CHAPTER 5
Municipal Solid Waste Management

Management of waste accumulation and its proper handling and disposal represents a major challenge as it has a direct and severe impact on environment. Pollutants from wastes and un-scientific landfills could also lead to soil contamination, air pollution and green house gas emissions, with detrimental effects on environment. Wastes include municipal solid waste, bio-medical waste, industrial and hazardous waste.

5.1 Municipal Solid Waste and its Effect

Municipal Solid Waste includes organic wastes generated by households and commercial establishments. Its improper disposal in open areas, lakes and on/in river banks/river has a direct negative impact on the living conditions of living beings and the overall environment. It also results in the spread of communicable and non-communicable diseases apart from contaminating soil, water and generating toxic and green house gases.

5.1.1 Regulatory framework, policies and strategies

The Environment (Protection) Act, 1986 (EP Act) enacted by the GoI provides for the protection and improvement of environment and prevention of hazards to human being, other living creatures, plants and property. Municipal Solid Waste (Management and Handling) Rules, 2000 were framed in conformity with the EP Act with the aim at standardization and enforcement of MSW Management practices. These rules stipulate that every municipal authority shall, within its territorial area, be responsible for the implementation of the provisions and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of MSW. LNN is the implementing agency in Lucknow City. Rule 4(2) and 4(3) of MSW Rules prescribe the implementation schedule for processing and disposal of MSW as stated in **Table 5.1**.

Table 5.1: Implementation schedule for processing and disposal of MSW

Sl. No.	Compliance Criteria	Time schedule
1	Setting up of waste processing and disposal facilities	By 31.12.2003 or earlier
2	Monitoring the performance of waste processing and disposal facilities	Once in six months
3	Improvements to existing landfill sites as per the provisions of these rules	By 31.12.2001 or earlier
4	Identification of landfill sites for future use and making site(s) ready for operation	By 31.12.2002 or earlier

(**Source:** MSW Rules)

5.2 Non-alignment of the Annual Action Plans and non-adherence to the Implementation Schedule

In compliance with the provisions of the MSW Rules for processing and disposal of MSW within prescribed time schedule, LNN was required to prepare perspective/long term plan. A Detailed Project Report (DPR) and allied Engineering Drawings on SWMP for City, in line with the guidelines of CPCB and MSW Rules, 2000, had been prepared by the Regional Centre for Urban and Environmental Studies (RCUES), GoI in February 2007 which, *inter alia*, included the status of the existing solid waste management system, proposals for MSW management, equipment specifications and route plans, design of waste to compost plan, conceptual design of sanitary landfill and engineering drawing, operational and maintenance aspects, financial framework for five years.

Scrutiny of the records of LNN revealed (June-July 2010) that neither had the Annual Action Plan (2009-10) of LNN been aligned with the DPR of 2007 nor had a perspective/long term plan been prepared by LNN despite lapse of the time schedules specified in the Rules. LNN continued working as per its old solid waste management system that led to the dumping of waste in open ground creating civic, environmental and health problems.

While accepting the audit observations, the Government replied (August 2011) that LNN had prepared SWMP which was approved by GoI on 12 March 2007. The project was under implementation and targeted to be commissioned by 30 November 2011.

5.3 Operational Management

Operational management of MSW includes waste collection, storage, segregation, recycle and its ultimate disposal. Audit findings are discussed in succeeding paragraphs.

5.3.1 Manpower management for effective handling of MSW

According to the norms fixed by the Government, 28 *Safai Karmchari* were required for per 10,000 population to handle MSW. The scrutiny of Annual Plan Reports of LNN revealed that there was shortage of *Safai Karmcharis*[12] during 2007 to 2010 as below:

[12] The status of *Safai Karmchari* during the year 2005 and 2006 was not made available to the audit as of April 2011.

Table 5.2: Status of *Safai Karmchari*

Sl. No.	Year	Projected Population (in lakh)	Requirement as per norm (in number)	Available (in number)	Shortage (*per cent*)
1	2007	26	7280	4808	2472 (*34*)
2	2008	28	7840	4776	3064 (*39*)
3	2009	30	8400	5858	2542 (*30*)
4	2010	32	8960	5745	3215 (36)

(**Source:** LNN)

Thus, during 2007-10, the shortage ranged between 30 and 39 *per cent*.

The Government replied (August 2011) that shortage of manpower might not be a problem for LNN as an operator on Public Private Partnership (PPP) basis had been selected under SWMP.

5.3.2 Unhygienic MSW collection and storage points

As per Schedule II of the MSW Rules, LNN is required to establish and maintain waste storage facilities in such a manner that these do not create unhygienic and insanitary conditions around it. According to the Annual Plan Report (2010), City was divided into six zones consisting of 110 wards. It had 32 Modern Waste Houses (*Apshist Grih*) and 446 *Pucca* and *Kachcha* collection points. LNN also had 27 RCC *Dhalaos*, 24 containers and 100 bins for storage of MSW collected. These collection and storage points were open and exposed to atmosphere as shown below:

Open waste collection centres of LNN

LNN's requirements for secondary storage of MSW, as of 31 March 2010, were inadequate as overleaf:

Table 5.3: Status of secondary storage centres of MSW

Type of storage	Required	Available	Shortage *(Per cent)*
RCC *Dhalaos*	59	27	32 (*54*)
DP Containers	128	0	128 (*100*)
1100 Litre Capacity Bins	1494	100	1394 (*93*)
600 Litre Capacity Bins	1048	0	1048 (*100*)
150 Litre Capacity Twin Bin Pair	350	0	350 (*100*)

(**Source:** Records of LNN)

As evident, the shortage of secondary storage of MSW ranged between 54 and 100 *per cent*.

The Government stated (August 2011) that after commissioning of SWMP the temporary storage of waste in *Dhalaos* would not be required as the solid waste collected would not touch ground before it reaches the processing plant. The Government did not respond to audit observations on shortage of other secondary storage centres of MSW.

5.3.3 Violation of Schedule II compliance criteria for collection

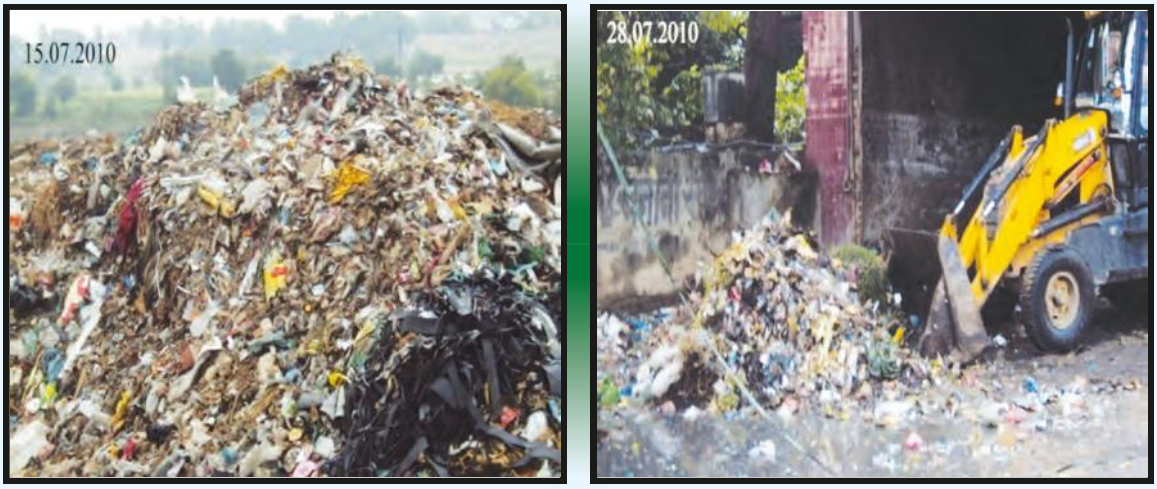
Further, while the Schedule II of MSW Rules prescribes the criteria for collection of solid wastes, organizing house-to-house collection and devising collection of waste from slums, hotels, slaughter houses, market places etc., the compliance criteria was violated as test check (July 2010) of the records of the LNN revealed that door-to-door collection service was not provided in any ward of the City during 2005-09. LNN informed (April 2011) that door-to-door collection service was initiated in four wards since November 2010 and extended to 55 wards as of April 2011.

The Government replied (August 2011) that at present door-to-door collection of MSW spans over a stretch of 57 wards with the help of a private firm[13] and remaining 53 wards would also be covered (November 2011) with the commissioning of SWMP.

5.3.4 Segregation of waste at source

Segregation means separating the solid waste into groups of organic, inorganic, recyclables and hazardous wastes. The recyclable wastes are required to be directly transported to the processors for new products, which help reduce the load of solid waste. The waste, if not segregated at source, causes hazards to the environment.

[13] M/s Jyoti Envirotech.



Un-segregated waste disposed adjacent to the river Gomti and at a Collection centre of LNN

According to DPR (February 2007), MSW primarily comprises of 30-35 *per cent* of organic fraction, 3-6 *per cent* of recyclables (paper and plastic), 40-45 *per cent* of inert material and less than one *per cent* of glass and metal. Approximately 1500 MT waste was generated daily in the City. However, no steps were taken by LNN for the segregation of waste at source into biodegradable, recyclable and inert waste. LNN in its reply (August 2010) admitted that no system existed for segregation of MSW.

The Government accepted (August 2011) that the target of segregation (December 2003) of waste had not been achieved. It further stated that the processing plant, being established under SWMP, had the facility of segregation into dry and wet waste, so that the recyclables and biodegradable waste were processed separately. Segregation of wastes into dry and wet categories has no relationship with biodegradable, recyclable and inert wastes and, therefore, the reply of the Government was irrelevant.

5.3.5 Inadequate and improper transportation facility for MSW

As per the DPR (February 2007), estimated quantity of MSW generation during 2006-10 ranged between 1198 MT to 1376 MT per day, whereas LNN intimated in July 2010 that on an average 1500 to 1800 MT of MSW was generated daily in Lucknow City. For transportation of MSW, LNN had 176 vehicles (131 tippers, 35 three wheeler tippers, four 3-wheelers and six tractors).

Audit observed that LNN did not have the required transportation facilities for collection and disposal of MSW. Though, LNN intimated (July 2010) the requirement of vehicles

and machines for the transportation of MSW, shortage of vehicles and machines as of July 2010 was as below:

Table-5.4: Shortage of vehicles and machines for transportation of MSW

Sl. No.	Type of vehicle/machine	Requirement	Available	Shortage (*Per cent*)
1	Dumper placers	28	23	05 (*18*)
2	Refuse Collector	10	03	07 (*70*)
3	Cattle Lifting Vehicles	02	0	02 (*100*)
4	Rickshaw with bins	3140	0	3140 (*100*)
5	Wheel barrow for street sweepings	2200	0	2200 (*100*)
	Total	**5380**	**26**	**5354**

(**Source:** Records of LNN)

Thus, there was acute shortage, if not near absence of vehicles and machines for transportation of MSW. Further, it was stipulated in the MSW Rules that the vehicles used for transportation of wastes are required to be covered. Contrarily, LNN was using vehicles for transportation of MSW without proper covering, as shown below in the photographs, thereby polluting the environment by littering of waste during transportation.

MSW loaded and transported in open trucks of LNN

The Government replied (August 2011) that an operator had been selected on the basis of PPP under SWMP for operation of door-to-door collection and transportation activities and LNN would attend only to the road sweeping and drain desalting activity. As regards transportation of MSW without proper covering, LNN stated (July 2010) that action is taken against the defaulters, violating the rules.

5.3.6 Non-arrangement of proper landfill sites

Schedule III of the MSW Rules stipulates that it shall be the responsibility of the Development Authority to identify the landfill sites and hand over the same to the concerned municipal authority for development, operation and maintenance.

Although four sites covering a total area of 120 hectare were proposed (March 2005) in the Lucknow Master Plan 2021, however, LDA could not provide appropriate land for landfill sites as of August 2011. LNN also failed to proactively pursue the identification and acquisition of appropriate land for construction of landfill sites, even after the lapse of more than 10 years.

LNN stated (July 2010) that it was the responsibility of LDA to provide the land as per specifications of the landfill site but no landfill site could be made available. Further, due to non-availability of proper landfill site, MSW presently generated was disposed of at Didoli. However, during joint physical inspection with representatives of LNN, LJS and UPPCB it was revealed (July 2010) that MSW was littered at other places also. The photographs of some of the places like bank of the river Gomti; near Sugar Institute, Telibagh; and Rubbish Removal (RR) Workshop of LNN also confirmed the unauthorised disposal of MSW.

Waste disposed at the bank of the river Gomti and near RR workshop of LNN

Waste disposed near RR workshop of LNN and Sugar Institute, Telibagh.

Joint physical inspection (July 2010) with representatives of LNN, LJS and UPPCB also revealed that dumping of MSW on roadside clogged the sewerage system creating other problems as below:

Road side dumps at Gomti bandh

Stray animals on open dump at Telibagh and Gomtinagar drain clogged with waste

- There were waste dumps on roadsides and *Haider*, *Sarkata* and *Kukrail Nalas* (riverlets) in the city were clogged;
- Animals strayed on open dumps and collection bins overflowed; and
- The historic *Haider Nala*, under the jurisdiction of Irrigation Department had been converted into a garbage dumping centre.

Thus, non-identification and acquisition of land for landfill sites resulted in un-scientific and improper disposal of MSW by continuous violation of MSW Rules by LNN. UPPCB did not initiate any punitive action, in accordance with the existing legislation, against LNN for violation of MSW Rules.

The State Government replied (August 2011) that LDA had identified four sites for

disposal of garbage in its Master Plan 2021 in Lucknow. It was further stated that LNN was developing a processing plant and landfill site at *Gram Shivri* under SWMP for which 19 hectare of land was handed over in February 2011 by Agriculture Department and work was started immediately thereafter.

The reply was not tenable as the Government failed to arrange the required land in last ten years.

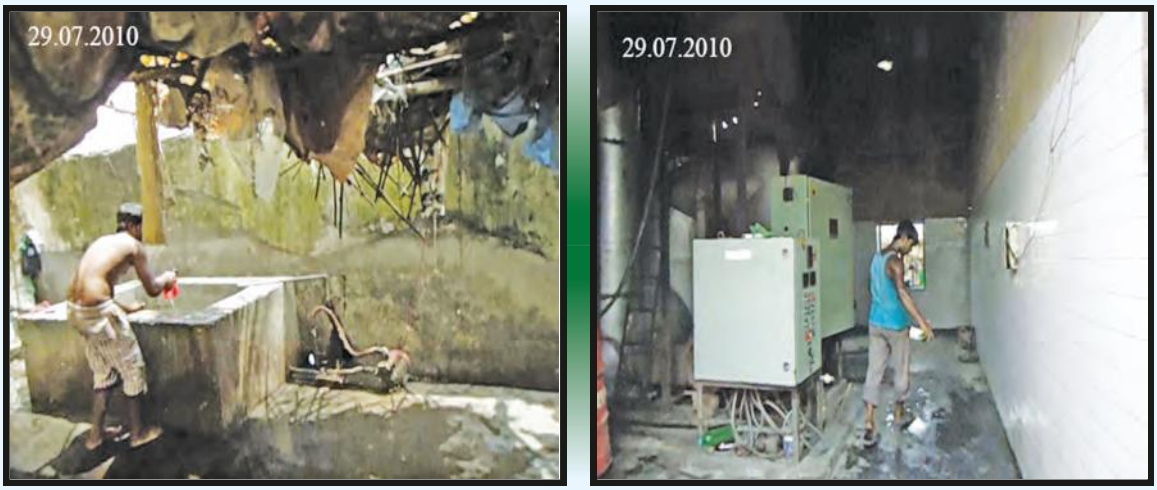
5.3.7 Inadequate Safety measures for *Safai Karmachari*

As per Schedule II to Rule 6 of the MSW Rules, manual handling of waste is prohibited. If unavoidable, manual handling is required to be carried out under proper precautions with due care for safety of workers. For work around sewage and waste water, use of Personal Protective Equipment (PPE) (gloves, goggles, a face shield, water-resistant suit or respirator- depending on the job) are the recommended ways of protecting workers from exposure and susceptibility to disease. While analysing the existing MSW system in the DPR (February 2007), it was specified that *Safai Karmcharis* involved in the primary collection of MSW were not using PPEs and that manual handling was prevalent in City.

Test check of the records of LNN (July 2010), however, revealed that no PPEs were available with LNN. On being pointed out LNN replied (April 2011) that it did not purchase any PPE but provided allowances to procure the same. The reply of LNN was not acceptable as it did not ensure the safety of *Safai Karmcharis*.

Joint physical inspection and photographs of STP, LNN Incinerator and primary/ secondary storage points also confirmed the audit contention.

Conservancy staff without PPE at Daulatganj STP and Gaughat Water treatment plant



Conservancy staff without PPE at LNN Incinerator

The Government replied (August 2011) that the conservancy staff, engaged for collection and transportation of MSW, had been provided with the PPE by the operator selected for the purpose.

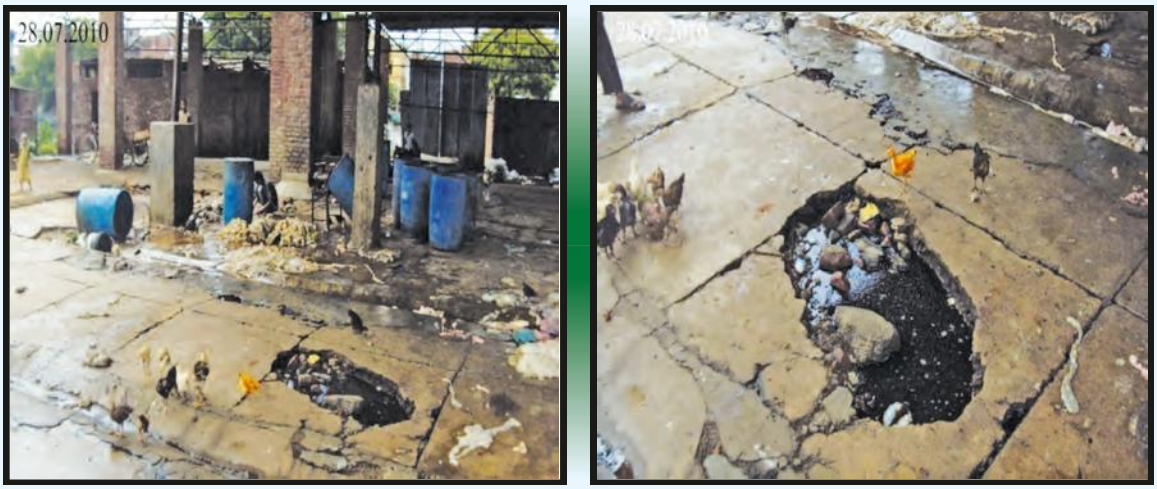
The reply was partially true as these operators were engaged only in 57 out of 110 wards, as of August 2011, for collection and transportation of waste only.

5.4 Disposal of Abattoir Waste

There were three abattoirs in the City under LNN and one in the Cantonment area run by the Cantonment Board as of July 2010. According to the DPR (February 2007) of RCUES, on an average, 350 animals were slaughtered everyday. The daily generated waste from these abattoirs included vegetable waste: 12.5 MT, inedible oils: 5 MT, blood: 3 Kilo Litres (KL) and wash imparts: 360 KL along with other wastes including skin, horns and bones. These abattoirs did not have any treatment facility for solid and liquid waste. Untreated solid waste was disposed of in nearby open dumps while liquid waste was disposed of through drains. There was also no caracas[14] processing plant in Lucknow.

The joint physical inspection (July 2010) with a representative of LNN of the abattoir at Aishbagh revealed that a heap of solid waste of slaughtered animals was lying in the open, within the premises of the abattoir and was drained out to the *Motijheel* through a connecting drain of the abattoir as shown in the photographs over leaf and at page 21 of the report.

[14] Caracas plant: processing of bones of animals.



Heap of solid waste and blood of slaughtered animals lying in open at abattoir, Aishbagh

The Government replied (August 2011) that LNN has already been directed for establishing a Modern abattoir and Carcass Utilisation Plant for City on PPP basis.

Thus, non-shifting of abattoir and delays in construction of Modern abattoir and Carcass Utilisation Plants were not only creating unhygienic conditions in the surrounding areas but also polluting water bodies like *Motijheel* in city.

5.5 Shifting of Dairies outside the City

The Allahabad High Court had ordered (May 1999) shifting of dairies outside the City area. Accordingly, in compliance with the order, LNN constructed cattle colonies under *Gokulgram Yojna* at Takrohi, *Kamdhenu Yojna* at Hardoi Road and Para Cattle Colony but failed to shift the dairies within the Lucknow City to these colonies. LNN also failed to take or initiate action for closure of these unauthorized dairies though more than 12 years have gone by since the order of the Hon'ble High Court.

The Government did not furnish any reply on this issue.

5.6 Recommendations

- *Compliance criteria of implementation schedule should be adhered to;*
- *Effective steps should be taken to fill-up the shortages of manpower and transportation vehicles;*
- *Different colour bins may be kept at source for segregation of waste into biodegradable, recyclable and inert waste; and*
- *Safai Karamcharis involved in collection of MSW should be provided with Personal Protection Equipment.*