Chapter-III
Management of Solid Waste in ULBs

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The Solid Waste Management process begins with the collection of segregated waste, transportation of waste to transfer station/central sorting facility for sorting recyclables, processing of waste and disposal in landfills. The effectiveness and efficiency in the solid waste management process as analyzed by audit are discussed in the succeeding paragraphs.

3.1 Targets and achievements against Service Level Benchmarks

MSWM Manual, 2016- Part I, Para 7.1-Monitoring of Municipal Solid Waste Management Plan Implementation envisaged the assessment of Service Level Benchmarks (SLBs).

Ministry of Urban Development, GoI launched (2008) the Service Level Benchmarking initiative covering Municipal Solid Waste and defined performance indicators for assessing the performance of Solid Waste Management. The eight performance indicators of Solid Waste Management prescribed on the recommendation of the Fifteenth Finance Commission by Government of India are given in **Table 3.1** below:

Table 3.1: SLB performance indicators and benchmarks pertaining to SWM

S.No.	Performance indicator	Description of item	Benchmark (in *per cent*)
1	Household level coverage of SWM services	Households and establishments covered by daily doorstep collection system	100
2	Efficiency of collection of municipal solid waste	Total waste collected against waste generated within the project area	100
3	Extent of segregation of municipal solid waste	Households and establishments that segregate their waste	100
4	Extent of municipal solid waste recovered	Quantum of waste collected, which is either recycled or processed	80
5	Extent of scientific disposal of municipal solid waste	Waste disposed in sanitary landfill after processing of waste	100
6	Extent of cost recovery in SWM services	Recovery of all operating expenses related to SWM	100
7	Efficiency in redressal of customer complaints	Number of complaints related to SWM resolved within 24 hours	80
8	Efficiency in collection of SWM user charges	Revenues collected against total operating revenues	90

(Source: prescribed by the Ministry of Urban Development, Government of India)

Achievement of Performance indicators against the prescribed benchmark by the test check ULBs during 2022-23 is given in the ***Appendix-II.*** Audit summarized indicator wise range of achievements against the prescribed benchmark as reported by 18 test checked ULBs in their Service Level Benchmarks for the year 2022-23

to the Ministry of Housing and Urban Affairs, Government of India in compliance with directions issued by DLB are shown in **Table 3.2** below

Table 3.2: Range of achievements of SLB by test checked ULBs during the year 2022-23

Performance indicator	Achievements by test checked ULBs				
	Nil	Up to 50 *per cent*	51 to 75 *per cent*	76 to 99 *per cent*	100 *per cent*
Household level coverage of SWM services	0	0	0	13	5
Efficiency of collection of municipal solid waste	0	0	0	12	6
Extent of segregation of municipal solid waste	5	5	1	5	2
Extent of municipal solid waste recovered	8	3	2	4	1
Extent of scientific disposal of municipal solid waste	10	1	2	4	1
Extent of cost recovery in SWM services	8	5	0	4	1
Efficiency in redressal of customer complaints	2	0	0	14	2
Efficiency in collection of SWM user charges	9	6	0	3	0

(source: Information collected from City Finance Portal through DLB)

The above table (read with ***Appendix-II***) shows that:

- Under Household level coverage of SWM services out of 18 test checked ULBs only five (28 *per cent*) ULBs achieved the target.
- Efficiency of collection of municipal solid waste benchmark achieved by only six ULBs (33 *per cent*) out of 18 test checked ULBs.
- Extent of segregation of municipal solid waste was achieved by only two ULBs and five ULBs (28 *per cent*) had nil achievement in segregation.
- Achievement under Extent of municipal solid waste recovered was nil in eight ULBs (44 *per cent)* out of 18 ULBs and only five ULBs achieved the target.
- Achievement under the Extent of scientific disposal of municipal solid waste was nil in 10 ULBs (56 *per cent*) out of 18 ULBs and only one ULB achieved the target.
- Achievement under extent of cost recovery in SWM services was nil in 8 ULBs (44 *per cent*) and only one ULB achieved the target.
- Efficiency in redressal of customer complaints of municipal solid waste was achieved in 16 ULBs (89 *per cent*) out of 18 test checked ULBs. Whereas two ULBs had nil achievement.
- Efficiency in collection of SWM user charges was nil in 9 ULBs (50 *per cent*), and only one ULB achieved the target.

Analysis of the service level benchmark (SLB) indicators stipulated by the Ministry of Urban Development showed that in the test checked ULBs, the achievement of the majority performance indicators was significantly low against the fixed targets.

The State Government stated (March 2025) that remaining ULBs would be persuaded to collect 100 *per cent* waste and efforts are being made to improve the percentage of segregation. The GoR stated that the scientific disposal of municipal waste is the weakest segment of SWM, however, numbers of dump yards have been scientifically bio remedied under SBM 2.0. It has been accepted that the ULBs are lagging behind in collection of user charges as several ULBs were reluctant to recover the user charges, but now there is considerable increase in recovery of user charges. All the ULBs are being directed to achieve 100 *per cent* of targets of service level benchmarks.

3.2 Status of generation, collection and processing of Solid Waste

Solid waste generated, collected and processed at the State as well as test checked 18 ULBs during 2017-18 to 2022-23 (in ton per day) are shown in **Table 3.3** and **Table 3.4** below:

Table 3.3 Solid waste generated, collected and processed at the State Level

(in TPD)

Particular	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Generated	6439.27	6625.56	6659.38	6897.15	7973.15	6836.68
Collected	6280.54 (98%)	6475.39 (98%)	6475.90 (97%)	6720.47 (97%)	7859.35 (99%)	6733.94 (98%)
Processed	695.35 (11%)	780.18 (12%)	1190.93 (18%)	1210.45 (18%)	1925.97 (25%)	1473.97 (22%)
Direct dumped	3983.7 (63%)	4187.16 (65%)	5112.66 (79%)	5082.16 (76%)	5525.18 (70%)	4828.76 (72%)

(Source: Information compiled from annual report of RSPCB)

Table 3.4: Solid waste generated, collected and processed at the test checked ULBs

(in TPD)

Particulars	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Generated	2803.78	2901.80	2976.15	2977.73	3104.49	3370.10
Collected	2582.67 (92%)	2846.31 (98%)	2947.84 (99%)	2934.47 (99%)	3079.26 (99%)	3346.02 (99%)
Processed	781 (30%)	920 (32%)	1018.43 (35%)	903.46 (31%)	985.97 (32%)	980.34 (29%)
Direct dumping	1801.67 (70%)	1904.25 (67%)	1929.41 (65%)	2031.01 (69%)	2093.29 (68%)	2365.68 (71%)

(Source: Information provided by test checked ULBs)

The above comparison of the generation, collections and processing of solid waste shows that during 2017-23 against the generation significant percentage of waste was collected at State level (97 *per cent* to 99 *per cent*) and in test checked ULBs (92 *per cent* to 99 *per cent*). However, processing of waste was only11 *per cent* to 25 *per cent* at State level and 29 *per cent* to 35 *per cent* in test checked ULBs. Further, direct dumping of solid waste ranged between 63 *per cent* to 79 *per cent* at the State level and 65 *per cent* to 71 *per cent* in test checked ULBs. Thus, remaining unprocessed waste at State level was not being dumped at dumped site. Audit also noticed instances of variation in reported figures of waste collection and actual waste collection in test checked ULBs as discussed in the succeeding para 3.3.1, which creates doubt on reliability of data being reported by the ULBs in respect of waste collection.

The State Government stated (March 2025) that for processing of Municipal Solid Waste processing plants are being established and the reject from these plants will be disposed of in Sanitary Landfill Facility being established under SBM 2.0.

3.3 Collection of Solid Waste

Collection of segregated municipal solid waste is an essential step in municipal SWM. Inefficient waste collection services have an impact on public health and the aesthetics of towns and cities. Collection of wet, dry and domestic hazardous waste separately ensures maximum recovery of recyclable waste and also paves the way for cost-effective treatment of such wastes. The collection service provided by ULBs also needs to be regular to be effective.

Audit observations pertaining to reported figures of waste collection, reporting incorrect data, deficient system for measurement of collection and non-installation of GPS system in vehicles used for waste collection etc. are discussed in the succeeding paragraphs:

3.3.1 Difference between waste collection reported and actual waste collection

During audit of test checked 18 ULBs instances have been noticed in four ULBs where the actual collection was higher or lesser than the reported collection of waste as detailed below:

(i) Municipal Corporation, Jaipur in its annual reports reported 100 *per cent* collection of waste during 2019-20 i.e. 1477 TPD. Audit noticed that during July 2019 to March 2020 an average 1581 TPD waste was collected by the contractor. During 2022-23 waste collection was reported as 1640 TPD, whereas audit noticed that in addition to this (1640 TPD), the Municipal Corporation also engaged its own fleet having capacity of 325 TPD for collection and transportation of waste.

(ii) The estimated quantity of waste generation in Municipal Corporation, Bikaner during 2021-23 was 363 TPD against which the Municipal Corporation claimed to have collected 363 TPD (100 *per cent)*. Audit observed that in addition to 363 TPD waste collected from households, 233.60 TPD waste was also collected from roadside by deploying additional resources during August 2021 to March 2023. Thus, the Municipal Corporation understated the actual collection of waste.

(iii) Municipal Corporation, Jodhpur reported 100 *per cent* collection of waste during 2019-20 to 2022-23. Audit observed that against the estimated waste of an average 497 TPD per year, an average 14.93 TPD waste was not collected by the contractor from January 2019 to August 2023 for which penalty was recovered from contractors.

(iv) Municipal Council, Sujangarh reported 25 TPD (100 *per cent*) collection of waste during 2018-19. Audit observed that an average of 31.40 TPD waste was collected during the same period.

Thus, it is clear that ULBs are not reporting correct figures of waste collection and this variation also indicates towards unrealistic estimation as actual collection have huge variation from estimated generation.

The State Government replied (March 2025) that own vehicles are also used for collection of slit, road side waste and other kind of waste which do not fall under the scope of outsourced firm and transported it to dump yard.

3.3.2 Inconsistency of data reported to RSPCB and Audit

As per Rule 15(za&zb) of SWM Rules 2016, every ULB had to prepare and submit annual report by 30 April of succeeding year to Director Local Bodies who in turn will send the report to Rajasthan State Pollution Control Board (RSPCB) by 31 May of every year.

Audit observed that the quantity of waste generated reported by the DLB to audit was different from the figures reported by the ULBs in their Annual Reports to the RSPCB. As per information provided to audit, Solid Waste generation and collection in 2021-22 for the entire State was 6829 TPD, whereas the data submitted by ULBs to RSPCB, the annual generation and collection of Solid Waste at State level shown as 7973 TPD and 7859 TPD respectively for the entire State. Thus, there was a variation of 1144 TPD and 1030 TPD in generation and collection respectively.

Audit compared the data of generation and collection of waste reported to audit and to RSPCB by the 18 test checked ULBs and observed variation between these data in four test checked ULBs as detailed in **Table 3.5** below:

Table 3.5: Difference in data of generation and collection of waste

(TPD)

Name of ULB	Year	Report to Audit	Report to RSPCB	Difference
Deoli	2019-20	8.90	10	1.10
	2020-21	9.10	10	0.90
Choti Sadri	2018-19	8.58	7	1.58
Pokhran	2020-21	8.62	6	2.62
Sambhar lake	2022-23	8.10	8	0.10

(Source: Information provided by the concerned ULBs)

The State Government accepted (March 2025) the facts and stated that there may be some inconsistency as these data are based on estimation, but data provided through Annual Reports were on actual basis. However, all ULBs would be directed to submit data to various agencies uniformly.

3.3.3 Deficient system for measurement of collection and transportation of waste

As per MSWM Manual 2016, the ULBs are required to install weigh bridges to measure the weight of the waste collected daily so that the collection can be monitored. Audit found that out of 18 test checked ULBs, eight weigh bridges were installed only in four ULBs (Bikaner: 01, Jaipur: 03, Jodhpur: 01 and Udaipur: 03). However, weigh bridges were not installed in 14 ULBs due to which daily waste collection could not be measured and monitored properly.

Audit observed that in Municipal Council, Bhiwadi, fraudulent weigh slips were being submitted by the contractors and payment was made against them. One of the vehicles shown to have been used for waste collection was found to be a passenger vehicle (Maruti Wagon R- HR31D4814). Audit observed that this vehicle made 56 trips during the month of July 2019 and shown transport of 55.36 tonnage waste.

State Government stated (March 2025) that all ULBs would be directed to install weigh bridges and ensure their functioning. Further, it was stated that the number of registration of car in Bhiwadi may have been noted erroneously.

The reply of the State Government is not tenable as the registration number of vehicle (Wagon R) having HR number was found noted on weigh slips several times during the month of July 2019, which cannot be termed as a onetime error and that creates doubt on the reliability on shown data related to waste transportation and collection.

Audit is of the view that the whole system of measuring the collection of waste is exposed to the risk of fraud and manipulation, and effective measures to ensure accountability and responsibility need to be taken to improve the system.

3.3.4 Global Positioning System not installed on transportation vehicles

According to MSWM Manual 2016, Global Positioning System (GPS) was to be installed on waste transportation vehicles for better monitoring of their movement and enable better control of solid waste management. Further, Local Self Government Department instructed (September 2017) all ULBs to install Vehicle Tracking System on all vehicles used for transportation of Solid Waste.

Audit observed that in 18 test checked ULBs, GPS/Vehicle Tracking System was not installed in owned vehicles used for collection and transportation of waste by ULBs.

State Government accepted (March 2025) that ULBs owned vehicles may have not equipped with the GPS and stated that at DLB level, orders have been issued from time to time to equip with the GPS and compliance of the order will be ensured strictly.

Thus, in the absence of GPS, monitoring of movement of waste transportation vehicles for better control of Solid Waste Management could not be ensured.

3.3.5 Installation of Radio Frequency Identification (RFID) cards

Radio Frequency Identification (RFID) waste management system solutions support identification and traceability of waste. Audit noticed that only three {Bikaner, Jaipur (Greater) and Kishangarh} out of 18 test checked ULBs made provisions in respective bid documents for installation of RFID at each household.

RFID is reported to have been installed in two zones of Municipal Corporation, Jaipur (Greater) only. Audit observed that the Municipal Corporation Jaipur awarded a work order (July 2022) to a firm for installation of RFID cards to an estimated 80,493 households of Malviya Nagar Zone and the firm was to be paid after actual survey of households. The firm intimated 98,492 households after the actual survey. As per the agreement, a penalty at the rate of ₹ five per household per day was to be deducted from the firm in case 100 *per cent* of the households were not covered.

The firm submitted a bill (₹1.11 crore) for the month of July 2023 for 98,492 households, whereas the Independent Engineer on verification reported that the firm did not submit scan reports of an average of 7,999 households during the month. Audit observed that the Municipal Corporation paid[1] ₹ 97.03 lakh to the firm for all 98,492 households, without reducing 7,999 households from where the waste was not collected. Although, the penalty amounting to ₹ 12.40 lakh at the

[1] 98492 households at the rate ₹ 111.60 per month per household (1 to 24 July 2023) and ₹ 114.95 per month per household (25 to 31 July 2023), total payment ₹ 110.66 lakh, reduced penalty ₹ 13.63 lakh (₹12.40 lakh for non-coverage of households and ₹ 1.23 lakh for other penalties). Paid amount ₹ 97.03 lakh.

rate of ₹ five per household was collected from the firm for 7,999 households but the firm was paid an excess amount of ₹ 8.98 lakh for uncollected waste for 7,999 household without collection of waste.

State Government stated (March 2025) that remaining ULBs are being directed to focus on installation of RFID cards to ascertain the actual coverage of households. However, the reply was not furnished for the excess payment paid to the firm.

3.3.6 Installation of smart dust bins

(i) Municipal Corporation Jodhpur decided (August 2017) to procure 55 smart dustbins[2] with an estimated cost of ₹ 7.42 crore (including O&M cost of ₹ 5 crore). These smart bins were to be equipped with sensors and a Bin Tracking System (BTS)/Global Positioning System (GPS). These sensor equipped bins were to send alerts after the bins were filled up to empty the bins immediately.

The Municipal Corporation, Jodhpur awarded (November 2017) a work order in favour of M/s Zonta Infratech Private Limited with a stipulated period for supply/installation of bins between 20 November 2017 and 19 May 2018 and for O&M of bins for five years. The firm installed these 55 smart bins in March 2018 at different locations provided by the Municipal Corporation and ₹ 1.88 crore was paid to the firm including O&M upto fourth running bill in March 2019.

Audit observed that:

a) The firm did not install the sensors and in the absence of the sensors, the envisaged benefits could not be achieved.

b) During physical inspection (10 October 2022) it was found that these smart bins were not cleaned regularly and at one location smart bin was not found installed.

[2] 15 smart dustbins having capacity of 2 cubic meter each and 40 smart dustbins having capacity of 1.5 cubic meter each.



Images showing dismantled bin lying without any utilization and bins not cleaned by ULBs

Thus, the very purpose of installation of these smart bins was defeated and these costly smart bins remained like ordinary iron dust bins. The expenditure of ₹ 1.88 crore incurred on these smart bins proved to be infructuous.

The State Government stated (March 2025) that Municipal Corporation, Jodhpur has been directed to forward factual position and after receipts of the same, concrete factual position would be furnished to audit.

3.3.7 Involvement of Self-Help Groups and waste pickers

Rule 15 (c) and (d) of SWM Rules 2016 prescribe to regulate and promote the involvement of waste pickers or informal waste collectors in Solid Waste Management. Urban Local Bodies were to facilitate the formation of Self-Help Groups (SHG), provide identity cards and authorize them to pick waste from collection, storage or dumping sites.

Test check of selected Urban Local Bodies revealed that: -

(i) Only two Urban Local Bodies (Municipal Corporation, Jaipur and Municipal Corporation, Udaipur) conducted survey and issued identity cards to waste pickers. Jodhpur prepared a list of waste pickers and the basis for preparation of list was not mentioned. No identity card was issued to the waste pickers by Jodhpur.

(ii) SHG was established by only Municipal Corporation, Udaipur and the remaining 17 Urban Local Bodies did not establish any Self-Help Group.

State Government stated (March 2025) that each and every ULB has recognized role of waste pickers and allowed rag pickers to segregate the waste. In smaller ULBs it may be possible that they did not issue any identity cards. Moreover, the work of Solid Waste Management in ULBs with small quantum of waste generation is planned to be done through convergence of SBM and SHG of National Urban Livelihood Mission (NULM).

The reply is contrary to the fact that only three out of 18 test checked Urban Local Bodies had recognized the role of waste pickers and formation of Self-Help-Group is yet to be done in ULBs.

3.4 Segregation of Solid Waste

Solid waste is segregated at two stages wherein at the first stage, biodegradable and non-biodegradable waste is collected at source in separate containers, at the second stage, waste is segregated at secondary storage/dump sites before its processing where various components of municipal solid waste namely biodegradable waste, recyclable waste, non-recyclable combustible waste, sanitary waste, non-recyclable inert waste and domestic hazardous waste are sorted and separately stored.

Rule 15 (b) of SWM Rules 2016 prescribes that ULBs shall arrange for door to door collection of segregated solid waste from all households and commercial institutions etc.

During audit, issues regarding segregation of solid waste, segregation of hazardous waste and facilities for segregation at secondary storage sites have been noticed as discussed in the succeeding paragraphs:

3.4.1 Status of segregation of waste

Director Local Bodies intimated that about 60 *per cent* Solid Waste was segregated at source in the State during 2022-23.

Further as per data shown in Annual reports of all ULBs, it was observed that only 50 *per cent* and 60 *per cent* of ULBs[3] in the State undertook segregation of waste at secondary storage facilities during 2021-22 and 2022-23 respectively. The segregation of solid waste at secondary storage facilities during 2021-22 and 2022-23 in the test-checked 18 Urban Local Bodies is shown in **Table 3.6** below:

[3] 104 out of 207 ULBs in 2021-22 and 133 out of 221 in 2022-23.

Table 3.6: Secondary segregation of waste in test checked ULBs

Particulars	2021-22		2022-23	
	Number of ULBs	Name of ULBs	Number of ULBs	Name of ULBs
100 per cent segregation	3 (17%)	Udaipur, Dungarpur and Kishangarh	2 (11%)	Dungarpur and Kishangarh
Partial segregation	4 (22%)	Jaipur, Jodhpur, Bikaner and Baran	11 (61%)	Jaipur, Jodhpur, Bikaner, Udaipur, Balotara, Hindaun City, Sambhar Lake, Sujangarh, Bari, Rajgarh, Bhiwadi
No segregation	11 (61%)	Balotara, Bhiwadi, Hindaun City, Sujangarh, Bari, Bhawani Mandi, Choti Sadri, Deoli, Pokhran, Rajgarh, Sambhar Lake	5 (28%)	Bhawani Mandi, Baran, Pokhran, Deoli and Choti Sadri

(Source: service level benchmark forms and information provided by test checked ULBs)

It can be seen from the above table that position of segregation of waste at secondary stage was slightly improved in test checked ULBs in 2022-23. However, in Udaipur segregation of waste was reduced to 80 *per cent* in 2022-23 from 100 *per cent* in 2021-22.

Further, it was observed that in two ULBs (Bari and Hindaun City) contract for collection, segregation and processing of the waste was awarded (September 2021 and August 2022) to firms. As per the contract both ULBs had to make payment to the firm in the following ratio: (a) 40 *per cent* on collection (b) 30 *per cent* on segregation and (c) remaining 30 *per cent* on processing of the waste. During joint physical verification[4] of both ULBs, it was noticed that waste was neither segregated nor processed.

State Government accepted the facts and stated (March 2025) that extent of source segregation of waste depends on the involvement of waste generation/residents. ULBs are doing regular IEC activities for motivating the residents for segregating the waste. Every ULB has twin compartments in its auto tippers and segregating waste into dry and wet waste at household level. In Bari and Hindaun City, both ULBs made conditions in the agreement for collection, transportation, segregation and processing of waste but as these firms did not work satisfactorily, the agreement was rescinded.

3.4.2 Segregation of domestic hazardous waste and sanitary waste

Domestic hazardous waste consists mainly of discarded paint drums, pesticide cans, compact fluorescent bulbs, expired medicines, used batteries, used needles and

[4] Bari: 28 September 2022 and Hindaun City: 19 May 2024.

syringes, and contaminated gauge. Sanitary waste comprises of used diapers, sanitary towels or napkins. As per Rule 15 (i) of SWM Rules 2016, ULBs shall establish waste deposition centres within 20 square km for domestic hazardous waste and give direction for waste generators to deposit domestic hazardous wastes at this centre for its safe disposal. All waste generators are required to segregate such waste at the source so that further action could be taken for their safe disposal.

Audit observed that neither specific centres were established for deposition of hazardous waste nor hazardous/sanitary waste was segregated at source/secondary source in 12 out of 18 test checked ULBs. During the physical verification of secondary storage/dumpsites[5], instances were seen where mixed waste was dumped.



Image showing mixed waste and unfenced secondary storage at Jaipur.

State Government stated (March 2025) that waste collection vehicles have separate bin for collection of domestic hazardous waste. The hazardous waste given by local residents are collected in these bins but if waste is given by residents in a mixed way it is very difficult to separate the hazardous waste from mixed waste. For segregation of waste at processing site the processing plants are being established in each ULB under SBM 2.0.

3.4.3 Facilities for segregation

Every Urban Local Body[6] should setup Material Recovery Facilities (MRF) or secondary storage facilities with sufficient space to enable authorized waste pickers and waste collectors to separate recyclable waste such as paper, plastic, metal, glass, and textile. National Green Tribunal also directed (2018) that adequate material

[5] Dumpsite is a place where waste materials are deposited without any planning or consideration for environmental or health standards.

[6] Rule 15 (h) of Solid Waste Management Rules 2016 & Section 2.3.2 of MSWM Manual 2016.

recovery facility/secondary storage facilities be constructed for segregation of solid waste.

Material recovery facilities were available in all 18 test checked ULBs. During physical verification (October to November 2022) of material recovery facilities in all 18 test checked Urban Local Bodies, Audit observed that in nine[7] ULBs:

(i) Material recovery facilities or secondary storages facilities were not covered or fenced, which allowed the stray animals to move around the waste storage sites.

(ii) Storages were not cleaned regularly which resulted in overflowing of waste and littering on the roadside.

(iii) Storage bins were not suitably designed for easy operations with regard to handling, transferring and transporting of waste.

(iv) Bins were also not in prescribed colour format.

(v) No segregation was done at source and mixed waste was dumped in these secondary storage facilities.



Images showing mixed waste and unfenced secondary storage at Bikaner, Bhiwadi, Sambharlake and Deoli.

Thus, uncovered storages, non-segregation of waste and lack of regular cleaning of bins led to littering of waste and unhygienic conditions.

The State Government accepted the facts and stated that most of MRF centers have since been made functional and working properly and efforts were being made to clean storage regularly. Further, under the mandate of SBM 2.0 the processing facility in all ULBs are being established.

[7] Bhiwadi, Bikaner, Choti Sadri, Deoli, Hindaun City, Pokhran, Rajgarh, Sambhar Lake and Sujangarh.

3.5 Processing and disposal of Solid Waste

Audit observations regarding non adopting technique of Reduce, Reuse and Recycle of waste, processing of waste, non-utilisation of composte machine, inordinate delay in setting up of waste to energy plant, non-construction of sanitary landfills and non-closure of dump sites are discussed in succeeding paragraphs:

3.5.1 Optimum utilisation of Solid Waste

Rule 11 (b) of SWM Rules 2016 provided that Secretary, LSGD while preparing State policy and strategy on SWM, lay emphasis on waste reduction, reuse, recycling, recovery and optimum utilisation of various components of solid waste to ensure minimisation of waste going to the landfill and minimise impact of solid waste on human health and environment.

Audit observed that LSGD issued byelaws 2015 and updated in 2019 which included provisions related to reduction, reuse, recycling, recovery and optimum utilisation of solid waste. However, test checked 17 ULBs did not follow provisions of the byclaws rclatcd to optimum utilisation of solid wastc and dumpcd thc wastc in landfill/dump sites. Only one ULB (Municipal Corporation, Jaipur) used the Refuse Derived Fuel (RDF) method and techniques of composting for recycling of solid waste and remaining 17 ULBs did not initiate any action for optimum utilisation of solid waste as of March 2023.

State Government stated (March 2025) that guidelines were issued regularly and position of waste processing facilities has been improved during 2023-25. At present 22 processing plants are operational, 155 plants are under construction and tendering of 33 plants are under process.

Audit observed that Municipal Corporation Gangtok had established (June 2024) a Reduce, Reuse and Recycle (RRR) Centre at Deorali. This initiative underscores dedication to reducing waste and conserving resources by promoting the principles of reducing consumption, reusing materials and recycling waste.

3.5.2 Processing of waste

Solid waste collected and processed at the State as well as test checked 18 ULBs during 2017-18 to 2022-23 (in ton per day) are shown in table 3.3 and 3.4 in paragraph 3.2 of the report.

It can be seen from the tables 3.3 and 3.4 that the position of processing of solid waste was marginally improved at State level from 11 *per cent* in 2017-18 to 22 *per cent* in 2022-23 of thc wastc collcction. Thc position of proccssing of wastc in 18 test checked ULBs was better than the State level position and it was ranged between 29 *per cent* and 35 *per cent* during the same period.

Further, Municipal Board, Bari reported to audit that 50 *per cent* to 70 *per cent* of waste were being processed during 2021-22 and 2022-23. However, audit noted

that Municipal Board, Bari did not have any processing facilities. Thus, the claim of processing waste was not reliable.

3.5.3 Setting up of processing facilities in test checked ULBs

3.5.3.1 Non-utilisation of compost machines under SWM

As per Rule 15(v) of Solid Waste Management Rules 2016, local authorities shall facilitate construction, operation and maintenance of solid waste processing facilities including its composting.

Director Local Bodies intimated (October 2018) all ULBs that rate contract has been accorded to M/s N K Gadhiya for procurement of various equipment including compost machines for implementation of Solid Waste Management and directed to procure machines through rate contract. LSGD also allowed (June 2019) ULBs to procure compost machines through GeM portal in accordance with provisions of RTPP Rules 2013 issued time to time from Finance Department.

Audit observed that six out of 18 test checked ULBs procured compost machines of different capacities between February 2019 and December 2019 through rate contract, GeM and open market. Out of these six ULBs, compost machinery installed in one ULB (Bhiwadi) was being used for processing of waste, in one ULB (Choti Sdari) it was burnt in June 2021 after installation and in remaining four ULBs (as detailed in ***Appendix III)*** compost machines were not put to use since their installation to between May 2024 and August 2024 for 57 months to 63 months due to non-providing of required training to staff by the venders; non-availability of segregated waste i.e. bio organic waste etc.

Photo of compost machines lying unutilized in Bikaner



State Government accepted (February 2025) the facts and intimated that these machines could not be utilised due to non-availability of space, quantum of segregated waste, etc.

This indicates towards lack of monitoring by ULBs to ensure working of installed compost machine which further reduced processed of waste.

3.5.3.2 Inordinate delay in setting up of Waste to energy plant

Rule 15 (v) of SWM Rules 2016 provided that it is responsibility of every ULB to construct solid waste-based power plants within two years from the date of notification of rules for processing of solid waste.

Rule 76 of RTPP Rules provided that the successful bidder should sign the procurement contract within a specified period/within fifteen days otherwise the procuring entity shall take action against the successful bidder.

Three ULBs viz Jaipur, Jodhpur and Baran had issued work orders for establishment of energy plants in 2016-17, but these have not been established as of April 2024 as discussed below:

(i) Municipal Corporation Jodhpur and Jaipur issued (March 2017 & April 2017) work orders for setting up waste to energy plant having capacity of 400 TPD and 700 TPD respectively to a firm M/s JITF Urban Infrastructure Limited with stipulated date of completion as of March/April 2019. In Jodhpur, the firm executed Power Purchase Agreement with Jodhpur Vidhyut Vitran Nigam Limited on 04 May 2022. In Jaipur, the firm executed lease agreement with Municipal Corporation Jaipur on 12 May 2022 and Power Purchase Agreement with Jaipur Vidhyut Vitran Nigam Limited on 11 July 2022 and statutory permission such as Consent to Establish from RSPCB was not obtained. Thus, these plants were not set up as of April 2024 due to delayed execution of lease agreement, power purchase agreements and non-obtaining of statutory permission such as Consent to Establish from RSPCB.

(ii) Municipal Council, Baran, invited (January 2016) tender for design, construction, O&M of processing facility for Baran and Anta towns. The Municipal Council issued (July 2017) 'Notice to Proceed' to a firm M/s Zonta Infratech Private Limited, work was to be completed up to 16 September 2018. The firm did not commence the work for establishment of the processing facility as of July 2022.

The above facts indicate that in Jaipur and Jodhpur the firms did not execute agreement due to land dispute, power purchase agreement with energy department etc.

Thus, due to inordinate delay in setting up of waste to energy plants, waste could not be processed and leading to piling up to dump unprocessed at dumping sites.

The State Government accepted that facts and stated (March 2025) that there was inordinate delay in setting up of waste to energy plants at Jaipur, Jodhpur and Baran due to several unforeseen hindrances. The major cause for delay was delay in getting environmental clearance. In Jaipur, waste to energy plant is set up and functioning and plant at Jodhpur is under process and delay is attributed to getting up Consent to Establish from RSPCB. While in Baran, the contractor did not set up the plant and agreement was terminated and necessary action as envisaged in the agreement had been taken. New work order under SBM 2.0 has been issued (December 2023) for the establishment of RDF and compost plant in Baran.

Audit further noted that in order to reduce landfill dependency and to promote sustainable waste management, waste to energy plants have been set up (i) in Ahmedabad (15 MW) by processing 1000 TPD Municipal Solid Waste into electricity for clean energy and waste reduction, (ii) a plant in Pune (14 MW) using thermal gasification technology to convert 1000 TPD waste into green energy, (iii) a bio-CNG plant in Indore under GOBARdhan scheme to convert municipal solid waste into bio-CNG and compost. These measures need to be emulated in Rajasthan also.

3.5.4 Construction and demolition waste not processed

The processing of construction and Demolition (C&D) waste is important as per C&D waste management Rule, 2016. It prevents unscientific disposal that causes air, water and soil pollution and it reduces dust, littering, and unmanaged dumping. Construction and Demolition (C&D) waste comprises of buildings materials, debris and rubble resulting from construction, repair and demolition of any civil structure. As per Rule 6 of the Construction and Demolition Waste Management Rules, 2016, it is the responsibility of the Urban Local Bodies to collect, transport, process and dispose of Construction and Demolition waste either through own resources or by appointing private operators. As per the Annexure 1 of SBM (Urban) 2.0 guidelines (effective from October 2021) seven cities[8] having population more than five lakh or categorised under National Clean Air Programme in Rajasthan are eligible for C&D waste processing funding.

Audit observed that as per the SBM (Urban) 2.0 guidelines four (Bikaner, Jaipur, Jodhpur and Udaipur) out of 18 test checked ULBs were eligible for setting up of C&D processing plant. Only Municipal Corporation, Udaipur has set up (December 2020) one C&D waste processing plant in the State as of March 2022. This plant was also not functioning (June 2022) due to want of O&M. As a result, 6.24 lakh MT[9] of Construction and Demolition waste generated during 2020-21 and 2022-23 in the State could not be processed. Due to non-set up of C&D waste processing plant, the C&D waste is being mixed with solid waste or disposed in low lying area.

[8] Ajmer, Alwar, Bikaner, Jaipur, Jodhpur, Kota and Udaipur.
[9] 2020-21: 1.65 lakh MT: 2021-22, 1.98 lakh MT and 2022-23 : 2.61 lakh MT.



Photo of idle C&D Waste plant at Udaipur and undisposed C&D waste lying undisposed in June 2022.

State Government stated (March 2025) that C&D plants at Jaipur and Udaipur are operational while plant at Jodhpur and Bikaner are under construction.

3.5.5 Non-construction of sanitary landfills

Solid Waste Management Rules, 2016 prescribes that Urban Local Bodies should set up sanitary landfill facilities in its area for disposal of residual waste. As per rule 15 (w) of SWM Rules, 2016 Urban Local Bodies have to construct, operate and maintain the sanitary landfills and associated infrastructure.

Out of 18 test checked Urban Local Bodies, 15 ULBs did not construct sanitary landfill sites and dumped the municipal solid waste in open dumping sites. Though Municipal Corporation Jaipur and Municipal Council Baran constructed landfill sites in year 2012 and 2016 respectively at a cost of ₹ 12.06 crore[10] these remained unutilized since their construction due to non-setting up of processing plants as discussed in para 3.5.3.2 of the report. This resulted in Municipal Solid Waste was being dump in open dumping site. In Dungarpur, landfill was being used.

The State Government stated (March 2025) that landfill sites are utilised after setting up of processing plants and residual waste is to be landfilled. The reject from processing plants will be disposed of in sanitary landfill facility being established under SBM (Urban) 2.0. For this, 174 ULBs have been clustered and tender for establishment of sanitary landfill facility has been invited in 28 clusters.

The audit further noticed and found that out of 18 test checked ULBs, two ULBs (Pokhran and Kishangarh) have not been included in the cluster.

3.5.6 Non-closure of dumpsites

Open dumpsites pose a threat to the environment and human health. As per rule 15 (zj) and (zk) of SWM Rules 2016, ULBs shall investigate and analyse all old open dumpsites and existing operational dumpsites for their potential of bio-mining and bio-remediation[11] and wheresoever feasible, take necessary actions for biomining

[10] Municipal Corporation, Jaipur: ₹ 10.93 crore and Municipal Council: Baran: ₹1.13 crore.

[11] Bio-mining and bio-remediation refer to excavation of old dump waste, make window of legacy waste, stabilisation of the waste through bio-remediation i.e. exposure of all the waste to air along with use of composting bio-culture i.e. screening of stabilised waste to recover all valuable resources (like organic fines, bricks, stones, plastics, metals, cloths, wax etc.) followed by its sustainable management through re-cycling, co-processing, road making etc.

or bio-remediate on the sites. In the absence of the potential of bio-mining and bio-remediation of dumpsite, it shall be scientifically capped as per landfill capping norms to prevent further damage to the environment.

Test check of 18 Urban Local Bodies showed that none of the ULBs planned for bio-mining and bio-remediation or undertook scientific capping of dump sites as of March 2023.

The State Government accepted the facts and stated (March 2025) that as of March 2022 no dump site was bio remedied but thereafter DLB issued work orders for bio remediation of these dump sites. It was further stated that 88 lakh cubic meters of legacy waste was estimated at 176 dumpsites out of which 63.42 lakh cubic meter waste has been remediated and 71 sites has been remediated. Work at 105 sites is under progress and likely to be completed by March 2025.

The audit further noticed and found that out of 18 test checked ULBs, in ten ULBs[12] legacy waste has not been remediated.

3.6 Conclusion

The audit has revealed discrepancies in the reporting & management of Solid Waste by ULBs. There were instances where the actual waste collection differed from reported figures. Additionally, inconsistencies were observed between data provided to audit and that reported to RSPCB. This indicates a lack of reliable monitoring mechanism. Audit observed absence of weigh bridges in 14 test checked ULBs, non-installation of RFID cards at each household for tracking collection efficiency.

Segregation of waste, a critical component of effective Solid Waste Management was not ensured in all ULBs. The capacity for processing waste remains inadequate which is leading towards ineffective SWM by ULBs.

Recommendations:

1. The State Government may ensure installation of weigh bridges and RFID cards in all ULBs for accurate measurement and to check collection efficiency.

2. The State Government should undertook advocacy & outreach activities and Health & Sanitation Committees to ensure 100 per cent segregation of waste at secondary stage.

3. *The State Government may make efforts to reduce dependency on landfills by enhancing its processing capacity.*

[12] Balotara, Bhawani Mandi, Bhiwadi, Bikaner, Choti Sadri, Jaipur, Jodhpur, Pokhran, Rajgarh and Sambhar Lake.

4. The State Government should make material recovery facilities mandatory to divert recyclable material from landfills by increasing recycling rates and reducing waste sent to landfills.

5. The State Government should ensure GPS enabled solid waste management vehicle for route optimization, real time tracking and enhanced customer services by ensuring timely waste collection.

6. The State Government should take new initiative for composting and waste to energy plants in line with other cities like Indore, Ahmedabad, Pune and Gangtok.