

Summary

In compliance with the provisions of Solid Waste Management (SWM) Rules 2016, the State Government approved (June 2018) the Chhattisgarh State Solid Waste Management policy for management of solid waste. As per the State Policy, the Solid Liquid Resource Management (SLRM) approach operational in Ambikapur was adopted as “Mission Clean City (MCC)” for SWM in 167 out of total 169 Urban Local Bodies (ULBs) and in large Municipal Corporations such as Raipur and Bilaspur, Integrated Solid Waste Management System has been adopted by the State Government.

During Audit it was observed that ULB specific Detail Project Report (DPR) for SWM was not prepared. Hence, financial and infrastructural capacity assessment was not done considering the actual quantity of waste generated in each ULB. The financial management for sustainable SWM service not being ensured as the operating revenue was less (57 *per cent*) in comparison to operating expenses of SWM during last five years in the ULBs.

Further, unplanned/inadequate construction of material recovery facility *such as* SLRM centers and compost sheds and sharing of facility with *Godhan Nyay Yojana* (GNY) without additional infrastructure, adversely affected the collection, segregation, and processing of waste in ULBs. This has resulted in unsegregated waste being dumped in open areas. Audit noticed 12 unauthorised dumping sites in nine ULBs besides six legacy dump sites awaiting remediation.

Inappropriate infrastructure development resulted in idle or unfruitful expenditure of ₹ 369.98 lakh. The Information, Education and Communication (IEC) activity in the State was mainly concentrated on promoting *Swachh Surveykshan* instead of intended purpose of bringing sustained behavioral change among the residents.

The monitoring and evaluation mechanism for SWM was not effective. Though State Level Advisory Board (SLAB) has been formed, but implementation of SLAB recommendations was not ensured. Further, the SWM activities were not reviewed regularly by Chhattisgarh Environment Conservation Board (CECB). Consequently, the Annual Report of CECB to Central Pollution Control Board does not feature deficiencies of SWM in the State.

3.1 Introduction

The urban population in India is increasing rapidly. According to census 2011, Indian urban population was 377 million (31 *per cent* of total population) and is expected to be 600 million by 2031. As the urban population is increasing, consumption trends are also changing with improvement in lifestyle. This has increased quantum of waste production drastically in Indian cities. The waste generation in India increased from 1,19,141 Tonnes Per Day (TPD) in 2016-17 to 1,60,039 TPD (34 *per cent*) in 2020-21. As per data available with the Government, the waste generation in Chhattisgarh increased from 1,650 TPD in 2016-17 to 1,820 TPD (10 *per cent*) in 2021-22 in urban areas. Hence, there is an urgent need to manage the waste in urban areas properly as inadequate management of solid waste will not only cause environmental pollution but also adversely impact human health. Therefore, scientific management of the Municipal Solid Waste (MSW) to protect human and animal life and the environment, has emerged as a major requirement. In order to address this evolving need, Solid Waste Management Rules 2016 (SWM Rules 2016) has been framed (April 2016) by the Government of India (GoI) in suppression of Municipal Solid Waste Rules 2000, under the Environment (Protection) Act, 1986.

3.1.1 *Regulatory framework governing management of Solid Waste*

The *Swachh Bharat Mission* (SBM), launched by the GoI in October 2014 aims to ensure 100 *per cent* scientific disposal of MSW in all the 4,041 ULBs in the country. As per scheme guidelines, all ULBs need to collect, transport, and scientifically manage solid waste.

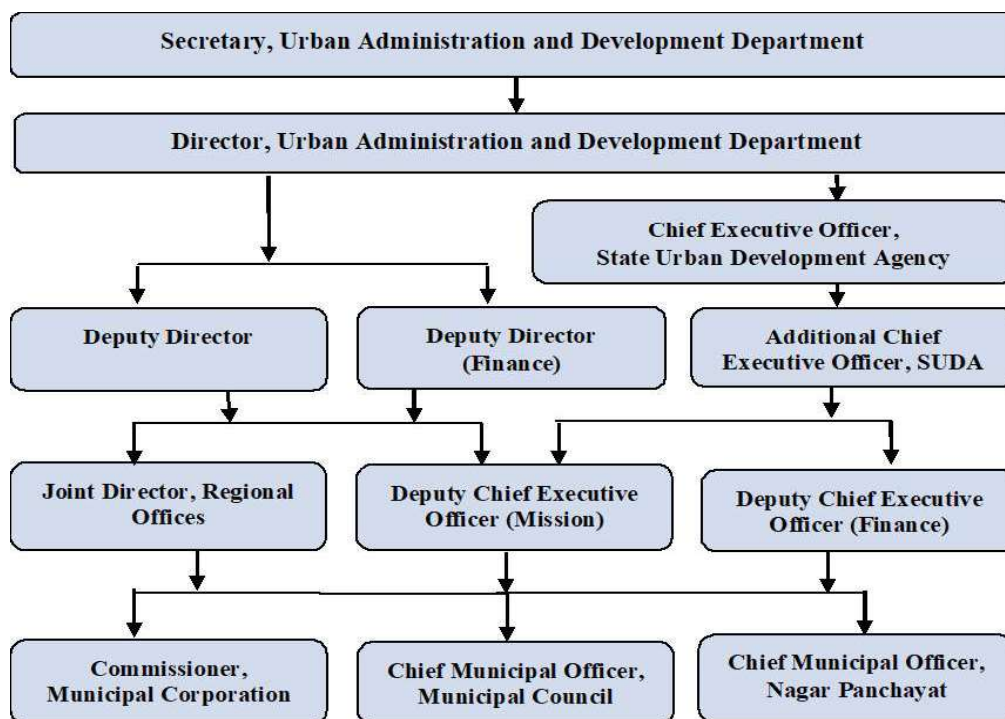
The SWM Rules 2016, framed by GoI under the Environment (Protection) Act, 1986, provides a legal framework for management of solid waste at the State level, Urban Local Bodies (ULBs) level and citizen level. The SWM Rules provides that States/ Municipal administration or Local Bodies shall prepare a “State policy” and “solid waste management” strategy for the State in consultation with stakeholders including representative of waste pickers, self-help groups and similar groups working in the field of waste management, in consistent with these Rules. As per the SWM Rules 2016, “solid waste” includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste, e-waste, battery wastes and radio-active wastes generated in the area under the local authorities.

The 74th Constitutional Amendment Act empowered the ULBs to perform and implement schemes in relation to 18 subjects specified in the 12th Schedule (under Article 243 of the Constitution of India), which *inter alia* includes SWM. In addition, the 14th and 15th Finance Commission identified SWM as one of the basic civic services besides water supply, sewerage, and storm water drainage.

3.1.2 Organisational set up

The Secretary, Urban Administration & Development Department (UADD) is responsible for implementation of the SWM Rules 2016 by all local authorities in the State. The State Urban Development Agency (SUDA) constituted (June 2001) under UADD is responsible for implementation, technical assistance and monitoring of various Centrally Sponsored Schemes (CSS) including *Swachh Bharat Mission* (SBM) in the urban areas of the State. The State Pollution Control Board (SPCB) (known as Chhattisgarh Environment Conservation Board (CECB) through its seven Regional Offices¹ is responsible for monitoring the compliance of the standards prescribed under SWM Rules 2016, in the State.

Organisational Chart of UADD



In Chhattisgarh, all 169 ULBs have been categorised into three tiers based on population², as shown in **Table 3.1**.

Table 3.1: Category-wise ULBs in Chhattisgarh State

Type of ULB	Number of ULBs
Nagar Palik Nigam (NPN)	14
Nagar Palika Parishad (NPP)	43
Nagar Panchayat (NP)	112
Total	169

(Source: Administrative report 2021-22 of UADD)

¹ Ambikapur, Korba, Bilaspur, Raigarh, Durg-Bhiai, Jagdalpur, Raipur,

² Population of 1,00,000 or more is *Nagar Palik Nigam*, population of 20,000 or more but less than 1,00,000 is *Nagar Palika Parishad* and population of 5,000 or more but less than 20,000 is *Nagar Panchayat*.

3.1.3 *Audit Objectives*

The Performance Audit on Solid Waste Management was conducted with the objectives:

- To assess whether “strategy and planning” and financial management of solid waste management in ULBs is commensurate with the waste generated and concurrent with the prevailing legal framework.
- To assess whether municipal tasks associated with solid waste management including collection, segregation, storage, transportation, disposal, and social inclusion of informal waste workers were effective, efficient and economical.
- To assess whether planning, construction, commissioning, operation and maintenance of solid waste management projects in ULBs was effective, efficient and financially sustainable.
- To assess whether monitoring and evaluation of solid waste management system including adequacy of awareness creation, citizen engagement for effecting behavioural change, complaint redressal mechanism for citizens, assessment of environmental impacts and implementation of the internal control and monitoring mechanism was adequate and effective.

3.1.4 *Audit Criteria*

The criteria for evaluating the performance of the State in solid waste management were derived mainly from:

- Solid Waste Management Rules 2016.
- Manual on Municipal Solid Waste Management (MSWM), 2016 issued by Government of India (GoI) in April 2016.
- Construction and Demolition Waste Management Rules, 2016.
- Performance parameters set out in Service Level Benchmarking (SLB) guidelines.
- The Environment (Protection) Act and Rules 1986.
- Water (Prevention and Control of Pollution) Act, 1974.
- Instructions, guidelines, policies issued by Central Pollution Control Board, State Pollution Control Board, Government of India / State Government on solid waste management from time to time.
- Guideline of Mission Clean City (MCC) issued (September 2016) by Chhattisgarh Government along with Standard Operating Procedure (SOP).

3.1.5 *Audit Scope*

The Performance Audit covered management of Municipal Solid Waste in ULBs during 2017-18 to 2021-22 with broad focus on implementation of Integrated Solid Waste Management Facility (ISWMF) in Raipur and Mission Clean City (MCC) in other test checked ULBs, and its consistency with SWM Rules 2016, and provisions of *Swachh Bharat Mission* (SBM). Field audit involved collection of data and information available on website (www.pas.org) maintained by Centre for Environment Planning & Technology (CEPT), Ahmedabad and examination of records in the Directorate, UADD,

SUDA, ULBs and CECB. Out of 169 Urban Local Bodies of Chhattisgarh, 16 ULBs were selected for the Performance Audit. The details of different categories of ULBs selected for the Performance Audit is given in **Table 3.2** below:

Table 3.2: Number of ULBs selected for test-check

S. No.	Category of ULBs	Total number of ULBs in the State	Number/ percentage of ULBs selected for test-check
1	Nagar Palik Nigam	14	5 (38 per cent)
2	Nagar Palika Parishad	43	6 (14 per cent)
3	Nagar Panchayat	112	5 (5 per cent)
	Total	169	16

The 16 ULBs³ from all the three tiers were selected by applying simple random sampling (Revenue Division wise) using IDEA application software for detailed audit. Samples were drawn from each tier of ULBs in a manner to ensure equal representation of each Revenue Division (five).

3.1.6 Audit Methodology

An entry conference was held on 08 August 2022 with the Secretary, UADD in which the audit methodology, scope, objectives and criteria were explained. The audit methodology involved record analysis, responses to audit queries, joint physical verifications (JPV) with municipal staff and collection of photographic evidence. An Exit Conference was held (7 August 2023) to discuss the audit findings and the views expressed by the Government have been suitably incorporated in the draft. Revised Report was issued to the State Government in November 2024 for which response not received.

3.1.7 Implementation of Solid Waste Management in Chhattisgarh

Rule 11(a) of the SWM Rules, 2016 requires that in every State, the Department of UADD shall prepare “State Policy” and “Solid Waste Management Strategy” for the State.

In compliance to the provisions of SWM Rules 2016, the State Government prepared and approved (June 2018) the State SWM policy on Solid Waste Management. As per the State Policy, SWM in the State shall be based on the Solid Liquid Resource Management (SLRM) approach, a low-cost model of segregation and recycling of waste, operational in Ambikapur (Ambikapur Model⁴). This low-cost model, in view of its cost effectiveness for the quantum of waste in the ULBs with less than one lakh population, was launched (September 2016) as “Mission Clean City (MCC)” in the State. The MCC was initially proposed to be implemented in 158 ULBs

³ Nagar Palik Nigam- Raipur, Korba, Ambikapur, Jagdalpur & Bhilai-Charaunda. Nagar Palika Parishad- Kanker, Bhatapara, Kumhari, Janjgir-Naila, Katghora & Jashpur. Nagar Panchayat- Pharasgaon, Rajim, Nawagarh, Pali & Pathalgaon.

⁴ Ambikapur model provides that after primary segregation at source (waste generator) collected solid waste will be transported to Solid Liquid Resource Management (SLRM) Centre.

for SWM by the Chhattisgarh Government and, for large Municipal Corporations such as Raipur, Bilaspur and Bhilai, separate strategy was to be prepared. Finally, MCC was adopted for 167 out of 169 ULBs and Integrated Solid Waste Management Facility (ISWMF) based solution was adopted in *Nagar Palik Nigam*, Raipur and Bilaspur in view of large quantity of waste generation and non-availability of sufficient sanitation workers.

Under MCC model, municipal waste segregated at source was collected on door-to-door basis by women SHGs/contractor on tricycle, e-rickshaws, mini tippers and brought to the SLRM centers for secondary segregation. MCC advocates maximum utilisation of waste by composting of 'wet fraction' and recycling the 'dry fraction' thereby eliminating the need of landfills for disposing of rejects. The process of waste management under MCC in the State is depicted below:



3.1.8 Integrated Solid Waste Management Facility (ISWMF) at NPN, Raipur

Out of the two *Nagar Palik Nigam* (NPN) where the State Government adopted ISWMF for solid waste management, Audit selected one *i.e.*, NPN, Raipur for detailed examination. *Nagar Palik Nigam*, Raipur entered (February 2018) into an agreement with M/s Delhi MSW Solution Ltd.⁵ for establishing the ISWMF for a period of 15 years (Concession period). The project was planned and executed under Design, Finance, Build, Operate and Transfer (DFBOT) model. The scope of work consisted of a. Collection and Transportation Operations, b. Waste Processing and Associated Tasks c. Information, Education and Communication (IEC) and d. Public Grievance Handling System.

Under ISWMF, the segregated solid waste was to be collected from doorsteps of households, hotels, commercial establishments, offices, markets, and street hawkers under jurisdiction of NPN, Raipur and brought by mini tippers to the

⁵ Directorate, UADD on behalf of NPN, Raipur invited Request for Proposal (RFP) vide system tender no.20793 dated 14.8.2017. The work order was issued to successful bidder M/s Delhi MSW Solution Ltd. on 17.11.2017.

ten transfer stations established at respective areas. After secondary segregation of recyclable plastic, metal and domestic hazardous waste at these transfer stations, the waste was to be transported to ISWMF established in *Sakri* at the outskirts of Raipur city.

The facility comprises of tipping floor⁶, composting shed, trommel machine⁷, sanitary land fill, leachate⁸ pond and testing laboratory. The bio-degradable waste was to be processed through windrow composting⁹, the recyclable part of the waste was required to be sold to the Recycler and Refuse Derived Fuel (RDF) to cement factory. The inert¹⁰ derived from the process was to be disposed in the scientific land fill. The process of SWM under ISWMF has been depicted as under.



3.2 Financial Management

3.2.1 Budget provisions and allocation of funds

Rule 15 (x) of SWM Rules 2016 provides that local bodies shall make adequate provision of funds for capital investments as well as operation and maintenance of Solid Waste Management services in the annual budget. The Rule *ibid* further provides that funds for discretionary functions of the local body are allocated only after meeting the requirement of necessary funds for SWM and other obligatory functions of the local body.

Audit observed that Central fund received under *Swachh Bharat Mission* (SBM), 14th and 15th Central Financial Commission (CFC) were released

⁶ Tipping floor is an enclosed floor made of an impervious surface on to which solid waste is deposited from a collection container or vehicle.

⁷ A trommel machine is a mechanical screening machine used to separate materials, mainly in the mineral and solid waste processing industries.

⁸ Leachate is defined as contaminated liquid that is generated from water percolating through a solid waste disposal site, accumulating contaminants, and moving into surface areas.

⁹ Windrow composting involves forming organic waste into rows of long piles called “windrows” and aerating them periodically by either manually or mechanically turning the piles.

¹⁰ Inert means wastes which are neither bio-degradable nor recyclable or combustible, street sweeping dust, silt removed from the surface drains or wastes which are chemically and biologically non-reactive.

to the ULBs as per prescribed norms. Total fund released under various central grants to ULBs during the last five years is as under:

Table 3.3: Total Central fund received under SBM, 14th & 15th CFC

(₹ in lakh)

Central Grant	2017-18	2018-19	2019-20	2020-21	2021-22
SBM Central share	8813.02	9911.75	6192.96	2192.79	3506.55
SBM State share					
14 th CFC	24380.00	22747.50	50612.50	00	00
15 th CFC	00	00	00	35000.00	53350.00

(Source: Information received from SUDA)

The SUDA issued financial sanction from time to time for construction of infrastructural capacity such as SLRM centers, Compost shed, Compost machine, *Fatka* machine, Bailing machine, and honorarium to SHG members against the fund released to ULBs, as per requirement of ULBs.

Details of fund released by UADD to ULBs for SWM activities, is as under:

Table 3.4: Funds released to ULBs for SWM

(₹ in lakh)

Source of fund	2017-18	2018-19	2019-20	2020-21	2021-22
SBM Central share	3081.70	4570.75	2013.67	489.51	1792.65
SBM State share	1343.68	1229.16	675.92	23.32	705.37
14 th CFC	1106.67	1955.50	2136.24	7615.03	2129.83
15 th CFC	0.00	0.00	0.00	8750.00	14255.00
<i>Adhosanranchana Mad</i>	89.92	0.00	30.00	0.00	0.00
Octroi Compensation (<i>Chungi Kshatipurti</i>)	1621.65	1859.52	3480.78	6200.64	6519.96
Total	7243.61	9614.93	8336.61	23078.50	25402.81

(Source: Information provided by SUDA; Funds of SBM were released to ULBs through SUDA while remaining funds are released by UADD)

The SWM is one of the components of the total fund released to ULBs under SBM, 14th and 15th CFC. As ULBs had not made specific budget provision for SWM, neither SUDA nor selected ULBs could provide expenditure figure under SWM against the sanctioned funds.

Besides, the above funds, the State Government has made specific budget provision of ₹ 3369.20 lakh for SWM under the scheme head -7948 in Grant no. 81-Financial assistance to ULBs during the year 2019-20 to 2021-22. Out of budget provision of ₹ 3369.20 lakh, ₹ 2369.20 lakh was released by State Government to UADD. Although the funds were received by UADD, the same was not released to ULBs but transferred to a separate account to avoid the lapse of fund.

On this being pointed out, the Government while accepting the observation stated (August 2023) that either the fund available with UADD will be utilised for SWM or refunded with interest.

3.2.1.1 Non-provision of adequate funds for SWM

The *Nagar Palik Nigam* (NPN), Raipur entered (February 2018) into a “Concession Agreement”¹¹ with M/s. Delhi MSW Solution Limited, Hyderabad for SWM on DFBOT basis for 15 years.

As per Clause 7.1.(c) of the agreement, the Contractor shall submit a consolidated statement of the total tonnage of tipping and processing weighment of solid waste during previous month, by the 7th of current month along with the monthly invoice to the ULB for payment.

Scrutiny of records revealed that under the concession agreement, Contractor claimed payment of 160.48 crore for the period May 2018 to October 2022, against which NPN, Raipur made payment of ₹ 89.85 crore only and balance payment of ₹ 70.63 crore (**Appendix 3.1**) was outstanding as of October 2022.

It is pertinent to mention that as per the contract condition (Para 7.3 a), NPN, Raipur would be liable for payment of simple interest at the rate of 12 *per cent* for any delay in payment to contractor. Thus, NPN, Raipur incurred a liability of ₹ 54.56 lakh (up to June 2021) on account of interest, due to delay in payment to the contractor.

Audit observed that despite having a contractual obligation for payment, NPN, Raipur had not made any provision for funds in the regular budget. As a result, regular monthly payment to the agency could not be ensured.

On this being pointed out, the Government replied (August 2023) that all the dues to M/s Delhi MSW Solution Ltd. have since been paid without any penal interest under mutual understanding. However, documents in support of the reply were not furnished to audit.

3.2.2 Financial sustainability of SWM in ULBs

As per Clause 1.4.5.6.1 & 2 of Municipal Solid Waste Management Manual (MSWM) 2016, SWM services are sustainable only if they are viable on a stand-alone basis. Therefore, the assessment of financial viability is an important part of planning in MSWM system. Further, the planning for an advanced MSWM system should be based on accurate financial calculations, taking into consideration all relevant costs including hidden costs and revenues. This important task within the planning process is to ensure financial viability of the MSWM system and its sustainability in the long run.

The cost associated with solid waste management for ULBs mainly includes capital cost and operating cost. The operating cost of SWM in ULBs primarily includes operations and maintenance cost, refurbishment cost and daily expenses of managing MSW. Since MCC guidelines provides that sale proceeds of compost and recyclable waste will go to the SHGs of concerned ULB, hence operating revenue of ULBs consists of user charges only.

¹¹ In terms of this agreement, Government (here RMC) defines and grants specific rights to an entity to build and operate a facility (concessionaire to undertake door to door waste collection, transportation operation, Waste processing and Landfill operation) for a specific period.

As per the Service Level Benchmark (SLB) for ULBs published (March 2021) by the State Government, the cost recovery in SWM services ranged from 16 per cent to 67 per cent against the target of 100 per cent in respect of 15 selected ULBs and for Nagar Palika Parishad, Nawagarh the cost recovery was 146 per cent.

Scrutiny of operating expenses and operating revenue data received from seven ULBs (**Appendix 3.2**) revealed that revenue receipts were only one to 57 per cent of the operating expenses during 2017-2022. In remaining nine¹² test checked ULBs, data of operating expenses and operating revenue was not provided, hence Audit could not ascertain the financial sustainability of the SWM in these ULBs. Further, there was mismatch in the data provided by ULBs to Audit and published in SLB notification.

Further, UADD, Chhattisgarh Government (GoCG) directed (August 2017) that 46 per cent of the honorarium¹³ amount will be provided from SBM as Central and State share for initial six months and the remaining share would be met from the user charges. Audit however observed that even after six months, SUDA continued to sanction funds for Central, State and ULB share from CFC grants, *Adhosanrachana* and *Chungi kshatipurti mad* (Octroi duty). During the period April 2018 to March 2022, SUDA sanctioned ₹ 268.58 crore to ULBs for payment of honorarium, details are given in **Appendix 3.3**. Thus, revenue receipts collected in the form of user charges were not enough to cover the operating expenses related to SWM in ULBs, raising question marks on sustainability in long run.

On this being pointed out, the Government while accepting the observation stated (August 2023) that user charge collection in ULBs was not adequate to make it self-sustainable, hence financial support is provided by the Government. It was also stated that MCC is in a transition phase and needs time to scale up.

3.2.3 *Deficiencies in mechanism for demand and collection of user charges*

The State Government issued notification (July 2017 and December 2017) stipulating category wise rates of user charges to be collected by the SHGs on behalf of ULBs for financial sustainability of SWM in Municipalities and Municipal Corporations. The criteria adopted for determination of user charges were, area for households/business establishments/ government and private offices/ vegetable and fruit vendors, sitting capacity for restaurants, number of rooms for hotels and lodges, standard of schools/ educational institutions, bed capacity of government/private hospitals/ nursing homes, fixed rate for clinics/pathology/ multiplex/fun parks/beauty parlors/hostels etc., subject to enhancement after every three years from the date of notification.

Similarly, MCC provides that members of self- help group (*Safai Mitra*) will collect user charges from the waste generators during door-to-door waste

¹² Nagar Palik Nigam Korba, Nagar Panchayat- Pathalgaon, Rajim, Pali, Pharsgaon Nagar Palika Parishad -Janjgir-Naila, Bhatapara, Kathgora, Jashpur

¹³ Honorarium at the rate of ₹ 5000/- per member/per month (at the rate of ₹ 6000/- with effect from 27 July 2019) to the members of SHGs, engaged in SWM under MCC.

collection and deposit it with their respective ULBs. The demand register for user charge will be prepared by the ULBs and necessary entry of collection will be made from the counter receipts submitted by the SHGs.

During audit, total 12 out of 16 selected ULBs could not provide year-wise demand figures of user charges for the last five years. The remaining four ULBs provided inconsistent demand figure which did not include outstanding amounts of previous years. Further, the demand register was not provided to Audit in any of the 16 selected ULBs. This indicates that the assessment of user charges and preparation of demand register was not ensured in these 16 selected ULBs.

Audit also observed that members of the SHGs were collecting user charges in 13 of the 16 selected ULBs. In the remaining three¹⁴ ULBs, user charges were being collected along with the Property Tax. As a result, user charges from various categories of waste generators¹⁵ which did not come under the purview/exempted from the payment of property tax remained un-collected. During the period 2017-22, total user charge of ₹ 37.43 crore (**Table 3.5**) was collected in the 16 selected ULBs, of which ₹ 9.79 crore was collected by the SHG members in 13 test checked ULBs and ₹ 27.63 crore was collected by three ULBs alongwith property tax. Details are given in **Appendix 3.4**.

Table 3.5: User charges collection in test checked ULBs.

(₹ in lakh)

Year	2017-18	2018-19	2019-20	2020-21	2021-22
User charges collected with Property Tax	69.28	170.62	227.45	253.16	2042.90
User charges collected by SHGs	128.73	189.76	216.15	216.07	228.75

(Source: Data furnished by selected ULBs)

Although the collection of user charges had increased over the period, the efficiency in collection of user charges could not be ascertained in audit due to absence of a proper mechanism for assessment of demand, collection of user charge and maintenance of related records in these ULBs.

However, as per the data for SLB published by the State Government, the efficiency in collection of SWM charges ranged between 23 and 77 *per cent* against the target of 100 *per cent*.

In the exit conference (August 2023), the State Government stated that necessary instructions as well as clarifications will be issued to ULBs for proper accounting and collection of user charges from all the categories of waste generators.

¹⁴ NPN, Raipur, Korba & Jagdalpur

¹⁵ Government- schools/colleges, offices, Government residential premises, Government hospitals, Religious institutions, PSUs, street vendors etc.

3.3 Strategy and Planning of solid waste management in ULBs

3.3.1 Representation of stakeholders in Advisory Board

Rules 11 (a) of Solid Waste Management Rules, 2016 stipulates that the concerned Department will prepare a state policy and SWM strategy for the State in consultation with stakeholders including representative of waste pickers, SHGs and similar groups working in the field of waste management consistent with these Rules, in a period not later than one year from the date of notification (April 2016) of these Rules.

The Chhattisgarh Government, UADD in compliance of the said provision, under the State policy, launched (September 2016) Ambikapur model of SWM by the name “Mission Clean City” (MCC). Standard Operating Procedure (SOP) of MCC was published (January 2017) by the Government and all the ULBs were directed to implement the mission with effect from 1 March 2017.

Audit observed that representation of various stakeholders such as Ministry of Environment, Forest and Climate Change of India, Ministry of Urban Development, Ministry of Rural Development, three representatives from ULBs, two representatives from Urban Community and one representative each from SHGs, Waste Pickers, Industrial representatives, Recycle Industry and two domain experts *etc.*, was not ensured during the meeting of State Level Advisory Board (SLAB) as was required in SWM Rules. This indicates that preparation of State Policy and SWM strategy was decided without having any consultation with the required stakeholders.

On this being pointed out, Government replied (August 2023) that throughout the planning and implementation stages, consultation with various stakeholders was ensured. Workshops and Seminars were also organised with the stakeholders.

The reply is not acceptable as representation of all stakeholders such as Ministry of Environment, Forest and Climate Change of India, Ministry of Urban Development, SHGs, Waste Pickers, Industrial representatives, Recycle Industry *etc.*, was not ensured as required under the SWM Rules 2016.

3.3.2 Generation and Assessment of Waste

Clause 1.4.3.3 of MSWM Manual, 2016 stipulates that as an essential requirement, each ULB should assess the quantity and composition of waste generated, to plan and design MSWM systems effectively. The quantity and composition of MSW generated in the ULB determine collection, processing, and disposal options that could be adopted. They are dependent on the population, demographic details, principal activities in the city or town, income level, and lifestyle of the community *etc.*

3.3.2.1 Survey and assessment of waste at the ULB level

The MCC guidelines provide that survey of all household/ commercial shops/ bulk waste generator will be conducted through SHGs, and information will be compiled at the ULB level. Based on available records, ULBs will prepare the DPRs.

Although all the test checked ULBs stated that survey was conducted in 2017, however, the survey report was not provided by the test checked ULBs except NPN, Ambikapur. Hence, in the absence of survey report, Audit could not ascertain whether assessment and quantification of waste generation was done by the ULBs.

On this being pointed out, Government replied (August 2023) that survey was conducted, and data is available in MIS.

Reply is not acceptable as MIS data was not shared with Audit despite repeated request. Further, assessment and quantification of waste was not done based on ward wise survey in each ULB after collecting current data of all households, commercial shops, and major solid waste generating establishments *etc.* Instead, assessment was done based on average per capita waste generation for population as per census 2011 following the CPHEEO formula.

3.3.2.2 *Future projection of quantity of waste generation and analysis for capacity development*

Clause 1.4.5.1 of MSWM Manual 2016 provides for estimating future waste generation quantities and composition which is critical for developing MSWM plan. Planning horizons for MSW processing, treatment, or disposal projects typically extend to 20–30 years depending on the nature of the facility. Forecasting future MSW generation is dependent on various factors, such as:

- future population forecasts,
- anticipated lifestyle changes; and
- change in socio-economic profile of the ULB.

Audit observed that neither MCC guidelines nor SOP of MCC provided any procedure or design for future projection of waste in ULBs or in the State.

Clause 1.4.3.3 of MSWM Manual 2016 states that the per capita waste generation is increasing by about 1.3 *per cent* per year and with an urban population growth rate of 3.0–3.5 *per cent* per year, the annual increase in municipal waste may be considered at 5 *per cent* per year.

During scrutiny of annual reports¹⁶ of 16 test checked ULBs for the year 2021, Audit observed that 12 ULBs had reported population as per census 2011 instead of current population (**Appendix 3.5**) without population assessment for base year (2017-18) as well as successive years. In the remaining four ULBs, population growth ranging between one and 1.8 *per cent* only has been reported.

This indicates that population growth and consequent increase in waste generation in the 12 ULBs had not been assessed to forecast future MSW generation and development capacity accordingly.

On this being pointed out, the Government replied (August 2023) that MCC follows a comprehensive approach of short and long-term planning based on

¹⁶ SWM Rules 2016 under Rules 15 (za) provides for submission of annual report by the ULBs in proforma iv.

CPHEEO norms. However, SBM 2.0 action plan ensuring future waste generation and capacity development was under preparation.

The reply is not acceptable. SWM rules require specific design periods for future projection of waste but, MCC has not defined any design periods for the State or ULBs. Further, ULBs are still reporting population of 2011 census in their Annual Report instead of current population. This exhibits that stipulated population growth and proportionate waste generation assessment during the period of audit had not been done.

3.3.3 *Determination of composition of waste and waste specific disposal plan*

As stipulated in Clause 1.4.3.3 of MSWM Manual, 2016, assessing the composition of waste is essential to plan and determine the options for collection, processing and disposal of each category of waste generated.

Audit observed that MCC had narrowed down the composition into two categories *i.e.*, organic and inorganic waste. As a result, MCC failed to provide disposal plan for different types of inorganic waste which are either non-recyclable or have no material value, *viz*,

1. Metal coated plastic wrapper of different food items (non-recyclable).
2. Single use plastic having no material value.
3. Bio-medical waste (BMW)
4. Wastes from meat market
5. Domestic Hazardous Wastes (DHW)
6. Silt and mix waste from drain cleaning
7. Inert waste from road sweeping

Various disposal facilities required for above wastes such as energy plant, incineration plant, landfill facility *etc.*, were not planned/established in any of the 15 test checked ULBs. Hence, scientific disposal of 'above category solid waste' was not ensured by the ULBs.

In test checked ULBs, Audit observed that due to lack of specific action plan, such types of wastes were not being segregated and mixed wastes were being dumped at dump sites¹⁷ (as depicted in photographs given in *Para 3.4.2.2(a)* and *Para 3.4.2.2(b)*). Waste from meat market was not collected under the system and unsegregated waste of categories at Sl. No. six to seven mentioned above were being used to fill low lying areas in the ULBs¹⁸ or being dumped at the dump sites.

In the exit conference, the Government stated (August 2023) that SWM was in transition phase and the gap filling is being done under SBM-2.0 action plan.

¹⁷ NPN, Jagdalpur, Korba, Ambikapur and NPP, Pathalgaon, Bhatapara, Rajim, Jashpur, Janjgir & Naila.

¹⁸ NPN, Korba, Jagdalpur, NPP, Katghora, Nawagarh, Janjgir Naila, Pathalgaon, Bhatapara, Rajim,,Jashpur, NP, Pali.

3.3.4 *Preparation of Plan/Detailed Project Reports for Solid Waste Management*

Clause 1 of MSWM Manual, 2016 stipulates that Municipal Solid Waste Management (MSWM) is an essential service and a mandatory function of municipal authorities across the country. It is still being managed in an unplanned manner, giving rise to environmental degradation, and causing serious health problems especially for women and children. This clearly underlines the need for preparing a strategic and detailed MSWM plan by the ULBs. Every ULB should undertake the preparation of a MSWM plan, addressing short term and long-term actions.

As per Para-3 of MCC guidelines, Detailed Project Report (DPR) of the SWM plan was to be prepared in two phases. In Phase I, the model format was to be prepared by the Nodal Agency (SUDA). The DPR for ULBs were to be prepared by consultant appointed by the Directorate (Technical Cell) by incorporating basic details like route plan, drawing & design for SLRM centers, determine the number of dustbin, Rickshaw/other vehicles, equipment, manpower, duty chart, assessment of income-expenditure and convergence with other Central/State schemes in the model DPR.

During audit, it was observed that ULB specific DPR-I or any specific plan (short term/long term) was not prepared by SUDA, or test checked ULBs for implementation of MCC. Instead, ULBs were directed to follow the SOP and other instructions issued by the Directorate from time to time. The SOP standardised the number of SLRM centers, compost sheds, vehicles, manpower, model drawing & design for SLRM centers for all the three tier ULBs irrespective of their topographic and demographic differences. Thus, ULB specific assessment of capacity development for SWM based on the profile of each ULB was not done. As a result, ULBs were working with inadequate infrastructure capacity, which has been discussed separately in *Para 3.5.1*.

The guidelines further stipulate that Phase-II of DPR will be prepared after identifying gaps in capacity development such as SLRM centers, compost sheds, manpower, machineries/equipment *etc.*, on review of implementation status in the ULBs.

Audit however, observed that gap detection analysis for capacity requirement was not done even after lapse of more than five years. Despite the increase in population and waste generation, most of the ULBs' were operating with same or less capacity for management of solid waste as was sanctioned initially (2017). Details are given in *Appendix 3.6*.

In the exit conference, Government stated (August 2023) that MCC was implemented for a short-term period of five years without ULB specific DPR. Now, the same is being prepared under SBM-2.0 action plan.

3.3.5 *Action Plan to Reduce, Reuse and Recycle (3 R) for waste reduction*

Municipal Solid Waste Manual (MSWM) 2016 (Clause 2.1) prescribes a stepwise approach in the order of environmental priority for different waste management options with 'prevention' being the most preferred option and

‘disposal’ the least favored. It is closely linked to the 3R (Reduce, Reuse, and Recycle) approach, which helps to reduce the quantity of waste, the cost associated with handling and its environmental impacts. Further, an efficient waste management program, regardless of the strategy, requires significant cooperation from waste generators and active community participation. Information, Education, and Communication (IEC) is a multilevel tool for promoting and sustaining risk-reducing behavior change in individuals and communities.

As per the information provided by the test checked ULBs, per capita waste generated annually increased progressively in nine ULBs while it remained constant in two ULBs over the period 2017-22. Four ULBs (NPN Raipur, NPP Bhatapara, Kanker, NP Pathalgaon) did not provide required data whereas only one ULB (NPP, Kumhari) reported decrease in per capita waste generation. The details of per capita waste generated annually in 12 out of 16 selected ULBs during the period 2017-22 is given in **Table 3.6** below:

Table 3.6: Per capita waste generation in 12 selected ULBs during 2017-22
(Gram per day)

Name of the ULB	2017-18	2018-19	2019-20	2020-21	2021-22
NP Pali	56	62	62	71	105
NPP, Janjgir-Naila	180	190	200	210	225
NPP, Kumhari	210	198	198	195	185
NPP, Katghora	180	190	185	200	230
NP, Rajim	0*	60	60	60	60
NPN, Korba	250	250	250	250	250
NP, Nawagarh	0.11	0.16	1.23	1.65	1.72
NP, Pharsgaon	200	200	200	200	250
NPN, Ambikapur	280	300	310	320	320
NPP, Jashpurnagar	0*	243	247	251	256
NPN, Jagdalpur	200	200	220	220	230
NPN, Bhilai-Charoda	116.02	127.76	137.58	144.98	149.56

(Source: Information provided by ULBs)

*DNM- Data Not Maintained.

Audit observed that primary focus of MCC was on reuse and recycling segregated solid waste through SLRM centers at each ULB level. The increasing trend of per capita waste as given above indicates that 3R approach was not implemented effectively by the ULBs.

The State Government replied (August 2023) that ban on single use plastic, *Bartan bank*, *Jhola bank*, *Neki ki Diwar* etc., are few efforts taken up to reduce waste. To further promote waste reduction, the department had released funds for establishing 500 *Bartan banks* across all the ULBs.

However, progressive trend in per capita waste generation was required more concentrated efforts through public awareness and behavioural change.

3.3.6 *Non-assessment of risk from municipal solid waste to environment and human health*

The MCC, based on Ambikapur model of SWM involves door-to-door collection of segregated waste followed by final segregation of recyclable dry waste and composting of wet waste by SHG members manually. The recyclable dry waste after segregation is sold to the junk dealer. Hence, this model is termed as “zero land fill”.

Audit observed that in this model, the entire process of collection and segregation involved manual handling of waste with the help of members of SHGs. In the absence of scientific landfill site, unprocessed waste was being dumped in open area which pose serious threat to environment and human health due to seepage of waste water into land and water channel.

Audit also noticed that no realistic assessment of risk to environment and human health from the exposure to diverse municipal solid waste was conducted by the 11 ULBs. *N P Pharasgaon* stated that such assessment was done and time to time penal actions were initiated to control use of prohibited items. Further, during Joint Physical Verification (JPV), Audit observed that arrangement for regular health check-up and monitoring of the SHG members did not exist in any of the test checked ULBs.

On being pointed out, the State Government (Special Secretary, Housing and Environment Department) accepted (August 2023) the fact that no risk assessment has been done regarding environmental impact of Solid Waste in Chhattisgarh.

3.3.7 *Integration of Rag-pickers with the process of SWM*

Rule 11(c) of SWM Rules 2016 provides that the state policies and strategies should acknowledge the primary role played by the informal sector of waste pickers, waste collectors. Rules 15 (c) recommends ULBs to establish a system to recognise organisations of waste pickers or informal waste collectors and promote and establish a system for integration of these authorised waste pickers and waste collectors to facilitate their participation in SWM including door-to-door collection.

A scheme named “Rag Pickers Welfare Scheme” was launched (2012) by the State Government for the welfare of the waste pickers. The scheme provides for conducting surveys for identification of rag-pickers in the ULBs, followed by registration and issue of identity cards and extending financial and material support to them. MCC also provides for integration of rag pickers in solid waste management in the State.

Audit however observed that survey to identify rag pickers was conducted in only eight out of the 16 selected ULBs. Out of these eight ULBs list of rag pickers was provided by only three ULBs (NPN, Raipur, Korba and Ambikapur), in two ULBs rag pickers were not found during survey, while remaining three ULBs did not provide any information (**Appendix 3.7**). Further, only NPN, Raipur and Korba have integrated 154 and 110 rag pickers respectively, with the SWM.

On this being pointed out, Government replied (August 2023) that the rag pickers were duly registered and issued identity cards to formalise their participation in SWM.

Reply is not acceptable as adequate efforts were not made to integrate the informal sector of rag pickers with the process of SWM in all ULBs in the State.

3.3.8 Penal provision for violators

Rule 15 (zf) of SWM Rules provides that the local bodies shall frame byelaws and prescribe criteria for levying of spot fine on persons who litter or fail to comply with the provisions of these Rules.

In exercise of the power conferred under above rule, the State Government had notified (January 2019) byelaws for prescribing criteria, for levying spot fine on person who fail to comply with the provision of the said rules and delegate powers.

Although, ULBs confirmed imposition of penalty for violation of codal provisions of SWM Rules, however the penal provision does not seem to be effective as during Joint Physical Verification (JPV), non-segregation of waste at-source and roadside dumping of waste was noticed in 14¹⁹ out of 16 test checked ULB areas, as depicted in following photograph nos. 3.3.8 (1) and 3.3.8 (2)).

	
<p>3.3.8(1)-Dumping of waste in market area in NPP, Janjgir Naila (Dt. 27.09.2022)</p>	<p>3.3.8(2)-Dumping of waste in residential area in NPP, Katghora (Dt.20.09.2022)</p>

On being pointed out, Government replied (August 2023) that the ULBs diligently maintained records of offenses and violations pertaining to the provisions of SWM Rules 2016. Also, the penal provision is effective in promoting compliance with the SWM Rules.

The reply is not acceptable as the notified byelaws could not be enforced effectively at the citizen level by the respective ULBs.

¹⁹ Except in Nagar Palik Nigam, Ambikapur and Nagar Panchayat, Farasgaon out of 16 test checked ULBs.

3.4 Collection, segregation, storage, transportation, and disposal of SWM

As provided under MCC, the primary segregated waste will be collected daily from the doorsteps (door-to door collection) separately in wet and dry fractions through dual bin system and it would be transported using compartmentalised Tricycle, e-Rickshaw, mini-tippers to the nearest Material Recovery Facility (MRF), else known as SLRM center, for final segregation. The organic part (wet fraction) of the waste will be used for preparation of organic fertilizer in compost sheds and inorganic part (dry fraction) will be further segregated into 20 sub-categories²⁰ for recycling, reuse, treatment, and scientific disposal subject to properties of the waste. The re-cyclable waste will be sold to waste recyclers and non-recyclable will be sent to cement factories as Alternate Fuel & Raw Material (AFR).

The entire process of collection, segregation, storage, transportation, and disposal involves manual handling of waste, executed through members (*safai mitra*) of women self-help groups.

3.4.1 Collection

3.4.1.1 Door-to-door collection of waste

The State policy under MCC provides for collection of segregated waste from each household or commercial establishment on door-to-door basis through members of SHGs in 167 ULBs and through private operators in remaining two²¹ ULBs.

During JPV, it was noticed that door-to-door collection of municipal solid waste on daily basis was being carried out in the test checked 15 ULBs through SHGs. In test checked NPN, Raipur, private agency was carrying out the door-to-door collection of MSW.

3.4.1.2 Compliance of number and color code of bins

Rule 4(a) of the SWM Rules 2016 envisages that every waste generator shall segregate and store the waste in three separate streams namely bio-degradable, non-biodegradable and domestic hazardous wastes (DHW) in suitable bins and handover segregated wastes to authorised waste collectors. On the other hand, the SOP-MCC guidelines categorises MSW into two broad categories viz. organic and inorganic and prescribed collection of Wet Waste in Green bin and Dry Waste in Blue bin.

Audit observed that the State Government had distributed a total of 28 lakh bins (two bins set of green & blue) to all residential and commercial areas. It is evident that provision for segregation of DHW has not been made in the MCC in line with SWM Rules, 2016. The MCC guidebook (January 2017) provides for collection of diapers, sanitary napkins *etc.*, in plastic bags hooked

²⁰ 1.Paper 2. Plastic items 3. Plastic Covers 4. Cardboard 5. Glass Items 6. Metal Items 7. Rubber Items 8. Leather Items 9. Aluminum coated paper 10. Aluminum coated plastic 11. Thermocol 12. Clothes 13. Medical waste cover 14. Tablet covers 15. Electronic Items 16. Wooden Items 17. Chemical Items 18.X-ray films 19. Expired Tablet covering 20. Inerts.

²¹ Nagar Palik Nigam, Raipur and Bilaspur.

on the vehicles separately. However, the provision in State Gazette notification (January 2019) provides to segregate such waste i.e. diaper/sanitary napkins *etc.*, in dry waste bin only after wrapping it securely. Thus, the orders of State Government are inconsistent with the MCC guidelines and induces manual segregation of sanitary waste during collection. Further, the collection and transportation of waste in separate bag as per the MCC guidelines creates a possibility of spillage during transportation, as evident from the following photographs.

	
<p>3.4.1.2 (a)-Plastic bag hooked on the vehicle for collection of waste at Katghora (Dt.20.09.2022)</p>	<p>3.4.1.2 (b)-Collection of waste in plastic bags at NPP, Janjgir- Naila. (Dt 27.09.2022)</p>

In the Exit Conference, Government replied (August 2023) that the SOP-MCC guidelines may not explicitly mention DHW, but the scheme has a separate provision for its segregation and management.

Reply is not acceptable, as there is no specific provision for segregation of DHW at source and its collection under MCC.

3.4.1.3 Non-collection of waste from slaughterhouse, meat market and fish market

Rule 15 (m) of the SWM 2016 stipulates that waste is to be collected from slaughterhouse, meat market, fish market and poultry on a day-to-day basis and promote setting up of decentralised compost and bio-methanation plant at suitable location in the vicinity of marketplace for maintaining hygiene. Though the State policy also advocates this, there is no such provision regarding collection and processing of waste from slaughterhouse, meat market, fish market *etc.*, in the guideline of MCC.

Audit noticed that decentralised composting or bio-methanation plant for disposal of such type of waste has not been established in any of the 15 ULBs. In NPN, Raipur the collection of such waste was not included in the scope of work of the operator /agency hired for collection of waste.

Although 15 ULBs, while replying to audit queries, stated that these wastes were collected under MCC, however, during JPV, handling of such waste was not observed in any of the existing SLRM centers. Further, collection and disposal of such waste under ISWMF was also not found in NPN, Raipur.



3.4.1.3 (a) - Dumping of waste from broiler market, meat market behind SLRM center, Minimata ward, Korba. (Dt 13.12.2022)

In NPN, Korba, Audit noticed (December 2022) that waste from meat, mutton market was being dumped in a site behind *Minimata* ward SLRM center, as shown in the photograph above.

Though Government stated (August 2023) that waste was being utilised in fish and poultry farming by private operators, fact remains that ULBs could not make systematic arrangements for collection and disposal of such types of waste.

3.4.1.4 Unplanned site selection for SLRM centers

As per guidelines of MCC, the site selection for SLRM center will be done in such a manner that tricycle/e-rickshaw/auto tipper need not cover long distance. Hence, the locations of SLRM centers were crucial for proper coverage of the entire municipal area and ensuring efficient collection.

Audit observed that no planning, either at the State level or at the ULB level was done for selection of site for SLRM centers, which were constructed according to the availability of vacant land. The factors such as municipal area intended to be covered, density of population, distance from the ward *etc.*, required to be ensured for total coverage of waste collection, were not considered for establishing SLRM centers as discussed below:

In NPN, Jagdalpur Audit noticed that three of the ten SLRM centers were constructed in one²² ward at the outskirts of municipal area and away from dense locality of the ULB, out of which only one SLRM center was found functional. As regards the other two, one was not connected with a proper approach road and the other one was being utilised for another scheme called *Godhan Nyay Yojana* (GNY). As a result, the waste collector had to cover a long distance to reach the SLRM center, consequently leading to dumping of waste in open areas or on roadside.

²² Maharanapratap ward no-47

In six test checked ULBs, against the prescribed number of 24 SLRM centers, 17 SLRM centers had been constructed of which only 15 (62.5 per cent) were operational, as detailed in *Appendix 3.8*.

Thus, either prescribed number of SLRM centers were not constructed or were not operational in seven²³ test checked ULBs due to reasons such as inaccessibility, land dispute, objection by locals or injudicious site selection.

During JPV, incomplete SLRM, inaccessible location, roadside dumping of waste etc., were observed in different²⁴ ULBs, as depicted in photographs numbers: 3.4.1.4 (e) and 3.4.1.4 (f).

	
<p>3.4.1.4 (a)-Lack of approach road to SLRM center in Maharana Pratap Ward, NPN, Jagdalpur (Dt.23.11.2022)</p>	<p>3.4.1.4 (b)- SLRM center in Maharana Pratap Ward, NPN, Jagdalpur was being used for GNY (Dt.23.11.2022)</p>
	
<p>3.4.1.4 (c)- Dumping of waste, due to non-accessibility to SLRM center in NPP, Bhatapara (Dt. 27.09.2022)</p>	<p>3.4.1.4 (d) -Incomplete SLRM center due to land dispute in NPP, Janjgir Naila (Dt. 28.09.2022)</p>

²³ NPN Jagdalpur, NPP, Katghora, Kumhari, Janjgir Naila, Bhatapara, Jashpur Nagar and Kanker

²⁴ NPN, Raipur, Korba, Jagdalpur NPP, Katghora, Kanker, Janjgir-Naila and NP, Pali.



3.4.1.4 (e) –Irregular collection of waste due to absence of SLRM center in a part of NPN, Jagdalpur (Dt.30.11.2022) leading to Road side dumping of waste.



3.4.1.4 (f) – Irregular collection due to lack of SLRM center in NPP, Kanker (Dt. 04.11.2022) resulted in to dumping of waste on road side.

On being pointed out, the Government replied (August 2023) that availability of land was an issue for construction of SLRM in the cities.

3.4.2 Segregation

3.4.2.1 Segregation of waste at source

As per Clause 4 (1) of SWM Rules 2016, every waste generator shall segregate and store the waste generated by them in three separate streams namely bio-degradable, non-bio-degradable and DHWs in suitable bins and handover the segregated wastes to authorized waste pickers.

The segregation of waste at source was not prevalent, as observed during audit in test checked ULBs, except Ambikapur. It was observed during JPV that rickshaw, e-rickshaw, and mini tippers used in the ULBs for collection of waste had only two compartments *i.e.*, for wet and dry waste. Thus, the vehicles used for collection of waste did not have any facility for collection of DHW and BMW separately from other bio-degradable and non-biodegradable waste except in NPN, Raipur where the vehicles had six compartments. Further, the ULBs had provided only two community bins (Green & Blue) in the marketplaces. Collection of mixed waste was also witnessed during JPV of SLRM centers, as depicted in the following photographs.



3.4.2.1 (1) - Collection of waste in single bin, NPN, Raipur (Dt. 01.02.2023)



3.4.2.1(2)- Collection of un-segregated waste, NPP, Janjgir Naila (Dt 27.09.2022)

	
<p>3.4.2.1(3)- Mixed waste collection in tricycle in NPP, Katghora (Dt.20.09.2022)</p>	<p>3.4.2.1(4) – Collected mixed waste being segregated in SLRM center NPP, Janjgir Naila (Dt. 30.09.2022)</p>

Thus, due to lack of public awareness, segregation of waste at source was not ensured and mixed wastes were collected by the SHG members, which may have adverse impact on the waste handlers. Despite the apparent shortcomings, Government had mentioned 100 *per cent* achievement under “extent of MSW segregation” in Service Level Benchmark for SWM published in March 2021.

Government in exit conference (August 2023) while accepting the audit observation assured that the issue will be addressed through IEC.

3.4.2.2 *Secondary segregation*

MCC provides that collected waste will be brought to the Material Recovery Facility (MRF) known as SLRM center for secondary segregation. The organic waste will be processed for preparation of organic fertilizer in compost sheds and the inorganic part of the waste will be further segregated to 20 different categories in SLRM centers.

During JPV of SLRM centers in 16 selected ULBs, Audit observed zero or partial segregation of waste as discussed in following paragraphs:

(a) *Zero segregation*

In two test checked ULBs *i.e.* NPP, Bhatapara and NP, Pathalgaon, Audit observed that no segregation of waste was being done. In NPP, Bhatapara, three functional SLRM centers were used as a transfer station²⁵ instead for segregation. Wastes collected from various wards was brought to these SLRM centers and the unsegregated accumulated wastes were transported to dumping sites in mini tippers. The only SLRM center in NP, Pathalgaon was engaged for packing and storing of vermi compost prepared under *GNV*.

²⁵ Transfer station means a facility under SWM created to receive solid waste from collection areas and therefrom transport in bulk in covered vehicles or containers to waste processing and, or disposal facilities.

	
<p>3.4.2.2.(a)(i) - Unsegregated waste in SLRM Center Subhas Nagar Ward NPP, Bhatapara awaiting further transportation to dumping site at Khapri. (Dt.27.9.2022).</p>	<p>3.4.2.2.(a)(ii) - Unsegregated waste in SLRM Center Gurunanak Ward NPP, Bhatapara awaiting further transportation to dumping site at Khapri. (Dt.27.9.2022).</p>
	
<p>3.4.2.2.(a)(iii) Unsegregated wastes in SLRM Center DDU ward, awaiting further transportation to dumping site at Khopri, NPP, Bhatapara (Dt.27.9.2022).</p>	<p>3.4.2.2.(a)(iv) - SLRM center at Ambedkar Ward engaged for GNY, NP, Pathalgaon (Dt. 07.09.2022)</p>

The unsegregated waste in these two ULBs was dumped at unauthorised dumping sites at *Khopri and Gurunanak ward* in Bhatapara and *Nandan Jhariya* in Pathalgaon respectively, as depicted in following photographs:

	
<p>3.4.2.2.(a)(v) – Dumping of waste at unauthorised dumping site Khopri, NPP Bhatapara (Dt.27.09.2022)</p>	<p>3.4.2.2.(a)(vi) – Dumping of waste at unauthorised dumping site Nandan Jhariya, NPP Pathalgaon (Dt.07.09.2022)</p>

Inspection Report (April 2023) of CECB also confirmed the existence of these dumping sites at Bhatapara and Palthagaon.

On being pointed out, the Government stated (August 2023) that necessary action will be taken against the concerned ULBs.

It is evident from the reply that the monitoring mechanism failed to ensure required segregation of waste in these SLRM centers.

(b) Partial segregation

In 11 ULBs,²⁶ partial segregation of waste was being done in SLRM centers. Bio-degradable or wet wastes which facilitate composting were segregated from the collected mixed waste. The non-biodegradable waste was further segregated broadly into two categories-*i.e.*, recyclable, and non-recyclable wastes. Recyclable items were sold to the local junk dealers and non-recyclable was dumped randomly in SLRM centers, vacant plots or in unauthorised dumping sites. Such unauthorised dumping sites were found in seven²⁷ out of 11 test checked ULBs. It is pertinent to mention that in four out of these seven ULBs, unauthorised dumping sites were found near SLRM centre, as depicted in the following photographs.

	
<p>3.4.2.2(b)(i) -Mixed waste were thrown beside SLRM center in NPP, Janjgir Naila (Dt. 30.09.2022)</p>	<p>3.4.2.2(b)(ii) - Waste thrown outside SLRM center, TP Nagar, NPN, Korba. (Dt. 02.12.2022)</p>
	
<p>3.4.2.2(b)(iii) - Dumping site at Kangoli, Maharanaprata Ward, Jagdalpur (Dt. 22.11.2022)</p>	<p>3.4.2.2(b)(iv) -Dumping site at Brahmacharya Ashram Ward, NP, Rajim (Dt. 12.10.2022)</p>

²⁶ NPN- Jagdalpur, Bhilai Charaunda & Korba. NPP-Janjgir Naila, Katghora, Jashpur, Kumhari & Kanker, NP-Rajim, Pali & Nawagarh.

²⁷ NPN, Jagdalpur, Korba, NPP, Janjgir-Naila, Kanker, Jashpur, Kumhari, Rajim.

Thus, non-segregation of waste resulted in dumping of waste in open area, which not only promotes littering openly but also poses serious threat to environment and human health due to seepage of wastewater (leachate) into land and water channel.

On this being pointed out, Government stated (August 2023) that the recyclable items are sold to authorised local junk dealers, while the non-recyclable waste is responsibly managed in compliance with the SWM guidelines.

The reply is not acceptable as no mechanism exists for disposal of non-recyclable waste in a scientific manner.

Good practice

Nagar Palik Nigam, Ambikapur is the only ULB performing absolute segregation at SLRM centers complying with the provisions contained in SWM Rules 2016 and MCC.

As per the said model, the collected solid waste is processed further to prepare compost. Inorganic soft plastic such as plastic bags (white and coloured), packing materials *etc.*, are shredded, washed, and dried for making pellets and sold to the recycler.



Photo-1: Shredding of single use plastic.



Photo-2: Pallet making of shredded plastic.



Photo-3: Segregated in-organic waste in Tertiary center.



Photo-4: Segregation of waste in to 98 categories in the Tertiary waste.

On the other hand, inorganic wastes having further economic potentiality are brought to tertiary segregation center and segregated into different categories such as iron, aluminum foil, electronic waste, plastic, plastic bottle, bottle caps *etc.*, and kept in separate drums. This level of segregation helped the ULB to

realise the enhanced value of segregated waste while the sale proceeds is provided to the members of self-help group as incentive.

The collected and segregated RDF (predominantly plastic sachets) are bailed and transported to cement factory for use as Alternate Fuel & Raw material.

3.4.3 Deficient infrastructure for waste processing

Clause 1.3 MSWM Manual provides for preparation of an MSWM plan following a seven-step process, which includes assessment of collection, transportation, processing, and storage capacity. Further, Rule 15 (h) of SWM Rules 2016 provides for setting up of material recovery facilities or secondary storage facilities with sufficient space for sorting of recyclable materials from the waste and provide easy access to waste pickers and recyclers for collection of segregated recyclable waste.

- Audit observed that the number of SLRM centers for the ULBs were planned as one SLRM in each *Nagar Panchayat*, four in each *Nagar Palika Parishad* and ten in every *Nagar Palik Nigam* along with one compost shed. Thus, SLRM centers were not planned based on ULB specific requirement.
- A total of 86 SLRM centers and 16 compost sheds were sanctioned for 15 test checked ULBs. Audit observed that seven SLRM centers could not be constructed in five²⁸ ULBs and four SLRM centers along with two compost sheds in three²⁹ ULBs were defunct due to injudicious site selection (**Appendix 3.9**). Thus, SWM activities in ULBs were being carried out with deficient capacity of 75 SLRM centers and 14 compost sheds against the planned capacity.



3.4.3(1) - Non-operational SLRM center at Chhatrapati Shivaji Ward, NPN Jagdalpur (Dt. 25.11.2022)



3.4.3(2) – Non-operational compost shed in dilapidated condition at Emlipara, NPP- Kanker (Dt. 19.10.2022)

- Further, five SLRM centres and one compost shed remained non-functional and unutilised in four ULBs, expenditure of ₹ 81.72 lakh incurred (**Appendix 3.10**) on the construction was rendered wasteful.
- Audit also observed that out of the 75 SLRM centers and 14 compost sheds which were functional, eight³⁰ SLRM centers and ten compost

²⁸ NPP, Janjgir Naila, Kumhari, Jashpur. Kanker & NPP, Katghora.

²⁹ NPP Kanker, Bhatapara. & NPN, Jagdalpur.

³⁰ Three SLRM fully and five partially engaged for GNY.

sheds were being utilised for *Godhan Nyay Yojana* (GNY). It indicates that out of the prescribed numbers, only 67 SLRM centers (78 per cent) and four Compost sheds (25 per cent) were available in entirety for SWM activities in 14 test checked ULBs (**Appendix 3.9**).

- Further, a standard drawing and design of SLRM center with floor area of 258.86 sqm was prescribed (October 2016) for all the ULBs without considering ULB specific requirement for size of SLRM centers on the basis of waste generated in that ULB.

	
<p>3.4.3(3) storage of Re-cyclables and RDF in SLRM center, Ward no. <i>NPN</i>, Ambikapur (Dt.13.12.2022)</p>	<p>3.4.3(4) Re-cyclable waste stored at SLRM center, Praveer Ward, <i>NPN</i> Jagdalpur. (Dt.25.11.2022)</p>
	
<p>3.4.3(5)-Re-cyclable and RDF waste in SLRM center <i>Nagar Palik Nigam</i>, Bhilai Charaunda (Dt.16.11.2022)</p>	<p>3.4.3(6)-Dumping of RDF behind SLRM center <i>Nagar Panchayat</i>, Pali (Dt. 08.09.2022)</p>

On being pointed out, the Government replied (August 2023) that the standard drawing and design of SLRM centers were prescribed by the Government to ensure a modular and standardised approach to waste management. The infrastructural requirement of ULBs is being reviewed under SBM-2.0 Action Plan.

3.4.4 Transportation

Transportation of preliminary segregated waste from doorstep of household to SLRM center has been provided in MCC. This activity is performed through e-rickshaw/ tricycle/tipper *etc.*, in ULBs.

3.4.4.1 Improper design of vehicles for transportation of waste

Clause 2.3.2 of MSWM 2016, provides that the vehicles used for transportation should be covered and collected waste should not be visible to public. It should have a facility to prevent spillage of waste and leachate *enroute* to the processing or disposal facility.

Audit observed during JPV that Mini tippers did not have covered compartments to prevent spillage during transportation and the tricycles possessed only two compartments for collection of wet and dry waste.

On being pointed out, Government accepted the audit observation regarding waste transport and the importance of using covered vehicle to prevent spillage and ensure public safety and acknowledged (August 2023) that MCC guidebook had a discrepancy regarding collection of DHW such as diapers and sanitary napkins.

3.4.4.2 Non-maintenance of e-rickshaw and tricycle

Tricycles, e-rickshaw and mini tippers are the principal medium of collection and transportation of MSW in the ULBs. MCC guidelines provide that it is the duty of center in-charge to inspect the vehicles on daily basis and oiling, greasing and pressure checking will be done as required. Major repair of the vehicles will be ensured from the approved garage or workshop.

Audit observed in NPP, Kanker that 10 e-rickshaws were procured at a cost of ₹ 30 lakh (October 2021) from District Mineral Foundation (DMF). As per the approved technical specification of vehicle, four free services and warranty for one-year period after purchase was to be provided. Further, the vehicle was to be fabricated from good quality steel painted properly to avoid rusting for more than five years. However, the ULB did not avail a single free service for these ten e-rickshaws. Due to lack of proper maintenance, eight out of these 10 e-rickshaws became unserviceable, as shown in **photograph nos. 3.4.4.2 (1) and (2)**. This resulted in the expenditure of ₹ 24 lakh incurred on purchase of these eight e-rickshaws as unfruitful.



3.4.4.2 (a) & (b)- Un-serviceable e-rickshaw found lying at fire station, Kanker (Dt. 26.06.2023)

Moreover, during JPV, nine e-rickshaws in three³¹ ULBs and several tricycles in SLRM centers at four³² ULBs were found in dilapidated condition, as depicted in the following photographs. In NPP Janjgir Naila, during JPV it was informed that nine out of 10 e-rickshaws required maintenance and were causing difficulty due to deteriorated condition. This confirmed the fact that proper inspection and maintenance of vehicles (tricycle, e-rickshaw) was not ensured by the center in-charge.

³¹ NPP Katghora, NP Pali and NPP Kumhari.

³² NN, Korba, , Bhilai-Charaunda , NPP-Janjgir Naila and Kumhari.



3.4.4.2 (c) - Tri-cycles in dilapidated conditions in SLRM center TP Nagar, NPN, Korba (Dt. 02.12.2022)



3.4.4.2 (d) -No maintenance of Tri-cycle, SLRM center, NPN, Bhilai-Charaunda (Dt. 23.11.2022)

In the exit conference, Government stated (August 2023) that necessary directions will be issued to ensure proper maintenance of e-rickshaw and tricycles in ULBs.

3.4.4.3 *Transportation of waste from road sweeping through open vehicle*

State policy provides that ULBs must ensure that street sweeping, drain cleaning garbage and silt do not get mixed with the waste collected from households and commercial establishments, as it can seriously hamper treatment and recycling options. However, there was no provision in MCC for collection and transportation of such garbage and silt.

Audit observed that the activities relating to road sweeping and drain cleaning were generally being done by the ULBs through their own staff and available vehicles. It was further observed that garbage collected from road sweeping and drain cleaning were being transported either to the dumping site or for land fill through open uncovered vehicles, mostly tractors and truck causing littering during transportation. Transportation of road sweeping waste and silt through open vehicles are shown in following *photograph nos. 3.4.4.3 (a), (b) and (c)*.



3.4.4.3(a) - Collection of drain silt in tractor, Nagar Palika Parishad, Janjgir Naila (Dt. 08.09.2022)



3.4.4.3(b) - Collection of waste from road sweeping in Tractor Nagar Panchayat, Pali (Dt. 27.09.2022)



3.4.4.3(c) Transportation of road sweeping garbage in open truck in NPN, Raipur (Dated 10.2.2023)

On being pointed out, Government replied (August 2023) that transportation of waste in vehicles with appropriate cover will be ensured in ULBs.

3.4.4.4 *Idle expenditure amounting to ₹ 15.51 lakh on purchase of e-Garbage Rickshaw*

During audit in *Nagar Palika Parishad, Jashpur* it was observed that six e-garbage rickshaws costing ₹ 15.51 lakh (at the rate of ₹ 2.58 lakh each) were purchased (May 2020) for mechanical transportation of waste.

During JPV (14 September 2022) of SLRM center-2 at *Chirbagicha, Jashpur*, Audit noticed that these rickshaws were lying idle from the date of their procurement. Further enquiry revealed that low engine capacity, heavy weight (kerb weight 420 kgs) and low ground clearance made these rickshaws unsuitable for plying in the hilly terrain of Jashpur. Door to Door collection process was being carried out with the existing cycle-rickshaw. Hence, the objective of procuring e-rickshaw for mechanical collection and transportation of waste, remained un-fulfilled.



3.4.4.4(a) e-garbage rickshaw found in unusable condition in SLRM center Chirbagicha, NPP, Jashpur. (Dated: 14.09.2022)

On being pointed out, Government replied (August 2023) that notices were issued to the supplier to address and rectify the technical issues with the e-rickshaws, and efforts have been initiated for proper maintenance.

The fact remains that the e-rickshaws procured were lying idle for two years.

3.4.5 Disposal

3.4.5.1 Processing of Waste to Energy

As per Clause 21 of SWM 2016, non-recyclable waste having calorific value of 1500 kilocalorie per kilogram (kcl/kg) or more shall not be disposed of on landfill and shall only be utilised for generating energy either through RDF or by giving away as feed stock for preparing Refuse Derived Fuel (RDF). High calorific waste shall be used for co-processing in cement factories or thermal power plants.

Audit observed that waste to energy plant has not (December 2022) been established in any of the 16-test checked ULBs.

The State Level Advisory Board (SLAB) for SWM in its third meeting (October 2018) decided to use non-recyclable waste as RDF in cement factories. However, Audit observed that 14 test checked ULBs (except *NPN*, Raipur and Ambikapur) did not have a valid MoU with any cement factory for disposal of RDF. The *NPN*, Ambikapur was the only ULB where a systematic process of transporting RDF to cement factory through a third party had been developed.

On being pointed out, the State Government accepted (August 2023) that Waste to Energy plant had not been established in any of the ULBs including *NPN*, Raipur and Bilaspur where waste generation is more than 500 TPD. Efforts are being made to establish MoUs with cement factories, since Waste to Energy plant may not be feasible due to relatively low quantity of waste.

The fact remains that, in the absence of Waste to Energy plant or MoU with cement factories for disposal of RDF, waste of high calorific value could not be utilised for generating energy and RDF was being dumped on roadside or at dumping sites in ULBs.

3.4.5.2 Bio-mining and remediation of old dumping sites

As per Clause 15(zj) and 15(zk) of SWM Rules 2016, Municipal authorities should investigate and analyse all old open dumpsites and existing operational dumpsites for their potential bio-remediation and wherever feasible, take necessary action to bio-mine or bio-remediate 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.

Chhattisgarh Government directed (January 2020) all the ULBs to initiate remediation of legacy waste to comply the orders of the National Green Tribunal (NGT) by March 2020 and proposed penalty for non-compliance by ULBs. The SLAB on SWM in its meeting (August 2021) emphasised upon early remediation of old dump site in seven *Nagar Palik Nigams*.

The status of bio-mining and remediation of legacy waste in the eight recognised legacy dump sites of eight ULBs is as given in the **Table 3.7**

Table 3.7: Status of remediation work of legacy dump sites

S. No.	Name of ULB	Date of work order	Present status of work (December 2022)
1	Raipur	Remediation work initially started in 2017 and partial work was done. However, work was not completed.	Remediation of remaining waste is yet to be started.
2	Bilaspur	Work done by Bilaspur Corporation itself	Completed (31.5.2020)
3	Raigarh	15.11.2022	In progress
4	Korba	10.11.2022	In progress
5	Bhilai	01.10.2018	Completed (07.12.2021)
6	Durg	07.09.2022	In progress
7	Dhamtari	07.11.2022	In progress
8	Jagdalpur	25.11.2022	In progress

(Source: Information furnished by SUDA)

It is evident from the above table that six ULBs did not complete remediation of old dumping sites till December 2022. Besides the above dumping sites, Audit found 12 unrecognised dumping sites in nine³³ test checked ULBs, as shown in **Appendix 3.11**. The existence of non-remediated old dumping sites along with unrecognised dumping sites indicates a lack of proper monitoring by the Department. The open dump site poses a threat to human health and environment.

On being pointed out by Audit, CECB conducted site inspection in six³⁴ ULBs and confirmed (April 2023) existence of unauthorised dumping sites.

In the exit conference, the Government stated (August 2023) that necessary directions will be issued to ULBs for early remediation of old dumping sites.

The fact remains that even after lapse of six years of implementation of SWM Rules 2016 and direction of Hon'ble NGT, remediation of old dumping sites was not completed.

3.4.5.3 No scientific landfill/waste disposal facility in Local Bodies

The duties of UADD, as prescribed in sub-Rules 11(J) of SWM Rules 2016, comprised of establishment of common regional sanitary landfill for a group of cities and towns falling within 50 Km (or more) from the regional facility on a cost sharing basis and ensure professional management of such sanitary landfills.

The Ambikapur model implemented by the State Government as MCC in 167 ULBs was designed on a zero-landfill model, which provides that the dry waste will be segregated into various fractions and sold to waste recyclers and the wet fraction or organic waste will be converted into super compost and inert was to be sent to landfill site/Construction and Demolition (C&D) waste facility accordingly to the mechanism devised by the ULB for such waste. The SOP of MCC provides that DHW and BMW were to be transported to designated site for disposal.

³³ NN- Korba (SECL, BALCO, NTPC, Minimata Ward), Ambikapur, NPP- Janjgir Naila, Kumhari, Kanker, Jashpur, Bhatapara, NP- Pathalgaon, Rajim.

³⁴ NPN-Korba, NPP- Bhatapara, Kanker, Janjgir NP- Rajim, and Pathalgaon

Audit, however, noticed that there was no such designated site for disposal of DHW and BMW due to which these wastes were either being sold to junk dealers or dumped in unauthorised dumping sites. Further, proper disposal of inert obtained through street sweeping, drain cleaning and residual left after processing of waste was also not ensured in absence of landfill site in 15 ULBs. This indicates that there was no specific disposal plan for inert, DHW and BMW in 15 ULBs (except NPN, Raipur). Regarding C&D waste, NPN, Korba and Raipur were the only ULBs having C&D processing facility.

During JPV in 15 (except NPN, Raipur) out of 16 selected ULBs, Audit did not find any sanitary land fill site for disposal of non-recyclable waste, as a result, unauthorised dumping sites were operated. The details of various categories of non-recyclable waste generated in 12 test checked ULBs during 2017-22 is given in **Table 3.8** below:

Table 3.8: Category and quantity of non-recyclable waste requiring landfill for disposal

Category of waste	Quantity generated (in ton)
Construction & Demolition Waste (C&D)	8868.73
Domestic Hazardous Waste (DHW)	3097.64
E-Waste	1415.36
Bio-medical Waste (BMW)	67.66
Inert	1606.98
Total	15056.37

(Source: Information furnished by 12 test checked ULBs)

In the absence of proper mechanism for disposal of such waste in landfill site/C&D facility, total 15056.37 ton of non-recyclable waste generated in 12 test checked ULBs were either sold to the junk dealers or disposed of in unauthorised dumping sites. MCC guidelines did not address the disposal of all kinds of waste being generated in the ULBs.

On being pointed out, Government stated (August 2023) that landfill was constructed in two³⁵ ULBs only. However, provision for common regional landfill facility based on access fees model, has been incorporated in SBM 2.0 action plan.

3.4.5.4 Dumping of unprocessed waste in Landfill facility in NPN, Raipur

Under the Integrated Municipal Solid Waste Management Project through Public Private Partnership, NPN, Raipur entered into a concession agreement (February 2018) with M/s. Delhi MSW Solutions Limited for management of MSW in the city of Raipur. Under the project, waste processing and associated tasks included designing, building, operating and maintaining the MSW processing and associated facilities that comprise weighbridges, compost and RDF facility and sanitary landfill. For implementation of project in accordance with agreement, NPN Raipur (March 2018) allowed contractor to start work at the designated site with an area of 27.045 hectare (ha) in village-Sakri,

³⁵ NPN, Raipur and Bilaspur

District-Raipur. The CECB accorded (2018) permission for establishment of storage, transport, segregation, treatment, and disposal facilities.

During JPV of the facility in Sakri, Raipur, a scientific landfill site was found as an integral part of the said facility, constructed with a view to dispose of the inert generated from the waste processing facility. It has been planned and designed to be developed in a phased manner for a period of 15 years with a closure plan.

- Schedule-I (A) (vii) of SWM Rules 2016 provides that the landfill site shall be 20 km away from Airports. However, in a special case, landfill site may be set up within a distance of 10 to 20 km away from the Airport after obtaining no objection certificate from civil aviation authority. The landfill site at Sakri, Raipur was found set up 10 km from local Airport, however, the NPN, Raipur failed to produce any NOC obtained from the civil aviation authority for setting up of the landfill.
- Audit also observed that cells constructed in the sanitary landfill were filled with waste collected from the municipal area. The processing plant for processing of waste, which was supposed to be completed by May 2019 by the contractor, was completed in June 2020 after a delay of 13 months. As a result, during these 13 months, the collected waste was temporarily stored in the landfill site constructed at Sakri. The partial processing of the accumulated waste along with daily collected waste was started after the inauguration of plant in June 2020. As a result, all the cells of sanitary landfill were filled with un-processed legacy waste which had rotten with passage of time. Further, the inert generated from the processing plants were also being dumped on the same landfill. Hence, the possibility of leachate from this legacy waste contaminating the ground water could not be denied. Further, residents of nearby habitats also have complaints about the foul smell coming from the legacy waste.
- It was also observed that, the contractor was paid in advance at the rate of 65 *per cent* of the processing fee amounting to ₹ 2233.16 lakh, for the quantum of waste collected during these 13 months, despite the fact that the waste was not actually processed. The advance was sanctioned by the NPN, Raipur owing to use of landfill for storing of unprocessed waste. However, partial processing of stored waste alongwith daily collected waste was started in March 2021, and by November 2023 around 81 *per cent* processing has been completed. Hence advance payment to the contractor in deviation from the contract resulted in undue aid to the contractor.

	
<p>3.4.5.4 (a)-Legacy waste dumped in the landfill at Sakri (Dt.24.06.2023).</p>	<p>3.4.5.4(b)-Satellite image of Landfill at Sakri, Raipur (Dt.24.06.2023)</p>

On being pointed out, Government acknowledged (August 2023) that waste collected from municipal area Raipur was temporarily stored in the landfill due to delay in construction of processing facility at *Sakri*. Processing of the said legacy waste will be completed soon.

The fact remains that the sanitary landfill was filled with unprocessed legacy waste defeating the purpose of scientific disposal of waste.

3.5 Planning, construction, commissioning, operation, and maintenance of SWM projects

In accordance with clause 1.4.3.3 of MSWM Manual 2016, as an essential requirement, each ULB should assess the quantity and composition of waste generated to plan and design MSWM systems effectively. Generated municipal waste was dependent on the population, demographic details, principal activities in the city or town, income levels, and lifestyle of the community. The quantity and composition of MSW generated in the ULB determine collection, processing, and disposal options that could be adopted.

3.5.1 Injudicious determination of infrastructural capacity

The MCC guidelines provided construction of one SLRM center in each *Nagar Panchayat*, four in each *Nagar Palika Parishad* and ten in every *Nagar Palik Nigam* along with one compost shed for each ULB.

Audit observed that the requirement of infrastructural capacity for ULBs were not determined on realistic basis taking into consideration current population, number of households/commercial establishments and estimated waste generation in each ULB.

Further, scrutiny of annual report (2022) of NPN, Ambikapur revealed that it was executing SWM activities for the 30,686 households and commercial establishments through 18 SLRM centre i.e. a ratio of 1:1705 (SLRM center to Household/Commercial establishments). Though MCC adopted in the State was based on Ambikapur model, Audit observed that the number of SLRM centers operating in other ULBs was not at par with NPN, Ambikapur in terms of number of household/establishments. The ratio of SLRM centers to number of households/commercial establishments in ten³⁶ out of 15 (except NPN, Raipur) test checked ULBs ranged from 1:2573 to 1:5200. Thus, infrastructural capacity available for ULBs were deficient ranging from 34 *per cent* to 67 *per cent* as given in **Appendix 3.12**. However, review or assessment for infrastructural gap filling has not been conducted either by the ULBs or Government and the ULBs were functioning with deficient infrastructure capacity.

On this being pointed out, Government stated (August 2023) that ULB wise capacity development of SLRM Centers was done on waste generation analysis based on principles of CPHEEO manual. However, the number of SLRM Centers in ULBs varied based on various other factors, such as availability of infrastructure, manpower and number of vehicles.

³⁶ NPN- Korba, Jagdalpur, Bhilai Charoda, NPP- Katghora, Janjgir Naila, Kumhari, Bhatapara, Jashpur nagar, Kanker and Rajim.

Reply is not acceptable as the requirement of SLRM centers were not determined on the basis of actual assessment of waste in each ULB.

3.5.2 *Sharing of infrastructural facilities of SWM for Godhan Nyay Yojana*

The *Godhan Nyay Yojana* (GNY) was launched by the State Government in 2020. The scheme provides for procurement of cow dung at SLRM and compost sheds in ULBs and vermicomposting with the mixture of wet-waste (biodegradable) and cow dung for the compost shed. The UADD strategically planned convergence (July 2020) of this scheme with MCC and approved construction of 377 *gothhan* in the vicinity of 357 SLRM centers of ULBs remaining 20 *gothhan* in NPN, Raipur and Bilaspur where MCC is not implemented. It was also planned that 9000 members of women SHGs engaged in SWM activity will also be involved in compost making activity under GNY along with MCC in urban areas. The scheme guidelines prescribed for convergence with MCC and execution in all the ULBs.

As no separate set up and manpower was provided for GNY, the scheme was being implemented through the SLRM centres with the help of existing members of SHGs which exerted additional burden on the existing resources of SWM in the ULBs. During JPV, Audit also found that eight SLRM centers (fully or partially) and ten compost sheds (*Appendix 3.9*) in 10 test checked ULBs, were used for purchase of cow dung and preparation of vermi-compost under GNY. The pits in the compost shed meant for processing compost from segregated organic waste were engaged for preparation of vermin compost from cow dung only in a cyclical batch of 40-45 days and SLRM centers were used for drying and packaging of vermin compost.

Audit observed that segregation of daily collected waste (wet waste) and super composting works were adversely affected in these SLRM centers, as the existing composting pit in 10 SLRM centers were being used for preparing compost from cow dung under GNY. Besides in seven ULBs, Audit observed that basic data such as waste collected, quantum of various category waste, penalty register, vehicle maintenance register, SHG members Health card, User charge collection register etc., was not being maintained by the SHG members.

	
<p>3.5.2(1) - Compost shed premise filled with cow dung, NP, Nawagarh (Dt. 13.10.2022)</p>	<p>3.5.2(2) – SLRM center filled with Cow dung and vermin compost at Maharana Pratap ward, NPN, Jagdalpur (Dt. 23.11.2022)</p>

	
<p>3.5.2(3) - Safai Mitra shifting vermin compost from SLRM center at Rajim (Dt. 12.10.2022)</p>	<p>3.5.2(4) - Dumped Cow dung awaiting composting at SLRM Center Katghora (Dt.23.9.2022)</p>

On being pointed out, the Government accepted (August 2023) that no new manpower for GNY was sanctioned as it was integrated with the sanction of additional infrastructure.

It is evident from the reply that no set up was sanctioned for GNY. Hence, convergence of GNY without proper and adequate infrastructure capacity had adversely impacted SWM activities.

3.5.3 No initiatives for Capacity Building

Rules 11 (k) and 15 (zc) of SWM Rules, 2016, require UADD/ULBs to arrange for capacity building of staff (including contract workers) and educate them in managing solid waste, segregation and transportation or processing of such waste at source.

Audit observed that no training calendar was prepared for the period 2017-18 to 2021-22. However, a total of 59 training programmes/workshop/seminars were arranged by the department through ULBs out of which 36 training programmes were conducted online for the officials and specialist of municipalities. Other training programmes were related to *swachh surveykshan*³⁷ of the respective years and meant for officials. Only three programmes involving 1045 SHG members (12 *per cent*) were organised for SWM. Thus, the staff and workers engaged in SWM have not been provided adequate training relating to management, transportation, and processing of MSW.

On being pointed out, the Government stated (August 2023) that training programs were conducted for sanitation workers at regular intervals to enhance their skills and knowledge in waste management.

Reply is not acceptable since the training programmes were provided to only 12 *per cent* of SHG members.

3.5.4 Compost machines costing ₹ 202.14 lakh lying idle

UADD, (Technical Cell)³⁸ sanctioned (September 2021) purchase of 64 compost machines of 600–3000 Kilogram (Kg) capacity to ULBs for

³⁷ *Swachh Survekshan* was introduced by Ministry of Housing and Urban Affairs (MoHUA) in 2016 as a competitive framework to encourage cities to improve the status of urban sanitation while encouraging large scale citizen participation. It has led to a spirit of healthy competition among cities and towns of India.

³⁸ vide order dated 20.9.2021

composting of organic waste at an estimated cost of ₹ 2,925.00 lakh. The expenditure was to be met from the untied grant of Fifteenth Finance Commission (FC) available with the million plus and non-million plus ULBs (NPPs and NPs). The technical specification of the compost machines was also made available to ULBs by the UADD.

During 2021-22, the UADD approved purchase of 65 compost machines for 57 ULBs from the Fifteenth FC grant. As per the information provided by UADD, only 18 compost machines were functional and the remaining machines in 37 ULBs were not functional due to various reasons.

During JPV (September-October 2022) in eight³⁹ test checked ULBs, it was noticed that out of 12 compost machines purchased, ten machines in six ULBs were non-operational due to non-installation or lack of infrastructure such as three-phase electric connection, non-availability of essential ingredients *i.e.*, saw dust, carbon culture powder and/or training to operate the machine (**Appendix 3.13**). Thus, 10 compost machines costing ₹ 202.14 lakh remained idle due to lack of basic infrastructure required to make these operational.

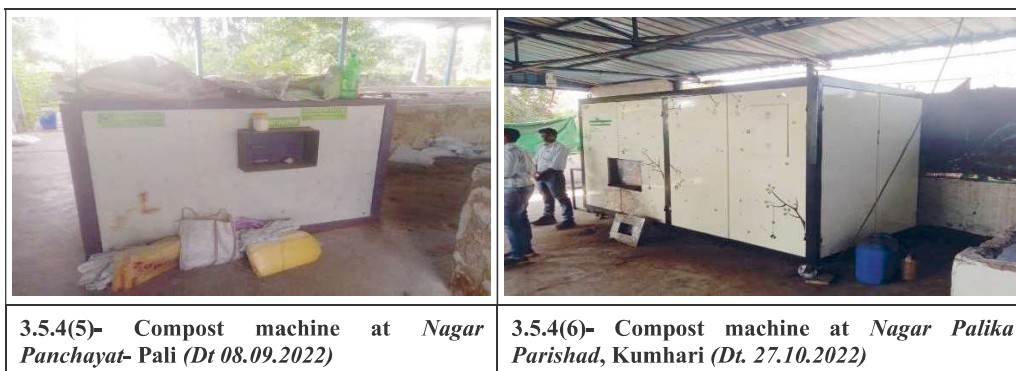
In remaining two⁴⁰ ULBs, though the machines were found in operational condition, however information regarding quantum of compost produced, sold and test reports certifying the quality of compost was not available with the ULBs.

The photos of compost machines lying idle in ULBs are given below as **photograph nos. 3.5.4 (1), (2), (3), (4), (5), (6)**.

	
<p>3.5.4(1) – Non-functional Quick Compost Machine at NP- Pathalgaon (Dt. 07.09.2022)</p>	<p>3.5.4(2) - Quick Compost Machine not installed at NPP- Kanker (Dt. 19.10.2022)</p>
	
<p>3.5.4(3) - Quick Compost Machine not installed at NPP, Bhatapara (Dt. 27.09.2022)</p>	<p>3.5.4(4) - Four nos. Compost Machine at NPP, Bhatapara (Dt. 27.09.2022)</p>

³⁹ NPN, Ambikapur, NPP-Kumhari, Kanker Jashpur, Bhatapara, Janjgir-Naila, and NP-Pathalgaon, Pali

⁴⁰ NPP, Kumhari and Jashpur



On being pointed, the Government stated (August 2023) that necessary action will be taken to operationalise the compost machines at the earliest.

3.5.5 *Unfruitful expenditure of ₹ 46.61 lakh on Bailing Machine and Fatka Machine*

The SUDA accorded sanction (Jan 2020) for purchase of 186 *Fatka*⁴¹ machines and 165 Bailing⁴² machines to all three categories of ULBs at a total cost of ₹ 1,077.30 lakh from the 14th CFC as Central share and *Adhosanranchana mad* as State share. However, demand for the *Fatka* Machines and Bailing machines from any ULB was not found in the records at SUDA.

Audit observed that nine *Fatka* machines and nine Bailing machines were installed in 11 test checked ULBs. However, JPV (September - October 2022) revealed that nine *Fatka* machines and six Bailing machines were not in workable condition in eight⁴³ ULBs and three Bailing machines though in working condition, were idle in three ULBs⁴⁴. Inorganic waste collected from household need not to be cleaned by *Fatka* machine as these wastes are neither muddy nor dusty. Similarly, RDF in ULBs were not being sold to cement factories and waste from road sweeping and drain cleaning were not brought to the SLRM centers hence, there was no utility of the Bailing and *Fatka* machines respectively. As these machines remained non-operational since procurement, they became defunct and the expenditure of ₹ 46.61 lakh incurred on the purchase of these machines was rendered unfruitful.

The photographs of non-operational *Fatka* and Bailing machines are given in *photograph nos. 3.5.5 (1), (2), (3), (4)*.

⁴¹ A *Fatka* machine is used to remove dust and muddy soil from inorganic waste of drain cleaning and road sweeping.

⁴² A Bailing machine is used to bail/ compress inorganic waste.

⁴³ NPN-Bhilai Charouda, NPP- Bhatapara, Janjgir Naila, Kumhari, Jashpur, NP-Pathalgaon, Pali, Nawagarh.

⁴⁴ NPN, Jagdalpur, NPP, Rajim & Farasgaon.

	
3.5.5(1) - Bailing Machine in Subhas Ward NPP, Bhatapara (Dt. 27.09.2022)	3.5.5(2) - Bailing Machine, NPP, Janjgir Naila (Dt. 30.09.2022)
	
3.5.5(3) - Fatka Machine, NPP, Janjgir-Naila (Dt. 30.09.2022)	3.5.5(4) - Fatka Machine, Nagar Panchayat, Nawagarh (Dt.12.10.2022)

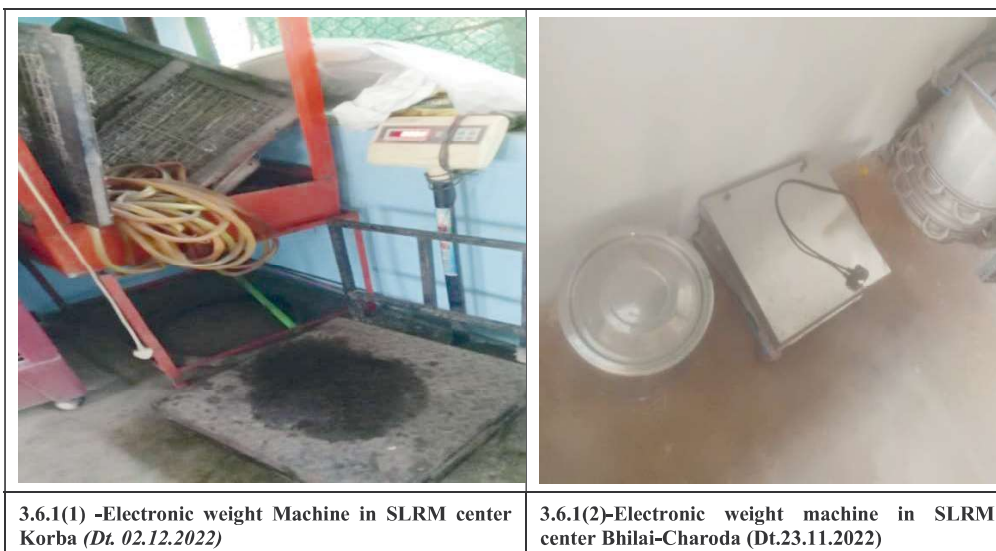
On being pointed out, the Government stated (August 2023) that the Government would remain committed to optimize the utilization of these machines and promoting responsible waste management across the State.

3.6 Monitoring and Evaluation of Waste Management

3.6.1 Data collection and analysis for monitoring

The MSWM Manual 2016, Section 6 has detailed the procedure to be followed for Monitoring and Evaluation (M&E) of Municipal Solid Waste Management system. The essential data source for proper M&E, as detailed in Table 3.1, primarily includes geographic and demographic information of ULBs. In addition to that, collection of data, in respect of quantity of waste generated, collected, segregated, processed and transported in ULBs through weigh bridge, has also been given special attention as these are the baseline data and important for determining performance of SWM.

Audit observed that annual reports (2017-18 to 2021-22) submitted by the ULBs were being prepared by taking the population figure of 2011 census instead of current population. Similarly, data of quantity of waste generated, per capita waste generated was also not reliable as systematic waste quantification process had not been developed in ULBs. Weigh bridge required to determine the quantity of waste generated and collected had not been provided at SLRM centers in any of the 15 test checked ULBs (except NPN, Raipur). It was also observed in JPV that electronic weigh machines provided to the SLRM centers were not being utilised and in eight SLRM centers it was not available.



It is also evident from the fact that required information in all of the 11⁴⁵ prescribed proformas for SWM were not being maintained at SLRM centers. In the absence of basic record maintenance at SLRM centres and data compilation, ULBs were reporting hundred *per cent* collection and processing of waste in SLBs, however facts in the ground level were different.

Further, seven ULBs could not provide data relating to operating expenses and 12 ULBs could not provide year-wise demand figures of user charges for the last five years. Even department does not have consolidated data of waste generation, segregation, disposal, and user charges collection in the ULBs. Hence, it is evident that primary and basic data were not being maintained at the ULB level, which reveals that a proper mechanism for monitoring and evaluation of SWM activities does not exist in the State.

On being pointed out, the Government replied (August 2023) that all ULBs are having electronic weighing scale. Weighing of waste and records maintenance are regularly carried out in the SLRM centers. ULBs update monthly comprehensive information of SWM on the *Swachhatam* MIS Portal.

The reply is not acceptable, as there was lack of basic mechanism for collection of data of waste collection, segregation, processing, and disposal from the SLRM centers which is required for data updation in the portal at ULB level. Hence, these figures are entered manually in random manner by the ULBs. It is also evident from the fact that data furnished to Audit and published in SLB were inconsistent.

In the exit conference Special Secretary, Housing and Environment also confirmed (August 2023) that Annual Report prepared and submitted to Central Pollution Control Board (CPCB) as per data furnished by the ULBs. and there is no mechanism in CECB to ascertain the authenticity of the data furnished by ULBs.

⁴⁵ Out of 11 prescribed proformas, 08-11 proformas in 12 SLRM centers, 04-07 in nine SLRM centers and 0-3 in 17 SLRM centers was not being maintained in test checked ULBs viz. NPN-Ambikapur, Jagdalpur, Bhilai-Charoda, NPP- Kanker, Bhatapara, Jashpur and NP- Rajim.

3.6.2 Information, Education and Communication

Para - 1.4.5.13 of the MSWM Manual 2016 stipulates that an efficient waste management program, regardless of the strategy, requires significant cooperation from waste generators and active community participation. Information, education, and communication (IEC) is a multilevel tool for promoting and sustaining risk-reducing behaviour change in individuals and communities.

As stated in the Manual and SWM Rules, the following major issues are to be addressed through IEC, for sustaining risk-reducing behavioural change, such as-

- i. Reduce generation of waste through 3Rs.
- ii. Segregation of waste into bio-degradable, non-biodegradable, e-waste, sanitary and domestic hazardous waste.
- iii. Pay monthly user fee to waste collector.
- iv. Awareness amongst the workforce for utilisation of protective equipment.

Audit observed that the strategy for IEC activity formulated under the SOP of MCC did not prescribe specific issues to be addressed through IEC for sustaining risk reducing behavior change. However, the focus of IEC activities was changed to promote *Swachh Surveykshan*.

During the period 2017-18 to 2021-22, SUDA sanctioned of ₹ 57.16 crore to ULBs for IEC activities including a sum of ₹ 220 lakh (October 2019) to 13 test checked ULBs with the instructions to promote *Swachh Surveykshan* 2020.

Scrutiny of IEC related records in NPN, Ambikapur revealed that a sum of ₹ 36.92 lakh was sanctioned (December 2020) by SUDA for promoting *Swachh Surveykshan*. Accordingly, expenditure was incurred primarily to promote *Swachh Surveykshan* 2021 through wall paintings and banner, the core issue of sanitation, SWM and its related health and environmental impact failed to catch focus.



3.6.3 (1) & (2)- Wall painting in Ambikapur Municipal area promoting *Swachh Surveykshan* (File photo)

In NPP Bhilai-Charoda and Ambikapur, expenditure for IEC was incurred towards installation of posters/banners/hoardings or wall art and paintings *etc.*, displaying messages for cleanliness/*Swachh surveykshan*.

This indicates that the fund was not spent on IEC activities as per the principles and guideline of SWM Rules 2016 or MSWM.

On being pointed out, Government replied (August 2023) that IEC campaign is designed strategically to address various aspects of SWM, including at-source segregation, minimising waste generation, promoting recycling and composting, proper disposal of hazardous waste, and discouraging littering, burning, or burying of solid waste.

The reply is not acceptable, as IEC activities carried out during the last five years were basically related to *Swachh Surveykshan*. without addressing the core issues of risk reducing behavioral change.

3.6.3 Constitution of committee/board for monitoring and internal control of SWM

3.6.3.1 Delay in constitution of State Level Advisory Body (SLAB) and less frequency of meeting

Clause 1.4.5.4 of MSWM 2016 envisages that for planning an efficient and advanced MSWM system, it is essential to have an efficient institutional structure besides having adequate infrastructure and equipment. Hence, every State Government and Union Territory shall constitute a State Level Advisory Board (SLAB) through UADD within six months from the date of notification of SWM Rules, 2016. Further, as per clause 23 (2) & (3) of SWM 2016, the SLAB shall meet at least once in six months to review the matters related to implementation of SWM Rules, 2016, implementation of State policy, strategy on MSWM, and to give advice to the State Government for taking measures that are necessary for expeditious and appropriate implementation of these Rules. The copies of the review report shall be forwarded to the State Pollution Control Board (SPCB) for necessary action.

Audit observed that the SLAB was constituted by the State Government in March 2017 *i.e.*, after 11 months of notification (April 2016) of SWM Rule 2016. Moreover, only seven⁴⁶ meetings of SLAB were held during 2017- 2022 against the required 13 meetings as per the frequency prescribed in the MSWM Rules.

Scrutiny of minutes of meetings of SLAB revealed that repeated directions were issued by the SLAB for preparation of action plan for disposal of RDF, BMW, C&D waste, e-waste, remediation of old dumping site. However, the directions issued by the SLAB were not implemented in a time bound manner as six out of eight legacy waste sites are not remediated till date (December 2022). The ULBs did not have any action plan for systematic disposal of C&D waste, e-waste, RDF & BMW.

⁴⁶ Meetings were held on 16.4.2018, 05.9.2018, 30.10.2018, 22.4.2019, 15.10.2019, 24.8.2021 & 19.4.2022.

Similarly, the Steering Committee at NPN, Raipur was constituted (July 2018) after a delay of four months. Further, the committee had met only twice⁴⁷ since its inception.

On being pointed out, Government acknowledged (August 2023) the delay in constitution of SLAB and stated that frequency of meeting was affected by the pandemic.

The reply is not acceptable, as the recommendations/directions of SLAB were not implemented over the years.

3.6.3.2 *Monitoring by Chhattisgarh Environment Conservation Board (CECB)*

As per SWM 2016, sub-rule 16 (a), CECB shall enforce these rules in their State through local bodies in their respective jurisdiction and review implementation of these rules at least twice a year in close coordination with concerned Directorate of Municipal Administration or Secretary-in-charge of Urban Administration and Development Department.

Scrutiny of CECB's Annual Report 2021-22 reported to the CPCB revealed that all dumpsites in 162 ULBs had been remediated. It is also reported that maximum processing was being done under MCC model, thus eliminating the need of the landfills for disposing of residual waste. However, Audit observed collection of mixed waste, roadside dumping, lack of disposal facility for DHW and C&D waste, inadequate infrastructure, and existence of open dumping sites in ULBs even after lapse of five years of implementation of SWM Rules.

The CECB inspected (February-March 2023) the SWM facilities in seven test checked ULBs on the request of Audit and confirmed existence of unauthorised dumping sites in NPP, Bhatapara, Kanker Janjgir-Naila and NP Rajim, Pathalgaon, burning of waste in NPP-Bhatapara and NP- Rajim. Delay in remediation of legacy waste was witnessed in NPN- Jagdalpur and Korba.

Further, CECB had replied that regular inspection of facilities in ULBs was done from time to time and shortcomings found, if any, were communicated to concerned authority for rectification.

However, documentary evidence of minutes of any review meetings, inspection report or any suggestions, recommendations from CECB was not made available either by the SUDA or any test checked ULB. Even CECB failed to provide any such documents against audit requisition indicating that review meetings were not being conducted as prescribed.

On being pointed out, Special Secretary, CECB stated (August 2023) that SWM activities were reviewed at the SLAB meeting, however, no review meeting was ever conducted by the CECB. It was also stated that as per the provision, regular review meetings will be ensured henceforth.

⁴⁷ On dated 18.07.2018 & 21.01.2019.

It is evident from the reply that, CECB which is the nodal agency in the State for implementation of SWM Rules, 2016 has no mechanism to review activities of ULBs for implementation of SWM Rules.

3.7 Conclusion

Determination of quantity and composition of waste was essential for planning of SWM activities in a State. The Performance Audit on solid waste management (SWM) in Urban Local Bodies (ULB) revealed that for implementation of SWM Rules, ULB specific Detailed Project Report (DPR) was not prepared in Chhattisgarh. Thus, planning of Solid waste management was not based on actual quantity and composition of waste generated in each ULB. The review of existing capacity or gap detection has not been done even after lapse of five years of implementation of SWM. Hence, strategy and planning of SWM in ULBs was not commensurate with the current waste generated and future projection of waste based on proper survey/assessment.

The State policy broadly categorised waste into two types- namely organic waste (*Gila kachra*) and inorganic waste (*Sukha kachra*) and accordingly, adopted two bins system in place of three bins, as provided in SWM Rules, 2016. As a result, systematic collection and disposal of Domestic Hazardous Waste and Bio Medical Waste (Household) was not ensured. Besides, decentralized disposal system for municipal wastes such as slaughterhouse, meat market and fish market were not established. Though collection and disposal of inert was provisioned in MCC, but the requirement of sanitary land fill / regional landfill was not envisioned in the MCC guidelines.

A total of 86 Solid Liquid Resource Management (SLRM) centers and 16 compost sheds were sanctioned in 15 test checked ULBs, however, only 67 SLRM centers (78 *per cent*) and four compost sheds (25 *per cent*) were operational/available for SWM activities. Unplanned/ inadequate construction of SLRM centers and compost sheds coupled with sharing of manpower/ infrastructure resources with *Godhan Nyay Yojna* adversely affected the collection, segregation, and processing of waste in ULBs. Unsegregated waste was dumped in open and unauthorised dumping sites. Though Urban Administration and Development Department and Chhattisgarh Environment Conservation Board (CECB) reported (2020-21) that no dumping sites exist in the State, Audit found 12 unauthorised dump sites in nine ULBs besides six legacy dump sites awaiting remediation.

Open vehicles and vehicles without necessary partition were being used for collection/transportation of waste, indicating that at source segregation had not been ensured yet. In the absence of regular and proper maintenance, tricycles and e-rickshaws were found in unserviceable conditions in eight ULBs. Further, 10 compost machine in six ULBs and nine *Fatka* and six Bailing machine in eight ULBs lying idle.

Though the State Level Advisory Board (SLAB) has been formed at the State level, monitoring, and evaluation of SWM do not exist and implementation of recommendations of SLAB was also not ensured. Neither CECB nor SLAB reviewed SWM in a periodical manner. The Annual Report of CECB to Central Pollution Control Board does not feature deficiencies of SWM in the State.

The Information, Education and Communication (IEC) activity in the State was mainly concentrated on promoting *Swachhata Surveykshan*. The core issue of developing sustained behavioural change among the residents was not addressed in the IEC activities.

The State policy for Solid Waste Management in the State was neither comprehensive nor consistent with the Solid Waste Management Rules, 2016.

3.8 Recommendations

1. *The State Government should ensure preparation of ULB specific Detailed Project Report based on household survey and periodically update data for gapfilling in financial and infrastructure requirement.*
2. *Responsibility may be fixed for parking of fund (₹ 2369.20 lakh) from State Budget into separate account by UADD.*
3. *The Department should instruct ULBs to keep account of receipts collected and expenses incurred for SWM activities to ascertain the sustainability of SWM. Proper demand and collection register for user charges may also be maintained.*
4. *ULBs should develop a regular system of health check-up of the SHG members, in consideration of all probable health hazards involved with waste handling.*
5. *All Urban Local Bodies should also ensure proper secondary segregation at SLRM center through appropriate monitoring of activities of SHG members.*
6. *The Government should recognize all the existing dumpsite in the State and make necessary arrangements for remediation.*
7. *The State Government should consider for establishment of Regional Landfill for disposal of inert /waste from drain cleaning and other residual waste left beyond maximum segregation and processing.*
8. *The State Government should ensure capacity development for SWM such as SLRM centers, compost sheds, vehicles, tools, human resource etc. as per ULB specific requirement and operationalisation of developed capacity for SWM.*
9. *The State Government should issue instruction to the Department for installation of weigh bridges for measuring waste collected and ensure recording of data of waste collected at ULBs.*
10. *The State Government should prepare centralized strategic plan for Information Education and Communication activities, focusing on sustainable behavior change of all stake holders.*