

CURRENT WASTE MANAGEMENT SYSTEMS IN SAHARANPUR CITY: AN OVERVIEW

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Abstract

In a developing country such as India, rapid population growth is ever-present and leads to several resource management issues, one such issue being waste management. In recent years, the government in India has taken several initiatives to better plan and manage its upcoming cities. Saharanpur is a city of high importance in the northwestern region of Uttar Pradesh and has also been selected as one of the cities to be raised as a smart city. This has a direct implication on waste management systems in Saharanpur since a smart city needs to be capable of both, efficient utilization of resources as well as adequate disposal of the waste generated. In this paper, we present a detailed review of the waste management systems currently in practice. This helps provide a clear understanding of the areas that need to be improved, thereby, aiding the city authorities in better implementation of any proposed waste disposal/ treatment solutions.

Keywords: *smart cities, waste management systems, sewage, waste collection, waste transportation*

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Introduction

Socio-economic development and environmental degradation have become inseparable entities of modern lifestyle. Newer inventions- plastics, alloys, agrochemicals and scores of other materials that provide comfort and means of coping with the pressure of our daily choice have been responsible for the generation of a variety of pollutants and wastes, management of wastes has become a priority issue the world over,

A clean city is the primary indicator of the municipal authority's performance due to its visibility and draws the attention the moment a person enters the City. Besides, a clean city is an essential pre-requisite for the good health of its citizens. The SNN, therefore, needs to pay adequate attention to solid waste management services and improve the same in a sustainable manner.

Municipal solid waste management is an obligatory function of the urban local bodies in India. As per the definition provided by the Solid Waste Management Rules, 2016 of Government of India, Municipal solid waste (MSW) [4] includes commercial and residential wastes generated in municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes. With a growing population and increasing waste generation, solid waste management has become a major environmental issue. ULBs across India face similar challenges in handling and disposal of municipal solid waste: lack of adequate financial and human resources, poor technology, and lack of public participation to list a few. Processing and treatment of waste are not practiced, and final disposal is being made unscientifically in dumpsites, posing threats of ground and surface water contamination and air pollution.

Saharanpur city in Uttar Pradesh, India is an example of this scenario. It is a trade, commercial, and industrial city besides having a commissionaire & district headquarter. According to the census data of 2011, Saharanpur city had a population of 3,466,382 [1]. In addition, as per the estimate, about 10 percent floating population is visiting the town every day for one reason or the other. Based on the trend as noticed in the past, the town will grow rapidly. Within a span of ten years, paper waste in the country has increased by 224 percent whereas plastic and rubber waste has increased substantially by 1537 percent. If anything, the above data is indicative of the need for a well-planned and feasible waste management plan. However, in order to do so, it is important to affirm the state of the current system. This is the aim of this paper, to study the existing waste management system in Saharanpur city.

The remainder of this paper is presented in sections explaining details of the

SWM in Saharanpur. There is also a section that discusses the compliance of the existing system with the Solid Waste Management Rules, 2016 [3].

Sewage&SolidWasteManagementinSaharanpurCity

Drainage and Sewage

Saharanpur city has both an open drainage system and as well as underground sewerage system. Most of the open drains are new, sludge also flows into these open drains. Due to lack of awareness and an uncaring attitude on the part of citizens, solid waste is being dumped in drains that generally result in blockages at various parts. The underground system is very old. It covers only 35 percent of the city has an overall functional efficiency of 30 percent. Presently, the City possesses sewage pumping stations and a functional STP of 38 MLD created under YAP-1 and is maintained by UP Jal Nigam.

SNN also has 20 community Toilets, maintained by agencies appointed by SNN that charges Rs. 1/- from user. Existing public toilets, however, are not adequate. Water and electricity supply is available in these public toilets, but they are not connected to the sewer system but to septic tanks. Under YAPI-II a separately level sewerage master plan in the process of being prepared for the city.

Details of Sewage System

Sewage Generation	80MLD
Received for Treatment	92 Km.
Length of sewers	92 Km.
Coverage	60%
Pumping stations	3 MPS
Type of Treatment	USB
Capacity of STP	38 MLD
Status	Some Sewers chocked due to plastic
Land Availability	11.4 Hectare
Occupied and at present	11.4 Hectare
Land availability for future expansion, available for 19 MLD Plant	
Outfall for the discharge of treated effluent	

Discharged into river

Solid Waste

Solid Waste Management is one of the major thrust areas of the municipality. The total solid waste generation within the city is 250 MT/Day. To collect and transport

this much of solid waste, SNN has 100 intermediate collection point, 30 open sites (along the roadside), 60 containers having a capacity of 4.5 tonnes] and 5 Loaders, 3 Lifter, 3 Dumper, 10 mid-size trucks, 5 Tractors, 6 Trolley, 2 Garbage Mover, and 1 Dumper presser to lift containers, along with 986 sanitation workers (745 seats filled and 241 seats vacant). Total waste generated stands to be 250 million tonnes/ day. For the treatment of 250 MT/Day of Solid waste, SNN does not have any Treatment Plant or Compost Plant except a 6 Acre land located about 9-10 Km away from the city.

Waste Management Systems in Saharanpur city

Municipal Council utilizes 465 cleaning personals in which 170 are on contract base, there are approx. 300 laborers from CLC in which 12 are for sewers and 42 labor used in the door to door collection. There are two NGOs working on solid waste management door to door collection. One is "UMANG SUNEHERA KAL SEWA SAMITI" from "ITC" there are 150 approx. labor working from this NGO and another NGO is "FORCE". For street sweeping and waste collection each sweeper sweeps approx. 500mt of road length. The work of street sweeping is carried out in two parts; morning 6 am to 10 am and 11 am to 2 pm.

Solid Waste Processing System

Processing of waste is done by composting and recyclable material recovery. NGOs collect the waste in a segregated way which is having a composition of 26 % of recyclable wastes and 60 % of compostable wastes. The segregated recyclables are sold to the recyclers and the revenue generated from the selling of recyclables is about Rs.38.70 lakhs per annum. Totally 12 TPD of waste is sent to the 15 T capacity composting plant. However, about 3.5 TPD of waste is produced as compost and sold at the rate of 3000 Rs./ton. ITC is supporting the NGOs by financially about Rs.1.62 Cr.

Presently, pre-treatment and processing of waste are not carried out by MC Saharanpur. In the absence of proper processing facilities and a sanitary landfill, the collected waste is simply directly. The existing dumpsite is in operation since 1980 and it is very near to the slaughterhouse and waterlogged area. The details of the dumpsite in Saharanpur MC are provided in Table 5.

At present, there is no system of segregation of MSW into biodegradable, non-biodegradable, and recyclable material in the city. Currently, Saharanpur Municipality and NGOs are collecting mixed waste only from generators.

Table1: Details of the existing dumpsite at Saharanpur

S. No	Information	Details
1.	Name & Location of the MSW dumpsite	Kamela colony
2.	Period of active use of dumpsite for the dumping of waste	From 1980 to till date
3.	Quantity of MSW dumped per day	332 TPD
4.	Total quantity of waste dumped till now	409600 Tons
5.	Total Area of Dumping	22.5 Acres
6.	Height of waste dumped	12 ft

Figure 1: Organizational chart for Solid Waste Management in Saharanpur MC
 Commissioner

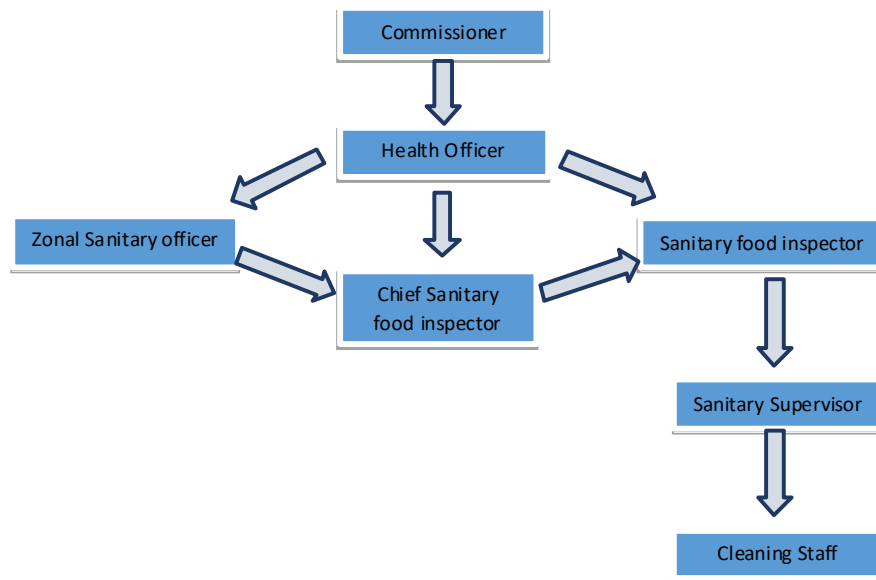


Table 2: Operational Cost of Existing SWM system

Employee Category	Annual expenditure Rs. Lakhs /Annum
Administration & Regular staff	2393.77
Contracted/outsourced staff	1073.82
Electricity/fuel charges	271.36
Chemical costs	49.62
Repair and maintenance charges	172.78
Contracted service costs	0
Other costs – sewer staff	51.58
Total	4012.93

Waste Transportation System:

(Source=Discussion with ULBs Officials for below data)

The Nagar Nigam has Tipper trucks (16 nos. 16 m³), Auto tippers (4 nos. 4 m³), tractor-trailers (7 nos.), and compactor (2 nos.) which are in operation presently for transportation of waste to the disposal site at Kamela colony. 30 drivers and 20 drivers 40 attendants for the door to door service are managing the transportation system from secondary collection points to the disposal site. The hydraulic tippers with manual loading are managed by drivers with 3 – 4 sweepers with 3 – 4 trips per vehicle per day.

Nagar Nigam currently facing problems inefficient source segregation, proper collection, social awareness, lack of technical expertise leading to improper waste management. The dumping site of Saharanpur Nagar Nigam is working from the last 10 to 12 years, the condition of the site is not good. On a rainy day, it is not possible to reach at the site for dumping waste, and after 1 to 2 years the landfill site will be fully filled. Due to the lack of an empty area in Saharanpur NN, there is only one landfill site.

Waste collection & transport system -Door to Door collection

Door to Door collection of waste from households is carried out by Saharanpur municipality and two other NGOs. Three Wards (12, 14, and 41) are covered under the ULB door to door waste collection system with a collection efficiency of 80-90%. In this system, 44.88% of households i.e 62647 number of households, 790 hotels, and restaurants, 790 commercial establishments are covered. Fee for waste collection is levied from people at the rate of Rs. 35 per household. However, the total fee collection is about Rs. 1.46 Cr. annually.

The other existing door to door waste collection system is carried out by two NGOs. This system covers some residential colonies of 62 wards and collects 12 TPD i.e., 360 Tons per month of waste in which 100% of waste is collected by Manual system with the help of 190 tricycles for proper daily operations.

Secondary Transportation System

MSW is transported from the Secondary collection point whereas waste stored in open places or bins to the disposal site by vehicles such as tipper trucks, dumper placers, and tractors (with trolleys). Waste stored in open places is loaded into secondary collection vehicles by JCB loader. For secondary collection, 2 Tipper trucks, 3 Tractor-trailers, 3 Dumper placers, and 9 lorries/Trucks are now in operation.

Waste storage System at secondary collection point

Waste is collected from individual houses and streets, transported in a polythene bag or bin and dumped or stored in bins at a designated waste collection point for secondary storage and onward transportation (to dumpsite). During a field visit to Saharanpur municipal areas, it was observed that most of the collection points are open and located on the roadsides fully accessible to stray animals and vectors. Waste is scattered, spills into the street, and makes the surrounding area very unhygienic and messy. There are 106 secondary collection points in Saharanpur given in Table 3.

Table 3: Details of MSW Collection Points, Sanitary Workers and Vehicles: Saharanpur

No. of wards	Collection points	No. of Employees involved in C&T to dumping ground	Contractor employed by MC	No. and type of vehicles used
70	106	Health officer – 2 Sanitary inspector – 9 Sanitary supervisor – 28 Safai karam chari - 465 Cleaners/drivers - 102 Laborers - 171 Others – 1434 Total - 2211	No	2 Tipper trucks(each 3 T capacity), 3 Tractor trailers (each 1.5 T capacity), 3 Dumper placers (each 2 T capacity) 9 lorries/Trucks (each 3 T capacity) 5 mini lorries (each 0. T capacity) 32 three-wheeled AutoTippers(each 1.42 T capacity)

Treatment & Disposal System

Collected waste from the SNN area is dumped at various disposal site about an area 8.9 acre, 2.5km away from the heart of the town, which is adjacent to Behat road. The site is a low- lying area and is operational from the last few years. Since no sanitary landfill method is followed, waste is crudely dumped at the low-lying area, which is posing a high pollution threat

from leachate and surface runoff during monsoon. Due to rainfall, the condition of the dumping site become very bad and this site is very near to the village as well as the river.

Compliance with Solid Waste Management (Management & Handling) Rules, 2016

The present practice of MSW management in Saharanpur does not comply with the Solid Waste Management Rules, 2016 in several aspects as described in Table 4. This table comparing the present status of MSW management system of Saharanpur vis-a-vis SWM Rules, 2016 clearly reveals that the existing MSW management system is primitive, unhygienic, highly polluting and environmentally not safe and not sound in nature. There is an urgent need for the development of a scientific and environmentally sound Integrated Solid management system in compliance with Solid Waste Management Rules, 2016.

Table 4: Present Status of SWM System and its Compliance with SWM Rules, 2016

S. No.	SWM component	Specifications of SWM Rules	Existing System
1	Collection of MSW	<ul style="list-style-type: none"> Littering of waste shall be prohibited 	<ul style="list-style-type: none"> Littering of waste is prevalent.
		<ul style="list-style-type: none"> Door to door collection of MSW must be carried out regularly. 	<ul style="list-style-type: none"> Door to door waste collection systems is covering 44.88% of total households. Informal waste pickers collect from the remaining households. Collected waste is placed on open land and outside the bins at many places.
		<ul style="list-style-type: none"> Construction or demolition wastes shall be separately collected and disposed of as per the Construction and Demolition Waste Management Rules, 2016. 	<ul style="list-style-type: none"> Some of the Construction or demolition waste is mixed with other municipal waste & disposed of together in the disposal site There is no separate C&D Waste collection system.
		<ul style="list-style-type: none"> Household Hazardous wastes shall be collected through drop off bins and safely disposed-off in a hazardous waste disposal facility 	<ul style="list-style-type: none"> No drop off bins provided for Household hazardous waste and it is mixed with MSW & disposed of together
2	Segregation of MSW	<ul style="list-style-type: none"> Segregation and recycling or reuse of segregated materials must be promoted 	<ul style="list-style-type: none"> No proper segregation of waste is practiced at present. Most of the waste is mixed including wet waste, dry waste, C&D, and electronic waste
3	Storage of MSW	<ul style="list-style-type: none"> Storage facilities must be covered and not create unhygienic conditions around it 	<ul style="list-style-type: none"> Not covered, Unhygienic and unsanitary Dogs, cows, and flies can be seen around these collection points.

5	Processing of MSW	<ul style="list-style-type: none"> • Biodegradable wastes shall be processed by composting, vermin composting, anaerobic digestion or any other appropriate biological processing for stabilization • Mixed waste containing recoverable resources shall follow the route of recycling. • Combustible fraction of waste shall be sent to waste to energy processes including refused derived fuel or supply as feedstock to solid waste-based power plants or cement kilns; 	<ul style="list-style-type: none"> • At present, there is no segregation of waste being done and no waste processing being carried out • There is no organized system of recycling.
6	Disposal of MSW	<ul style="list-style-type: none"> • Stop land filling or dumping of mixed waste and set up SLF. Only non-usable, non-recyclable, non-biodegradable, non-combustible and non-reactive inert waste and pre-processing rejects and residues from waste processing facilities to go to sanitary landfill • Landfill sites should have the following facilities: <ul style="list-style-type: none"> ➢ Fence or hedged with proper gates ➢ Approach road ➢ Waste inspection facility ➢ Weighbridge • Drinking water and appropriate lighting arrangements. 	<ul style="list-style-type: none"> • Mixed waste is simply dumped on the dumpsite. There is no provision for sanitary landfills. • Existing disposal site has no facilities as mentioned in the Rules

Solid waste management indicators

Solid waste management system in Saharanpur has the following Indicators mentioned Swachh Sarvekshan report [5].

Table 5: Indicators of Solid waste management system in Saharanpur

S.No.	Indicators	Value in %
1.	Household-level coverage of Solid waste management services	42.31
2.	Efficiency of collection of municipal solid waste	96.35
3.	Extent of segregation of municipal solid waste	3.61
4.	Extent of municipal solid waste recovered	100
5.	Extent of scientific disposal of municipal solid waste	3.61
6.	Extent of cost recovery in solid waste management services	0
7.	Efficiency in the collection of solid waste management charges	0
8.	Efficiency in the redressal of customer complaints	90.20

Conclusion

Saharanpur is an up-and-coming city with the potential of rapid progression in all socio-economic spheres. This has a direct impact on the management facilities offered by the city authorities. As seen throughout this paper, the existing SWM is far from optimal and the conditions of the city are unhealthy and unhygienic. The

paper discusses the present waste collection, transportation, and disposal system, and it is observed that there is a lack of manpower, awareness, and infrastructure required for efficient treatment of the waste generated. However, this also provides a clear picture of the aspects that need attention and need to be improved.

References

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