



Draft Policy of Uttar Pradesh on Solid Waste Management

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Brief profile of Uttar Pradesh

Embedded in the heart of India, a land where cultures have evolved and religions emerge. The greatness of Uttar Pradesh lies not only in this confluence, but also in the emergence of cultural and religious traditions along some of the greatest rivers in the Indian sub-continent – the Ganga and the Yamuna. Throughout history, great cities have emerged and established along great rivers. Within India, the Ganga and the Yamuna have nurtured a culture because of which religious faith, rituals, culture and intellectual enlightenment have evolved in places along the two rivers.

Uttar Pradesh is the 4th largest state in terms of geographical area covering 9.0 per cent of the country's geographical area. It is also the most populous state in India consisting of 19.96 crore (199.6 million) inhabitants as per 2011 Census. It is also the most populous country subdivision in the world. There are 75 districts in Uttar Pradesh and they are grouped into 18 divisions. They are Agra, Aligarh, Azamgarh, Allahabad, Kanpur, Gorakhpur, Chitrakoot Dham, Jhansi, Devi Patan, Faizabad, Bareilly, Basti, Vindhyachal (Mirzapur), Moradabad, Meerut, Lucknow, Varanasi and Saharanpur. There are 14 *Nagar Nigams*, 202 *Nagar Palika Parishads* and 438 *Nagar Panchayats*, in all 654 Urban Local Bodies.

The major sector of Uttar Pradesh economy is agriculture. Wheat, pulses, oilseeds, rice, sugarcane, and potatoes are the main crops grown here. Sugarcane is an important cash crop grown here. Tourism, computer hardware and software, information technology products and handicraft are other major contributors to the state's economy.

Introduction to Solid Waste Management

Solid waste management is the collecting, treating, and disposing of solid material that is discarded. It also offers solutions for recycling items that do not belong to garbage or trash. With this increasing population, solid waste management in the country has emerged as a challenge not only because of the environmental and aesthetic concerns, but also because of the huge quantities of waste generated every day.

Waste management is all about how solid waste can be changed and used as a valuable resource i.e. waste to wealth. It is the process of treating solid wastes and offers variety of solutions for recycling items that don't belong to trash. It is about how garbage can be used as a valuable resource. Solid waste management should be embraced by each and every household including the business owners across the world. One of the negative effects of industrialization is the creation of solid waste.

According to Britannica, "Solid-waste management, the collecting, treating, and disposing of solid material that is discarded because it has served its purpose or is no longer useful. Improper disposal of municipal solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to outbreaks of vector-borne disease—that is, diseases spread by rodents and insects."

Solid waste management is one among the basic essential services provided by municipal authorities in the country to keep urban centres clean. It is one of the important obligatory functions of the urban local bodies in India. However, it is among the most poorly rendered services in the basket—the systems applied are unscientific, out-dated and inefficient; population coverage is low; and the poor are marginalized. Waste is littered all over leading to insanitary living conditions. Municipal laws governing the urban local bodies do not have adequate provisions to deal effectively with the ever-growing problem of solid waste management. With rapid urbanization, the situation is becoming critical.

The Environment Ministry Solid Waste Management Rules 2000 have been revised after 16 years. The Rules are now applicable beyond municipal areas and will extend to urban agglomerations, census towns, notified industrial townships, areas under the control

of Indian Railways, airports, airbase, port and harbour, defence establishments, special economic zones, State and Central government organizations, places of pilgrims, religious & historical importance.

The responsibility of generators has been introduced to segregate waste into three categories – Wet, Dry and Hazardous Waste. Now the generator will have to pay ‘User Fee’ to the waste collector and a ‘Spot Fine’ for littering and non-segregation, the quantum of which will be decided by the local bodies. The government is keen on the integration of ragpickers from the informal sector to the formal sector.

Now waste processing facilities will have to be set up by all local bodies having 1 million or more population within two years. In case of census towns below 1 million population, setting up common, or stand-alone sanitary landfills by, or for all local bodies having 0.5 million or more population and for setting up common, or regional sanitary landfills by all local bodies and census towns under 0.5 million population will have to be completed in three years.

The Government has also constituted a Central Monitoring Committee under the chairmanship of Secretary, Ministry of Environment, Forest and Climate Change to monitor the overall implementation of the Rules. The Committee comprises the Ministry of Urban Development, Ministry of Rural Development, Ministry of Chemicals and Fertilizers, Ministry of Agriculture, Central Pollution Control Board, three State Pollution Control Boards /Pollution Control Committees, Urban Development Departments of three State Governments, rural development departments from two State Governments, three urban local bodies, two census towns, Federation of Indian Chambers of Commerce & Industry (FICCI), Confederation of Indian Industry (CII) and two subject experts. The Committee will meet once a year to monitor the implementation of these Rules.

Some important definitions which are mentioned in Solid Waste Management Rules, 2016 are as follows:

1. **Aerobic composting** - means a controlled process involving microbial decomposition of organic matter in the presence of oxygen;
2. **Anaerobic digestion** - means a controlled process involving microbial decomposition of organic matter in absence of oxygen;
3. **Authorisation** - means the permission given by the State Pollution Control Board or Pollution Control Committee, as the case may be, to the operator of a facility or urban local authority, or any other agency responsible for processing and disposal of solid waste;
4. **Biodegradable waste** - means any organic material that can be degraded by micro-organisms into simpler stable compounds;
5. **Bio-methanation** - means a process which entails enzymatic decomposition of the organic matter by microbial action to produce methane rich biogas;
6. **Brand owner** - means a person or company who sells any commodity under a registered brand label.
7. **Buffer zone**- means zone of no development to be maintained around solid waste processing and disposal facility, exceeding 5 TPD of installed capacity. This will be maintained within total and area allotted for the solid waste processing and disposal facility.
8. **Bulk waste generator** - means and includes buildings occupied by the Central government departments or undertakings, State government departments or undertakings, local bodies, public sector undertakings or private companies, hospitals, nursing homes, schools, colleges, universities, other educational institutions, hostels, hotels, commercial establishments, markets, places of worship,

stadia and sports complexes having an average waste generation rate exceeding 100kg per day.

9. **Bye-laws** - means regulatory framework notified by local body, census town and notified area townships for facilitating the implementation of these rules effectively in their jurisdiction.
10. **Census town** - means an urban area as defined by the Registrar General and Census Commissioner of India; 11. “Combustible waste” means non-biodegradable, non-recyclable, non-reusable, non-hazardous solid waste having minimum calorific value exceeding 1500 kcal/kg and excluding chlorinated materials like plastic, wood pulp, etc.
11. **Composting** - means a controlled process involving microbial decomposition of organic matter.
12. **Contractor** - means a person or firm that undertakes a contract to provide materials or labour to perform a service or do a job for service providing authority;
13. **Co-processing** - means use of non-biodegradable and non-recyclable solid waste having calorific value exceeding 1500k/cal as raw material or as a source of energy or both to replace or supplement the natural mineral resources and fossil fuels in industrial processes.
14. **Decentralised processing** - means establishment of dispersed facilities for maximizing the processing of biodegradable waste and recovery of recyclables closest to the source of generation so as to minimize transportation of waste for processing or disposal;
15. **Disposal**- means the final and safe disposal of post processed residual solid waste and inert street sweepings and silt from surface drains on land as specified in Schedule I to prevent contamination of ground water, surface water, ambient air and attraction of animals or birds;
16. **Domestic Hazardous waste** - means discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines, broken mercury thermometers, used batteries, used needles and syringes and contaminated gauge, etc., generated at the household level;
17. **Door to door collection** - means collection of solid waste from the door step of households, shops, commercial establishments , offices , institutional or any other non-residential premises and includes collection of such waste from entry gate or a designated location on the ground floor in a housing society , multi storied building or apartments , large residential, commercial or institutional complex or premises;
18. **Dry waste** - means waste other than bio-degradable waste and inert street sweepings and includes recyclable and non-recyclable waste, combustible waste and sanitary napkin and diapers, etc;
19. **Dump sites** - means a land utilised by local body for disposal of solid waste without following the principles of sanitary land filling;
20. **Extended Producer Responsibility (EPR)** - means responsibility of any producer of packaging products such as plastic, tin, glass and corrugated boxes, etc., for environmentally sound management, till end-of-life of the packaging products;
21. **Facility** - means any establishment wherein the solid waste management processes namely segregation, recovery, storage, collection, recycling, processing, treatment or safe disposal are carried out;
22. **Fine** - means penalty imposed on waste generators or operators of waste processing and disposal facilities under the bye-laws for non-compliance of the directions contained in these rules and/or bye- laws.
23. **Form** - means a F8orm appended to these rules;

24. **Handling** - includes all activities relating to sorting, segregation, material recovery, collection, secondary storage, shredding, baling, crushing, loading, unloading, transportation, processing and disposal of solid wastes.
25. **Inert** - means wastes which are not bio-degradable, recyclable or combustible street sweeping or dust and silt removed from the surface drains;
26. **Incineration**- means an engineered process involving burning or combustion of solid waste to thermally degrade waste materials at high temperatures.
27. **Informal wastecollector** - includes individuals, associations or waste traders who are involved in sorting, sale and purchase of recyclable materials.
28. **Leachate** - means the liquid that seeps through solid waste or other medium and has extracts of dissolved or suspended material from it.
29. **Local body** - for the purpose of these rules means and includes the municipal corporation, Nagar Nigam, municipal council, Nagarpalika, Nagar Palika Parishad, Municipal board, Nagar Panchayat and town panchayat, census towns, notified areas and notified industrial townships with whatever name they are called in different States and union territories in India.
30. **Materials Recovery Facility (MRF)** - means a facility where non-compostable solid waste can be temporarily stored by the local body or any other entity mentioned in rule 2 or any person or agency authorised by any of them to facilitate segregation, sorting and recovery of recyclables from various components of waste by authorised informal sector of waste pickers, informal recyclers or any other work force engaged by the local body or entity mentioned in rule 2 for the purpose before the waste is delivered or taken up for its processing or disposal.
31. **Non-biodegradable waste** - means any waste that cannot be degraded by microorganisms into simpler stable compounds;
32. **Operator of a facility** - means a person or entity, who owns or operates a facility for handling solid waste which includes the local body and any other entity or agency appointed by the local body.
33. **Primary collection** - means collecting, lifting and removal of segregated solid waste from source of its generation including households, shops, offices and any other non-residential premises or from any collection points or any other location specified by the local body.
34. **Processing** - means any scientific process by which segregated solid waste is handled for the purpose of reuse, recycling or transformation into new products.
35. **Recycling**- means the process of transforming segregated non-biodegradable solid waste into new material or product or as raw material for producing new products which may or may not be similar to the original products.
36. **Redevelopment** - means rebuilding of old residential or commercial buildings at the same site, where the existing buildings and other infrastructures have become dilapidated;
37. **Refused Derived Fuel (RDF)** - means fuel derived from combustible waste fraction of solid waste like plastic, wood, pulp or organic waste, other than chlorinated materials, in the form of pellets or fluff produced by drying, shredding, dehydrating and compacting of solid waste ;
38. **Residual solid waste** - means and includes the waste and rejects from the solid waste processing facilities which are not suitable for recycling or further processing;
39. **Sanitary land filling** - means the final and safe disposal of residual solid waste and inert wastes on land in a facility designed with protective measures against pollution of ground water, surface water and fugitive air dust, wind-blown litter, bad odour, fire hazard, animal menace, bird menace, pests or rodents, greenhouse gas emissions, persistent organic pollutants slope instability and erosion;

40. **Sanitary waste** - means wastes comprising of used diapers, sanitary towels or napkins, tampons, condoms, incontinence sheets and any other similar waste;
41. **Schedule** - means the Schedule appended to these rules;
42. **Secondary storage** - means the temporary containment of solid waste after collection at secondary waste storage depots or MRFs or bins for onward transportation of the waste to the processing or disposal facility.
43. **Segregation** - means sorting and separate storage of various components of solid waste namely biodegradable wastes including agriculture and dairy waste, non-biodegradable wastes including recyclable waste, non-recyclable combustible waste, sanitary waste and non-recyclable inert waste, domestic hazardous wastes, and construction and demolition wastes;
44. **Service provider** - means an authority providing public utility services like water, sewerage, electricity, telephone, roads, drainage, etc.
45. **Solid waste** - means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities mentioned in rule 2.
46. **Sorting** - means separating various components and categories of recyclables such as paper, plastic, cardboards, metal, glass, etc., from mixed waste as may be appropriate to facilitate recycling.
47. **Stabilising**- means the biological decomposition of biodegradable wastes to a stable state where it generates no leachate or offensive odours and is fit for application to farm land ,soil erosion control and soil remediation.
48. **Street vendor** - means any person engaged in vending of articles, goods, wares, food items or merchandise of everyday use or offering services to the general public, in a street, lane, side walk, footpath, pavement, public park or any other public place or private area, from a temporary built up structure or by moving from place to place and includes hawker, peddler, squatter and all other synonymous terms which may be local or region specific; and the words “street vending” with their grammatical variations and cognate expressions, shall be construed accordingly.
49. **Tipping fee** - means a fee or support price determined by the local authorities or any state agency authorised by the State government to be paid to the concessionaire or operator of waste processing facility or for disposal of residual solid waste at the landfill.
50. **Transfer station** - means a facility created to receive solid waste from collection areas and transport in bulk in covered vehicles or containers to waste processing and, or, disposal facilities;
51. **Transportation** - means conveyance of solid waste, either treated, partly treated or untreated from a location to another location in an environmentally soundmanner through specially designed and covered transport system so as to prevent the foul odour, littering and unsightly conditions.
52. **Treatment** - means the method, technique or process designed to modify physical, chemical or biological characteristics or composition of any waste so as to reduce its volume and potential to cause harm.
53. **User fee** - means a fee imposed by the local body and any entity mentioned in rule 2 on the waste generator to cover full or part cost of providing solid waste collection, transportation, processing and disposal services.
54. **Vermi-composting** - means the process of conversion of bio-degradable waste into compost using earth worms.

55. **Waste generator** - means and includes every person or group of persons, every residential premises and non-residential establishments including Indian Railways, defense establishments, which generate solid waste.
56. **Waste hierarchy** - means the priority order in which the solid waste is to should be managed by giving emphasis to prevention, reduction, reuse, recycling, recovery and disposal, with prevention being the most preferred option and the disposal at the landfill being the least.
57. **Waste picker** - means a person or groups of persons informally engaged in collection and recovery of reusable and recyclable solid waste from the source of waste generation the streets, bins, material recovery facilities, processing and waste disposal facilities for sale to recyclers directly or through intermediaries to earn their livelihood.

QUANTIFICATION AND COMPOSITION OF WASTE

As an essential requirement each ULB should assess the quantity and composition of waste generated to plan for and design MSWM systems effectively. The quantity and composition of MSW generated in the ULB determine collection, processing, and disposal options that could be adopted. They are dependent on the population, demographic details, principal activities in the city or town, income levels, and lifestyle of the community.

Waste generation is strongly dependent on the local economy, lifestyle, and infrastructure. It has been well established that waste generation of an area is proportional to average income of the people of that area. It is also observed that generation of organic, plastic, and paper waste is high in high income areas.

An assessment states that the per capita waste generation is increasing by about 1.3% per year. With an urban growth rate of 3.0%–3.5% per year, the annual increase in waste quantities may be considered at 5% per year. Impacts of increasing ULB jurisdiction should also be considered while assessing future waste generation rates.

Several studies were conducted by Central Pollution Control Board (CPCB) over the last 2 decades to arrive at waste generation details and composition of MSW generated in the country. Summaries of the several findings are listed below:

1996: The characterisation studies carried out by National Environmental Engineering Research Institute (NEERI) in 1996 indicate that MSW contains large organic fraction (30%–40%); ash and fine earth (30%–40%); paper (3%–6%); along with plastic, glass, and metal (each less than 1%). The calorific value of refuse ranges between 800 and 1,000 kilocalorie per kilogram (kcal/kg) and carbon-to-nitrogen (C/N) ratio ranges between 20 and 30. Study revealed that quantum of waste generation varies between 0.2 and 0.4 kg/capita/day in the urban centres and goes up to 0.5 kg/capita/ day in metropolitan cities. The study was carried out in 43 cities of varying sizes, as detailed out in Table 1.5. The results were presented in a report published by NEERI “Strategy Paper on Solid Waste Management in India” (1996).

Table-1: Per-capita Waste Generation Rates from NEERI Study in 1996

POPULATION RANGE (IN MILLION)	NO. OF CITIES SURVEYED	AVERAGE PER CAPITA VALUE (KG/CAPITA/DAY)
0.1 to 0.5	12	0.21
0.5 to 1.0	15	0.25
1.0 to 2.0	9	0.27
2.0-5.0	3	0.35
>5.0	4	0.50

1999-2000: The study conducted by CPCB through Environment Protection Training and Research Institute (EPTRI) in 1999–2000 in 210 Class I cities and 113 Class II towns indicated that Class I cities generated 48,134 tons per day (TPD) of MSW while Class II towns generated 3,401 TPD of MSW. The study revealed that waste generation rate in Class I cities was approximately 0.34 kg/capita/ day while the waste generation rate in Class II towns was found to be 0.14 kg/capita/day.

2004-2005: NEERI's study "Assessment of Status of Municipal Solid Wastes Management in Metro Cities and State Capitals" in 2004–2005 assessed 59 cities (35 metro cities and 24 state capitals). Studies have revealed that waste generation rate varies from 0.12 to 0.60 kg/capita/day. Analysis of physical composition indicates that total compostable matter in the waste is 40%–60%, while recyclable fraction is 10%–25%. The moisture content in the MSW is 30%– 60%, while the C/N ratio is 20–40.

Table-2: Physical Composition of Municipal Solid Waste

YEAR	COMPOSITION (%)							
	Biodegradables	Paper	Plastic/ Rubber	Metal	Glass	Rags	Other	Inerts
1996	42.21	3.63	0.60	0.49	0.60	-	-	45.13
2005	47.43	8.13	9.22	0.50	1.01	4.49	4.016	25.16

2010-2011: The survey conducted by the Central Institute of Plastics Engineering and Technology (CIPET) at the instance of CPCB has reported generation of 50,592 TPD of MSW in 2010–2011 in the same 59 cities.

2014-2015: As per CPCB, 1,43,449 TPD of MSW was generated for 34 states and union territories during 2013–2014. The average rate of waste generation in India, based on this data, is 0.11 kg/capita/ day. Out of the total waste generated, approximately 1,17,644 TPD (82%) of MSW was collected and 32,871 TPD (22.9%) was processed or treated. Other studies and observations indicate that waste generation rate is between 200 and 300 gm/capita/day in small towns and cities with a population below 2,00,000. It is usually 300–350 gm/capita/day in cities with a population between 2,00,000 and 5,00,000; 350–400 gm/capita/ day in cities with a population between 5,00,000 and 10,00,000; and 400–600 gm/capita/day in cities with a population above 10,00,000. However, these are only indicative figures which need to be verified while planning city specific MSWM systems.

Existing Status of Solid Waste Management in Uttar Pradesh

{Status as on 28/01/2015 (Source: U.P. Pollution Control Board)}

- Total no. of local bodies- 630
- Nagar Nigam-13
- Nagar Palika Parishad-196
- Nagar Panchayat-421
- Total Generation of MSW – 19180 TPD
- Treated quantity of MSW – 5197 TPD
- MSW facility installed & operational in Nagar Nigam - 08 (Kanpur, Agra, Lucknow, Moradabad, Aligarh, Varanasi, Allahabad & Bareilly).

- Bareilly Nagar Nigam MSW facility is presently closed in the compliance of Hon'ble NGT order.
- No. of MSW facility under construction (Nagar Nigam Jhansi)
- No. of Nagar Nigam which do not have MSWTF - 04 (Ghaziabad, Meerut, Gorakhpur, Saharanpur)
- No. of MSW facility installed & operational in Nagar Palika-08 (Muzaffarnagar, Mainpuri, Etawah, Raebareilly, Barabanki, Fatehpur, Kannauj & Mathura).
- No. of MSW facility under construction in Palika-02 (Sambhal & Mirzapur)
- No. of Nagar Palika which do not have MSWTF-186
- No. of Nagar Panchayat which do not have any facility-421

There are 630 urban local bodies (Nagar Nigam-13, Nagar Palika Parishad-196, Nagar Panchayat-421) are identified in State of UP. Out of 13 Nagar Nigam, 8 Nagar Nigams namely Kanpur, Agra, Lucknow, Moradabad, Aligarh, Varanasi, Allahabad and Bareilly have been installed MSW treatment and disposal facilities (MSWTSDF). Nagar Nigam Bareilly MSW facility is presently closed in compliance of Hon'ble National Green Tribunal Order. While OJ MSW treatment and disposal facility is under development at Nagar Nigam Jhansi. Remaining 04 Nagar Nigams namely Ghaziabad, Meerut, Gorakhpur and Saharanpur, development of MSW treatment disposal facilities yet to be done. Furthermore 08 MSW treatment and disposal facilities are installed and operational at different Nagar Palika Parishad Muzaffarnagar, Mainpuri, Etawah, Raebareilly, Barabanki, Fatehpur, Kannauj and Mathura. Again development of 02 MSW treatment and disposal facilities is under progress at Nagar Palika Parishad Sambhal and Mirzapur. Municipal Solid Waste generation is about 19180 TPD in state of UP out of which about 5197 TPD MSW is processed/treated (approx. 27%). These figures clearly reflect that MSW Rules are not enforced and the local bodies are non-compliant. Majority of the local bodies have not approached SPCB for seeking authorization under MSW Rules. Also, Local bodies are not submitting Annual Reports to SPCB and this is the main cause that SPCB is not able to adhere with time schedule given in the Rule for submitting Annual Report.

Existing facility for waste processing and disposal in respect of Waste processing and disposal 16 MSW treatment and disposal sites have been constructed and operational in U.P. while 3 MSW treatment disposal sites are under construction, disposal of municipal solid waste is done by composting, bio-composting, Vermi-composting, palletisation/composting, land filling etc. These 16 MSW treatment and disposal facilities, 03 sites are based on composting process, 01 site is based on composting/landfilling/recycling/briquette making, 05 sites are based on bio-composting/landfill, 01 site bio-composting/RDF process, 04 sites on palletisation /composting and 02 sites are operational on the basis of vermi-composting process etc.

Nagar Nigam:

According to Annual Book of Department of Urban Development, Government of Uttar Pradesh 2013-14, there are 13 Nagar Nigam in the state with total area 1814.09 sq km and population 138.66 lakhs. As per Annual Book of Department of Urban Development, Government of Uttar Pradesh 2013-14, till 31-03-13 number of approved centralized employees is 1456, out of which only 794 employees are working. The post under Group A - 128, Group B - 265, Group C - 1063 are approved out of which 101, 159, 534 are working in respectively. Under non-centralized general category regular employees, number of post are 16997 (Group C - 3518 & Group D - 13479) against that 11385 (Group C - 2554 & Group D - 8831) employees are working. 59 Daily, 389 contractual and 278 fixed scale employees are working at present. In Nagar Nigam out of 26640 approved regular posts of sanitation employee only 18237 are working at present. Number of contractual sanitation employee are

13809 which are approved by government against that 12209 employees are working in which there are on-daily basis – 340 and fixed scale 720 employees (Table-3). In Nagar Nigam centralized, non-centralized and sanitation employees, number of approved post is 45093 against that 30416 employees are working. There are total daily wage – 399 employee and total contractual employee – 12598 and total field scale employee – 998 are available. Thus, till 31-03-13 total working employees are 44411. In the year 2012-13, the availability is 40 lakh metric ton is reported by 13 Nagar Nigam of Uttar Pradesh out of which 38.42 lakh metric ton is showed as disposed-off. (Table-4)

At present there are 14 Nagar Nigam in the state with total area 1835.44 sq km and population 1.76 crore and total employees are 46396.

Nagar Palika Parishad:

According to Annual Book of Department of Urban Development, Government of Uttar Pradesh 2013-14, there are 194 Nagar Palika Parishad in the state with total area 2853.23 sq km and population 140.15 lakhs. Regarding manpower, till 31-03-13 number of approved centralized employees is 1124, out of which only 639 employees are working. The post under Group A - 09, Group B – 135, Group C – 980 are approved out of which 0, 110, 529 are working respectively. Under non-centralized general category regular employees, number of post are 12665 (Group C – 2505 & Group D – 10160) against that 10727 (Group C – 1900 & Group D – 8827) employees are working. 166 Daily-wage, 92 contractual and 115 work charge and 431 are fixed scale employees working. In Nagar Palika Parishad out of 19410 approved regular posts of sanitation employee only 15623 are working at present. Number of contractual sanitation employee are 19065 which are approved by government against that 12474 employees are working in which there are on-daily basis – 579, work charge 70 and fixed scale 509 employees (Table:3). In Nagar Nigam centralized, non-centralized and sanitation employees, number of approved post is 33175 against that 26629 employees are working. There are total daily wage – 745 employee and total contractual employee – 12566, work charge employees 185 and total field scale employee – 940 are available. Thus, till 31-03-13 total working employees are 41065. In the year 2012-13, the availability is 13.15 lakh metric ton is reported by 194 Nagar Palika Parishad of Uttar Pradesh out of which 12.84 lakh metric ton is showed as disposed-off. (Table-4).

At present there are 202 Nagar Palika Parishad in the state with total area 2020.15 sq km and population 1.55 crore and total employees are 44283. Moreover, there are 438 Nagar Panchayat in the state with total area 2408.98 sq km and population 0.72 crore and total employees are 18950.

This means there are 654 Urban Local Bodies in the state with total area 6264.57 sq km and population 4.03 crore and total employees are 109629. Moreover, around 15500 metric tonnes has generated from 636 ULB's which includes 11290 wards.

Table-3 Sanitary Workers Distribution (Status till 31-03-2013)

Urban Local Body	Number of Urban Local Bodies	Sweepers							
		Regular		Daily wage	Contractual		Work charge	Salary	Total
		Approved	Working		Approved by Administration	working			
1	2	3	4	5	6	7	8	9	10
Nagar Nigam	13	26640	18237	340	13809	12209	0	720	31583
Nagar Palika Parishad	194	19410	15263	579	19065	12474	70	509	28895

Nagar Panchayat	423	4915	4166	140	12777	7132	60	363	11861
Total	630	50965	37743	45651	45651	31815	130	1592	72339

(Source: Annual Book of Department of Urban Development, Government of Uttar Pradesh 2013-14)

Table-4: Solid Waste Management in ULBs

Urban Local Body	Number of Urban Local Bodies	Waste management	
		Total solid waste generated (lakh metric ton)	Soild Waste managed (lakh metric ton)
		40.00	38.42
Nagar Palika Parishad	194	13.15	12.84
Nagar Panchayat	423	0.63	0.62
Total	630	53.78	51.88

(Source: Annual Book of Department of Urban Development, Government of Uttar Pradesh 2013-14)

SWOT Analysis

<p><u>Strength</u></p> <ul style="list-style-type: none"> • Statutory Body already available in the state to look after sanitation including solid waste management • All statutory body having elected board. • Every board have Ward Member and Mayor/Chairman at Nagar Nigam/ Nagar Palika Parishad & Nagar Panchayat and they are directly elected by the public. • In 74TH Amendment Act, there is provision of ward committee for above 3,00,000 population in Nagar Nigam & Nagar Palika Parishad. • There is also a notification by the state government to have Area Sabha for 1,000 populations. • All ULBs in state are covered in Swachh Bharat Mission and each ULB will get grant from State Finance Commission. • Centralized Cadre is available at state level. 	<p><u>Weakness</u></p> <ul style="list-style-type: none"> • No implementation of ward committee in Nagar Nigam and Nagar Palika Parishad. • No organised structure to look after particular Solid Waste Management. • Lack of Financial strength and institutional capacity. • No implementation of Area Sabha. • Lack of civic sense in citizens. • No proper disposal facility of the waste. • Absence of ICT technology in implementation of collection, transportation and treatment of the waste. • Dis-aggregated data is not available. • No standardization practise under SWM. • Lack of Manpower
<p><u>Opportunity</u></p> <ul style="list-style-type: none"> • Due to large number of ULBs and population waste generation is high. 	<p><u>Threats</u></p> <ul style="list-style-type: none"> • Due to non-scientific disposal of waste, ground water, soil, surface

<p>This waste can be converted into wealth in form of compost and energy.</p> <ul style="list-style-type: none"> • Weather condition is suitable converting the waste into good quality of manure. • Quantum of recyclable material is also high like plastic, paper, etc. • Due to high population, human excreta are more which can be further improved to get good quality of manure. • State have good number of STPs, so sludge can also utilized easily 	<p>water, air can get contaminated.</p> <ul style="list-style-type: none"> • Due to dense population of the state, land availability for SWM plant and sanitary landfill site is very difficult. • Poor management of Solid Waste leads to: <ul style="list-style-type: none"> ➤ Poor health status of the citizens in particular URBAN POOR ➤ Increase in Diseases
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Focus Point of the State on SWM:

- Environment friendly and scientific solid waste management in each ULB.
- Planning will be made to convert waste into energy.
- Advance and scientific STP plant will be established nearby slaughter houses and leather industries.
- Advance and scientific STP plant will be established in town along Ganga, Yamuna and its tributaries so that treated water go into river.
- Under Swachh Bharat Mission, Solid Waste Management component 35% grant from Government of India and 40% from state government in case of Nagar Nigam, so in case of Nagar Palika Parishad grant is being provided by the state government.

Vision of the Policy

The vision which this Policy seeks to pursue is:

“A healthy, prosperous and resource-efficient society in which wastes are prevented, re-used, reduced and recycled wherever feasible and beneficial, and disposed-off safely only as a last resort.”

Goal & Objectives of the Policy

The overall goal of this Policy is therefore to ensure that:

“The system for managing solid wastes in Belize is financially and environmentally sustainable, and contributes to improved quality of life.”

The primary objectives of this Policy are to achieve and maintain a situation where:

1. Achieve high standards of cleanliness in the towns and cities of Uttar Pradesh for achieving healthy, hygienic and liveable environment.
2. Implementing waste hierarchy- 3R's, Reduce, Reuse, Recycle.

3. The Policy for managing solid wastes is developed to facilitate preparation, implementation and operation of a decentralized /integrated and cost-effective Solid Waste Management System in the state with adequate revenue flow from SWM fee and other sources.
4. Available data and information on the sources, nature, quantities and fate of wastes, and SWM facilities, is sufficiently comprehensive and reliable to be able to regulate and manage wastes effectively helping in waste prevention, recovery and recycling.
5. Stakeholders, institutional and organisational arrangements must have a sufficient awareness and understanding of their roles, duties and responsibilities in achieving an optimal for the development and operation of a decentralized/ integrated and cost-effective solid waste management system.

Activities to achieve Objectives of the Policy

1. Framing Ward Committee in all Nagar Nigam and Nagar Palika Parishad.
2. Organised institutional and financial strength will be setup to look after SWM.
3. Area Sabah will be constituted as per 74TH amendment act.
4. The source segregation of waste has been mandated to channelize the waste to wealth by recovery, reuse and recycle.
5. Increasing the efficiency of use of resources through ICT in reduction, reuse, and recycling, and become an appropriate tool of SWM for monitoring using GPS.
6. Responsibilities of Generators have been introduced to segregate waste in to three streams, Wet (Biodegradable), Dry (Plastic, Paper, metal, wood, etc.) and domestic hazardous wastes (diapers, napkins, empty containers of cleaning agents, mosquito repellents, etc.) and handover segregated wastes to authorized rag-pickers or waste collectors or local bodies.
7. Integration of waste pickers/ rag pickers and waste dealers/ Kabadiwalas in the formal system should be done by State Governments, and Self Help Group, or any other group to be formed.
8. Proper disposal mechanism will be implemented to dispose-off solid waste.
9. No person should throw, burn, or bury the solid waste generated by him, on streets, open public spaces outside his premises, or in the drain, or water bodies.
10. Generator will have to pay 'User Fee' to waste collector and for 'Spot Fine' for Littering and Non-segregation.
11. Used sanitary waste like diapers, sanitary pads should be wrapped securely in pouches provided by manufacturers or brand owners of these products or in a suitable wrapping material and shall place the same in the bin meant for dry waste / non- bio-degradable waste.

12. The concept of partnership in Swachh Bharat has been introduced. Bulk and institutional generators, market associations, event organizers and hotels and restaurants have been made directly responsible for segregation and sorting the waste and manage in partnership with local bodies.
13. All hotels and restaurants should segregate biodegradable waste and set up a system of collection or follow the system of collection set up by local body to ensure that such food waste is utilized for composting / biomethanation.
14. All Resident Welfare and market associations, gated communities and institution with an area >5,000 sq. m should segregate waste at source- in to valuable dry waste like plastic, tin, glass, paper, etc. and handover recyclable material to either the authorized waste pickers or the authorized recyclers, or to the urban local body.
15. The bio-degradable waste should be processed, treated and disposed of through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local authority.
16. New townships and Group Housing societies have been made responsible to develop in-house waste handling, and processing arrangements for bio-degradable waste.
17. Every street vendor should keep suitable containers for storage of waste generated during the course of his activity such as food waste, disposable plates, cups, cans, wrappers, coconut shells, leftover food, vegetables, fruits etc. and deposit such waste at waste storage depot or container or vehicle as notified by the local authority.
18. The developers of Special Economic Zone, industrial estate, industrial park to earmark at least 5% of the total area of the plot or minimum 5 plots/ sheds for recovery and recycling facility.
19. All manufacturers of disposable products such as tin, glass, plastics packaging etc. or brand owners who introduce such products in the market shall provide necessary financial assistance to local authorities for the establishment of waste management system.
20. All such brand owners who sale or market their products in such packaging material which are non-biodegradable should put in place a system to collect back the packaging waste generated due to their production.
21. Manufacturers or Brand Owners or marketing companies of sanitary napkins and diapers should explore the possibility of using all recyclable materials in their products or they shall provide a pouch or wrapper for disposal of each napkin or diapers along with the packet of their sanitary products.
22. All such manufacturers, brand owners or marketing companies should educate the masses for wrapping and disposal of their products.

23. All industrial units using fuel and located within 100 km from a solid waste based RDF plant shall make arrangements within six months from the date of notification of these rules to replace at least 5 % of their fuel requirement by RDF so produced.
24. Non-recyclable waste having calorific value of 1500 K/cal/kg or more shall not be disposed of on landfills and shall only be utilized for generating energy either or through refuse derived fuel or by giving away as feed stock for preparing refuse derived fuel.
25. High calorific wastes shall be used for co-processing in cement or thermal power plants.
26. Construction and demolition waste should be stored, separately disposed-off as per the Construction and Demolition Waste Management Rules, 2016
27. Horticulture waste and garden waste generated from his premises should be disposed as per the directions of local authority.
28. An event, or gathering organiser of more than 100 persons at any licensed/ unlicensed place, should ensure segregation of waste at source and handing over of segregated waste to waste collector or agency, as specified by local authority.
29. Special provision for management of solid waste in hilly areas:- Construction of landfill on the hill shall be avoided. A transfer station at a suitable enclosed location shall be setup to collect residual waste from the processing facility and inert waste. Suitable land shall be identified in the plain areas, down the hill, within 25 kilometres for setting up sanitary landfill. The residual waste from the transfer station shall be disposed-off at this sanitary landfill.
30. In case of non-availability of such land, efforts shall be made to set up regional sanitary landfill for the inert and residual waste.

Guiding Principles for Future Solid Waste Management Approach in Uttar Pradesh

With the ever increasing population and urbanization, the waste management has emerged as a huge challenge in the country. Not only the waste has increased in quantity, but the characteristics of waste have also changed tremendously over a period, with the introduction of so many new gadgets and equipment.

Scientific disposal of solid waste through segregation, collection and treatment and disposal in an environmentally sound manner minimises the adverse impact on the environment. The local authorities are responsible for the development of infrastructure for collection, storage, segregation, transportation, processing and disposal of MSW. The Uttar Pradesh Solid Waste Management Policy is based on following principles:

- Effective segregation at source- three bin
- Segregation at also processing unit,
- 100% collection at fixed time 365 days in a year,
- Timely transportation.
- Maximum resources recovery
- Effective treatment
- Safe disposal
- Minimal waste at Landfill site (not more than 10%)

- Polluters to pay
- Daily Road sweeping-preferably night sweeping on main roads
- Effective IEC and Capacity Building

Implementation Plan for Achieving Above Mentioned Guiding Principles

Duties of Stake Holders

Duties of Waste Generator: -

1. Every waste generator shall:
 - Segregate and store the waste generated by them in three separate streams namely biodegradable, non-bio-degradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorised waste pickers or waste collectors as per the directions or notification by the local authorities from time to time.
 - Wrap securely the used sanitary waste like diapers, sanitary pads etc., in the pouches provided by the manufacturers or band owners of these products or in a suitable wrapping material as instructed by the local authorities and shall place the same in the bin meant for dry waste or non-bio-degradable waste;
 - Store separately construction and demolition waste, as and when generated, in his own premises and ULB shall dispose-off as per the Construction and Demolition Waste Management Rules, 2016 ; and
 - Store horticulture waste and garden waste generated from his premises separately in his own premises and dispose of as per the directions of the local body from time to time.
2. No waste generator shall throw, burn or bury the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.
3. All waste generators shall pay such user fee for solid waste management, as specified in the bye-laws of the local bodies.
4. No person shall organise an event or gathering of more than one hundred persons at any unlicensed place without intimating the local body, at least three working days in advance and such person or the organiser of such event shall ensure segregation of waste at source and handling over of segregated waste collector or agency as specified by the local body.
5. Every street vendor shall keep suitable containers for storage of waste generated during the course of his activity such as food waste, disposable plates, cups, cans, wrappers, leftover food, vegetables, fruits, etc., and shall deposit such waste at waste storage depot or container or vehicle as notified by the local body.
6. All resident welfare and market associations shall, within one year from the date of notification of these rules and in partnership with the local body ensure segregation of waste at source by the generators as prescribed in these rules, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorised recyclers. The bio-degradable waste shall be processed, treated and disposed-off through composting or biomethanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.
7. All gated communities and institutions with more than 5,000 sq mt. of area shall within one year from the date of notification of rules and in partnership with the local body, ensure segregation of waste at source by the generators as prescribed in rules, facilitate collection segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorised recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or

bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

8. All hotels and restaurants shall, within one year from the date of notification of rules and in partnership with the local body ensure segregation of waste at source as prescribed in rules, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorised recyclers. The bio-degradable waste shall be processed, treated and disposed-off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

Duties of District Magistrate:-

1. Facilitate identification and allocation of suitable land as per clause (f) of rules 11 for setting up solid waste processing and disposal facilities to local authorities in his district in close coordination with the Secretary-in-charge of State Urban Development Department within one year from the date of notification of these rules;
2. Review the performed of local bodies, at least once in a quarter on waste segregation, processing, treatment and disposal and take corrective measures in consultation with the Commissioner or Director of local bodies and Secretary-in-charge of the State Urban Development.

Duties of Urban Local Bodies:-

1. Notify rules regarding Segregation of waste and door to door collection.
2. Notify rules for User Charges to be collected.
3. Notify rules regarding Prohibition of Littering of Waste and penalty on defaulters.
4. Create a SWM Cell at the ULB level.
5. Prepare a Plan for Solid Waste Management.
6. Ensure timely collection of segregated waste from the door step of waste generators.
7. Ensure proper transportation of Waste.
8. Ensure proper processing of waste- selling of recyclables, Arrangements to send RDF to Industries, Composting of Wet waste (Green Waste).
9. Large ULB's (Distt. HQ) to have Sanitary Land Fill sites and smaller ULB's to tie-up with the nearest Landfill site.

Duties of Housing Board, Development Authorities and Private Builders:-

1. All will ensure that while planning for commercial and residential colonies a place is marked for waste management.
2. And they should try to become "0" waste producing communities.

Capacity Building and Training

In the context of this strategy, it is recognized that there is a need to improve the efficiency of the state departments and the ULBs across the state through a systematic approach, of which training is an important component. It is understood that capacity

development is a long-term process that requires systematic and continuous effort at state as well as ULB level, both from the demand and supply perspective of service delivery.

The approach to capacity building in SWM shall not be only about technology and economics but also about:

- Understanding the administration systems for waste management and related activities (multidisciplinary and cross-sectoral).
- Understanding the need for human resource development to achieve better results in SWM.
- Focus on building sound institutions and good governance for attaining improved SWM.
- Delineating strategies for sustenance of achievements.

IEC (Information, Education and Communication)

Information, Education and Communication (IEC) is a process of working with individuals, communities, societies and policy & decision makers to develop communication strategies to promote positive behaviours which are appropriate to their Culture & Social/Community behaviours. IEC combine all suitable strategies, approaches and methods that enable individuals, families, groups, organizations and communities to play active role in achieving, protecting and sustaining the desired behavioural change.

Importance of IEC

Community participation has a direct bearing on efficient SWM. Yet, the municipal authorities have failed to mobilize the community and educate citizens on the rudiments of handling waste and proper practices of storing it in their own bins at the household-, shop- and establishment-level. In the absence of a basic facility of collection of waste from source, citizens are prone to dumping waste on the streets, open spaces, drains, and water bodies in the vicinity creating insanitary conditions. Citizens assume that waste thrown on the streets would be picked up by the municipality through street sweeping.

For the general public, which is quite indifferent towards garbage disposal etiquette, the onus of keeping the city clean is entirely on the ULBs. This mind set is primarily responsible for the unscientific systems of waste management in the country.

IEC plays a key role in creating awareness, mobilizing people, and making development process participatory through encouragement and by sharing knowledge, skills and techniques with the people. It is also critical for bringing about transparency in implementation of programmes at the field level and for promoting the concept of accountability and social audit. There are various techniques of communication, which include mass communication as well as inter personal communication. There are no any fixed formulae and the techniques mobilize and ensuring participatory development .It varies from place to place, according to their specific problems, cultures and social setup.

Strategy for the IEC, Public awareness & Capacity Development: Principles of strategy for IEC and Public awareness are based on the downward dissemination theory and Convergence theory for the message dissemination, behaviour change and capacity development on integrated Solid Waste Management (ISWM)

Followings strategies shall be adopted at the Implementations level.

- Sensitization cum Workshop of town leaders for Behaviour Change Communication (BCC) on SWM. This workshop shall be aimed at sensitization of community leaders and also take their feedback. These town leaders shall be requested to disseminate the information amongst their community and they will be motivated to spearhead the movement in the town. This workshop shall also be utilized to identify volunteers dedicated to the cause of MSWM.

- Sensitization cum workshop of Ward leaders for SWM; this workshop shall be organized after the town leaders workshop and shall be aimed at establishing partnerships with the ward level community leaders. Ward level volunteers dedicated to the cause of waste management shall be identified in the workshop.
- Sensitization cum workshop at community level: it shall be done by way of ward level camps and other community based activities. SHGs formed in the wards could be assigned pivotal role in it.
- Training and sensitization of support organization and Volunteers on Behaviour Change Communication (BCC)
- Interpersonal Communication (IPC), contacting every household through town leaders and supporting organizations Volunteers. These volunteers shall tale the message to each and every household and take their feedback as well. Convergence theory for the message dissemination and BCC by involving religious leaders, SHGs, Youth Clubs, Mahila Mandals, RWA and with pre-recorded religious & Cultural programme.
- Involvement of Institutions academicians for the Environment and atmosphere building by school/College Student as School Rallies, Slogan writing, essay Competition etc.
- Formations and Involvement of Swachchata Committee comprising of Volunteers or Natural Leaders in each ward who will act as SBM ambassadors and take oath for Waste free Uttar Pradesh and each committee shall have minimum 10 members.

Implementation Mechanism (The Uttar Pradesh MSW Operation Plan):

At present most of the ULBs in Uttar Pradesh lack the financial strength and institutional capacity to manage municipal solid waste in compliance with SWM Rules 2016 and implement and manage SWM projects. Hence State Government intervention is necessary to tackle the sanitation issue arising due to MSW in a systematic, coordinated and time bound manner. The State Government has drawn up an action plan for ensuring compliance of SWM Rules 2016 by the ULBs in a time bound manner.

Broadly, the Uttar Pradesh MSW Operation Plan involves:

- Primary Collection-Door to door collection and segregation of MSW at Source;
- Transportation;
- Segregation and Processing;
- Scientific Disposal in Sanitary Landfill Facility.

Primary Collection

Where Primary collection or first stage collection is concerned, the principle of reducing manual handling and doorstep collection would be promoted. For this purpose, the various activities proposed include the following:

- Residents would be encouraged to segregate, store and deliver the MSW to primary collection staff as per procedures set out by ULBs. Municipal Solid Waste to be segregated at source into groups of organic, inorganic, recyclables and hazardous waste. MSW constituents like metal, plastics, glass and paper wastes are to be

segregated and recycled at the collection point through involvement of rag pickers, social entrepreneurs, NGOs and Self Help Groups.

- Auto tippers would be used to enable doorstep collection (residents would be encouraged to deliver waste at door step at a pre-specified time).
- The procurement of auto tippers could be done either by the ULB concerned or the SHG / RWA, and appropriate contractual arrangements would be entered into with RWA/SHG and private operator(s) to carry out primary collection activities.
- The ULB would charge a “user fee” from the residents and other generators, the amount of which would be based on need and affordability criteria
- The MSW from other larger generators (commercial zones, institutions, hotels etc.) and construction debris would be collected and transferred directly to the secondary transport system and disposed appropriately (bio-degradable to the treatment facility and others to the landfill facility)
- Community level large and unsightly garbage bins to be withdrawn from streets and ‘Litter Bins’ to be limited to busy commercial areas and public places. Bulk generators such as vegetable/ fruit markets, shall be provided with closed large size containers with lid for easy collection of waste. These bulk waste generators shall not dispose waste other than in the bins provided.
- Route mapping of door to door collection activities on city wide scale for improved coverage. Primary vehicles to be used to collect and transport waste from lanes and by- lanes to the main roads synchronizing with bulk transportation vehicles. Entire town to be divided into zones and further sub-divided into beats staffed with adequate sanitary workers for proper door to door collection.
- Daily collection of waste from slums and open squatter areas, hotels/restaurants/office complexes and commercial areas

Street Sweeping and road side drain cleaning

Plans for efficient and daily effective Street cleaning include:

- Provision of ergonomically designed implements for street sweeping to the conservancy staff.
- Deposition of the refuse swept from the street would be directly into the secondary transportation system
- ULB entering into appropriate contractual agreements with private operators (preferably on lump sum basis) for carrying out the activities.
- Will ensure cleaning of drains at least once in fortnight and major drains once in six months.

Secondary Collection and Transportation

- Usage of metal containers of specified dimensions and capacity is proposed for secondary storage. The usage of concrete bins would be discontinued as per the mandatory recommendation of the Committee constituted by The Hon. Supreme Court of India.
- MSW from the auto tippers (obtained during primary collection) would be directly uploaded into these metal containers.

- The metal containers would be handled mechanically through dumper placers, or tractors with tipping trailer mechanism. Compactors have a separate system for secondary collection and these vehicles are not recommended for towns with population of less than 20 lakhs.
- The transportation vehicles would carry and unload the waste mechanically at treatment plants and landfill sites depending on the type of waste.
- The procurement of vehicles could either be by ULB concerned or could be arranged with private operators under suitable contractual arrangements.
- Waste to be handled mechanically across the MSW value chain with minimum human contact with waste. Modernize fleet management services with covered transportation system to be adopted for transportation of the waste.

Treatment and Landfill Operation

- Pursuant to the Supreme Court guidelines and the prevalent market constraints, composting would be the preferred method of treatment.
- Landfill, as required under prevailing statutes, would need to be developed to
- Dispose non – biodegradable matter and compost rejects.
- Development of these facilities, either individually or as integrated unit, could be done under appropriate contractual arrangement (management contract / BOT contracts etc.)

Waste received at the processing site shall be segregated mechanically as far as possible depending on the quantum of waste generated. Suitable technology option for processing shall be adopted. Common technology options for processing of MSW are given below:

- **Composting:** Composting process is quite commonly used in MSW management in India and results in production of a stable bio-fertilizer product known as bio-compost. This bio-compost, depending upon its quality can be used as a useful manure and soil conditioner element. Compost can be produced by either of the two processes viz. vermi-composting and mechanical composting. Mechanical composting has been found to be suitable in most of the ULBs due to the ease in handling and management of mechanical composting plant. Mechanical composting is most suitable and is proposed to be adopted across ULBs in the State with MSW generation of 5 TPD and above.
- **Waste to Energy:** It is the process of direct burning of wastes in the presence of excess air (oxygen) to produce power. These plants require MSW of 300 TPD and above.
- **Anaerobic Bio-Methanisation facility:** Bio-Methanation technology can also be used for treatment of garbage as decentralized plants for treating limited quantity of municipal garbage. The process involves biological decomposition of organic wastes in the absence of air to produce bio-gas (methane) which can be directly used by the consumer or can be used to generate electricity. This technology is most suitable in de-centralised locations like canteens, large restaurants and large housing colonies. The State Government will promote this technology in universities and colleges in the State.
- **Refuse Derived Fuel (RDF):** In RDF plant, the combustible waste is shredded into a smaller, more uniform particle size for burning. It involves the process of conversion of garbage into fuel pellets involves primarily drying, separation of combustibles from garbage, size reduction and palletisation after mixing with binder and/or additives as

required. RDF plant will be set up in ULBs/ cluster of ULBs depending on commercial viability and market for RDF in the vicinity of the ULB.

Disposal through common Sanitary Landfill Sites (SLF)

The final inert material will be disposed in the common sanitary landfill facility. Landfill sites shall be used sparingly and only as a last resort in waste management hierarchy and shall not exceed 20% of the total municipal solid waste generated.

Common landfill sites shall be developed by adopting a cluster approach for ULBs within a distance of less than 50 Km between each other. Land filling of mixed waste must be avoided, unless the waste is found unsuitable for waste processing. Under unavoidable circumstances or till installation of alternate facilities, land-filling shall be done following proper norms.

The major components of the MSW landfill site are-

- A liner system at the base and sides of the landfill, which prevents migration of leachate or gas to the surrounding soil.
- A leachate collection facility to collect and extract leachate from within and from the base of the landfill and then treats the leachate
- A gas collection facility to collect and extract gas from within and from the top of the landfill and then treat it and use it for energy recovery
- A final cover system at the top of the landfill, which enhances the surface drainage, prevents infiltration of water and supports surface vegetation.
- A surface water drainage system to collect and remove all surface runoff from the landfill site.
- An environmental monitoring system to periodically collect and analyses air, surface water, soil gas and ground water samples around the landfill site.
- A closure and post-closure plant close and secure a landfill site once the filling operation has been completed and the activities for long term monitoring, operation and maintenance of the completed landfill.

Reclamation of old dumps

The MSW is being dumped at the dump yard without any processing over many years by the ULBs. Hence, apart from setting up of processing plant and scientific landfill facility, the ULBs shall reclaim the dump yard in a time bound manner. The SWM project also includes reclamation of dump yard as a key component. Reclamation process is given below.

Compacted old waste is loosened and scraped off in layers by a tractor-harrow. Composting bio-culture is sprayed from a tanker-truck with high-pressure pump. It is formed into windrows & turned weekly by JCB. At each turning, hired rag-pickers retrieve buried recyclables, which partly cover their labour cost. After 3-4 weekly turnings, the waste is dry, volume-reduced & ready to sieve by either manual or motorized simple portable sieves.

The reclamation process shall be completed within one year from setting up of processing plant and scientific land fill facility.

Provision of safety equipment

The MSW project shall also include provision of necessary tools and tackles, adequate protective clothing and safety gears to sanitary workers. Further, ULBs should provide adequate protection and health care facilities to its sanitation workers.

Involvement of rag pickers and Khabadiwallahs

The rag picker plays a very important part in the segregation of waste. In India, only 30-60% waste is collected by the ULBs, whereas waste collection by the rag pickers is estimated at 15-25%. About 1 million urban poor are engaged in informal waste management sector. However, majority SWM initiatives in the country somehow side-line the informal sector in solid waste management. This is in spite of the fact that this sector, if integrated in to the mainstream SWM system of cities and towns can lead to a win-win situation of providing secured livelihoods to the urban poor and reducing expenditure on setting-up high cost energy intensive processing plants.

Moreover, in states like Uttar Pradesh where large numbers of small sized ULBs are dispersed across the state and density of urban population is very high and, cluster approach for setting-up processing plants is a viable option in big Cities. Whereas in smaller cities it is precisely here, there is a need to go for decentralized composting of bio-degradable waste and recycling of the non-biodegradable waste through the network of rag pickers. Thus networking Rag Pickers and Kabadiwalas in to the municipal solid waste management system in the state becomes imperative, especially in case of smaller ULBs of Uttar Pradesh.

Involvement of NGOs, Self Help Groups and Community Participation

Solid Waste management, after the passage of the Municipal Solid Waste Rules occupies primary focus in ULBs, but suffers from lack of adequate community involvement and constraints with respect to safe disposal.

Existing Municipal laws provide for punitive action against house/building owner in case of letting out waste impacting local environment. However, punitive action recommended is not a major deterrent and seldom enforced. Also, clarity on provisions should be made in places frequented by public (eating places, shopping areas) need to be detailed in the bye-laws of the ULBs. Even with the necessary legal provisions, city managers find enforceability a problem.

The successful implementation and management of MSW is dependent on community participation involving the local residents of town. Through effective IEC programs awareness need to be created regarding sanitation amongst households, industries, elected body representatives and various other stakeholders. State Government shall roll out such IEC programs across ULBs in a phased manner in the next one year.

State Government shall insist on deployment of a dedicated technical staff for SWM for each ULB. Encourage sound contracting practice begins with setting operational goals, defining performance or service benchmark standards and specifications and producing a document that communicates these to private, semi-private, NGO, CBO or other economic actors who would like to participate as service providers.

Through NGOs and SHGs, segregation shall be strengthened. Further revenue generation through segregation of recyclables and sale of same thereby providing livelihood for rag pickers shall be encouraged.

Strategy of Solid Waste Management as per Size of Urban Local Bodies

1. Urban Local Bodies up to 100000 Population

- Segregation of waste at household level/ establishment level- three bin system

- Door to door collection- collection vehicles/ carts to have three bin system.
- At secondary collection point three bins to be kept.
- Transportation to be in different vehicles.
- Bio-degradable waste to be sent to Vermi-composting unit- to be established at ward level and managed by local NGO's.
- Local rag-pickers and kabariwalas to be roped-in for segregation and paid out of the sale of recyclables.
- If no nearby Industry is available than RDF material to be sent to nearest big ULB to be further sent to Industry.
- Balance inert waste to be sent to nearest Landfill site.

2. Urban Local Bodies from 100000 Population to 1000000 Population

- Segregation of waste at household level/ establishment level- three bin system
- Door to door collection- collection vehicles/ carts to have three bin systems.
- At secondary collection point three bins to be kept.
- Transportation to be in different vehicles.
- Bio-degradable waste to be sent to composting unit- to be established at City level and managed by Private Party.
- Local rag-pickers and kabariwalas to be roped-in for segregation and paid out of the sale of recyclables.
- RDF material to be sent to nearest Industry.
- Balance inert waste to be sent to Landfill site.(not more than 10%)

3. Urban Local Bodies above 1000000 Population

- Segregation of waste at household level/ establishment level- three bin system
- Door to door collection- collection vehicles/ carts to have three bin systems.
- At secondary collection point three bins to be kept.
- Transportation to be in different vehicles.
- Bio-degradable waste to be sent to composting unit - to be established at City level and managed by Private Party .
- Local rag-pickers and kabariwalas to be roped-in for segregation and paid out of the sale of recyclables.
- RDF material to be sent to Waste to Energy Project.
- Balance inert waste to be sent to Landfill site.(not more than 10%)