable waste: Kitchen waste, Peels of fruits and vegetables, dry leaves, plants and flowers. Most of such waste is generated by household sector, hotels and restaurants etc. Organic wastes take 2-3 weeks to decompose and it can better be used to make soil fertilised.

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Toxic waste: Old medicines, fertilizers and pesticides containers, batteries, paints, chemicals, tyres. This type of wastes has resulted from the activities of industries, refineries, chemical plants etc. Tin, aluminium and metal cans take 100 to 500 years to degenerate. Toxic waste may seep into the soil and pollute the groundwater. Sometimes this waste mixes with organic waste and makes the disposal process even harder.

Dead animals: Dead bodies of livestock and other animals

Biomedical waste: Hospital waste such as cloth soiled with blood and other body fluids, bandages, used gloves, syringes etc. The wastes generated by hospitals, Nursing Homes, health centres, laboratories, animal houses, veterinary institutions constitute a major component of waste generation.

Hazardous waste: Oil, industrial waste, plastic waste, glass waste, paper and cardboard materials, electronic wastes, obsolete cell phones etc. Plastic waste takes millions of years to degenerate so it is very hazardous to the environment.

Table 1: Time taken in the decomposition of different wastes

S.No.	Category of waste	Time in years
1.	Plastic bag	20-1000
2.	Plastic bottles	400
3.	Polystyrene cup	50
4.	Plastic Coated paper cup	30
5.	Glass bottle	1000000
6.	Disposable Napkins	450
7.	Aluminium cans	80-200
8.	Milk carton with wax coating	3 months
9.	Cigarette but	1-5
10.	Paper towel	2-4 weeks

Source: Uttar Pradesh Solid Waste Management Policy

METHODS OF SOLID WASTE DISPOSAL MANAGEMENT:

Solid Waste Open Burning: This method of solid waste disposal is not desirable as it may be hazardous to the environment.

Solid wastes sanitary landfills: In this process, the waste that cannot be reused or recycled are separated out and spread as a thin layer in low-lying areas across a city. A soil layer is added over each layer of garbage. However, once this process is complete, the area is declared unfit for construction of buildings for the next 20 years. Instead, it can only be used as a playground or a park.

Incineration method: Incineration is the most common thermal treatment process. It is burning off the waste at a very high temperature of 1000°C ± 100°C in the presence of oxygen to eliminate all odours and to ensure good combustion. In some cases, the heat generated is used to produce electricity. After incineration, the wastes are converted to carbon dioxide, water vapour and ash. It converts hazardous organic substances into less hazardous components. High operation costs and construction are involved in this procedure. It can be used to reduce the volume of solid wastes for landfilling.

Composting process: The biological decomposition of organic waste in a controlled aerobic environment is known as composting. Wastes of industries like paper, agriculture, and food processing are almost entirely organic. This organic material can be composted to create high-quality manure. Compost is the result of aerobic or anaerobic decomposition of the organic fraction of solid waste.

Recycling: Recycling is the process of transforming waste material into new products which may be used as raw material for further production. Recycling is to decrease energy consumption, reduce the volume of landfills, air and water pollution, greenhouse gas emissions, and conservation of natural resources for potential use.

Vermicomposting: Vermicomposting is undertaken by introducing earthworms on semi-decomposed organic waste and transforming it into nutrient-rich manure. Earthworms can consume five times of organic matter per day as compared to their body weight. The worms' excretion of digestive by-products enriches the soil, allowing bacteria and fungi to thrive. It is also a lot more efficient than conventional composting methods.

Existing Solid Waste Management System of MMC

The city generates about 600 Metic Tons of waste daily with an average per capita generation of 500 grams. The MMC is responsible for the collection, transportation and disposal of all solid waste generated in the city. Hardly 78 per cent of the area under Municipal Corporation is covered under daily collection and the rest under biweekly or fortnightly collection system. The garbage collection from the bins is extremely irregular.

According to the data provided by MMC, there is a range of vehicles for the transportation of solid waste. Sweepers employed by the MMC regularly sweep the streets in the early morning and then waste is collected by the door to door collection (DTDC)

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method, private sweepers also collect waste. Vehicles of MMC are plied in the three depots, namely, Surajkund Depot, Delhi Road Depot and Kankerkhera vehicle depot. MMC has the following list of vehicles for the collection of wastes:

Table 2: No. of vehicles for Solid Waste Management in 3 Depot of MMC

S.No.	Vehicles Name	Surajkund depot	Delhi Road vehicle depot	Kankarkhera vehicle depot	Total
1	JCB	04	04	04	12
2	Truck	07	04	05	16
3.	Tractor,Trolley	20	15	08	43
4.	Tata Ace	06	08	09	23
5.	Large Porklane	02	04	02	08
6.	Small Porklane	02	00	01	03
7.	Mini Porklane	05	06	05	16
8.	Door to Door Vehicles	60	52	34	146

Source: Meerut Municipal Corporation 2021

Porklane machine is used for cleaning drains. Under the area of MMC, total 315 drains are there. In order to clean the drains, porklane/fassi machines are used for the big drains while small drains are cleaned by JCB. Presently,12 JCB are working for cleaning the drains. There are 24 big drains, having the 45.9 kilometres length which are generally cleaned by JCB, Big porklane and fassi machines while 195 drains with 142 kilometres distance are cleaned by the small porklane and remaining are 53 of about 51 kilometres long which are cleaned by sanitary workers of Nagar Nigam.

Door to door collection system municipal vehicles include carriage, hand-cart, cycle-rickshaw and every wheeled conveyance which is used or is capable of being used on a street provided by ULB for point to point collection of Municipal Solid Waste. These vehicles carry the collected solid waste to the Gawdi plant where the waste is segregated into three parts:

Non-recyclable component of solid waste like plastic, paper, cardboard is used as RDF (Refuse Derived Fuel). Such waste is sold by MMC at the rate of Rs.250 per tonnes to the industries, where it is shred, dried, baled and then burned to produce electricity. RDF is a renewable energy source that ensures waste not to be thrown out, rather to be put for good use.

Biodegradable waste is used for making manure and compost which is sold to the farmers of the nearby villages at a subsidised rate. They use this organic manure to improve the fertility of the soil.

Inert solid waste (eg. concrete, dust and sand) is solid waste or remnant of processing whose physical, chemical and biological properties make it suitable for sanitary landfilling; it is used for denting of the roads by MMC.

The company namely, **Environ Organic Work and Supplier**, is working with MMC to segregate the solid waste, it basically provides its labour force to assist the segregation process undertaken by MMC at its Gowdi dumping site.

Swachch Bharat Mission (SBM) and Solid Waste Management (SWM)

SWM is one of the key components of SBM. SBM was launched by PM Modi in 2014 to make the country garbage and open defecation free. The second phase of SBM, started in 2019, has been planned to focus on SWM and now all the funds received under SBM from central and state governments are to be used solely for SWM. One of the stated objectives of SBM is to ensure door to door garbage collection and proper disposal of municipal solid waste. Under SBM, solid waste is converted into compost or bio-gas. The Ministry of Housing and Urban Affairs has directed the cities to start segregation of wastes into two bins: Green and Blue. Green-coloured dustbins are meant for wet and biodegradable wastes eg. kitchen wastes like fruits and vegetable peels. While Blue-coloured dustbins are to be used for disposal of plastic wrappers and non-biodegradable wastes.

Meerut Municipal Corporation's (MMC) initiative for SWM

MMC gets funds for solid waste management from central government, state government and finance commission grants under SBM. Also, MMC uses its own funds, collected from tax and non-tax sources, for paying remunerations to safaikarmis (both permanent and contractual). Below is given the data of last five years related to MMC expenditure under SBM for solid waste management:

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Table 3.: MMC Expenditure for SWM under Different Heads (in lakh Rs.)

Heads of Expenditure	2016-17	2017-18	2018-19	2019-20	2020-21(Ap 20 to 31 Oct.2020)
Mechanisation for SWM financed by FFC*	-	-	5240.93	5013.86	370.83
Exp. under SBM	52.96	369.05	385.83	112.88	15.51
Payment to Safaikarmi (a)Permanent	3296	4126.04	4266.26	5412.64	2418.10
(b)Contract	2459.48	2182.25	3107.25	3459.70	2083.72
Total exp for SWM	5808.44	6677.34	13000.27	13999.08	4888.16

Source: Budgets documents of MMC *Fourteen Finance commission

Role of Rag-pickers in SWM: Ragpickers play a vital role in SWM. They move from one community bin to open dump/landfilling sites in search of recyclable items (paper, plastic, tin, etc.) that can be sold to scrap merchants to enable these urban poor to generate income. These ragpickers save almost 14% of the municipal budget annually, but their role is mostly unrecognized and they are generally deprived of the right to work. These rag-pickers may reduce up to 20% load on transportation and on landfill. Their work needs to be brought into the mainstream and should be recognised.

Challenges before Meerut Municipal Corporation

UP government has formulated Uttar Pradesh Solid Waste (Management and Handling) and Sanitation Rules, 2019. These rules are the guidelines for all urban local bodies (ULBs) to handle solid waste generated in their territorial boundary. Since waste management is the responsibility of all ULBs, they are facing challenges. MMC is also suffering from improper management of solid waste, below are given the reasons for this:

1. Failure of waste to energy projects: Waste is collected, transported and segregated at Gowri dumping site but there is no technology available to generate electricity from this waste. If it happens, it may be very helpful to the local inhabitants.
2. Though SWM occupies a primary focussed objective of MMC but it lacks adequate community participation in the safe and hygienic disposal of solid waste.
3. A huge sum is spent by MMC for waste disposal and management, still a large area has not been covered under the door to door (DTDC) garbage collection service. It is a big challenge for MMC to cover all interior parts under DTDC.
4. Though MMC has state rules related to SWM but they are not properly implemented. There is always a reluctance to impose penalties on the local inhabitants upon violation of SWM rules.
5. The role of ragpickers in SWM has not been adequately recognised until now, despite the fact that they are one of the most important stakeholders in India's SWM. In order to raise their morale, there is a need to accommodate them in the organised sector and absorb them in mainstream employment as they are currently operating in the unorganised sector. This action will provide secured livelihood to these urban poor and help MMC to reduce its expenditure on setting-up high-cost energy-intensive processing plants.
6. Resistance for notification of new landfill site: There is resistance of local citizen for notification of landfill site in their locality and therefore selection of new site is difficult and all the existing landfill sites are running beyond their capacity. MMC is facing this challenge as MMC officials are trying to operate Lohia Nagar dumping site for solid waste disposal but because of resistance of local people, this has not been operational.
7. Dependence on upper tiers of governments for funds is also a big challenge before MMC. This problem can be sorted by levying user charges on the waste generator to cover full or partial cost of providing solid waste collection, transportation, processing and disposal services. (Uttar Pradesh Solid Waste Management Policy)

RECOMMENDATIONS AND CONCLUSIONS

The overall objective of this study was to investigate the solid waste management system of MMC. From the ongoing discussions, some recommendations can be given to improve the solid waste management system of MMC:

1. The locals should be trained to realize the importance of segregation at generation point as biodegradables, inert and recyclable material for proper waste management.
2. Manufacturing of non-recyclable polyethene bags should be banned and the use of biodegradable polyethene should be encouraged.
3. Provisions should be made to arrange the funds for SWM at the local level. For this proper user charges should be levied to cover the cost. MMC often declares to levy user charge but it is not properly materialised. MMC should prepare a byelaw to prohibit littering and burning of waste with penalty. This penalty for littering should be

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minimum Rs.1000 and for manufacturing, sale and use of prohibited polythene bags (thickness less than 50 micron) to Rs. 50. (Revised draft for UP Solid Waste Management Policy 2019)

4. The waste should be treated as a resource and formal recycling industries should be encouraged to be developed to recycle non-biodegradable recyclable component from the waste. Such type of industries may be a very good source of new employment avenues.

With the growing population and economy of the urban region, the generation of municipal solid waste is on the rise. The usage of plastics is despoiling the landscape, blocking drainage systems, and affecting the health of animals. There is a need to ensure proper collection, segregation, processing and disposal of solid waste.

REFERENCES

[1] http://www.rcueslucknow.org/publication/NewsLetter
[2] http://www.meerutnagarnigam.in
[3] http://rcueslucknow.org/Swachh_Bharat_Mission/English.pdf
[4] Joshi Rajkumar and Sirajuddin Ahmed (2016), 'Status and challenges of municipal solid waste management in India: A review', Cogent Environmental Science (2016), 2: 1139434
[5] Kumar Sudarshan, Somendra Sharma, Suraj Jaluthriya (2016), 'Solid Waste Management: A Case Study of Jaipur City', NCACE – 2016 (VOL.4 ISSUE 23)
[6] Ohri Anurag,Prabhat Kumar Singh (2009), 'Private Sector Participation in Municipal Solid Waste Management in India: Observation and Options', Conference: Recent Advances in Waste Management 2009
[7] Pandey Bindhi Vasini, Rani Usha (2019), 'Studying Municipal Solid Waste Management System in Meerut City, Uttar Pradesh, Journal of Global Resources, Volume 6 (01) August 2019-January 2020 Page 58-63
[8] Slum Free City Planning: Meerut city by Regional Centre for Urban and Environmental Studies (Sponsored by Ministry of Urban Development, Govt. of India) Osmania University, Hyderabad
[9] Swachh Bharat Mission (Urban) [SBM (U)] Manual for District- Level Functionaries (2017)
[10] Uttar Pradesh Municipal Solid Waste (Management & Handling) and Sanitation Rules 2019