9.2 SOLID WASTE MANAGEMENT

9.2.1 Background

Solid Waste Management (SWM) is one of the most expensive municipal services that a local body has to provide as its obligatory municipal function and absorbs about 1% of GNP in the urban areas. About three to six persons per 1000 population are required to cater to this important civic amenity, which is about 1% to 2% of the total National Work Force. It is, therefore, imperative to optimize this huge civic expenditure and evolve an indigenous low cost technology which is technically sound, financially viable, aesthetically beautiful and socially acceptable to public.

Regional Plan-2001 proposed that solid waste disposal and management should be planned for a minimum period of 20 years and at least controlled tipping should be adopted in the disposal of the solid waste. Areas should be identified in all the towns for sanitary landfill and, all the towns above one lakh population should have arrangements to properly manage the waste disposal.

In the review of Regional Plan-2001 it was observed that large quantities of solid waste (garbage) were generated daily, out of which very little was collected. NCT-Delhi, however had comparatively better collection (70% of the waste) than rest of NCR towns. Most landfill sites are brimming to the full and vacant sites for landfill are not available in Delhi. No specific sites have been identified in any Subregions for disposal of solid wastes and landfill.

9.2.2 Existing Situation and Issues

Studies have revealed that none of the towns in the region are disposing off solid waste in environmental friendly manner. The landfill sites are not lined to protect the ground water from leachate percolating into it. No other disposal system has been adopted by the local bodies. The status of availability of solid waste management facilities in some of the towns of NCR in the year 2000 is at Annexure 9/III.

As per estimates, at present 13,499 MT/day of garbage was being generated in the year 2001 in the region, of which about 1,540 MT/day was being generated from Haryana Sub-region, 201 MT/day was being generated from Rajasthan Sub-region and 2,270 MT/day was being generated from U.P. Sub-region and remaining from the NCT-Delhi Sub-region. Total garbage generation in the region is likely to be about 27,236 MT/day by the year 2021 and handling of this kind of waste will need special efforts and funds. Sub-region wise details have been given in Table 9.2.1.

Table 9.2.1: Solid Waste Generation in NCR

Sub-region	Garbage Generation (in MT/day)	
	2001	2021
NCT-Delhi	9,488	15,413
Haryana	1,540	4,569
Rajasthan	201	1,116
Uttar Pradesh	2,270	6,138
Total	**13,499**	**27,236**

Since land is a resource, the disposal methodologies for solid waste cannot remain only sanitary landfill. We have to examine other environmental friendly and financially viable options also.

Some of the major issues in this sector include:

- ***Lack of Knowledge of the Local Bodies***

Local bodies adopt casual approach for the management of solid waste. Most of the municipalities are not aware of the ways and means to dispose off solid waste that is generated in their respective towns. Even the collection and transportation system of solid waste is not up to the mark. Major chunk of the revenue generation from the city is eaten away in managing the solid waste, which is done inefficiently.

- ***Non-availability of suitable Land for Solid Waste Disposal in Environmental Friendly Manner***

In most of the towns, no land is earmarked for the disposal of solid waste, neither as landfill site nor for disposal through other techniques. The Master/Development Plans, prepared by the Town Planning Department, do not reflect this aspect. Many a times, land is earmarked for sanitation purpose, which includes the disposal of solid waste as well as a site for sewage treatment plant, which is insufficient for either use. Since location of the land plays an important role, therefore, it should be located in such a way that solid waste is disposed off in decentralized manner so that the transportation cost for the solid waste is optimized.

- ***Lack of Public Awareness***

People are not aware of the harmful effects of solid waste that litters around in towns and cities in the region. There is need for arranging awareness campaign in this regard.

- ***Non-Availability of Funds***

Local bodies do not have funds to handle this kind of waste and in future, as discussed above, the quantities are likely to increase manifolds. In case the waste is not handled and disposed off in a scientific manner, it will reach unmanageable proportions in future. In view of this, the local bodies should improve their financial condition through better management and improve their revenue generation capacity. It should also examine the alternative options for optimization of transportation costs of solid waste.

- ***Piecemeal Approach for Handling of Solid Waste***

Local bodies do not have any Waste Management Plan for their towns/cities. The state of affairs is such that when the NCR Cells contacted the local bodies for data on solid waste to create database for solid waste management, some of the local bodies were not even aware of the quantum of solid waste generated in their town. Local bodies/municipalities are adopting piecemeal approach in this regard.

- ***Dependence on Departmental Staff causing Labor Related Problems***

Most of the local bodies are dependent upon their own staff for handling of solid waste, which has resulted in labour related problems. Major chunk of revenue is eaten away by way of paying wages, upholding transportation fleet, operation and maintenance etc. There is need for the local bodies to adopt a comprehensive approach to manage solid waste in terms of collection, transportation, treatment and disposal of waste factoring in various components like labour, equipment, vehicles, institutional arrangements etc.

- ***Other Deficiencies***

- Lack of coverage
- Poor collection system specially in the narrow and circuitous lanes, making the collection more difficult
- Mixed variety of organic and inorganic solid waste
- Non-involvement of NGOs/informal sector and private agencies.
- Unsanitary conditions in and around community bins.
- Handling of specialized wastes
- Shortage of vehicles
- Shortcomings at landfill sites
- Organizational inadequacies
- Shortage of equipment and committed supervisory staff
- Financial stringency

9.2.3 Policies and Proposals

In order to improve the overall situation in the National Capital Region for the harmonized and balanced development for the perspective 2021, following policies and strategies are proposed:

- ***Preparation of Detailed Solid Waste Management Plan***

All the towns in NCR should prepare Solid Waste Management Plan in order to handle the waste being generated in their respective towns on the basis of guidelines provided by the CPHEEO Manual for the solid waste management. It would be appropriate that the local bodies plan for the whole city and decentralization should be done for disposal of solid waste for reducing the transportation cost.

- ***Norms and Standards***

Norms and standards provided in the CPHEEO Manual for solid waste management which provides guidelines for collection, transfer, transport and disposal of solid waste in environmental friendly manner should be followed. This also provides the directions for handling of medical and hazardous wastes. In this regard, the notification of the Ministry of Environment and Forests under the Environmental Protection Act, 1986 should also be followed.

- ***Identification of Land for Treatment/Disposal of Waste***

While preparing the Master/Development Plan for various towns/cities, Town Planning Department of respective Sub-regions should earmark the land for treatment/disposal of

solid waste. The acquisition of these sites, by the development authorities and municipalities, should form a compulsory element of the development programme and properly budgeted for in their Plan documents.

In NCT-Delhi, the land is scarce and it should plan for future development considering the availability of land for various aspects because the solid waste generation in NCT-Delhi alone by the year 2021 has been projected as 15,000 MT/day, which requires about 28 sq kms of land for disposal of solid waste through sanitary land filling assuming that the depths of landfill will be 10 metres (partly below ground and partly above ground), density of solid waste is 0.85 MT per cubic metre, life cycle of landfill site is 20 years and there are three landfill sites. Details of various options examined are in Annexure 4/II. Land area of about 28 sq kms required for solid waste disposal through sanitary land fill, should be identified in the MPD-2021, which is under preparation. Another 85 sq kms of land area should also be kept reserved for solid waste disposal in future beyond year 2021.

Sanitary landfill sites should be designed and engineered properly to collect and treat leachate and biogas should be collected and utilized in a planned manner. Constituents States of NCR should also earmark land for solid waste disposal by sanitary landfill and other means appropriately.

- ***Waste Minimization-Recycling/Recovery of Resources***

In view of the limited availability of land for use as landfill sites, there is an urgent need to find other mechanical means of minimizing waste requiring disposal. In fact, we should aim at zero waste output. Fly-ash from proposed/existing thermal power plants should be utilized in environmental friendly manner by using it in the construction industry. The prevalent system of recycling/recovery of plastic, glass, metal, paper, etc. from the domestic waste is completely informal/unorganized. This should be done in more organized, scientific, cost effective and environmental friendly manner. The segregation of biodegradable waste from non-biodegradable waste such as plastics, glass, metal, paper etc. at the source should be made compulsory in all towns/cities. Not more than 50% of the total solid waste generated should be disposed off through sanitary landfill.

- ***Public Awareness and Training***

Public awareness need to be created through mass media including T.V. and newspapers regarding the harmful affects of littering around and how the places can be kept clean. The informal training along with broad-based formal awareness through schools educational curriculum is also recommended. NGO's and Resident Welfare Association (RWA) should be actively involved in the public awareness campaign.

- ***Institutional Improvements***

Institutional capacity building measures are required to be taken in order to improve the efficiency and effectiveness of solid waste management at each stage such as waste collection, transfer/transportation, treatment and disposal. There is a need to associate NGOs/private sector also in this regard. The combination of private sector and public sector in proportionate ratios will be the right option.

In the rural areas, there is no mechanism for collection and disposal of solid waste. This should be developed by associating local Panchayats.

- ***Resource Mobilization***

Local bodies and Panchayats should improve their financial conditions through better financial management and should also improve the revenue generation capacities.

- ***Other Recommendations***

Other suggested measures, which are required to be taken, are as follows:

- ☞ Adoption of closed bins and covered transportation vehicles
- ☞ Modification of building bye-laws to ensure provisions of refuse storage
- ☞ Safe and separate storage as well as doorstep collection of biomedical waste, hotel and yard waste etc. on full cost recovery basis.
- ☞ Community participation

9.2.4 Plan of Action and Phasing of Implementation of Strategies/Policies/Proposals

In order to implement the policies of solid waste disposal in the region, it is imperative to have a phase wise plan of action so that the implementation of policies and proposals in the Regional Plan can be dovetailed with the five-year plans. In view of this, each recommendation has been phased plan-wise where certain activities are to be completed within first five-year of the implementation of the Region Plan whereas some activities will span over to all the four five-year plans. Some of the activities which need to be implemented in the first five years of the Regional Plan include preparation of the Solid Waste Management Plans for all the towns, creation of mass awareness, allocation of land, waste minimization through recycling of solid waste. Construction of solid waste disposal sites and treatment plants in the region, as recommended above, have been proposed to be carried out in a phased manner in all the five- year plans.

Phased programme and plan of action have been worked out to give effect to the proposal and implementation thereof, which is at Annexure 9/II.

9.2.5 Investment Plan

Total solid waste generation in the urban areas of the region would be about 27,236 MT/day by the year 2021 and accordingly, there will be need to develop appropriate system for collection, transportation and disposal of solid waste in environmental friendly manner either through properly designed sanitary land filling or through other treatment methods. Total investment required for this would be about Rs.1,361.81 crores up to the year 2021. However, Sub-region wise and Plan wise fund requirement for the region has been given in the following table:

Table 9.2.2: Sub-region wise investment required in Urban Areas for SWM

Sub-region	Requirement @ Rs.0.05 crores per MT (Rs. In Crores)
Haryana	228.46
Rajasthan	55.80
Uttar Pradesh	306.92

Table 9.2.2: Sub-region wise investment required in Urban Areas for SWM	
Sub-region	**Requirement @ Rs.0.05 crores per MT (Rs. In Crores)**
NCT-Delhi	770.63
Total	1,361.81

Assuming investment at the rate of Rs. five lakhs per MT, total fund requirement within NCR is estimated to be Rs.1,361.81 crores. Haryana Sub-region requires Rs.228.46 crores, Rajasthan Sub-region requires Rs.55.80 crores, Uttar Pradesh requires Rs.306.92 crores while NCT-Delhi requires Rs.770.63 crores.

Table 9.2.3: Plan wise Investment required for SWM		
Plan Period	**Percentage (%)**	**Amount (Rs. In Crores)**
2002-2007	40.0	544.73
2007-2012	25.0	340.45
2012-2017	20.0	272.36
2017-2021	15.0	204.27

The investment for solid waste management in the 10th Plan is estimated to be Rs.544.73 crores, for 11th Plan Rs.340.45 crores, while for 12th Plan it is projected to be Rs.272.36 crores and for 13th Plan the estimate is Rs.204.27 crores.