

**CHAPTER - IV
SEGREGATION,
COLLECTION AND
TRANSPORTATION
OF SOLID WASTE**

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Segregation, Collection and Transportation of solid waste

4.1 Segregation of waste

For segregation of solid waste MSW Rules 2000 provides that ULBs should organise awareness programmes, meetings with local resident welfare associations and NGOs to encourage citizens and community participation for segregation of various types of waste, and for promoting recycling or reuse of segregated materials. Segregation of solid waste is required for separating recyclable material, organic waste for processing and residual inert material for disposal.

4.1.1 Segregation of waste at source/household level

MSWM Manuals, 2000 (Section 8.10.1(a) and 2016 (Section 2.2.1) stipulate that ULBs must accord highest priority for segregation of waste at source.

The test-checked ULBs declared that they had achieved SLBs upto 100 *per cent* for segregation. Based on JPVs, it was found that segregation at source was being partially followed in test checked ULBs and even the hazardous waste was getting dumped in landfills. After purchase of Battery Operated vehicles (BOVs)/ Light commercial vehicles (LCVs) after issue of SOP (July 2019), ULBs focused on collection of dry and wet waste through these vehicles and segregated at MCC/MRF centres. Since ULBs did not procure required number of BOVs/ LCVs as of March 2021 for door to door collection, partial segregation was made by the ULBs as discussed in **Paragraph 4.3.1.**

The Government stated (May 2022) that ULBs were instructed for collection of segregated waste since implementation of SBM (Urban). Segregated waste collection was done through BOVs/LCVs. The reply was not acceptable as ULBs did not procure required number of BOVs/ LCVs as of March 2021 for door to door collection resulting in only partial segregation of waste by the ULBs.

4.1.1.1 Non-issuance of bins

As per Para 7.10.7 of SBM Rule, ULBs were advised to distribute two colour coded bins per household. As per compliance report to NGT 2015 of H&UD, the ULBs should target daily door to door collection and 100 *per cent* segregation at source in a period of three years.

Audit observed that three ULBs¹⁷ procured 1,85,000 bins between July 2017 and September 2018 to distribute among 92,500 households for segregation at source by incurring an expenditure of ₹1.19 crore. Out of the above, ULBs issued 87,568¹⁸ bins to 43,784 households during July 2017 and September 2018 and remaining 97,432 bins were not issued to households as of March 2021 and kept with the concerned ULBs. Audit further observed during JPV

¹⁷ Berhampur (1,60,000 dust bins for distribution among 80,000 households for ₹68.80 lakh) , Jeypore (20,000 dustbins for distribution among 10,000 households for ₹31.60 lakh and Choudwar (5,000 dustbins for distribution among 2,500 households for ₹19 lakh)

¹⁸ Berhampur issued 64,338 bins to 32,169 households, Choudwar: 3,230 bins to 1,615 households and Jeypore: 20,000 bins to 10,000 households

(March 2021) that households were not adopting source segregation due to lack of awareness rendering the expenditure unfruitful. Other 18 ULBs did not issue any bins to households to encourage source segregation of waste. After purchase of BOVs (after SOP July 2019), ULBs initiated collection of dry waste and wet waste from households and segregation at MCC/MRF since March 2021.

The Government stated (May 2022) that the SWM Rules 2016 had not prescribed any provisions for distribution of bins. The reply was not acceptable since SBM guidelines on solid waste envisage that ULBs were to distribute two colour bins *per* household to practise source segregation.

4.1.2 Non-segregation of domestic hazardous waste

As per Clause 15(i)(j) of SWM Rules 2016, ULBs are required to establish waste deposition centres for domestic hazardous¹⁹ waste and give directions to waste generator to deposit domestic hazardous wastes at the centres for its safe disposal. SWM Manual 2016 indicates different kinds of domestic hazardous waste.

Audit observed that both State and local bodies did not notify and publicise list of items classified as domestic hazardous waste to be segregated at source. Consequently, the quantity of domestic hazardous waste generated was not assessed and the contaminated mixed waste reached the landfills. Test-checked ULBs also did not establish separate waste deposition centres for domestic hazardous waste as of March 2021. Non-notification of hazardous waste and depositing the mixed waste in landfills could possibly lead to toxic waste residue seeping underground and contaminating the ground water apart from air and soil pollution. During joint survey by Audit and ULB officials, it was reported by the inhabitants residing near the landfills that their health condition has deteriorated.

The Government stated (May 2022) that awareness activities have been undertaken at the ULBs level for segregation and collection of domestic hazardous waste. However, the test-checked ULBs did not furnish any documentary evidence for creation of any awareness for segregation and collection of hazardous waste from the households.

4.1.3 Non-segregation of sanitary waste

As per clause 4 under Section 2.2.2.1 of SWM Manual, 2016 sanitary waste²⁰ generated by households was to be wrapped in old newspaper/pouches provided by the manufacturers and handed over to the waste collectors separately.

Audit observed that none of test-checked ULBs emphasised segregation and disposal of sanitary waste as required under the Manual as of March 2021.

The Government stated (May 2022) that sanitary napkins, diapers *etc.*, wrapped in waste papers are collected separately in a bag attached in the

¹⁹ Household Hazardous Waste (HHW) is any unwanted household product labelled as flammable, toxic, corrosive, or reactive. The most common products include aerosols, anti-freeze, asbestos, fertilizers, motor oil, paint supplies, photo chemicals, poisons, and solvents, *etc.*

²⁰ Waste comprising of used diapers, sanitary towels or napkins, tampons, incontinence sheets and any other similar waste

BOVs/LCVs and the same is processed through incinerator at wealth centers. However, test checked ULBs had not procured the required BOVs/ LCVs as of March 2021.

4.1.4 Non-segregation of waste at transfer station/ central sorting facility

As per Clause 15 (h) of SWM Rules, 2016, the local authorities shall set up material recovery facilities or secondary storage facilities for sorting of recyclable materials.

Audit observed that source level segregation was absent/deficient in the test checked ULBs. Hence, there was a need for ensuring segregation of waste at least



Photograph 1 Secondary transfer station Satichoura of CMC

before it reaches the processing/landfill site. In test checked ULBs, the waste was transferred in mixed form from primary storage to secondary storage facility and from secondary storage to landfills. Failure to segregate waste at primary storage, secondary storage and dry waste centres resulted in failure to recover the recyclables, thereby leading to dumping these resources in landfills.

The Government stated (May 2022) that the basic principles of collection of segregated waste from the household level has been adopted throughout the State after issue of SOP December 2020. The reply is not acceptable as test checked ULBs had not procured the required BOVs/LCVs as of March 2021 resulting in collection of unsegregated waste from households. The unsegregated waste without recovering the recyclables was transferred to primary and secondary storage, and finally being disposed to landfills.

4.2 Collection of waste

Sections 10.3 and 10.4 of Manual on MSW, 2000, state that ULBs shall arrange for the collection of domestic, trade and institutional, food/biodegradable waste, recyclable waste material/non-biodegradable waste besides domestic hazardous/toxic waste from doorstep or community bins or waste deposition centres specially established for the purposes. Waste collection system is therefore necessary to ensure that waste stored at source is collected regularly and it is not disposed of on the streets, drains, water bodies, *etc.* The following deficiencies were noticed in the test checked ULBs for collection of waste.

4.2.1 Street sweeping and cleaning on daily basis

Section 11.3.1 of Manual on MSW, 2000 and Section 2.4.2 of MSW Manual, 2016 stipulate that it is necessary to have a well-planned, time-bound daily system for street sweeping including adequate staff and equipment. Street sweepers were instructed to report daily for duty at designated locations and such locations should have provisions for storing street sweeping equipment.

Audit observed in the 21 test checked ULBs that out of 5,967.16 km of roads, ULBs did not carry out street sweeping of 1,157.55 km (19.39 per cent) on daily basis. In four ULBs, the non-coverage of roads for daily sweeping was 50 per cent or more **Appendix-VIII**.

The Government stated (May 2022) that in all the ULBs street sweeping was done regularly. The reply was contrary to the data provided by test-checked ULBs to Audit.

4.2.2 Non-integration of informal waste collectors in waste management

SWM Rules, 2016 requires State Government to provide broad guidelines regarding integration of waste pickers or informal waste collectors with SWM system. It is the duty of ULBs to establish system to recognise organisations of informal waste collectors and establish a system to facilitate their participation in SWM including door to door collection.

Audit observed that the State Government did not issue any guidelines for involvement of waste pickers/ rag pickers during 2015-20. In absence of state policy for waste management, services of informal sector could not be utilised. The GoO issued (January 2021) guidelines for integration of waste pickers/ rag pickers for SWM. After issue of the guidelines, test checked ULBs have identified 1,320 rag pickers²¹ to be involved in SWM in wealth centres²². Since, wealth centres in test checked ULBs were not fully operationalised, services of rag pickers / waste pickers were not utilised fully in test checked ULBs as of March 2021.

The Government stated (May 2022) that so far 3,052 waste pickers were identified. Out of which, 700 waste pickers were engaged in wealth centers in 94 ULBs. However, integration of informal waste collectors remained underachieved in test checked ULBs as of March 2021 due to partial operationalisation of wealth centres.

4.2.3 Discrepancies in collection of waste

As per Clause (E) of the agreement for door-to-door collection of garbage, ULB should provide written permission to agencies to execute scope of works and services during day shifts from 6 AM to 12 Noon, during which an officer of ULB would inspect their activities.

Audit observed (December 2020) that EO, Puri ULB had outsourced (April 2017) four agencies for door to door collection of garbage and its management in 27 wards. The H&UD department had pointed out (June 2018) that performance of 100 per cent door to door collection was not done by any of agencies. Without assessment of performance, agencies were paid ₹70.73 lakh out of bill amount of ₹4.47 crore (May 2018). No further payments were made to those agencies.

The Government stated (May 2022) that waste collection from the households

²¹ Rag pickers: BMC(662), CMC(127),Puri(98), Bhadrak(4), Rayagada (0), Jeypore (6), Hinjilicut (16),Chhatrapur (10),Sundargarh (10), Rourkela (48), Gunupur (4), Sambalpur (104), Nuapada (30), Bolangir (2), Baragarh (0), Ranapur (5), Baripada (5), Chandabali (3), Berhampur (186), Choudwar (0) and Jharsuguda (0)

²² MCCs and MRFs are known as wealth centres

through outsourcing agencies were stopped in all the ULBs. However, the reply is silent on release of payment to the agencies without assessing the performance.

4.2.4 Inadequate storage facilities

Clause 3 of Schedule II of MSW Rules 2000 stipulates that municipal authorities shall establish and maintain storage facilities for solid waste in such a manner that unhygienic and insanitary conditions were not created. Further, the storage facility was to be established by taking into account quantities of waste generation in a given area and the population density placed in an area that is accessible to users; waste stored are not exposed to open atmosphere and bins for storage of bio-degradable wastes shall be painted green, white for storage of recyclable wastes and black for storage of other wastes. As per Schedule-II (Para 4) of the above Rule, the storage facilities set up by municipal authorities shall be daily attended for clearing of wastes. The bins or containers wherever placed shall be cleaned before they start overflowing. Audit observed the following storage deficiencies in test checked ULBs:

Test checked ULBs had provided only green open containers on road sides. During joint field visit of 21 ULBs, it was observed that none of the ULBs placed different coloured containers at one particular place. Due to non-provision of adequate number of secondary storages, people deposited garbage on the road side. The open-air temporary storage bins created insanitary conditions emanating foul smell all around. Further, it was seen that the containers were overflowing with solid waste as shown in the photographs below.



Photograph 2: Garbage deposited at road side at Ward 10 Bhadrak near river bank



Photograph-3: Overflow of dustbins at Ward 31 of Sambalpur

This indicated that neither there were adequate containers/bins nor were they cleaned regularly leading to unhygienic condition, contamination of the environment and causing health problems for the nearby residents.

The Government stated (May 2022) that the ULBs were on the verge of declaring themselves “bin free” (without secondary storage bins) with the initiative taken for door-to-door collection from source itself in segregated manner on daily basis. Action is being taken to discourage installation of the secondary storage. The reply was not acceptable as the ULBs were to place different coloured containers at identified places for deposition of different types of waste generated from market complexes and commercial areas as per MSW Rules. Due to non-availability of different colour bin it was difficult to

segregate different types of waste. Therefore the objective of waste recycling and reuse could not be achieved effectively.

4.2.4.1 Non-completion of underground dustbins

Audit observed that BMC made two agreements for installation and maintenance of 50 underground dust bins in different market areas and commercial establishments at a cost of ₹6.80 crore for completion by January 2019 with a maintenance period of five years. The agencies, however, installed only 34 dustbins as of January 2021 with payment of ₹1.55 crore. The reasons for non-completion of the balance underground dust bins was not forthcoming from record.

4.2.4.2 Dashboard module and maintenance for underground dust bins

As per agreement, agency should provide a dashboard module for quick and easy view to know overall fleet status on real time basis. The dashboard should also provide information such as bin number, bin type, bin location, time of emptying each bin for indicating bin fill level²³ and vehicles to be deployed for lifting and transporting of waste. The operator shall ensure regular upkeep and cleaning of bins so that surrounding of bins are free from littering and odour.

Audit observed that the agencies did not install software tracking fill level inside dustbins and dashboard model for underground dust bins as per agreement. During JPV, it was observed that bins



Photograph 4: Underground dustbin at Market No.1 (sensor not functioning)

were not cleaned regularly. At Market No.1 in BMC it was seen that garbage was deposited outside dustbins as shown in the photograph-4. The sensors of dustbins installed at many places like Market No.1, OMFED square (near bus stop) and Keshari Mall were not functioning. The Assistant Engineer stated that sensors of dustbins would be restored shortly and agencies would be instructed to keep dustbin areas hygienic and clear it on daily basis. As a result of non-restoration of sensors, online monitoring of underground dustbins could not be achieved as of March 2021 rendering the expenditure of ₹1.55 crore, unfruitful.

The Government replied (May 2022) that sensors were electronic devices and were prone to defects and such situations were unavoidable. However, the facts remained that due to non-installation of software tracking and non-functioning of sensors, online monitoring of underground dustbins remained unachieved.

4.2.5 Mechanical Sweeping

As per contract conditions (Paragraph 7.6) of mechanical sweeping, operator shall perform mechanical sweeping of minimum 80 per cent of the total road stretch assigned, daily. If the operator fails to do so, then operator shall be penalised for un-cleaned portion below 80 per cent at 50 per cent of unit rate quoted by him.

²³ Full capacity of the underground dust bin

Audit observed that BMC made two contracts for mechanical sweeping between October 2018 and December 2018 (Package-I for 172 km and Package-II for 146.59 km) at rate of ₹5.23 crore and ₹5.08 crore per year for three years, respectively. The agencies were paid interest free advance of ₹13 crore (October 2018 and October 2020) without any agreement clause for payment of advance which remained unadjusted as of March 2021. The DC, Sanitation of BMC assessed the performance of the agencies for two months *i.e.*, August and September 2020 only and found shortfall/non-performance of mechanical sweeping of 712 km and 2,110 km by the agencies for which no penalty was levied. No assessment of performance of mechanical sweeping by the agencies was done in respect of other months. The details of log book for working hours of machineries, daily performance record and GPS tracking was not provided to Audit for review. Due to non-assessment of performance of agencies for balance period, the advance payment of ₹13 crore remained unadjusted as of March 2021. Besides, interest on advance payment amounting to ₹1.11 crore was also not adjusted.

The Government stated (May 2022) that advance payment of ₹8 crore has been adjusted from one agency and advance outstanding is under process of adjustment. However, the reply was silent on levy of penalty for non-performance and recovery of interest on advance payments to the agencies.

4.2.5.1 Overlapping of mechanical sweeping works

While according post facto approval (July 2020) for mechanical sweeping works, Joint Secretary, H&UD Department instructed that deployment of human resources for manual sweeping may be strictly avoided in such areas where mechanical sweeping machines were used. The scope of manual sweeping performed areas by agency, if any, prior to use of mechanical sweeping machine in those areas should be revised along with its financial implication after use of said machine in those areas.

Audit observed that prior to adoption of mechanical sweeping, manual sweeping was done in those areas. BMC did not make any revision in the scope of manual sweeping as of March 2021. As such non-revision of scope of manual sweeping even after adoption of mechanical sweeping, led to overlapping of works and unwarranted maintenance cost of ₹10.32 crore per year.

The Government stated (May 2022) that there was no overlapping of work with respect to award of manual sweeping work to the agencies engaged for mechanical sweeping. The reply was contrary to the data given by BMC which indicates that manual sweeping was carried out despite adopting mechanical sweeping in same area of BMC.

4.2.6 Non operation and maintenance of screening of solid waste

As per instruction of National Green Tribunal (NGT) (January 2019), all States and Union territories may ensure that all drains are tapped with appropriate measures (wire nets) and no solid waste or plastic



Photograph 5: Drain near Shree leather, Patia Bhubaneswar

waste is allowed to reach river, lake, water bodies, ponds *etc.* Each screen should be cleaned daily by sweeping staff.

Audit observed that 114 ULBs had installed 1,281 (355 in 21 test checked ULBs) screen bars in different critical locations of storm water drains in city to prohibit solid waste entering into water bodies and avoid water clogging. During JPV (January 2020 to September 2021) in test checked ULBs, it was, however, observed that screen bars were not cleaned on daily basis by sweeping staff resulting in solid waste entering into water bodies creating water clogging, foul smell and pollution.

The Government stated (May 2022) that guidelines and instructions have been issued (June 2019) for cleaning of screens by sweeping staff. However, the instructions were not carried out and lack of monitoring in this regard was also seen during JPV.

4.2.7 Personal protection equipment

As per Clause 15 (zd) of SWM Rules, 2016, ULBs shall ensure that operator of a facility provides personal protection equipment including uniform, hand gloves, raincoats, appropriate foot wear and masks to all workers handling solid waste and same are used by workforce.

Audit observed during JPV in test-checked ULBs that work force involved in manual handling of waste did not use protective equipment particularly gloves and boots. Non-utilisation of protective equipment is risky and may lead to serious health hazards.



Photograph 6: Sweeping staff without protective equipment

The Government stated (May 2022) that swachha sathis were given orientation training to ensure that PPEs were worn by sanitation workers/ swachha karmis. However, Joint inspection revealed failure in compliance of use of PPEs by work force as of March 2021.

4.3 Transportation of waste

Transportation plays a vital role in SWM services. Depending on the local conditions and location of landfill site, ULBs use different types of vehicles such as pushcarts, auto tippers, tractors, tipper trucks, BOVs and light commercial vehicles (LCVs) for collection and transportation of waste.

4.3.1 Partial coverage of households due to shortage of vehicles

SOP (July 2019) envisaged use of BOVs/LCVs for door-to-door collection of solid waste. One BOV would cover 600 households and one LCV would cover 1,000 households for door to door collection of waste. As against requirement of 1,159



Photograph 7: Idle BOVs at RMC for want of registration

BOVs/LCVs in test checked ULBs, only 634 BOVs/LCVs were available as of March 2021. The status of availability of BOVs in the test-checked ULBs

as of March 2021 is given in **(Appendix-IX)**. Audit observed that the test checked ULBs could cover 5.14 lakh households (62 per cent) out of 8.29 lakh households for door to door collection as of March 2021 resulting in partial coverage of households due to shortage of BOVs/LCVs despite availability of funds with ULBs. On the contrary, in three ULBs, due to technical problems and want of registration²⁴, 16 BOVs procured between September 2020 and February 2021 for ₹44.49 lakh remained idle.

The Government stated (May 2022) that ULBs were authorised to procure BOVs as per their requirement. As regards defective BOVs, it was stated that MoU has been signed by the ULBs with the local Industrial Training Institutes for providing technical support, clearing up the defects, etc. The reply was silent on BOVs remaining idle for want of registration as of March 2021.

4.3.2 Transportation of solid waste

4.3.2.1 Transportation of solid waste in open vehicles

Clause 4 of Schedule II of MSW Rule 2000 envisages that vehicles used for transportation of wastes shall be covered. Waste should not be visible to public, nor exposed to open environment preventing their scattering.



Photograph 8: Open vehicles used for transportation of waste without covering by SMC

Audit noticed in test checked ULBs that vehicles used for solid waste transportation were not covered. The transported wastes were visible and exposed to open environment (Photograph 8). These uncovered vehicles emanate bad odour during transportation and also scatter the waste causing inconvenience to public besides defeating the very purpose of hygienic transfer of solid waste from one place to other.

The Government stated (May 2022) that BOVs were engaged for collection of waste which were covered in segregated compartments for avoiding open carriage. However, fact remains that open vehicles were also used for carrying solid waste as shown in photograph 8.

4.3.2.2 Use of transportation vehicles without authorisation

As per Section 39, 55 and 56 of Motor Vehicle (MV) Act 1988, a transport vehicle shall not be deemed to be validly registered for the purpose of Section 39 of MV Act, 1988, unless it carries a certificate of fitness issued by the prescribed authority to the effect that the vehicle complies with all the requirements of Act and rules made there under.

Audit noticed that in ten ULBs the vehicles used for SWM activities did not have valid fitness, pollution and insurance certificates as detailed below.

- 95 out of 242 vehicles²⁵ (39.25 per cent) have no valid fitness certificate

²⁴ Technical fault: Rayagada-05 out of 05, Bhadrak -02 out of 04; Want of Registration: Rourkela-09 out of 15

²⁵ Fitness certificate: BMC 30 out of 64, Jeypore- 3 out of 3, Rayagada- 17 out of 17, Gunupur – 3 out of 3, CMC 3 out of 48, Sambalpur 18 out of 48 and Puri 11 out of 26, Choudwar 3 out of 5, Jharsuguda 4 out of 40 and Sundargarh three out of 12

- 25 vehicles²⁶ have no valid insurance, and
- 12 vehicles of BMC have no valid pollution certificates.

The ULBs had to obtain the fitness/pollution certificate from Regional Transport Office (RTOs). The above deficiencies highlights absence of internal control mechanism within the department.

The Government assured (May 2022) that steps would be taken to ensure fitness certificates for LCVs. The reply was silent on other contract vehicles used for waste management which did not have valid fitness and pollution certificates.

4.3.2.3 Non-monitoring of transportation vehicles through GPS

Transportation of solid waste from source of generation to the authorised destination is important to ensure its proper disposal. SWM Manual, 2016 stipulates that communication technologies such as Global Positioning System (GPS), Geographic Information System (GIS) are to be integrated as part of monitoring of SWM system. A GPS can be synchronised with the GIS to monitor and track waste transportation vehicles and identify any irregularities in waste movement (Clause 2.3.12.1 of SWM Manual 2016).

Audit noticed that Rourkela Municipal Corporation (RMC) had executed an agreement with BSNL Ltd (January 2017) for providing e-Swachha Bharat Mission (e-SBM) platform for monitoring of 15 vehicles engaged in SWM for ₹3.11 lakh per year. The scope of the work provided that each waste disposal truck will be fitted with the SIM based tracking device. BSNL was paid ₹2.69 lakh (March 2017) for tracking of 13 vehicles. The said service was discontinued since 2019. This resulted in deficient monitoring of transportation vehicles through GPS systems.

The Government accepted and stated (May 2022) that the service with BSNL has been discontinued as it was not satisfactory. However, the fact remained that RMC failed to track and monitor vehicles utilised for SWM through GPS as of March 2021.

Bhubaneswar Municipal Corporation (BMC) installed GPS devices in three transportation vehicles out of 65 vehicles (five *per cent*) used for SWM as of August 2021. RMC and Bhadrak ULB installed GPS devices for transportation vehicles which was tested from March 2021. Three ULBs (Berhampur, Hinjilicut and Baragarh) have GPS facilities for tracking of vehicles used for waste management. Other 16 ULBs have not used GPS devices for tracking of vehicles used for SWM activities during 2015-20. The reasons for non-provision of GPS tracking system for monitoring SWM activities were not on record. In the absence of GPS, ULBs were deprived of an effective tracking mechanism which resulted in unauthorised dumping of waste near the river bank/ open areas by the ULBs.

The Government stated (May 2022) that tender has been invited by BMC for engaging private agencies to carry out IT based intervention for monitoring the performance for SWM through Smart City. However, BMC had installed GPS systems only in three out of 65 vehicles engaged in SWM as of August

²⁶ Insurance: BMC-7, Jeypore-3, CMC-1, Sambalpur-1, Puri-1, Choudwar-12.

2021. Government reply is silent on non-installation of GPS devices in vehicles in other ULBs.

4.3.2.4 Avoidable extra expenditure on transportation of waste

(i) As per MSW Rule 2000 and 2016, landfill site shall have waste inspection facility to monitor waste brought in for landfill, office facility for record keeping and shelter for keeping equipment and machinery including pollution monitoring equipment.



Photograph 9: Chain mounted dozer inside Bhuasuni dumping yard, BMC since June 2020

Audit noticed that BMC had hired two trailers (August 2016) for transportation of dozer and excavator from Bhuasuni dumping yard to TTS at Sainik School to and fro daily at rate of ₹12,000 per day each for spreading of garbage in the landfill up to June 2020. However, from July 2020, the above two vehicles were retained inside the premises of dumping yard. BMC incurred ₹2.83 crore²⁷ (August 2016 to June 2020) towards hire charges of trailers which was avoidable.

The Government accepted and stated (May 2022) that the dozers were transported on daily basis and brought back due to existence of public resentment and law and order situation at the site which had the chances of damaging the equipment hired. The reply was not acceptable as the responsibility for security of equipment lies with BMC at landfill sites as per SWM Rules. Moreover, no documentary evidence for such law and order situation was provided to Audit for which dozers were transported on daily basis.

(ii) As per SWM Rule, 3R approach stipulates the preferred option in SWM as waste minimisation and has a significant impact on waste composition and quantities of waste to be handled and disposed which correspondingly reduce transportation costs.

Audit observed that BMC had not taken any steps to reduce waste during 2017-20 even after introduction of SWM Rule 2016. The per capita waste generation of BMC was between 450 gm/day to 580 gm/day in 2017-18 and 2019-20 as against 413 gm/day to 423 gm/day respectively as per CPCB norms. Due to non-adherences of 3R approach to reduce burden of landfills through waste minimisation and to reduce transportation cost, per capita waste generation had increased from 423 gm/day to 580 gm/day. Against 4.90 lakh MT waste to be transported as per norms, 6.76 lakh MT of garbage was transported to landfill resulting in excess transportation of 1.86 lakh MT

Appendix-X.

The Government stated (May 2022) that due to floating population in the city, the quantum of waste was higher than the standard/ average norms. The reply was not acceptable since BMC had not taken any measures for 3R approaches to reduce the burden of landfills through waste minimisation.

²⁷ Two vehicles @ ₹12,000 per day X 1,054 days i.e., from 07.08.2016 to 30.06.2020 = ₹2.53 crore + GST 6 % + CGST 6 % = ₹2.83 crore

(iii) As per Section 1.4.3.3.3 of MSWM Manual, moisture increases the weight of solid waste and therefore the cost of collection and transportation increases. To prevent an increase in weight, waste should be insulated from rainfall or other extraneous water in wet seasons.

Audit observed that BMC did not take cognizance of the fact that moisture content of solid waste increases considerably in wet seasons *i.e.*, during monsoon and winter period (June to December). Audit analysed month-wise data for the period 2015-20 of four outsourcing packages and observed that average quantities of waste for disposal during wet seasons *i.e.*, monsoon/winter period were higher by 10,190 MT than those during normal period (January to May). The increase in weight during wet season indicated that the waste was not insulated from rainfall or contact from other extraneous water. The payments to the extent of ₹2.52 crore to outsourcing agencies towards transportation of excess quantities could have been avoided had BMC insulated the waste during wet season.

The Government accepted and stated (May 2022) that BMC had already instructed the agencies to cover the vehicles carrying waste all the time including rainy season to prevent moisture in wet seasons.