2.1 Introduction

2.1.1 Background

Wastes are materials that are unwanted or unusable. Waste is any substance that is discarded after the primary product has served its purpose and is now worthless, defective or for which the generator has no further use in terms of value. Solid Waste (SW) is the unwanted or useless solid material generated by humans undertaking residential, industrial or commercial activities. They include solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste.

2.1.2 Necessity of Municipal Solid Waste Management

Municipal Solid Waste Management (MSWM) in urban areas has emerged as one of the biggest challenges that we face today, not only in terms of environmental concerns but also the potential threat to public health resulting from improper and non-scientific handling of waste. The issue has further aggravated owing to the fast pace of urbanisation. According to the Central Pollution Control Board (CPCB) Report (2021-22), in India per day generation of Solid Waste (SW) was 1,70,339 Metric Tonnes (MT), out of which 1,56,449 MT (92 *per cent)* SW was collected, of which only 91,511 MT (58 *per cent)* SW was treated. In Punjab State, per day generation of SW during 2021-22 was 4,222 MT, out of which 4,207 MT SW was collected but only 1,471 MT (35 *per cent)* was treated. Therefore, about 65 *per cent* of waste generated remained untreated which marks the gap in Solid Waste Management (SWM) that needs to be addressed by the 166 Urban Local Bodies (ULBs) in the State.

Solid waste comprises **(i)**. **biodegradable**[1] waste **(**50-60 *per cent*) and **(ii) non-biodegradable**[2] waste {saleable 30 *per cent*, Refused Derived Fuel (RDF)[3] 15 *per cent* and inert[4] five *per cent*}. Inadequate segregation at source, along with ineffective collection, transportation, treatment and unscientific disposal of waste leads to degradation of the environment and poor quality of life. Most ULBs continue to face challenges in the areas of appropriate and advanced collection and transportation systems, technology selection and disposal methods of solid waste.

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1 **Biodegradable waste-** means any organic material that can be degraded by micro-organisms into simpler stable compounds.

2 **Non-biodegradable waste-** means any waste that cannot be degraded by micro-organisms into simpler stable compounds.

3 **RDF-** means fuel derived from combustible waste fraction of solid waste.

4 **Inerts-** means fine earth and road sweep silt.

The poor management of SW not only leads to land and water pollution but also generates many vector and water-borne diseases like Cholera, Dysentery, Jaundice, Typhoid and Diarrhoea. Therefore, SWM is one of the major environmental areas that needs to be addressed effectively for environment concerns and improvement of social conditions.

The United Nations Member States jointly committed (September 2015) to the Sustainable Development Goal (SDG) 11.6 which seeks to reduce the adverse per capita environmental impact by paying special attention to air quality, municipal and other waste management.

2.1.3 Regulatory framework governing management of Solid Waste

The Solid Waste Management Rules and Construction and Demolition (C&D) Waste Management Rules framed in 2016 under the Environment (Protection) Act, 1986, provide the legal framework for disposal and management of SW and entrust responsibilities at State level, ULBs level and citizens' level. Guidelines for the preparation of a comprehensive plan for the prevention, control or abatement of pollution through scientific SWM have been issued by the Government of India (GoI) from time to time.

As per the *ibid* rules, waste generators are responsible for segregating and storing waste in three separate streams biodegradable or wet waste, non-biodegradable or dry waste and domestic hazardous waste, to be handed over to waste collectors. Biodegradable wastes are to be processed through composting/ bio-methanation, while recyclables are to be handed over separately. Further, waste generators are not allowed to burn, bury or throw waste in the open. C&D Waste is to be stored separately and disposed of in accordance with C&D Waste Management Rules, 2016.

2.1.4 Principles of Sustainable Solid Waste Management

Three fundamental internationally accepted principles of SWM are:

1. **Affordability** or the ability of households to pay for SWM services. It is universally accepted that 1-1.5 *per cent* of average household disposable income is the limit for payment for complete SWM services.
2. **Polluter pays principle** whereby waste generators should bear the cost of waste management.
3. **Sustainability** in terms of countering negative environmental and economic effects of waste generation and management by imposing charges on the agents and users concerned.

2.1.5 Waste Management Hierarchy

The concept of sustainable SWM is crucial to holistic sustainable development and its essence is encapsulated in the principle of 3Rs - Reduce, Reuse and Recycle to minimise the use of natural resources. These 3Rs are also referred to as the "hierarchy of waste management", implying a preferred order of waste management practices to be adopted rather than the largely prevalent disposal of all solid wastes in landfills.

Figure 2.1: Waste Management

Source: MSWM Manual

Waste prevention and reduction are placed at the top of the hierarchy to show that the best way to deal with waste is to prevent its production and where this is not possible, to produce less of it. Despite efforts by municipal authorities to improve waste management, most countries in the world still resort to strategies at the bottom of the waste hierarchy.

2.1.6 Solid Waste Disposal Methods

Indiscriminate disposal of waste by way of roadside dumping, open burning, open dumping near water bodies and dumping in a landfill are improper methods of disposal as these pose environmental hazards leading to ecological imbalances and land, water and air pollution. Moreover, a major limitation of this method is costly transportation of SW to distant landfill sites.

Down gradient surface water gets polluted by surface runoff in the absence of proper drainage[5] systems and contaminate groundwater aquifers due to a lack of proper leachate collection and treatment systems. An inefficient gas recovery process emits two[6] major greenhouse gases into the atmosphere.

Sanitary Land Filling[7] is a necessary component of SWM, since all other options produce some residue which must be disposed of through land filling. Major improvements are required to ensure proper Sanitary Land Filling.

Urban local bodies are generally facing a major problem in finding new landfill sites. Moreover, the cost of construction, operation and maintenance of an engineered landfill is also high.

An efficient treatment of waste at every stage, i.e., from collection to disposal is essential, which includes processing through composting, incineration, bio-methanation and gasification.

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5 A system to collect leachate generated due to natural decomposition of stockpiled solid waste.

6 Carbon Dioxide and Methane.

7 Sanitary land filling means the final and safe disposal of residual solid waste and inert wastes on land in a facility designed with protective measures against pollution of ground water, surface water and fugitive air dust, etc.

This Performance Audit report brings out efforts made by ULBs for SWM in the State and also highlights the shortcomings in their efforts.

2.1.7 Ranking of the State in Solid Waste Management

The Central Pollution Control Board ranked the States and UTs in SWM services in 2019-20 and 2020-21 based on various parameters relating to SWM, such as waste processing, gaps in waste management, best practices in SWM, dumpsites reclaimed, environmental monitoring etc.

Out of 35 States and UTs, Punjab's rank was 30th and 29th during 2019-20 and 2020-21 respectively in SWM. In 2021-22, the CPCB report did not include an overall ranking, however, it provided State-wise progress on waste processing and treatment. Punjab ranked 26th out of 35 States and UTs in this category. It is, therefore, of utmost importance to take effective measures to improve SWM components such as collection, segregation and processing of solid waste to minimise the hazardous effects of waste.

2.1.7.1 Ranking of State ULBs in Swachh Survekshan

Ministry of Housing and Urban Affairs (MoHUA), releases the Swachh Survekshan (SS) ranking every year with the objective to encourage citizen participation and create awareness amongst all sections of society about the importance of working towards making towns and cities a better place to live in. The ranking considers several parameters including Service Level Progress (SLP), which accounts for 40 *per cent* of the total weightage. SLP includes segregated collection, processing and disposal of MSW and sustainable sanitation. MoHUA releases national ranking in two categories, one for Cities with a population of 1-10 lakh and one for cities with more than 10 lakh.

Out of 166 ULBs in the State, only two ULBs[8] had a population of more than 10 lakh and both were selected in the Performance Audit. These ULBs contribute approximately 37 *per cent* of the MSW in the State.

Out of a total of 45 ULBs in the country that participated in the SS rankings in the year 2022, in the category of ULBs with more than 10 lakh population, Ludhiana and Amritsar were ranked 40th and 32nd, respectively.

Similarly, out of a total of 380 ULBs that participated in the category of ULBs with a 1-10 lakh population, 13 ULBs[9] were from Punjab. Out of these, four ULBs (i) Ferozepur; (ii) SAS Nagar; (iii) Bathinda; and (iv) Moga were selected in the sample. They were ranked 64th, 113th, 132nd and 309th respectively.

[8] (i) Ludhiana; and (ii) Amritsar.

[9] (i) Ferozepur-64; (ii) SAS Nagar-113; (iii) Bathinda-132; (iv) Moga-309; (v) Abohar-78; (vi) Patiala-117; (vii) Jalandhar-154; (viii) Barnala-172; (ix) Hoshiarpur-191; (x) Pathankot-195; (xi) Muktsar-196; (xii) Malerkotla-198; and (xiii) Khanna-245.

Further, in 2023, SS rankings were issued for categories of ULBs with populations of more than one lakh and less than one lakh. In the category of ULBs with a population of more than one lakh, out of a total of 446 participating ULBs, Amritsar and Ludhiana secured 142nd and 207th ranks, respectively. The rank of other four selected ULBs was SAS Nagar 82nd, Bathinda 121st, Ferozepur 127th and Moga 246th.

The lower ranking of the State's ULBs is indicative of the need for improvement in the management of solid waste facilities in respect of collection, segregation, transportation and processing.

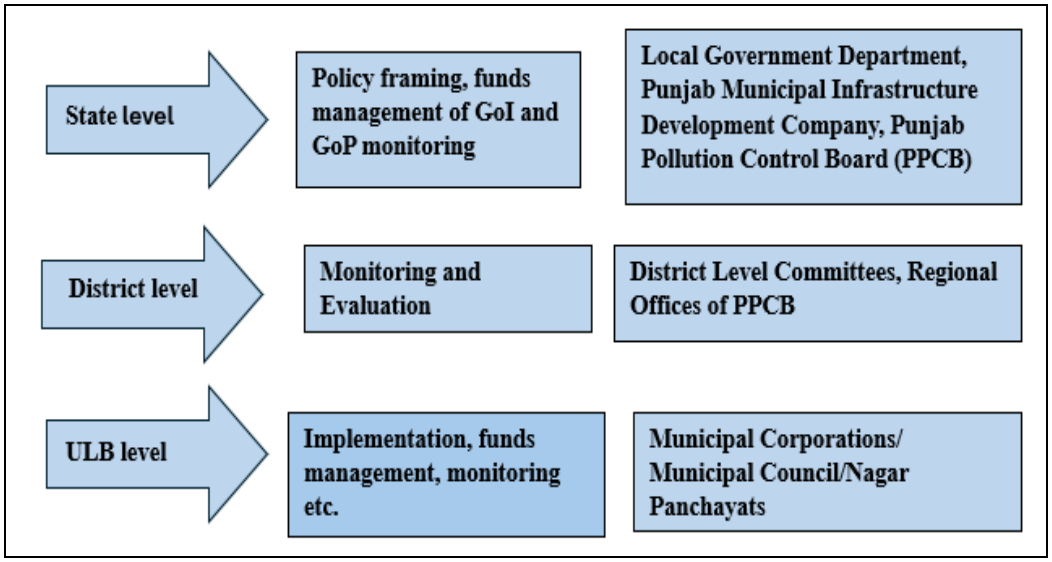
2.2 Audit Framework

2.2.1 Administrative Control and Monitoring of Solid Waste Management

With growing urbanisation and changing lifestyle, the generation of waste and its appropriate disposal poses a challenge for the State at different levels. Though SWM is a State subject, it is basically a municipal function and as such ULBs are directly responsible for performing this important activity. The 74th Amendment of the Constitution also envisages that the ULBs should shoulder this responsibility. The ULBs are, therefore, required to plan, design, operate and maintain the SWM system in their respective cities/towns.

The role of various authorities at all levels in planning, execution and monitoring of Municipal Solid Waste Management is depicted in **Figure 2.2.**

Figure 2.2: Role of various authorities

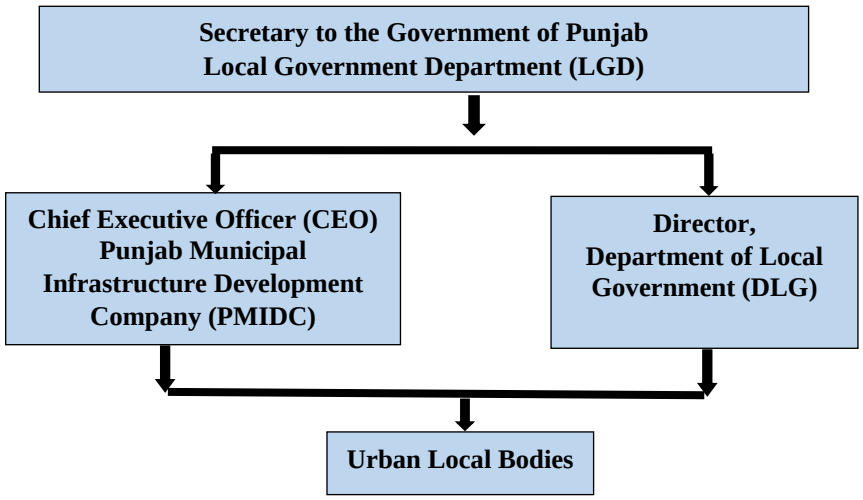


Source: Departmental data

2.2.2 Organisational Set-up

The organisational setup for SWM at different levels in Punjab is exhibited in Figure 2.3:

Figure 2.3: Organisational setup of SWM in Punjab



The Secretary, LGD, is the administrative head of the Department and also functions as Managing Director of Punjab Municipal Infrastructure Development Company (PMIDC), which had been identified as the nodal agency for implementation of SWM component of the Swachh Bharat Mission (SBM). The Municipal Commissioner and Executive Officers are the administrative heads of the Municipal Corporation and Municipal Council/ Nagar Panchayat, respectively, and are responsible for Municipal Solid Waste Management in their respective areas.

The Punjab Pollution Control Board (PPCB) is the designated agency for enforcing and reviewing of implementation of SWM Rules in coordination with LGD[10].

2.2.3 Audit Objectives

The Performance Audit was conducted to assess whether:

1. Strategy and planning of SWM in ULBs is commensurate with the waste(s) generated and concurrent with the prevailing legal framework;
2. Municipal tasks associated with SWM, including collection, segregation, storage, transportation, disposal and social inclusion of informal waste workers, were effective, efficient and economical;
3. Identification, implementation, operation and maintenance of SWM projects in ULBs was effective, efficient and financially sustainable; and

[10] As per rule 16 of SWM Rules, 2016.

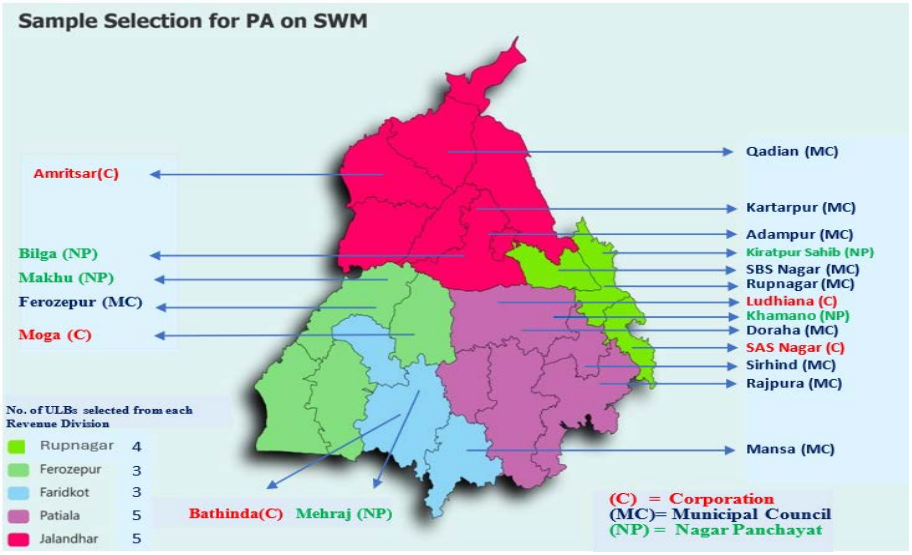
4. Monitoring and evaluation of the SWM system, including the adequacy of awareness creation, citizen engagement for effecting behavioral change, assessment of environmental impacts and implementation of the "internal control and monitoring mechanism" was adequate and effective.

2.2.4 Audit Scope and Methodology

The Performance Audit on Solid Waste Management by ULBs in Punjab, covering the period 2017-22, was conducted between August 2022 and March 2023. The focus was to analyse the data and information made available to Audit by the Director, Local Government Department (DLG), PMIDC, selected ULBs and PPCB with reference to the SWM Rules/ Manual and assess the ground-level performance.

The State has been divided into five Revenue Divisions (RDs) in which a total of 166 ULBs {13 Municipal Corporations (Corporations), 101 Municipal Councils (MCs) and 52 Nagar Panchayats (NPs)} are functioning.

Figure 2.4: Map depicting coverage of ULBs in all Revenue Divisions



To achieve the Performance Audit objectives, out of 166 ULBs, 20 ULBs {five Municipal Corporations (one from each RD), 10 MCs (10 *per cent)* and five NPs (10 *per cent*)} were selected (covering 44 *per cent* of the total expenditure of the State on SWM and 32 *per cent* revenue generated)[11] for detailed examination. The selection was done by adopting a random sampling method through IDEA software. Joint Physical Visit (JPV) of 25 dumpsites including waste processing facilities[12] of MSWM was also conducted with the representatives of ULBs.

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[11] Out of total expenditure of ₹ 692.32 crore incurred in the State, selected ULBs incurred expenditure aggregating ₹ 306.87 crore (discussed in detail in *Paragraph 2.4.1*). In 166 ULBs ₹ 3.70 crore was generated as revenue from the SWM services out of which ₹ 1.20 crore was generated in the selected ULBs.

[12] Sanitary Land Fills (SLFs), Material Recovery Facilities (MRFs), Compost pits etc.

An entry conference for the Performance Audit was held (October 2022) with Chief Executive Officer (CEO), PMIDC during which the audit objectives, criteria, scope and methodology were discussed. The exit conference for the PA, to discuss audit findings, was held (July 2023) which was attended by Secretary, LGD and CEO, PMIDC.

2.2.5 Audit Criteria

The sources of audit criteria were:

- Manual of Municipal Solid Waste Management, 2016 and Solid Waste Management Rules, 2016;
- Construction and Demolition Waste Management Rules, 2016;
- Performance parameters set out in Service Level Benchmarking Guidelines;
- Operational Guidelines for implementation of recommendations of 14th &15th Finance Commissions;
- Instructions/ orders of National Green Tribunal; and
- Instructions and guidelines issued by the Central Pollution Control Board, State Pollution Control Board, Government of India/State Government, PMIDC on SWM from time to time.

2.2.6 Audit constraints

There was no practice of keeping full and proper records of the collection, segregation, transportation, processing and disposal of solid waste in most of the selected ULBs. Therefore, Audit had to rely on the records and information made available by the Department as well as the ULBs.

2.2.7 Acknowledgement

We acknowledge the cooperation and support extended by the Department of Local Government, Punjab and the Urban Local Bodies during Audit.

2.3 Strategy and Planning

Municipal Solid Waste Management (MSWM) is primarily a municipal function[13] and it is mandatory for municipal authorities to perform this service efficiently to keep the cities and towns clean by processing the waste and disposing of the residual MSW in an environmentally acceptable manner.

Municipal Solid Waste Management Manual, 2016 delineates the planning process for the MSWM services into a seven-step process to be undertaken by ULBs so as to ensure compliance with SWM Rules and other guidelines provided by GoI and Government of Punjab (GoP). Audit framed the

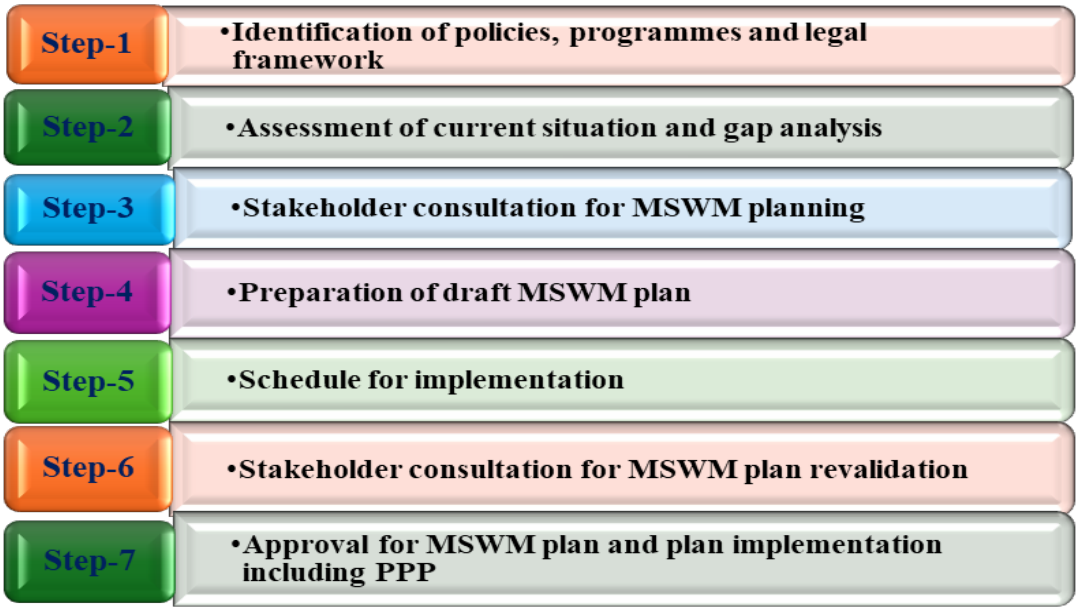
[13] Under Section 276 of the Punjab Municipal Corporation Act, 1976 and 12th schedule of 74th Constitution Amendment Act, 1992.

following objective to assess the effectiveness of the planning process in MSWM:

"Whether Strategy and Planning of Solid Waste Management was commensurate with the wastes generated and concurrent with the prevailing legal framework."

The seven steps of planning are given in **Figure 2.5**.

Figure 2.5: Seven-steps approach for developing SWM Plan



Source: MSWM Manual, 2016

2.3.1 Policies, Programmes and Legal Framework

2.3.1.1 Formulation of Solid Waste Management Policy

The State Governments were required to prepare their State Policy and Strategy for SWM within one year of notification of the Rules by GoI in terms of Rule 11 (1) (a) of SWM Rules[14], 2016. Accordingly, the State Policy was required to be prepared by April 2017. However, GoP notified the State Policy in July 2018, with a delay of 15 months from the scheduled date.

The action plans of all the selected ULBs were prepared after the notification of the policy, between August 2018 and December 2019. Subsequently, the ULBs initiated the creation of infrastructure essential for solid waste processing including establishing Material Recovery Facilities (MRFs) for recovery of recyclables from waste, construction of compost pits for processing wet waste, procuring machinery such as trommels and mechanical separators for bio-remediation of legacy waste and construction of Sanitary Landfill Sites etc. as discussed in ***paragraphs 2.4.3.3***, ***2.4.5.2***, ***2.4.5.5*** *and* ***2.4.5.6***. As a result, the percentage of waste processing, which was merely

[14] Notified on 08 April 2016.

20 *per cent* upto 2018-19, witnessed substantial improvement in subsequent years as discussed in ***paragraph 2.4.2***.

2.3.1.2 Construction and Demolition (C&D) Waste Management Policy

As per the GoI report[15] on Circular Economy in Municipal Solid and Liquid Waste, the average generation of C&D waste is about 12 million tonnes per year i.e., 20-25 *per cent* of total MSW generated in the country. This C&D waste is usually disposed in landfills or dumped along roads or other public areas in an unauthorised manner. C&D waste from households (HHs) also found its way into nearby municipal waste bins making waste heavy and degrading its quality for treatment such as composting or energy recovery.

As per CPCB report (2021-22) on implementation of SWM Rules, 2016, the quantum of solid waste generation in Punjab was 4,222 metric ton per day (TPD) or about 15,41,030 MT per year. Thus, on a conservative estimate, C&D waste generation in the State was 3,08,206 MT during that year.

Exhibit 1: Unprocessed C&D waste lying at dump site in Sirhind

In terms of Rule 13 of SWM Rules, 2016, read with Schedule III of C&D Waste Management (CDWM) Rules, 2016, the State Government was required to frame its policy for CDWM within 12 months from the date of notification (29 March 2016) of CDWM Rules. The State, however, notified its Policy in August 2020, with a delay of more than three years from the scheduled date. The instructions for utilisation of C&D waste were issued to ULBs in November 2021.

Audit observed that C&D waste processing machinery was acquired by ULBs only after the implementation of the C&D Policy. The utilisation of C&D waste machinery and the use of processed material has been discussed in ***paragraph 2.5.6***.

2.3.1.3 Delay in framing of bye-laws

Rule 15 (e) of SWM Rules, 2016 provides that all the ULBs would frame their bye-laws incorporating the provisions of these Rules within one year from the date of notification (April 2016) of rules and ensure their timely implementation.

Audit observed that the bye-laws were prepared by the selected ULBs between September 2018 and August 2020. The Local Government Department (LGD) also notified "The Punjab Solid Waste Management, Cleanliness and

[15] Circular Economy in Municipal Solid and Liquid Waste by Ministry of Housing and Urban Affairs, GoI (published in June 2021).

Sanitation byelaws 2020" on 11 August 2020 to facilitate the ULBs and ensure uniform bye-laws across the State. The bye-laws were framed with delays ranging between 17 and 40 months by ULBs. This led to issues related to SWM, such as collection of user charges, littering of waste in water bodies, segregation of waste, management of existing/old dumpsites, etc. not being addressed more effectively as detailed in ***paragraphs 2.4.1.7***, ***2.4.2.6***, ***2.4.3.1*** *and* ***2.4.5.4***.

PMIDC attributed (August 2022 and January 2024) the delay in formulation of SWM policy to administrative reasons for the delay in the framing of bye-laws, it was stated that the PMIDC worked out details, examined the bye-laws of other States/UTs and administrative orders/ instructions of Hon'ble National Green Tribunal leading to delay in framing of bye-laws.

2.3.2 Assessment of current situation and gap analysis

2.3.2.1 Assessment of waste generation

The Municipal Solid Waste Management Manual states that it is essential to assess quantities of waste generated to establish adequacy of existing systems and to plan for augmentation of treatment and disposal facilities. Wastes moving through the system have to be quantified at multiple locations to assess the actual quantities of wastes available for processing and direct disposal.

Towards this end, the ULBs were required to prepare their short-term as well as long-term plans for assessment of quantum of waste. To enable ULBs to prepare their short-term solid waste management plans, storage bags sufficient for three to seven days were to be distributed to 100 representative sampling locations per 1,00,000 population including all type of waste generators[16]. The waste collected from each category of waste generator was thereafter to be sorted category-wise and segregated component-wise and each component weighed separately to arrive at the waste composition generation in different categories of waste generators. For long-term planning, the average amount of waste disposed by a specific class of generators was to be estimated by averaging data from several samples collected continuously for seven days at multiple representative locations within the ULB's jurisdiction in each of the three main seasons (summer, winter and rainy).

Audit observed that the procedure prescribed for assessing the quantum of waste generated was not adopted by any of the selected ULBs. However, the selected ULBs prepared their Action Plans for SWM during August 2018 to December 2019 and also submitted Annual Reports[17] (ARs) on SWM to the

[16] Households of low, medium and high-income levels, commercial establishments, institutional generators, hotels, function house, vegetable markets, sports complexes, places of worship etc.

[17] Form-IV as per rule 24 (2) of SWM Rules 2016.

higher authorities[18]. In both these documents, the waste generation in terms of Grams Per Capita Per Day (GPD) was incorporated without any assessment. The waste generation incorporated in these documents was compared with the information provided to Audit by the ULBs ***(Appendix* 2.1)** and status of the same for the period 2017-22 is in **Table 2.1** below.

Table 2.1: Waste generation at selected ULBs in various documents/records

Waste Range (in GPD)

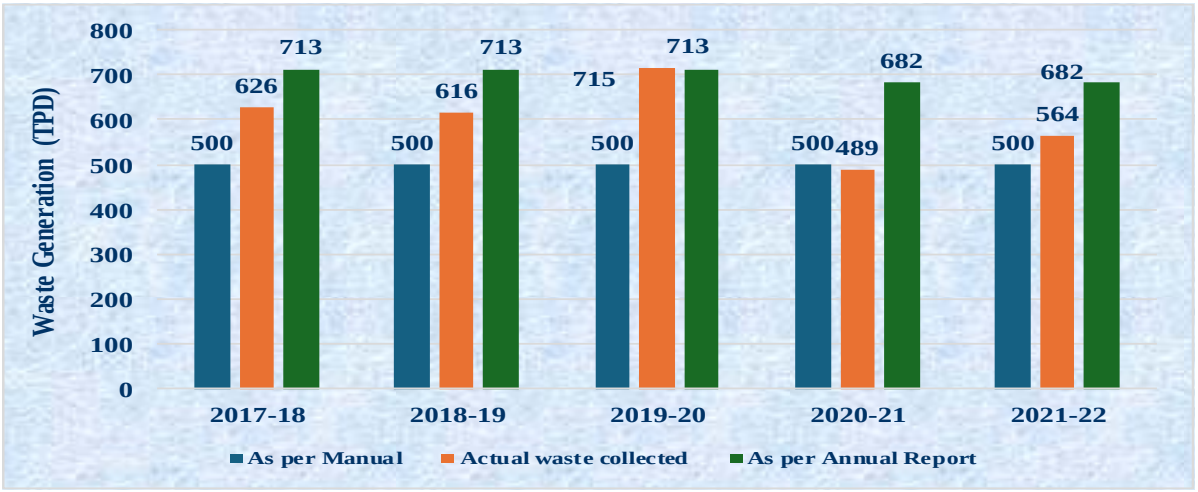
Sr. No.	Category of ULBs	Estimated Waste generation as per Manual	Waste generation taken in Action Plan	Waste generation taken in Annual Report submitted to PMIDC, PPCB and DLG
1.	Corporations	250-500	323 to 585	310 to 713
2.	Municipal Councils	250	85 to 544	119 to 630
3.	Nagar Panchayats	250	12 to 462	60 to 642

Source: Compiled from data furnished by ULBs to PMIDC, DLG and PPCB.

The variations in figures incorporated in the Action Plans as well as in the ARs for the same period can be observed from above table.

Out of 20 ULBs, actual data of solid waste collected and transported was available only for Corporation Ludhiana for the period 2017-22. Audit compared the actual waste collected with the waste generation figures mentioned in the Manual and the figures included in the ARs, as depicted in **Chart 2.1**.

Chart 2.1: Comparison of actual waste generation with generation taken in the Manual and Annual Report (TPD)



Source: Ludhiana ULB data

The waste generation figures shown in the annual reports considerably varied from the actual waste generated, except during 2019-20. This can be attributed to non-observance of the procedures as given in the Manual. It was also

[18] Higher authorities-PMIDC, Local Government Department and PPCB.

noticed, in some instances, that the ULB reported inflated waste generation figures to the higher authorities through the annual reports.

Corporation Amritsar stated (October 2024) that the waste assessment was done at the time of preparing Detailed Project Report (DPR) and assessment as required in MSWM Manual 2016 would be carried out in future. Corporation Bathinda stated that the methodology given in the Manual was not adopted to assess the waste generation. The remaining 18 ULBs[19] stated that sampling was not done as per the method given in Manual because quantifying waste is a technical area. The replies were not acceptable, as the ULBs did not follow the procedure specified in the MSWM Manual to determine the actual quantity of waste generated.

2.3.2.2 Non-assessment of waste composition

Paragraphs 1.4.3.3 and 1.4.3.3.2 of the MSWM Manual, 2016 provide that each ULB should assess the composition of waste generated to plan and design effective MSWM systems. The composition of Municipal Solid Waste (MSW) generated in a ULB determines the collection, processing and disposal options that could be adopted. MSW composition and characteristics vary considerably, not only between cities but also within a ULB. Daily, seasonal and temporal fluctuations are usually observed. MSW is heterogeneous in nature and consists of varied waste fractions, requiring multiple samples at multiple locations.

Audit observed that in 17 out of 20 selected ULBs, the composition of waste was not assessed. Three ULBs, i.e., Amritsar[20], Bathinda[21] and Ludhiana[22] were the only exceptions that assessed the waste composition while preparing the DPRs prior to the implementation of the SWM Rules 2016.

Exhibit 2: Mixed waste lying at dumpsite SBS Nagar

Three ULBs[23] stated (October 2024) that waste composition was assessed while preparing the DPRs. MC Mansa stated that the process given in the MSWM Manual 2016 would be adopted in

[19] (i) Moga; (ii) Adampur; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Mansa; (vii) Rajpura; (viii) SBS Nagar; (ix) Rupnagar; (x) Sirhind; (xi) Bilga; (xii) Khamanon; (xiii) Kiratpur Sahib; (xiv) Makhu; (xv) Mehraj; (xvi) SAS Nagar; (xvii) Ludhiana; and (xviii) Qadian.

[20] The assessment of waste composition was recorded in DPR prepared (2016) by selecting samples which were drawn on randomly selected vehicles with 500 grams of waste collected from every third vehicle. These samples were then mixed using the quartering method to create a final sample lot of 500 kilograms which was fully assessed according to standard methods.

[21] No specific method for assessment of waste composition found adopted, only general categorisation of waste was done.

[22] The assessment of waste composition was recorded in DPR prepared (February 2014) by collecting five samples each from existing MSW disposal site (Jamalpur and Jainpur) and from residential, commercial, industrial as well as market area of each zone of Ludhiana city.

[23] (i) Amritsar; (ii) Bathinda; and (iii) Ludhiana.

future. The remaining 16 ULBs[24] stated that the waste composition was taken in the Action Plan for SWM as per the template distributed by the PMIDC to all ULBs in Punjab.

Replies of the three ULBs referred above confirmed that the methodology adopted for assessment of waste composition was not as per the MSWM Manual 2016. Replies of the other 16 ULBs are not satisfactory as they adopted the waste composition figures from the template distributed by PMIDC instead of assessing the waste composition by observing the procedure prescribed in the Manual.

Due to non-determination of composition of solid waste, capacity of installation of waste management equipment and infrastructure could not be planned efficiently.

2.3.3 Non-consultation with stakeholders in planning and validation process

SWM Rules, 2016, read with paragraph 1.4.7 of the MSWM Manual, provide that the Urban Development Department is responsible for preparing a State policy and SWM strategy in consultation with stakeholders[25], followed by plan validation with the stakeholders. The State SWM Policy was notified (July 2018) without involving any internal or external stakeholders in its preparation as well as in planning. The Department had not initiated any scheme for the registration of waste pickers and waste dealers. Further, the Action Plans prepared by the ULBs during August 2018 to December 2019 were neither validated from any stakeholder to obtain their inputs nor was any stakeholder committee formed in the ULBs.

In respect of stakeholders' involvement in the planning process, seven ULBs[26] stated (October 2024) that internal stakeholders were involved in the district-level meeting on SWM and external stakeholders would be involved in due course and 13 ULBs[27] stated that the internal and external stakeholders would be involved in the preparation of the revised plan. Further, PMIDC did not provide any reply in this regard. These replies confirm that stakeholders were not involved during the planning stage.

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[24] (i) Moga; (ii) Adampur; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Rajpura; (vii) SBS Nagar; (viii) Rupnagar; (ix) Sirhind; (x) Bilga; (xi) Khamanon; (xii) Kiratpur Sahib; (xiii) Makhu; (xiv) Mehraj; (xv) SAS Nagar; and (xvi) Qadian.

[25] Internal stakeholders: Representative of ULB, Town Planning Department, Water Supply and Sanitation Department and External stakeholders: Households, Informal sector, NGOs, Community Based Organisations, Women's groups, Secondary Schools, and College students.

[26] (i) Doraha; (ii) Ferozepur; (iii) Rajpura; (iv) Rupnagar; (v) Sirhind; (vi) Khamanon; and (vii) SAS Nagar.

[27] (i) Mehraj; (ii) Adampur; (iii) Kartarpur; (iv) SBS Nagar; (v) Makhu; (vi) Amritsar; (vii) Moga; (viii) Bilga; (ix) Mansa; (x) Ludhiana; (xi) Bathinda; (xii) Qadian; and (xiii) Kiratpur Sahib.

In respect of involvement in plan validation, 19 ULBs[28] accepted the audit observation or assured (October 2024) that in future the stakeholders would be involved for plan validation. Corporation Bathinda did not furnish a specific reply on this matter.

Inefficient planning due to non-involvement of stakeholders deprived the Department of the stakeholder's insight and perspectives. Cases in point are the Material Recovery Facilities (MRF) at Rupnagar and the Modern Carcass Management Plant at Ludhiana, which were lying inoperative due to public protests, as discussed in ***paragraphs 2.4.3.3 and 2.5.4.1*.**

2.3.4 6Rs Approach

Solid Waste Management is a step-wise approach in order of environmental priority for different waste management options with prevention being the most preferred option and disposal the least favoured. It is closely linked to the 3Rs (Reduce, Reuse and Recycle) approach, which helps to reduce the quantity of waste, the cost associated with its handling and its environmental impacts. It was observed that in addition to these 3Rs, the State also adopted another 3Rs i.e. Refuse, Research and Re-design.

Audit observed that none of the ULBs adopted the 6Rs approach in line with the State Policy. The ULBs had planned to adopt 4Rs (refuse, reduce, re-use and recycle) principle. However, it was observed that no steps were taken to adopt 6Rs during 2017-18, as no infrastructure was created. Further, after construction of compost pits[29] during 2018-22, in all selected ULBs, approach of recycle, reuse and reduce was adopted by preparing compost from wet waste and in two ULBs[30] the segregated plastic waste was sold to recyclers. The other 'Rs' were not adopted in any of the selected ULBs.

Eight ULBs[31] reported partial adoption of the 6Rs by composting wet waste, recycling plastic and issuing challans, with plans to adopt the remaining Rs. 10 ULBs[32] cited staff shortages and stated that strategies would be developed. Corporation Amritsar stated that continuous awareness activities and installation of waste processing facilities would be carried out in future. Corporation Ludhiana stated that the 6Rs strategy would be adopted after streamlining waste management. These replies confirm that even after more

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[28] (i) Adampur; (ii) Amritsar; (iii) Doraha; (iv) Ferozepur; (v) Rajpura; (vi) Rupnagar; (vii) SBS Nagar; (viii) Sirhind; (ix) Bilga; (x) Ludhiana; (xi) Makhu; (xii) Mehraj; (xiii) Qadian; (xiv) Moga; (xv) Khamanon; (xvi) Kiratpur Sahib; (xvii) Kartarpur; (xviii) Mansa; and (xix) SAS Nagar.

[29] Construction of compost pits is essential for processing of biodegradable waste for further production/generation of compost.

[30] (i) Mehraj; and (ii) Rupnagar.

[31] (i) Adampur; (ii) Kartarpur; (iii) Kiratpur Sahib; (iv) Bilga; (v) Rupnagar; (vi) SBS Nagar; (vii) Moga; and (viii) SAS Nagar.

[32] (i) Doraha; (ii) Ferozepur; (iii) Rajpura; (iv) Sirhind; (v) Khamanon; (vi) Makhu; (vii) Mehraj; (viii) Bathinda; (ix) Mansa; and (x) Qadian.

than six years since the notification of the SWM policy, the ULBs had not adopted 6R approach.

Good practice

Cloth/Jute bags were distributed to encourage users to refuse/reduce the plastic bag usage in three[33] ULBs. In two[34] ULBs, steel utensils were purchased and given to the public as substitute of disposables.

2.3.5 Integration of informal waste collectors in waste management

SWM Rules recognise the role played by the informal waste collection sector, *viz.*, waste pickers, waste collectors and the recycling industry. The Rules enjoin upon ULBs to establish a system to recognise organisations of waste pickers or informal waste collectors, promote and establish a system for integration[35] of these authorised waste-pickers and waste collectors to facilitate their participation in SWM, including door-to-door collection of waste.

The State Policy for SWM proposed to empower the ragpickers and integrate them into the SWM mainstream. In the selected ULBs, 711 ragpickers and 2,682 waste collectors **(*Appendix* 2.2)** were identified as per action plans, but none of the ULBs integrated the waste collectors/ragpickers by issuing identity cards, ensuring minimum wages, welfare funds and other measures even when working through contractors. No records, as mandated under Paragraph 6.1 read with Table 6.1 of MSWM Manual regarding collection, segregation, processing etc. were found to be maintained in the selected ULBs. Therefore, the benefits arising out of such integration were not passed on to the waste pickers by any ULB. In one ULB (Kiratpur Sahib), it was seen that identity cards were issued to 45 ragpickers/waste collectors.

Thirteen ULBs[36] stated (October 2024) that informal waste collectors were not showing any interest in integrating with the mainstream chain of SWM and three ULBs[37] stated that efforts would be made to provide other social benefits to the informal waste collectors. MC SBS Nagar stated that health checkups of informal waste collectors were organised, but no other social benefits were provided. Corporation Amritsar stated that it had notified 148 ragpickers as per action plan, however, no document provided by both ULBs in support of replies. MC Mansa stated that the waste collectors were engaged

[33] (i) Mehraj; (ii) SBS Nagar; and (iii) Rupnagar.

[34] (i) Ferozepur; and (ii) Sirhind.

[35] The integration process would typically result in the accrual of social benefits to waste pickers such as; providing identity cards, receipts for transactions, ensure minimum wages when they are employed by contractors or other employers, health facilities, creation of welfare funds, prohibition of child labour from the activity and the likes and also give legal recognition to, and strengthen the informal sector systems of collection and recycling of various material.

[36] (i) Moga; (ii) Adampur; (iii) Ferozepur; (iv) Kartarpur; (v) Rajpura; (vi) Sirhind; (vii) Khamanon; (viii) Bilga; (ix) Makhu; (x) Mehraj; (xi) SAS Nagar; (xii) Doraha; and (xiii) Qadian.

[37] (i) Kiratpur Sahib; (ii) Ludhiana; and (iii) Rupnagar.

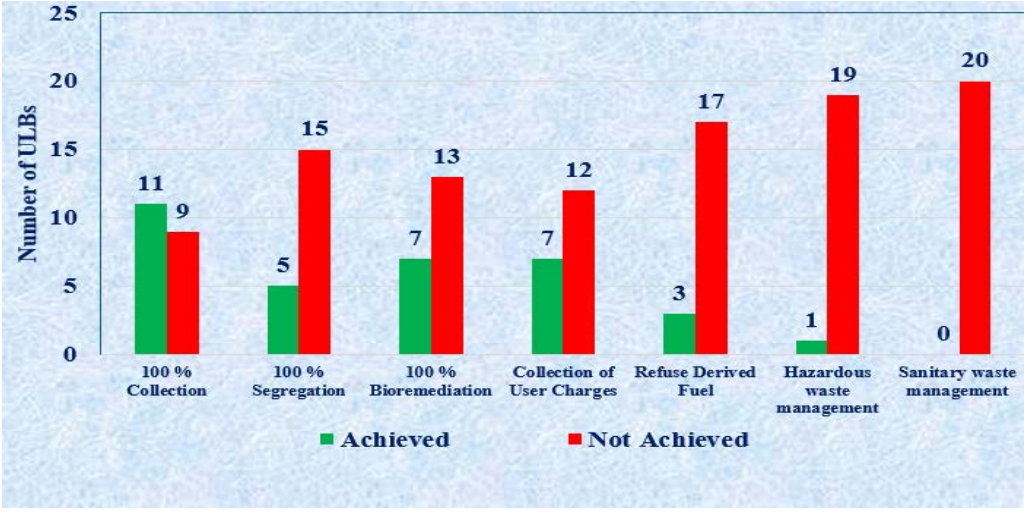
through a Society and no other efforts for integration of informal waste collectors were made. Corporation Bathinda did not furnish a specific reply on this matter.

Thus, due to lack of mechanism for integration of waste pickers, the informal waste collectors and ragpickers remained engaged in unhealthy practice of segregation of recyclable material from soiled and infected waste. Other social benefits such as legal recognition, health facilities, welfare funds etc. were also denied to them.

2.3.6 Schedule for implementation of Action Plan

Scrutiny of plans prepared by the selected ULBs showed that the schedules for implementation of various SWM activities were mentioned in the plans e.g. 100 *per cent* door-to-door collection, segregation of wastes, remediation of waste lying at dumpsites which were to be completed between January 2019 and December 2021. However, it was observed that the requisite records as defined in Paragraph 6.1 read with Table 6.1 of the Manual were not maintained in the ULBs to ascertain the status of implementation of activities within schedule time as depicted in the plan. Analysis of data ***(Appendix* 2.3)** made available to Audit is depicted in **Chart 2.2** below:

Chart 2.2: Implementation status of Action Plan activities in selected ULBs



Source: ULB data

It is further added that:

- Out of seven ULBs where 100 *per cent* bio-remediation was completed, in four ULBs[38], the bio-remediation was completed between September and December 2022 and in three ULBs[39], bio-remediation was completed but logbooks were not maintained.

[38] (i) Kiratpur Sahib; (ii) Khamanon; (iii) Makhu; and (iv) Rupnagar.

[39] (i) Qadian; (ii) Mehraj; and (iii) Ferozepur.

- Only the ULB of SBS Nagar was collecting and disposing hazardous waste separately and safely.
- Sanitary waste disposal was not ensured in any of the 20 selected ULBs. However, in six[40] ULBs, sanitary incinerators were found installed in public toilets rather than in the processing facilities.

Eighteen ULBs[41] stated that sincere efforts were being made or would be made to implement all the aspects of the Action Plan, out of which eight ULBs added that the Action Plan could not be adhered to for one or the other reasons, e.g., shortage of staff, non-availability of trained staff as well as financial resources. Two ULBs[42] did not furnish the reply.

Thus, the delay in implementation of SWM plans and late formulation of policy contributed to curtailed SWM activities.

2.3.7 Conclusion

State Government did not formulate its Solid Waste Management and Construction and Demolition Waste Management policies in the prescribed time due to which preparation of corresponding bye-laws was delayed by ULBs. Consequently, activities like waste segregation, prevention of waste littering in water bodies, management of legacy waste and establishment of Solid Waste Management infrastructure could not be addressed efficiently and promptly. Non-integration of informal waste collectors in the solid waste management system deprived them of legal recognition, health facilities, welfare funds and other benefits. Action Plans were deficient in addressing the adequate management of solid waste.

Assessment for waste generation and waste composition was not conducted in accordance with the Rules/Manual in any of the selected ULBs. Involvement of stakeholders in planning and validation of plans was not assured by ULBs.

2.3.8 Recommendation

The State Government/ ULBs may ensure:

- *the involvement of stakeholders in the planning process as required as per the Manual; and*
- *to prepare a policy for the integration of informal waste collectors in SWM and provide them legal recognition, health facilities and financial assistance.*

[40] (i) Ferozepur; (ii) Makhu; (iii) Mehraj; (iv) Sirhind; (v) Bathinda; and (vi) Kiratpur Sahib.

[41] (i) Moga; (ii) Kartarpur; (iii) Khamanon; (iv) Mehraj; (v) Adampur; (vi) Rupnagar; (vii) Kiratpur Sahib; (viii) Bilga; (ix) Makhu; (x) SAS Nagar; (xi) SBS Nagar; (xii) Doraha; (xiii) Ferozepur; (xiv) Rajpura; (xv) Sirhind; (xvi) Ludhiana; (xvii) Amritsar; and (xviii) Qadian.

[42] (i) Bathinda; and (ii) Mansa.

2.4 Effectiveness of Solid Waste Management Process

Municipal Solid Waste Management services have to be planned in a manner that they meet all statutory requirements. The solid waste needs to be managed by efficient collection, segregation, storage, transportation, processing and disposal to achieve the intended objectives of SWM. MSWM projects should be made viable by ensuring cost recovery through levy of user fee from the beneficiaries, sale of end products from processing of waste, allocation of funds from municipal internal resources and Government grants, viability gap funding etc.

To assess the effectiveness of financial resources in relation to collection, segregation, transportation and processing of MSW, following audit objective was framed:

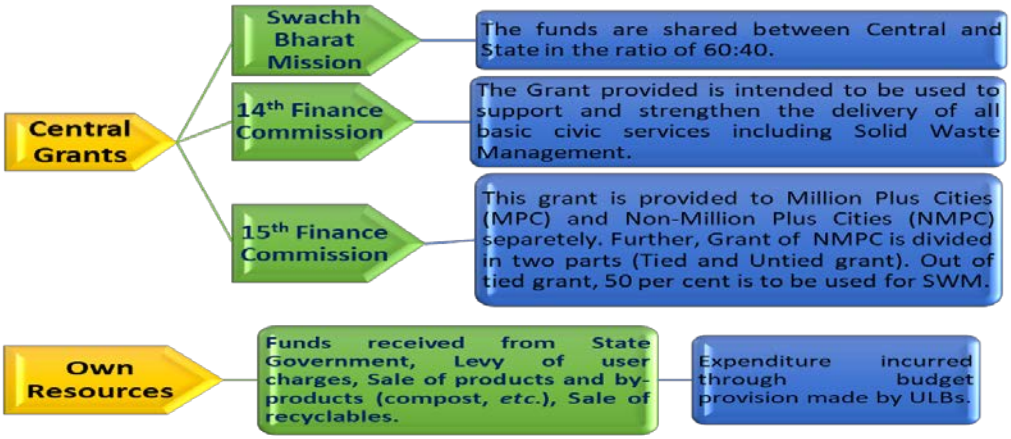
'Whether municipal tasks associated with Solid Waste Management including collection, segregation, storage, transportation, processing, disposal and social inclusion of informal waste workers were effective, efficient and economical'.

In this regard, the audit findings are detailed below:

2.4.1 Financial Management

The Urban Local Bodies in the State were dependent on Central/State Government grants besides own resources during the period 2017-22. The sources of funds for SWM are shown in **Chart 2.3**.

Chart 2.3: Sources of funds and funding pattern of various schemes



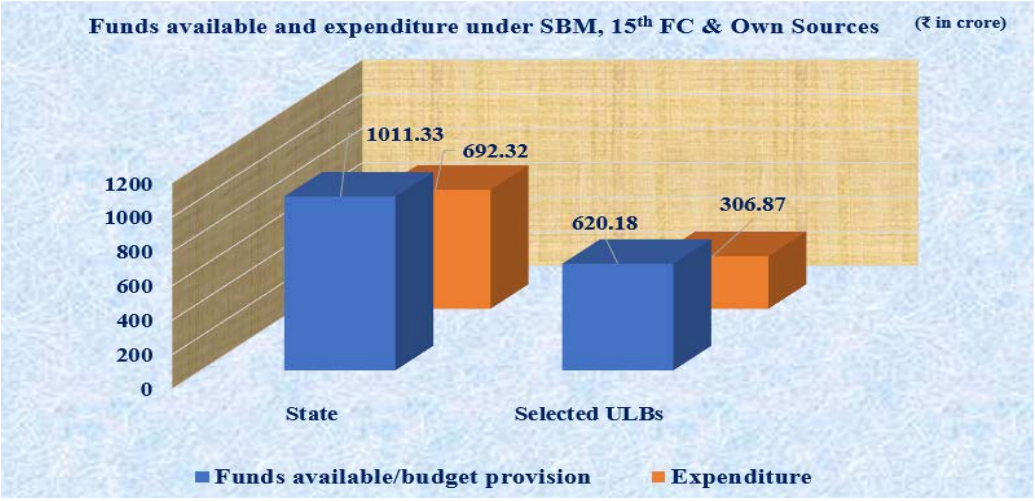
Source: Grants, scheme guidelines and budget documents of ULBs

An amount of ₹ 1,011.33 crore[43] was available with the ULBs in the State for utilisation on SWM during 2017-22, against which an expenditure of ₹ 692.32 crore[44] was incurred. In the selected 20 ULBs, ₹ 306.87 crore[45]

[43] (i) SBM - ₹ 126.94 crore; (ii) 15th FC - ₹ 223.89 crore; and (iii) Own resources - ₹ 660.50 crore.
[44] (i) SBM - ₹ 126.94 crore; (ii) 15th FC - ₹ 223.89 crore; and (iii) Own resources - ₹ 341.49 crore.
[45] (i) SBM - ₹ 41.61 crore; (ii) 15th FC - ₹ 58.79 crore; and (iii) Own resources - ₹ 206.47 crore.

(49 *per cent)* was spent out of available funds of ₹ 620.18 crore[46] as shown in **Chart 2.4**.

Chart 2.4: Details of funds available and expenditure incurred during 2017-22



Source: Departmental and ULB data

Under 14th Finance Commission (FC), ₹ 1,706.85 crore was available with the ULBs to support and strengthen the delivery of all basic civic services including SWM, out of which ₹ 115.25 crore was incurred in the State on SWM which includes ₹ 21.95 crore spent by six selected ULBs.

The scheme-wise receipt of funds and expenditure incurred there against on SWM are discussed in succeeding paragraphs:

2.4.1.1 Swachh Bharat Mission

(i) Position at the State Level

Swachh Bharat Mission (SBM), a Centrally Sponsored Scheme (CSS) was launched on 2nd October 2014. One of the objectives of the scheme is to manage the municipal solid waste scientifically. The sharing pattern of funds between GoI and GoP was decided in the proportion of 60:40. The position of funds sanctioned, received and released under SBM to the ULBs during 2017-22 is given in **Table 2.2**.

Table 2.2: Details of funding position under SBM during 2017-22

(₹ in crore)

Year	Sanctioned amount		Amount released to PMIDC		Total funds available	SS not released as at the end of the year	Funds released to ULBs by PMIDC
	GoI Share	State Share (SS)	GoI	State			
2017-18	97.38	64.92	40.00	0.00	40.00	64.92	5.04
2018-19	0.00	0.00	0.00	20.83	20.83	44.09	46.05
2019-20	77.38	51.59	39.88	28.69	68.57	66.99	44.16
2020-21	0.00	0.00	94.88	0.00	94.88	66.99	22.66
2021-22	6.64	4.43	0.00	0.00	0.00	71.42	9.03
Total	**181.40**	**120.94**	**174.76**	**49.52**	**224.28**		**126.94**

Source: Departmental data

[46] (i) SBM - ₹ 48.57 crore; (ii) 15th FC - ₹ 122.88 crore; and (iii) Own resources - ₹ 448.73 crore.

Audit noted that:

- Only ₹ 126.94 crore (57 *per cent*) was released to the ULBs despite available funds of ₹ 224.28 crore with PMIDC under the scheme during 2017-22 as the SBM was a demand-based scheme and funds were released as per demand of ULBs.
- Government of India released ₹ 174.76 crore to GoP during 2017-22 under the SWM component. The GoP released these funds to the Department after delays ranging between 64 and 1406 days beyond the prescribed 30 days from date of receipt of funds.

The Government stated (August 2023) that the Finance Department (FD) released the due State share of ₹ 71.42 lakh during 2022-23. However, no reply about reasons for non-releasing of due share in time was furnished by FD to audit.

(ii) Position in Selected ULBs

As per instructions (March 2021) of GoI, each State Government had to designate a Nodal Agency for implementation of CSS and the agency would open a Single Nodal Account (SNA) for each CSS at the State Level to keep unspent balances in it by all the implementing agencies. The position of funds sanctioned, received and released to the selected ULBs during 2017-22 is given in **Table 2.3**.

Table 2.3: Funds received and expenditure incurred by selected ULBs

(₹ in crore)

Year	Opening balance	Funds received	Funds available	Expenditure	Closing balance
2017-18	10.66	5.04	15.70	10.45	5.25 (33)
2018-19	5.25	19.00	24.25	7.17	17.08 (70)
2019-20	17.08	9.17	26.25	4.82	21.43 (82)
2020-21	21.43	2.68	24.11	12.85	11.26 (47)
2021-22	11.26	2.02	13.28	6.32	6.96 (52)
Total		**37.91**		**41.61**	

Source: ULB's Data

Note: Figures in parenthesis indicate percentage of closing balance to funds available.

Audit observed that in selected ULBs, an amount of ₹ 48.57 crore was available during 2017-22 as released by PMIDC for purchase of machinery, creation of infrastructure (MRF, Compost Pits, Sanitary Landfill, Boundary Wall, Plantation etc.) for SWM. Out of this, ULBs had incurred expenditure of ₹ 41.61 crore (March 2022) ***(Appendix 2.4)*** and remaining unutilised funds were kept with ULBs/SNA. Only three[47] ULBs spent the entire available funds of ₹ 22.71 crore. The short utilisation of available funds ranged between 33 and 82 *per cent*, due to which the shortfall in creation of

[47] (i) Amritsar; (ii) Mehraj; and (iii) SBS Nagar.

infrastructure (such as MRF, compost pits) and non-purchase of machinery were noticed as discussed in ***paragraphs 2.4.3.3, 2.4.5.2 and 2.5.6.***

The ULBs stated (October 2024) that the funds under SBM were being utilised through SNA account maintained at headquarters level. The replies are not acceptable as despite the operation of the SNA account, substantial funds available for SWM activities remained unutilised, leading to shortfalls in creation of infrastructure and machinery procurement.

2.4.1.2 Fourteenth Finance Commission

Under the 14th FC, the grants provided are intended to be used to support and strengthen the delivery of basic civic services i.e. water supply and sanitation including septic management, sewerage and solid waste management etc. and any other basic services within the functions assigned to ULBs under relevant legislation.

Audit observed that an amount of ₹ 1706.85 crore was released to ULBs during 2017-22 for basic civic services as given in Schedule-XII of 74th Constitution Amendment Act 1992, out of which ₹ 115.25 crore was incurred in the State on SWM services. Further, out of the total amount available, ₹ 645.31 crore were released to the selected 20 ULBs, out of which only six ULBs utilised ₹ 21.95 crore on SWM services and remaining 14 ULBs did not incur any expenditure on SWM services ***(Appendix 2.4)***.

Ten ULBs[48] stated (October 2024) that the funds received under 14th FC were not exclusively earmarked for SWM. Funds were not provided to ULB Kiratpur Sahib under 14th FC. Nine ULBs did not offer reply.

2.4.1.3 Fifteenth Finance Commission

The 15th Finance Commission recommended (July 2021) to release the grants (tied and untied) to the State Governments for onward transfer of funds to ULBs for improving air quality and urban drinking water supply, sanitation and SWM programmes. During 2020-22, the details of funds received and released to the ULBs for SWM (i.e. 50 *per cent* of the tied grants) are given in **Table 2.4**.

Table 2.4: Funds received and expenditure incurred under 15th FC

(₹ in crore)

Year	OB	Funds received	Total available funds	Funds released to ULBs	CB
2020-21	0	168.39	168.39	168.39	0
2021-22	0	156.00	156.00	55.50	100.50[49]
Total		**324.39**	**324.39**	**223.89**	

Source: Departmental data

[48] (i) Amritsar; (ii) Bathinda; (iii) Doraha; (iv) Ferozepur; (v) Ludhiana; (vi) Mansa; (vii) Rajpura; (viii) Rupnagar; (ix) SBS Nagar; and (x) Sirhind.

[49] This amount was received from GoI on 31.03.2022 and released to ULBs during 2022-23.

An amount of ₹ 324.39 crore was released by GoI during 2020-22, out of which ₹ 223.89 crore was transferred by GoP to the ULBs as on 31 March 2022. Out of funds released to the ULBs, ₹ 122.88 crore was disbursed to selected ULBs, of which only ₹ 58.79 crore (48 *per cent*) ***(Appendix* 2.4)*** was spent by the ULBs. Therefore, ULBs could not utilise ₹ 64.09 crore.

Sixteen ULBs[50] stated that efforts would be made to utilise the funds of SWM component whenever requirement arises. Two ULBs[51] stated that almost all the funds received under 15th FC were utilised. Two ULBs[52] utilised all the funds received.

2.4.1.3 (i) Avoidable burden of interest

The guidelines attached to grants released under 15th FC to ULBs instructed for their further release within ten working days of receipt, without any deduction. The State Government was required to release the funds with interest[53] in case of any delay beyond ten working days.

Government of India released ₹ 257.00 crore during 2020-22 under various components but the FD released the grants to the LGD for onward transfer to the ULBs after delays ranging between 12 and 83 days which led to an extra payment of interest of ₹ 2.97 crore by Government to ULBs for delayed period as detail given in **Table 2.5**.

Table 2.5: Avoidable burden of interest due to delayed release of funds

(₹ in crore)

Name of the component	Year	Funds released	Date of release by GoI	Date of release by GoP	Delay in days	Interest paid
Drinking water and Solid Waste Management (NMPC)	2020-21	122.00	05.11.2020	10.02.2021	83	2.03
Drinking water and Solid Waste Management measurement (MPC)	2020-21	45.00	05.11.2020	10.02.2021	83	0.75
1st Installment of 2021-22 for SWM and Sanitation (MPC)	2021-22	90.00	31.03.2022	02.05.2022	12	0.19
Total		**257**.00				**2.97**[54]

Source: Departmental data

Audit requested the FD (March, August 2023, February and September 2024) to give the reasons for delayed release of fund. Their reply was awaited (November 2024).

[50] (i) Adampur; (ii) Bathinda; (iii) Bilga; (iv) Doraha; (v) Ferozepur; (vi) Kartarpur; (vii) Kiratpur Sahib; (viii) Ludhiana; (ix) Makhu; (x) Mansa; (xi) Mehraj; (xii) Moga; (xiii) Qadian; (xiv) Rajpura; (xv) SBS Nagar; and (xvi) Sirhind.

[51] (i) Amritsar; and (ii) Rupnagar.

[52] (i) Khamanon; and (ii) SAS Nagar.

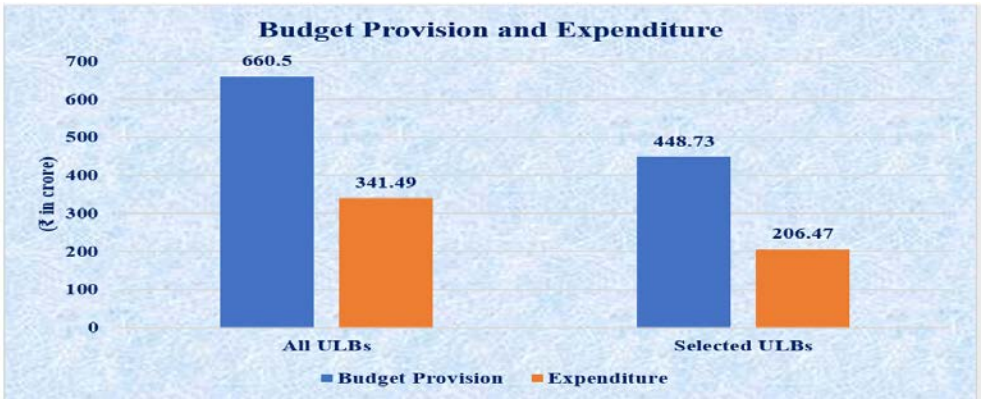
[53] Rate of interest on market borrowings/State Development Loans for previous year.

[54] Interest calculated on funds released upto 31.03.2022 and released during 2022-23.

2.4.1.4 Own Resources

Audit observed that the State ULBs made a budget provision of ₹ 660.50 crore during 2017-22 for SWM, against which an expenditure of ₹ 341.49 crore was incurred. The details of budget provision and expenditure in the selected ULBs *viz-a-viz* all ULBs of the State during the period 2017-22 are given in **Chart 2.5** below:

Chart 2.5 Details of budget provision and expenditure from own sources



Source: Departmental and ULBs data

2.4.1.4 (i) Irregular Expenditure

Municipal Council, Rajpura entered into an agreement (September 2018) with the Waste Pickers Association (WPA) for door-to-door collection and segregation of MSW. As per clause 12 of the agreement, rickshaws/ carts etc. used to carry waste would be of the WPA.

However, MC, Rajpura incurred (December 2018) an expenditure of ₹ 29.46 lakh for providing 120 tricycles/carts to the WPA against the provisions of the agreement. This expenditure was irregular.

MC, Rajpura stated (October 2024) that the agreement with WPA would be revised. However, the reply did not substantiate the rationale behind the expenditure of ₹ 29.46 lakh.

2.4.1.5 Delay in payment of Environmental Compensation

Rule 22 of SWM Rules, 2016 stipulates timelines for the creation of necessary infrastructure for the implementation of provisions of SWM rules by the local bodies on their own, directly or by engaging agencies, failing which the ULBs were required to pay Environmental Compensation (EC)[55] as per the order of the NGT (January 2020).

[55] At the rate of ₹ 10 lakh per month per Local Body for population of above 10 lakh, ₹ Five lakh per month per Local Body for population between Five lakh and 10 lakh and ₹ One lakh per month per other Local Body from 01.04.2020 till compliance.

The NGT further ordered (December 2018)[56] that in case of delay in payment of EC, interest at the rate of 12 *per cent* would also be payable. The CPCB also decided to levy interest at the rate of 12 *per cent* for the pending ECs.

The NGT observed (January 2020) that most of the statutory timelines had expired and the directions of the Hon'ble Supreme Court and NGT remained unexecuted. However, NGT decided to give an extension of three months in the time span for levy of EC from April 2020 to July 2020 as a one-time relaxation arising because of the COVID-19 epidemic. On the directions of NGT, the PPCB accordingly imposed a penal EC of ₹ 67.10 crore[57] on 163[58] ULBs of the State for non-adherence to timelines for implementation of provisions of SWM rules. The LGD deposited ₹ 20.67 crore with PPCB (July 2023) against the levied EC. Out of the total EC, ₹ 14.54 crore pertained to 20 selected ULBs, which contributed ₹ 3.77 crore towards the deposited amount (July 2023) with the PPCB. The delayed payment may entail payment of interest as per the standing orders of CPCB.

ULBs[59] stated (October 2024) that efforts were being made to manage the Solid Waste as per rules to avoid penalties. The reply did not address the issue of delayed payment of Environmental Compensation.

2.4.1.6 Irregular payment of Gap Funding

SWM Rules, 2016 made the local authorities responsible for making arrangements for the door-to-door collection of segregated solid waste from all categories of waste generators. The waste generators shall also pay user fees as specified in the bye-laws of the local bodies.

ULB Mansa outsourced (April 2019) its door-to-door waste collection to a Society registered under the Societies Registration Act, 1860. The members of the Society were Deputy Commissioner, Mansa (President), Additional Deputy Commissioner, Mansa (Member), Sub Divisional Magistrate, Mansa (Vice President) besides other officers/staff of MC Mansa. As per the resolution (July 2019) of the MC house, it was agreed to fund the gap between the user charges collected and actual expenditure incurred by the Society.

Audit observed that while agreeing to fund the gap, the MC Mansa did not evolve/ specify the mechanism to verify the expenditure incurred and the income of the Society. The Society reported (July 2019 to November 2022) only its deficiency in the collection of user charges and claimed gap payments. MC paid ₹ 65.32 lakh to the Society without verification.

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[56] OA No. 125/ 2017 of NGT.

[57] ₹ 31.84 crore (July 2020 to March 2021) and ₹ 35.26 crore (April 2021 to February 2022).

[58] As the remaining three were newly notified.

[59] (i) Adampur; (ii) Amritsar; (iii) Bathinda; (iv) Bilga; (v) Doraha; (vi) Ferozepur; (vii) Kartarpur; (viii) Khamanon; (ix) Kiratpur Sahib; (x) Ludhiana; (xi) Makhu; (xii) Mansa; (xiii) Mehraj; (xiv) Moga; (xv) Qadian; (xvi) Rajpura; (xvii) Rupnagar; (xviii) SAS Nagar; (xix) SBS Nagar; and (xx) Sirhind.

ULB Mansa accepted (October 2024) that the gap funding was paid to the Society as per provision of letter vide which the waste management was handed over to it and that in future, the gap funding would be made after proper scrutiny of the claims of the society by obtaining bill in shape of actual expenditure made by the society and actual collection of user charges.

2.4.1.7 Cost Recovery Management

The basic principle that polluter pays for waste generation, its collection and safe disposal has to be considered by ULBs for levying user or service fee for MSWM services. Rule 4 (3) of the SWM Rules, 2016 mandates that waste generators pay a user fee for SWM, as specified in the local body bye-laws. Further, MSWM projects can be made viable by ensuring cost recovery through levy of user fees from the beneficiaries. Punjab SWM Policy, 2018 also prescribed user charges to be mandatorily collected from waste generators to sustain the SWM projects.

Audit observed that in 19 ULBs[60] an amount of ₹ 204.84 crore[61] (***Appendix 2.5***) had been projected to be collected as user charges during April 2019 to March 2022[62]. Further, an amount of ₹ 328.82 crore ***(Appendix 2.4)*** was spent on SWM services, against which only ₹ 1.06 crore (0.52 *per cent*) ***(Appendix 2.5)*** was recovered[63] as cost recovery of SWM during 2019-22 (***Appendix 2.6***) as depicted in **Table 2.6**.

Table 2.6: Efficiency in collection of user charges

(₹ in crore)

Name of ULB	Ludhiana	Moga	SAS Nagar	Mansa	Rupnagar	SBS Nagar	Adampur	Makhu	Kartarpur	Kiratpur Sahib	Bilga	Mehraj	Qadian	Rajpura	Ferozepur	Sirhind	Khamanon	Bathinda	Doraha
Projected	51.97	21.84	16.38	11.22	8.97	5.61	4.5	3.81	3.45	2.1	1.08	0.87	3.3	12.33	11.97	5.16	0.85	38.31	1.12
Collected	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.04	0.11	0.01*		0.82	0.07
Not/short Collected	51.97	21.84	16.38	11.22	8.97	5.61	4.5	3.81	3.45	2.1	1.08	0.87	3.29	12.29	11.86	6.00 (5.16 + 0.84)		37.49	1.05
Shortfall percentage	100	100	100	100	100	100	100	100	100	100	100	100	99.70	99.68	99.08	99.93	99.27	97.86	93.75

Source: Departmental data

** ₹ 0.01 crore includes 0.31 lakh of Sirhind and ₹ 0.62 lakh of Khamanon.*

[60] In Amritsar, the concessionaire was involved and user charges were being collected by him.

[61] The calculation of total user charges was based on the waste generators incorporated in APSWM and minimum rates taken in bye-laws passed by State as well as by ULB.

[62] The tentative collection of user charges for the period 2017-18 and 2018-19 could not be calculated due to non-identification of waste generators for this period with ULBs.

[63] Total cost recovered was ₹ 1.20 crore which included: ₹ 0.10 crore as other recoveries; ₹ 1.10 crore as user charges (out of this ₹ 0.04 crore pertaining to 2017-19 and ₹ 1.06 crore pertains to 2019-22).

From the Table, it could be seen that 12 out of 19 (63 *per cent*) ULBs did not collect any user charges during 2019-22. The remaining seven ULBs collected nominal user charges ranging between one and six *per cent* of the projection, whereas in ULB Amritsar, the concessionaire was authorised to collect user charges.

Ten[64] ULBs stated that efforts were being made to collect the user charges from the waste collectors. Four ULBs[65] stated that they had started collecting user charges recently either directly or through agencies or by informal waste collectors. Two ULBs[66] stated that informal waste collectors were handling waste collection and user charge collection, with no detailed data available. Two ULBs[67] stated that user charges were collected partially by societies or waste pickers. Rajpura ULB stated that it was collecting the SWM user charges from Railways and an educational institution. Amritsar ULB stated that the collection rights had been extended to the concessionaire as per the SWM agreement.

The low recovery[68] of user charges not only puts extra financial burden on the ULBs but also is a pointer to inefficient cost recovery mechanism due to which the ULBs could not reduce the gap between expenditure and income from SWM.

2.4.2 Collection of Solid Waste

Collection of segregated municipal waste is an essential step in MSWM. Collection of wet, dry and domestic hazardous waste separately ensures maximum recovery of recyclables. Waste collection services are divided into primary and secondary collection.

In India, per day waste generation was 1,70,339 MT[69] (December 2021). The per day waste generation, collection and disposal efficiency (in MT) of Solid Waste Management in neighbouring State of Haryana when compared with Punjab during 2021-22 is given in **Chart 2.6**.

[64] (i) Bilga; (ii) Doraha; (iii) Ferozepur; (iv) Kartarpur; (v) Makhu; (vi) Mehraj; (vii) Moga; (viii) Qadian; (ix) Kiratpur Sahib; and (x) Sirhind.

[65] (i) Adampur; (ii) Bathinda; (iii) Khamanon; and (iv) Rupnagar.

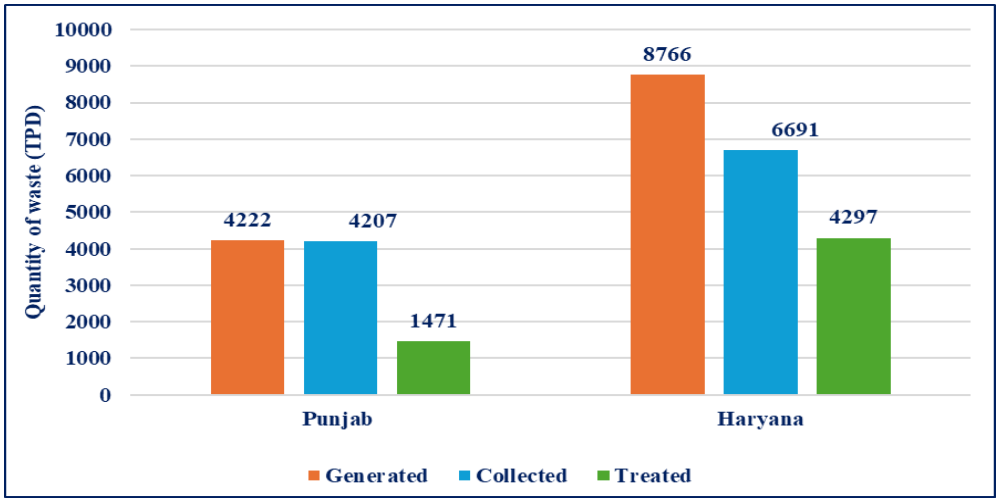
[66] (i) Ludhiana; and (ii) SAS Nagar.

[67] (i) Mansa; and (ii) SBS Nagar.

[68] ₹ 1.06 crore collected against the planned collection of ₹ 204.84 crore in 20 selected ULBs.

[69] CPCB Annual Report 2021-22.

Chart 2.6: Comparison of per day waste generated, collected and processed/treated (in MT)



Source: CPCB Annual Report 2021-22 provided by Department

The waste processing efficiency (i.e. waste processed scientifically against waste collected) in Punjab (35 *per cent*) was lower than that of Haryana (64 *per cent*), which indicates that the efficacy in processing solid waste needs to be improved.

Punjab contributes 2.48 *per cent* of waste (4,222 MT) per day to the total estimated waste generation (1,70,339 MT) of India. The waste generation, collection and its treatment in Punjab during 2017-22 is given in **Table 2.7**.

Table 2.7: Waste generation, collection and processing in Punjab

(Figures in MT)

Calendar year	Waste generation per day	Waste generation per year	Waste collection per year	Short collection per year	Processing of waste per year	Unprocessed waste at dump site
1	2	3	4	5	6	7
2017	4,632.27	16,90,779	16,41,978	48,801 (2.89)	2,54,185 (15.48)	13,87,793 (84.52)
2018	4,634.48	16,91,585	16,69,849	21,736 (1.28)	3,34,909 (20.06)	13,34,940 (79.94)
2019	4,477.54	16,34,303	16,11,092	23,210 (1.42)	7,71,047 (47.86)	8,40,045 (52.14)
2020	4,338.37	15,83,505	15,61,784	21,721 (1.37)	6,91,325 (44.27)	8,70,459 (55.73)
2021	4,221.60	15,40,884	15,35,446	5,438 (0.35)	5,36,842 (34.96)	9,98,604 (65.03)
Total		**81,41,056**	**80,20,149**		**25,88,308 (32.27)**	**54,31,841 (67.73)**

Source: Annual Reports of PPCB furnished to CPCB
Note-Figures in parenthesis indicate percentage.

The data of waste generation per day showed a decreasing trend over the period 2017-21 which was contrary to the studies quoted in MSWM Manual which estimated an increase of 1.3 *per cent* in generation of solid waste on year-to-year basis.

The Government stated (August 2023) that the ULBs had been directed to use the actual data in all their documents and reports.

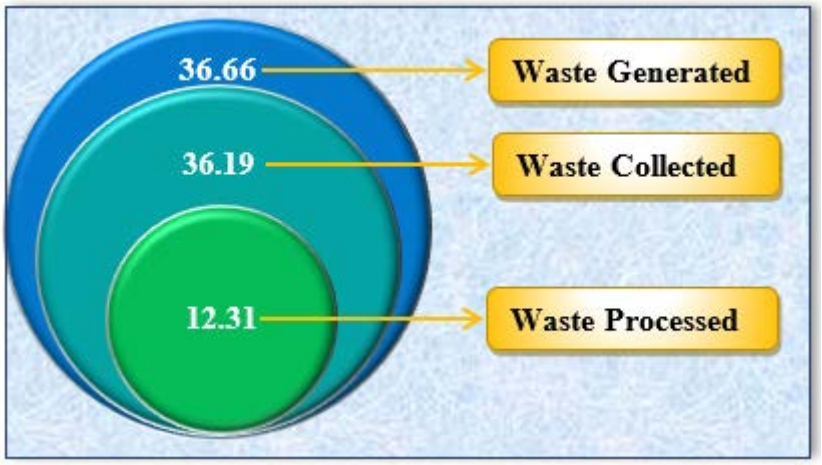
2.4.2.1 Collection efficiency in selected ULBs

The local authorities are responsible to arrange door-to-door collection of segregated solid waste from all categories of waste generators. PMIDC citing the instructions issued (February 2020) by NGT instructed for maintenance of proper records of waste collection in all ULBs.

Audit observed that the concessionaires were involved in waste management in five ULBs[70]. Out of these five ULBs, in four ULBs[71], the concessionaires left the work midway between December 2017 and February 2021. Thereafter, the collection was made by informal waste pickers or persons involved through contractors. In two ULBs[72], the waste was being collected by societies and informal waste collector association through agreement. In remaining 13 ULBs, the collection of waste was being carried out either by informal waste collectors or by engaging workers through contractors or by the ULBs themselves.

During 2017-22, in 19[73] ULBs, against generation of 36.66 lakh MT waste generated, 36.19 lakh MT was collected and 12.31 lakh MT (34.01 *per cent*) waste was processed ***(Appendix 2.7)*** as depicted in **Chart 2.7**.

Chart 2.7: Waste generated, collected and processed (MT in lakh)



Source: ULB data

Analysis of data furnished by the ULBs showed that none of them had maintained the data of collection of quantity of segregated wet waste, quantity of dry waste, quantity of compost produced, quantity of dry waste/ recyclables sold to/ sent to junk dealers etc., as specified in the format prescribed in MSWM Manual 2016 and reiterated and circulated (February 2020) by PMIDC. The data was to be maintained on a daily basis; however, no such data was maintained by the ULBs.

[70] (i) Amritsar; (ii) Bathinda; (iii) Doraha; (iv) Khamanon; and (v) Ludhiana.

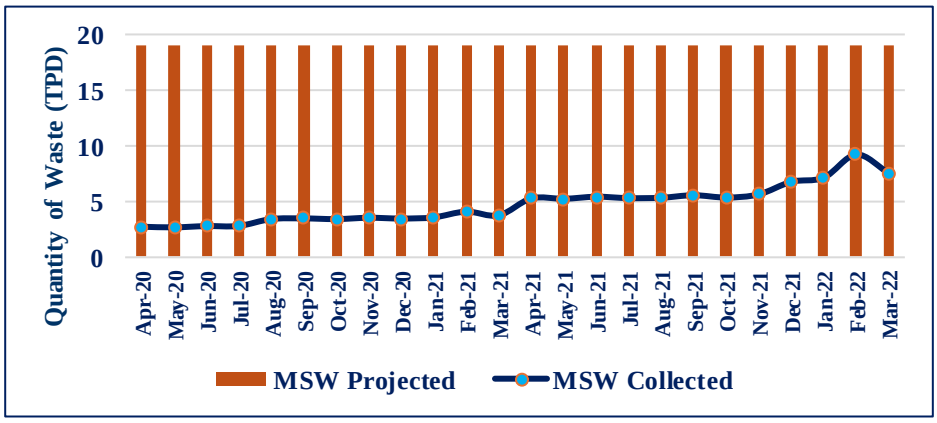
[71] (i) Bathinda; (ii) Doraha; (iii) Khamanon; and (iv) Ludhiana.

[72] (i) Mansa-by Society; and (ii) Rajpura-by Waste Collector Association.

[73] Data of waste generation for the year 2017-18 to 2019-20 was not provided by Corporation Bathinda. Hence, ULB Bathinda was not included in the comparison.

Collection and processing of waste was not done by ULB Kiratpur Sahib during 2017-18 and by ULB Mansa during 2017-20. However, the waste management in ULB Mansa was being done by a Society from April 2019, but requisite records of collection, segregation and disposal were not maintained during 2019-20. As per logbooks maintained by the Society, total 3,454 MT waste was collected during April 2020 to March 2022. The Status of waste collection during this period against the projected waste generation in ULB Mansa is depicted in **Chart 2.8.**

Chart 2.8: Waste collected (TPD) against the projected quantity in Mansa



Source: ULB data

As apparent from the chart, the collection rate in ULB Mansa ranged between 2.67 TPD and 9.26 TPD against the estimation of 19 TPD, which did not support the claim of 100 *per cent* coverage of door-to-door collections. Audit apprehends that the viability gap funding extended to the concessionaire society at Mansa was irregular ***(paragraph 2.4.1.6*** above refers).

Fifteen[74] ULBs stated (October 2024) that they were in the process of collecting the whole waste generated in their area. ULB Khamanon stated that it would make efforts to ensure that no waste was left unprocessed in the future. ULB Kiratpur Sahib stated that presently 100 *per cent* of generated waste was being collected in the ULB. The process of maintenance of the basic records had been initiated. ULB Ludhiana stated that it had no data regarding waste collection due to the involvement of concessionaire. ULB Makhu stated that the waste was being collected by the informal waste collectors. ULB Mansa admitted and replied that the Society would be instructed to maintain the record properly.

2.4.2.2 Variations in collection of waste

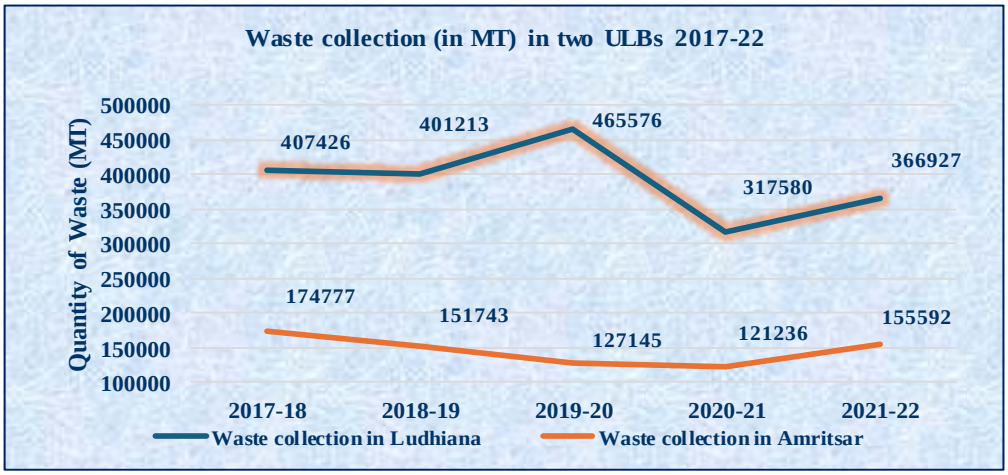
It was observed in four ULBs[75] that the payments were made to the contractors on account of waste lifted from service area to dumpsite during

[74] (i) Adampur; (ii) Amritsar; (iii) Bathinda; (iv) Bilga; (v) Doraha; (vi) Ferozepur; (vii) Kartarpur; (viii) Mehraj; (ix) Moga; (x) Qadian; (xi) Rajpura; (xii) Rupnagar; (xiii) SAS Nagar; (xiv) SBS Nagar; and (xv) Sirhind.

[75] (i) Amritsar; (ii) Doraha; (iii) Khamanon; and (iv) Ludhiana.

April 2017 to March 2022. In two[76] of these four ULBs, the lifting of waste was stopped by the concessionaire agency in January 2020 and August 2020. In the remaining two ULBs[77], the actual data of lifting of waste was available for the period 2017-22. Audit analysed this data to assess the actual collection of waste and transportation of the same from service area to dumpsite during 2017-18 to 2021-22 (**Chart 2.9)**.

Chart 2.9: Waste collected and transported in two ULBs during 2017-22



Source: ULB data

In Ludhiana, the collection of waste showed a varying trend. It increased by 16 *per cent* during 2019-20 over the lifted quantity of the year 2018-19. It decreased by 31.79 *per cent* during 2020-21 and increased by 15.54 *per cent* during 2021-22 over 2020-21. This is despite the projections of the increase in the population of ULB assumed in DPR for Integrated MSW management of Ludhiana; submitted and accepted by Corporation Ludhiana.

The collection and transportation of waste in Amritsar decreased till 2020-21 as compared to 2017-18. However, it increased in 2021-22, but it was still less than 2017-18 despite the estimate of an increase in the population of Amritsar city by almost 8.5 *per cent* (from 13,11,026 to 14,23,114 during 2017-22[78]).

The decreasing trend of waste transportation was not justifiable except for the period of 2020-21 due to COVID because the ULBs were showing almost 100 *per cent* collection in Form-IV which was not aligned with the actual waste collected/transported by the ULBs.

In reply, ULB Amritsar stated (October 2024) that the waste was being collected by the concessionaire on a daily basis and decreased waste collection was reported during 2020-21 due to COVID-19 and that the Corporation

[76] (i) Doraha; and (ii) Khamanon.

[77] (i) Amritsar; and (ii) Ludhiana.

[78] DPR for Integrated MSW management of Amritsar (February 2016) prepared and accepted by Corporation Amritsar.

would examine with the concessionaire the reasons for decreasing trends of waste collected. ULB Ludhiana stated (October 2024) that during 2020-21, waste collection decreased due to the COVID outbreak as the markets were closed and public movement was minimal. However, no specific reasons were given for the decreasing trend in 2021-22 compared to 2019-20.

2.4.2.3 Involvement of Self-Help Groups in SWM

Solid Waste Management Rules, 2016, provide that ULBs would facilitate the formation of Self-Help Groups (SHGs), provide identity cards and thereafter encourage their integration into SWM, including for door-to-door collection of waste.

Out of 20 selected ULBs, SHGs were involved in door-to-door waste collection only in three[79] ULBs. These SHGs engaged 119, 83 and 215 persons in these ULBs. The waste generators in Rajpura, Mansa and Moga were 26,713; 20,771; and 41,417, respectively, from which 48,660 MT; 3,454 MT; and 1,15,394 MT waste was collected (***Appendix 2.7***).

Fourteen[80] ULBs stated that in the future, SHGs would be involved in SWM. ULB Amritsar stated that the work of SWM was being executed through the Concessionaire. However, the Corporation had involved clubs/societies at different times but no records were available to corroborate the same. ULB Ludhiana stated that no SHGs approached ULB to engage in waste management and that whenever SHG comes forward, the ULB would take it immediately.

2.4.2.4 Non-removal of Garbage Vulnerable Points

One of the objectives of SBM-U (2.0) is to achieve Garbage Free Cities (GFC), which involves the elimination of Garbage Vulnerable Points (GVPs) which pose a significant roadblock for ULBs when it comes to keeping the city clean.

PMIDC identified and circulated (July 2022) a list of 494 GVPs located in Punjab. Of these, 96 GVPs were falling under the jurisdiction of 13 of the 20 selected ULBs (***Appendix 2.8***).

During visits to nine selected ULBs[81], 16 GVPs were found to be still existing. Further in ULB SBS Nagar, four new GVPs were found, which did not form part of the list circulated by PMIDC.

In reply, ten[82] ULBs stated that it was a common problem in ULBs and it was very difficult to remove all the GVPs. However, whenever it came to notice, it

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79 (i) Mansa; (ii) Moga; and (iii) Rajpura.

80 (i) Adampur; (ii) Bilga; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Khamanon; (vii) Kiratpur Sahib; (viii) Makhu; (ix) Mehraj; (x) Qadian; (xi) Rupnagar; (xii) SAS Nagar; (xiii) SBS Nagar; and (xiv) Sirhind.

81 (i) Ludhiana; (ii) Kiratpur Sahib; (iii) Khamanon; (iv) SAS Nagar; (v) Makhu; (vi) Sirhind; (vii) Rupnagar; (viii) Doraha ; and (ix) Qadian.

82 (i) Doraha; (ii) Kiratpur Sahib; (iii) Ludhiana; (iv) Makhu; (v) Qadian; (vi) Rupnagar; (vii) SAS Nagar; (viii) SBS Nagar; (ix) Khamanon; and (x) Sirhind.

had been removed at once. The reply was not acceptable as it was the responsibility of the ULB to prevent the formation of such GVPs.

2.4.2.5 Non-synchronisation of vehicles for collection of waste

Municipal Solid Waste Management Manual, 2016 stipulates a well-synchronised primary and secondary collection and transportation system with regular and well-communicated intervals of operation (with respect to primary collection) as essential to avoid containers' overflow and waste littering. Paragraph 1.4.5.10, therefore, advises that the choice of secondary collection vehicles is to be synchronised with the design of secondary collection bins and storage containers in the transfer station. Compactors may be used to haul waste from transfer stations to the waste disposal site.

The waste, collected by the informal waste collectors using various modes of transportation such as rickshaws (rehries), e-rickshaws and other mechanised means, was unloaded at transfer stations, secondary storage points, and MRFs. Thereafter, it was loaded on tippers or tractors using machines and transported for disposal or processing.

Scrutiny of records and physical visits of various sites of 20 selected ULBs showed that compactors were used for compaction of dry as well as wet waste to avoid multiple handling of waste only in ULB Ludhiana. In this system, the waste pickers unload the waste in the compactor, which reduces the volume of waste by compressing it, and the hook loader transports the waste in a scientific manner to the dump site. During a joint physical visit (JPV) in ULB Amritsar, two synchronised vehicles were seen for the collection and transportation of waste.

Exhibit 3: Synchronised vehicles, Amritsar

In the remaining 18 ULBs, the waste was being collected by the waste pickers using various modes of transportation such as rickshaws (rehries), e-rickshaws and other mechanised means. The collected waste was then unloaded at transfer stations, secondary storage points and MRFs. Thereafter, it was loaded on tippers or tractors using machines and transported for disposal or processing.

The collection method adopted by the ULBs indicated that the synchronisation of vehicles for collection of waste to avoid multiple handling of waste was not done. The examples of multi-handling of waste are depicted in the pictures:

Exhibit 4: Transfer Station at Chhabal Road, Amritsar

Exhibit 5: Transfer Station near MC Office, SBS Nagar

In reply, seventeen[83] ULBs stated that efforts would be made to purchase the synchronized vehicles as required. Corporation Amritsar replied that presently, most of waste is carried into the closed compactors, there were only three tippers of open body used for the transportation of the waste and that notices would be issued to the concessionaire for transportation of waste in open body vehicle or without covering. Corporation Bathinda stated that sufficient vehicles with four compartments were available with Corporation and that synchronised vehicles would be arranged in future.

Thus, non-synchronisation of vehicles resulted in multiple handling of waste, littering and improper disposal of waste which was hazardous to the workers engaged for the transfer of waste from temporary stations to dumpsites.

2.4.2.6 Dumping of waste in water bodies

The ULB is required to direct waste generators not to throw or dispose of any waste[84] on streets, open public spaces, drains, water bodies and to segregate the waste at source as prescribed under SWM Rules, 2016 and hand over the segregated waste to waste pickers or waste collectors authorised by the local body.

Scrutiny of records as well as JPV revealed that out of 20 selected ULBs, in six ULBs[85] the waste was found deposited in or near adjoining water bodies as depicted in the pictures :

Exhibit 6: Waste deposited near the pond in Mansa

Exhibit 7: Waste lying in Sidhwan Canal, Ludhiana

[83] (i) Adampur; (ii) Bilga; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Khamanon; (vii) Kiratpur Sahib; (viii) Makhu; (ix) Mansa; (x) Mehraj; (xi) Moga; (xii) Qadian; (xiii) Rajpura; (xiv) Rupnagar; (xv) SAS Nagar; (xvi) SBS Nagar; and (xvii) Sirhind.

[84] Such as paper, water bottles, liquor bottles, soft drink canes, tetra packs, fruit peel, wrappers, etc. or burn/bury waste.

[85] (i) Khamanon; (ii) Kiratpur Sahib; (iii) Ludhiana; (iv) Mansa; (v) Rupnagar; and (vi) Sirhind.

In reply, three[86] ULBs stated (October 2024) that efforts would be made to spread awareness regarding non-throwing waste in water bodies. Corporation Ludhiana stated that the Corporation had taken action to cover the bank of water bodies with walls or steel nets so that the public was deterred from throwing waste in water bodies. ULB Mansa stated that due to the non-availability of other land, the MC was dumping the waste near the water body. ULB Rupnagar stated that the IEC activities were also undertaken to educate the public about the hazards of throwing waste in open spaces.

2.4.3 Segregation of Solid Waste

Solid Waste Management Rules define segregation as sorting and separate storage for various components of solid waste *viz*; biodegradable wastes including agriculture and dairy waste, non-biodegradable wastes including recyclable waste, non-recyclable combustible waste, sanitary waste and non-recyclable inert waste, domestic hazardous waste and construction & demolition waste.

Municipal Solid Waste Management Manual advises that segregating waste at source ensures that waste is less contaminated and can be collected and transported for further processing. Segregation of waste also optimises waste processing and treatment technologies, leading to a high proportion of segregated material that could be reused and recycled.

2.4.3.1 Inefficient segregation of waste

Rule 15 (g) of SWM Rules, 2016 provides that local authorities would direct waste generators not to litter i.e. throw or dispose of any waste such as paper waste, plastic waste etc. Paragraph 6.1 of the MSWM Manual, 2016, provides that the ULBs were required to maintain the records by weighing the quantity of waste collected on a daily basis. Further, the Handbook of Service Level Benchmark (SLB) stipulates that all the ULBs were required to achieve 100 *per cent* segregation of waste. The timeline for achieving segregation of waste was revised[87] to March 2020 by NGT in December 2016.

Audit observed that though IEC activities on segregation of waste were conducted in all the selected ULBs, the requisite effect on segregation at ground level was not seen. ULBs also had not devised any mechanism to maintain the records as required under the provisions of the MSWM Manual which would have shown the improvement achieved, if any.

Audit analysed the SLB reports (***Appendix* 2.9**) for the period 2017-18 to 2018-19[88] and observed that:

[86] (i) Khamanon; (ii) Kiratpur Sahib; and (iii) Sirhind.

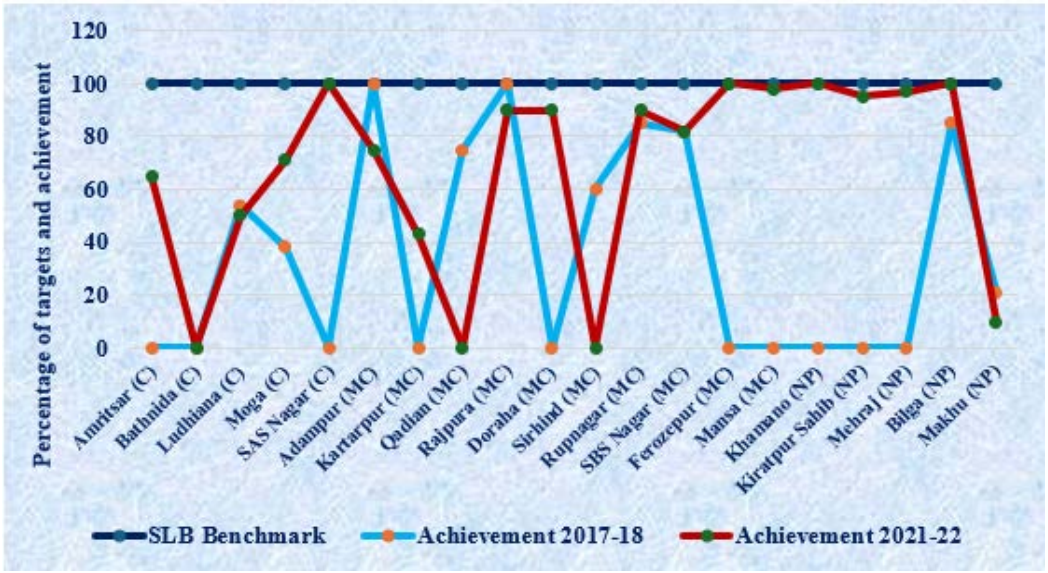
[87] As per Rule 22 of SWM Rules, the earlier timeline was March 2018.

[88] SLB reports were not provided to audit for the year 2019-20 to 2021-22.

- during 2017-18, out of 20 selected ULBs, 15 had *nil* segregation and in five ULBs[89] the segregation of waste was 20 *per cent.*
- during 2018-19, out of 20 selected ULBs, ULB Adampur had *nil* segregation, in 12 ULBs, the segregation of waste ranged between 10 and 50 *per cent and* in six ULBs[90] it ranged between 55 and 85 *per cent,* whereas in ULB Kiratpur Sahib, it was 100 *per cent.*

The selected 20 ULBs supplied data of segregation done at various[91] stages during 2017-22 (***Appendix* 2.10**). The extent of segregation in selected ULBs during 2017-18 and 2021-22 has been depicted in **Chart 2.10**:

Chart 2.10: Extent of segregation in selected ULBs



Source: Departmental data

In six ULBs, a decrease ranging between four and 75 *per cent* was noticed in the segregation of waste during 2021-22 as compared to 2017-18. Whereas in 12 ULBs, there was an improvement in the segregation of waste from 2017-18. The position of segregation remained static in the two ULBs.

It was also noticed that:

- during 2017-22, against the collection of 37.74 lakh MT waste, only 17.76 lakh MT (47 *per cent*) waste was segregated.
- out of 20 ULBs, eight ULBs[92] segregated some amount of waste in all the years. Whereas 12 ULBs had not segregated the waste and a shortfall ranging between one and four years was noticed during 2017-22.
- the percentage of segregation ranged between 12 and 98 *per cent*.

[89] (i) Amritsar; (ii) Bathinda; (iii) Ludhiana; (iv) Moga; and (v) SAS Nagar.

[90] (i) Bathinda; (ii) Doraha; (iii) Qadian; (iv) Rajpura; (v) Rupnagar; and (vi) Bilga.

[91] Segregation at source, secondary points/MRFs and dumpsites.

[92] (i) Ludhiana; (ii) Moga; (iii) Adampur; (iv) Rajpura; (v) Rupnagar; (vi) SBS Nagar; (vii) Bilga; and (viii) Makhu.

- In Ludhiana, though the segregation ranging between 50 and 96 *per cent* was made during 2017-22, the segregated waste was being transported to the dumpsite as mixed waste, which indicated a futile exercise done by ULB Ludhiana for segregation.

Further, during the JPV of 48 secondary points/MRFs and 25 dumpsites, unsegregated waste was found lying at sites, which indicated that the claims of ULBs regarding segregation of waste at source or other places were not based on reliable facts. ULBs were neither collecting 100 *per cent* segregated waste from waste generators nor segregating the waste at secondary/MRF points which would result into accumulation of legacy waste at dumpsites causing hazards for environment and public as depicted in pictures below:

Exhibit 8: Unsegregated waste lying at dump site in Sirhind

Exhibit 9: Unsegregated waste lying at dumpsite of Ludhiana

In reply, seventeen[93] ULBs replied that they were making efforts to collect the segregated waste at source. ULB Bathinda stated that waste was being collected in segregated form through the vehicles used for door-to-door collection. However, the documentary evidence in support of the reply was not furnished. ULB Ludhiana stated that the report of the segregation was submitted by the Concessionaire. The physical records for segregation, as required under the Manual, were not maintained and the same would be maintained in future. ULB Mansa stated that the segregation of waste was being done by engaging 21 workers of 3D society.

2.4.3.2 Disposal of Sanitary and Hazardous Waste

As per CPCB guidelines (May 2018), the ULBs shall send the segregated sanitary waste to available waste management options/ incinerators for final disposal/incineration. For processing/disposal of sanitary waste, various methods such as low-cost locally made incinerators, high-temperature incinerators etc. have been described depending upon the type of sanitary waste. Further, SWM Rules, 2016 provide that the local authority would

[93] (i) Adampur; (ii) Amritsar; (iii) Bilga; (iv) Doraha; (v) Ferozepur; (vi) Kartarpur; (vii) Khamanon; (viii) Kiratpur Sahib; (ix) Makhu; (x) Mehraj; (xi) Moga; (xii) Qadian; (xiii) Rajpura; (xiv) Rupnagar; (xv) SAS Nagar; (xvi) SBS Nagar; and (xvii) Sirhind.

ensure safe storage and transportation of domestic hazardous waste to the waste disposal facility.

Audit observed that none of the ULBs installed the incinerator facility at the processing/Sanitary Landfill sites for safe disposal of sanitary waste. Pictorial evidence showing instances of non-segregation of sanitary waste are given below:

Exhibit 10: Sanitary waste at MRF, near Makhu Gate, Ferozepur

Exhibit 11: Hazardous waste lying at GVP in NP Kiratpur Sahib

Small sanitary waste incinerators were seen installed in public toilets in six ULBs[94]. There was no system for separate collection and transportation of such waste[95] as seen during the JPV.

Further, it was also observed that none of the selected ULBs had collected the segregated hazardous waste separately except SBS Nagar, where the vehicle was found to be designed for a separate collection of hazardous waste besides wet and dry waste. In the remaining ULBs, the vehicles were not found designed for separate collection of waste. The hazardous waste was not being segregated and deposited at various sites.

In reply to disposal of sanitary waste, fifteen[96] ULBs stated (October 2024) that a processing facility for scientific disposal of sanitary waste would be installed. ULB Adampur stated (October 2024) that a waste incinerator had been installed at the waste processing site, which would be used after the segregation of sanitary waste. Corporation Amritsar stated that collection of waste was the responsibility of the concessionaire who had been directed to collect the segregated sanitary waste. Corporation Bathinda stated that efforts were being made for separate collection and transportation of sanitary waste. ULB Ferozepur stated that it had installed separate boxes on the new vehicles for separate collection of the same. ULB Rupnagar stated that two incinerators (five KG each) were installed at MRF for the scientific disposal of sanitary waste and efforts were being made to install a processing facility for the scientific disposal of sanitary waste of large capacity.

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94 (i) Makhu; (ii) Mehraj; (iii) Kiratpur Sahib; (iv) Sirhind; (v) Bathinda; and (vi) Ferozepur.

95 Except in ULB SBS Nagar.

96 (i) Doraha; (ii) Khamanon; (iii) Kiratpur Sahib; (iv) Ludhiana; (v) Mansa; (vi) Moga; (vii) Rajpura; (viii) SAS Nagar; (ix) SBS Nagar; (x) Sirhind; (xi) Bilga; (xii) Kartarpur; (xiii) Makhu; (xiv) Mehraj; and (xv) Qadian.

In reply to the disposal of hazardous waste, seventeen[97] ULBs stated that efforts were being made or compliance would be made in future for collection and storage of hazardous waste separately. Corporation Amritsar stated that notice would be issued to the concessionaire to start the collection of segregated hazardous waste at the earliest. Corporation Bathinda stated that the hazardous waste was collected through the vehicles designed for the same as per rules by attaching a separate box for the hazardous waste, however, no documentary evidence in support of their assertion was furnished to audit. Corporation Ludhiana stated that after the construction of all the required MRF and receiving of machinery, the processing of DHW would be strengthened and done as per the provision of the MSWM manual/rules.

2.4.3.3 Availability of Material Recovery Facilities

Rule 15 (h) of SWM Rules, 2016 provides that the ULBs should set up MRFs or secondary storage facilities with sufficient space for sorting of recyclable materials (paper, plastic, metal, glass, textile etc) to enable informal and authorised waste pickers and waste collectors to separate recyclables for further segregation and processing.

Scrutiny of records of selected ULBs revealed that during the period 2017-18, no MRF was available in any ULB. According to the records of ULBs, the MRFs were constructed during 2018 and 2022. Further, the status of availability of MRFs was analysed in the selected ULBs and found that there was a shortfall in creation of MRFs for segregation of waste (***Appendix 2.11***) as given in **Table 2.8**.

Table 2.8: Availability of MRFs in selected ULBs

Name of ULB	Moga	Ludhiana	Doraha	Mansa	Amritsar	Bilga	Rupnagar	SAS Nagar	Bathinda	Adampur	Kartarpur	Qadian	Rajpura	Sirhind	Khamanon	SBS Nagar	Kiratpur Sahib	Mehraj	Makhu	Ferozepur	Total
MRF required	16	54	3	10	10	2	3	20	1	0	1	1	4	1	1	1	1	1	1	2	133
Constructed	2	12	1	4	5	1	2	14	1	0	1	1	4	1	1	1	1	1	1	2	56
Shortfall	14	42	2	6	5	1	1	6	0	0	0	0	0	0	0	0	0	0	0	0	77
Shortfall percentage	88	78	67	60	50	50	33	30	0	0	0	0	0	0	0	0	0	0	0	0	58

Source: ULBs data

From the table it can be seen that:

- in eight ULBs, against the requirement of 118 MRFs, only 41 were constructed.

[97] (i) Adampur; (ii) Kartarpur; (iii) Rupnagar; (iv) Bilga; (v) Makhu; (vi) Mansa; (vii) Mehraj; (viii) Qadian; (ix) Doraha; (x) Ferozepur; (xi) Khamanon; (xii) Kiratpur Sahib; (xiii) Moga; (xiv) Rajpura; (xv) SAS Nagar; (xvi) SBS Nagar; and (xvii) Sirhind.

- in 19 ULBs, against the requirement of 133 MRFs, only 56 MRFs were constructed during 2018-22 leading to shortfall in construction of 77 MRFs[98] (58 *per cent*) due to various reasons[99].
- out of 56 constructed MRFs, 13 MRFs were not in use due to various reasons[100].

During physical visits, the available MRFs were mostly found in use and different types of waste i.e. papers, polythene, wood, cloths etc. were being stored in covered separate compartments after segregation. As per PMIDC report (January 2023) in 26 ULBs, against the requirement of 116 MRFs, only 63 MRFs were constructed, leaving a shortfall of 53 MRFs. In these 26 ULBs a shortfall of 12 MRFs was noticed in three ULBs[101] out of the 20 selected for audit. The Government accepted (August 2023) the facts.

Exhibit 12: Abandoned MRF in Mehraj

ULB Amritsar informed (October 2024) that one MRF at Bhagtanwala site was non-operational and would be made operational soon. However, the ULB did not offer its reply about the shortfall. Three[102] ULBs stated that the remaining MRF would be constructed to fulfil the requirements. Two[103] ULBs stated that remaining MRFs were not constructed due to non-availability of land. ULB SAS Nagar stated that requisite MRFs had been constructed and were being used to segregate the waste at secondary station. ULB Mehraj stated that the one existing MRF was in operation to segregate the waste. ULB Ludhiana did not furnish any reply.

2.4.4 Transportation of solid waste

It is essential that primary collection vehicles should meet local requirements. Before selecting a vehicle for primary collection, it was advisable to assess the amount of waste generated, local climatic conditions, topography of the area and available facilities for repair and maintenance of these vehicles.

During the test check of records, the following were noticed:

[98] Amritsar: Five; Ludhiana: 42; Moga: 14; SAS Nagar: Six; Bilga: One; Doraha: Two; Mansa: Six; and Rupnagar: One.

[99] Ludhiana: site problem or objection raised by the residents and non-calling of tenders; Doraha: Non-availability of land with MC; Mansa: due to non-availability of lands; and Rupnagar: due to public protest.

[100] Eight in Ludhiana due to non-installation of compactors; three in Amritsar due to shortage of staff; one in Rupnagar due to public protest; and one in Mehraj due to construction near schools.

[101] (i) Ludhiana: Six; (ii) SAS Nagar: Five; and (iii) Moga:One.

[102] (i) Bilga; (ii) Moga; and (iii) Rupnagar.

[103] (i) Doraha; and (ii) Mansa.

2.4.4.1 Shortage of vehicles

Solid Waste Management requires various types of vehicles, such as tippers, hook loaders, tractors, JCBs, etc. for the collection and transportation of waste from primary source to secondary storage/MRF and for further transportation to dump or processing sites. The status of the availability of vehicles in selected ULBs is given in ***Appendix 2.12***. On analysing the status, the following observations are made:

- Out of five Corporations, the requirement of vehicles was assessed by two Corporations[104] only. In other two Corporations[105], the assessment was not done and in Amritsar Corporation, the assessment was not required as the arrangement of vehicles was the responsibility of the concessionaire.
- In two Corporations[106], against the assessed requirement of 3,280 vehicles, only 1,209 vehicles (36.86 *per cent)* were available.
- Out of 10 selected MCs, four[107] had partially assessed the requirement of vehicles. Six MCs[108] had not assessed the requirement of vehicles. Thus, due to non-assessing the requirement of vehicles, the shortage of vehicles could not be ascertained in audit.
- Out of five NP[109], only Bilga NP had assessed the requirement of vehicles and remaining four NPs did not assess the same.

In reply, sixteen[110] ULBs stated (October 2024) that shortage of vehicles would be assessed and new vehicles purchased against the requirement. ULB Bathinda stated that the vehicles had now been purchased with multiuse compartments required as per SWM Rules. ULB Amritsar stated that concessionaire had been directed to depute more vehicles as per micro plan.

The replies do not address the existing shortfall in assessment and availability of waste collection and transportation vehicles.

2.4.4.2 Use of un-covered vehicles for transportation

Solid Waste Management Rules provide that the transportation of waste to processing or disposal facilities has to be mandatorily done in covered vehicles. The vehicles should have segregated containers for collection of different fractions (wet, dry and domestic hazardous). At a minimum, the vehicle should have a facility to prevent spillage of waste and leachate

[104] (i) Ludhiana; and (ii) Bathinda.

[105] (i) Moga; and (ii) SAS Nagar.

[106] (i) Ludhiana; and (ii) Bathinda.

[107] (i) Doraha; (ii) Kartarpur; (iii) Rajpura; and (iv) Qadian.

[108] (i) Adampur; (ii) Ferozepur; (iii) Mansa; (iv) Rupnagar; (v) SBS Nagar; and (vi) Sirhind.

[109] (i) Bilga; (ii) Khamanon; (iii) Kiratpur Sahib; (iv) Makhu; and (v) Mehraj.

[110] (i) Adampur; (ii) Doraha; (iii) Ferozepur; (iv) Kartarpur; (v) Khamanon; (vi) Kiratpur Sahib; (vii) Ludhiana; (viii) Makhu; (ix) Mansa; (x) Mehraj; (xi) Moga; (xii) Qadian; (xiii) Rupnagar; (xiv) SAS Nagar; (xv) SBS Nagar; and (xvi) Sirhind.

en-route to the processing or disposal facility. Further, the LGD notified (October 2020) that every local body was responsible to deploy waste collectors to collect domestic waste including hazardous/sanitary waste in separate containers installed on the waste collection vehicles.

Audit observed that out of 20 selected ULBs, in ULB SBS Nagar, vehicles were designed with four compartments in compliance with the requirements. In remaining 19 ULBs, though the vehicles had two compartments i.e. for dry and wet waste collection as per minimum criteria, but sanitary and hazardous waste was found mixed at MRF dump site.

Audit noticed that in six ULBs[111] waste was being transported in uncovered vehicles.

In reply, ULB Amritsar stated (October 2024) that notices would be issued to the concessionaire for transportation of waste in open body vehicles or without covering it. ULB Kartarpur stated that in future, covered vehicles would be used for transportation of waste. Two[112] ULBs stated that covered vehicles were used for transportation of waste. ULB Mansa stated that covers had been provided to the drivers for covering the waste during transportation. ULB Qadian stated that covered vehicles were used most of the times for transportation of waste. However, in future closed vehicles would be purchased or the vehicles would be covered properly.

The replies do not address the continued non-compliance with the requirement of transporting waste in fully covered and compartmentalized vehicles.

2.4.4.3 Non utilisation of vehicles provided for Solid Waste Management

Audit observed that in two ULBs[113], 10 E-vehicles received (December 2019) from PMIDC and one dumper placer received as a donation for SWM were not in use and lying idle at the workshop and dumpsite of the ULBs, respectively. It was also observed that these vehicles were not included in the inventory.

In reply, ULB Amritsar stated (October 2024) that these E-vehicles were used in the walled city and due to the SWM operation and lack of durability of E-vehicles in MSW operations, these E-vehicles had been discarded, however, the reply was not supported by any documentary evidence related to durability issue and approvals to discard the vehicles. ULB Sirhind stated that efforts would be made to use the idle dumper placer after necessary repair work.

2.4.4.4 Monitoring of vehicles

The Global Positioning System (GPS) is a simple and advanced management

[111] (i) Amritsar; (ii) Kartarpur; (iii) SAS Nagar; (iv) Makhu; (v) Mansa; and (vi) Qadian.

[112] (i) Makhu; and (ii) SAS Nagar.

[113] (i) Amritsar (10 E-vehicles); and (ii) Sirhind (one dumper placer).

information system and an important tool for ULBs to manage the collection and transport of MSW. It helps the SWM Department, as well as the head of the ULB, to be informed of the day-to-day performance of the services.

In the 20 selected ULBs, 714 motorised vehicles were engaged for collecting and transporting MSW. GPS was installed in 513 vehicles out of 714 vehicles (***Appendix* 2.12**) of 16 ULBs. However, route maps fixed for vehicles were not available in the concerned ULBs. Further, the GPS data was not provided to audit. This indicated the inability of ULBs to monitor the plying of vehicles despite installing GPS devices.

In reply, ten[114] ULBs stated (October 2024) that efforts would be made to install GPS on all vehicles, and data would be kept for monitoring and tracking the vehicles. Five[115] ULBs replied that GPS was installed on vehicles, but GPS data was not saved or stored. ULB Amritsar stated that although GPS had been installed in all vehicles, GPS data was not available with the corporation. The periodic record was not maintained by the concessionaire, but it would be directed to comply with the provisions of the agreement in future.

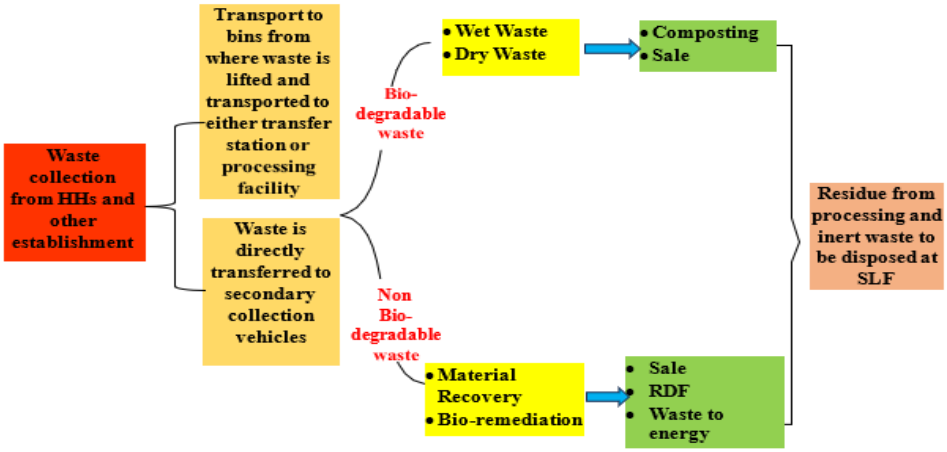
Replies confirmed that effective GPS-based monitoring of waste collection vehicles was not ensured by the ULBs during 2017-22.

2.4.5 Processing, treatment and disposal of waste

Municipal Solid Waste Management and adoption of processing technologies depend largely on the quantity and characteristics of the total waste generated in an ULB. The processing of waste includes composting, waste to energy technology and safe disposal of residual waste into landfill.

The processing of waste can be seen in the **Chart 2.11**:

Chart 2.11: Processing of waste



Source*: MSWM Manual, 2016*

[114] (i) Ferozepur; (ii) Ludhiana; (iii) Makhu; (iv) Mansa; (v) Moga; (vi) Qadian; (vii) Rajpura; (viii) Rupnagar; (ix) SAS Nagar; and (x) Sirhind.

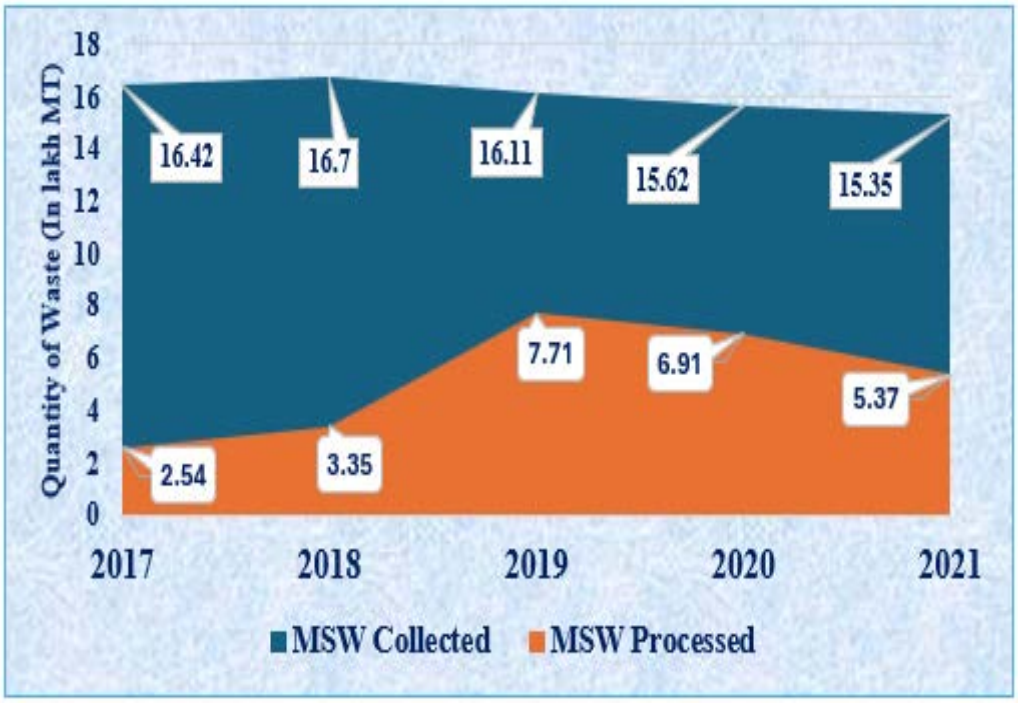
[115] (i) Adampur; (ii) Bilga; (iii) Kartarpur; (iv) Mehraj; and (v) SBS Nagar.

2.4.5.1 Non-processing of collected waste

As per Rule 15(v) of SWM Rules, the local authorities shall facilitate the construction, operation and maintenance of solid waste processing facilities and associated infrastructure on their own or with private sector participation or through any agency for optimum utilisation of various components of solid waste through adoption of suitable technology.

As per details of the composition of waste incorporated in Action Plans for Solid Waste Management (APSWM) in selected ULBs, there was ample scope to process upto 95 *per cent* waste by adopting various technologies such as composting, RDF etc. The status of waste collected and processed in the State during 2017-2021 is given in **Chart 2.12**.

Chart 2.12 Status of waste collected and processed (in lakh MT) in Punjab

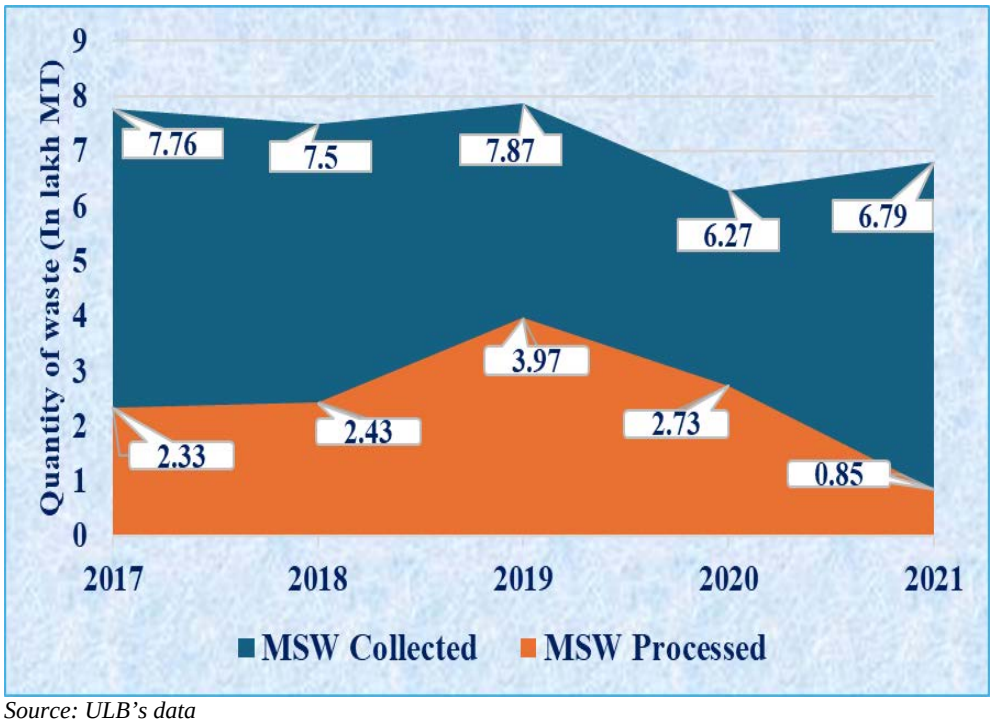


Source: PPCB Annual Reports

During January 2017 to December 2021, 80.20 lakh MT of waste was collected in the State. Of this, 25.88 lakh MT (32 *per cent*) was processed and 54.32 lakh MT (68 *per cent*) left unprocessed. The percentage of processed waste ranged from 15.48 *per cent* to 47.86 *per cent*.

In selected ULBs, the status of processed waste against the collected waste ***(Appendix 2.7)*** is given in **Chart 2.13.**

Chart 2.13: Status of waste collected and processed (in lakh MT) in selected ULBs



Source: ULB's data

In 19 selected[116] ULBs, of 36.19 lakh MT of waste collected, only 12.31 lakh MT was processed and the remaining 23.88 lakh MT of waste i.e. 66 *per cent* was left unprocessed. The percentage of total waste processed to waste collected came down from 50.44 in 2019 to 12.52 in 2021. It was due to *nil* processing done by ULB Ludhiana as the concessionaire terminated the agreement (February 2021) of Integrated Solid Waste Management ***(Appendix 2.7)***.

Fourteen ULBs[117] stated (October 2024) that the waste was being processed and would be completed in due course. ULB Amritsar stated that it collected approximately 500 MT of waste, of which 347 was managed through composting/MRF centres or by ragpickers and 153 MT of mixed waste is dumped at the dumping site. ULB Mehraj stated that it had processed all the waste lying at the dump site, however, records of waste processing were not maintained. Four ULBs[118] stated that old waste had been processed.

Non-processing of municipal solid waste had serious repercussions on the environment and human health. The unprocessed waste, which was either left to accumulate or burnt, releases harmful pollutants, such as greenhouse gases and toxic chemicals into air, soil and water.

[116] Data of waste generation for the year 2017-18 to 2019-20 was not provided by ULB Bathinda.

[117] (i) SBS Nagar; (ii) Kartarpur; (iii) Bilga; (iv) Khamanon; (v) Adampur; (vi) Doraha; (vii) Rupnagar; (viii) Rajpura; (ix) Ludhiana; (x) SAS Nagar; (xi) Qadian; (xii) Mansa; (xiii) Bathinda; and (xiv) Moga.

[118] (i) Makhu; (ii) Kiratpur Sahib; (iii) Sirhind; and (iv) Ferozepur.

The low rate of processing was due to inadequate infrastructure and under-utilisation of infrastructure, as explained in the succeeding paragraphs.

2.4.5.2 Utilisation of waste processing facilities

In the selected ULBs, apart from partial bio-remediation of legacy waste and segregation at MRFs, only the wet waste was being processed by making compost through compost pits.

(i) Two ULBs[119] did not plan to construct the compost pits due to the involvement of the concessionaire and in ULB Ludhiana though the concessionaire was involved, the ULB planned to construct 400 compost pits. ULB Amritsar constructed 67 compost pits though these were not included in the plan.

(ii) In 17 ULBs, a total of 2,239 compost pits were required, of which only 1,310 compost pits were constructed. The ULB-wise status of compost pits constructed, compost pits in use and short construction of compost pits (***Appendix 2.13***) is as under:

- Out of 17 ULBs, only five ULBs[120] constructed 241 compost pits as required.
- In five ULBs[121], against the requirement of 1,607 compost pits, only 499 compost pits were constructed, a shortage of 1,108 compost pits. In ULB Rajpura, out of 150 constructed compost pits, 80[122] were found in dilapidated condition during JPVs, out of which 71 were got repaired. Thus, due to non-availability of required number of pits, the processing of wet waste was not done effectively.
- In seven ULBs, the compost pits were constructed in excess and these were found in use during physical visit (***Appendix 2.13***).

(iii) The status of processing of waste in three ULBs[123], where the concessionaire was involved showed that, in ULB Amritsar, no composting was done during 2017-20, in ULB Bathinda, no record was produced citing that an arbitration case was pending and in ULB Ludhiana, against 15.92 lakh MT collected waste, 9.85 lakh MT waste (62 *per cent*) was processed during 2017-21 whereas, no processing was done during 2021-22 due to termination of contract (February 2021) by the concessionaire.

In the remaining 17 ULBs, it was claimed that 13,663 MT of waste was processed during 2017-18 though no facilities for composting were available with the ULBs during this period, as the compost pits were constructed during 2018-19. Thus, claims of ULBs in respect of processing of waste were not

[119] (i) Bathinda; and (ii) Amritsar.
[120] (i) Kartarpur; (ii) Doraha; (iii) Makhu; (iv) Bilga; and (v) Mansa.
[121] (i) Adampur; (ii) Rajpura; (iii) Sirhind; (iv) SBS Nagar; and (v) SAS Nagar.
[122] Constructed at a cost of ₹ eight lakh.
[123] (i) Ludhiana; (ii) Amritsar; and (iii) Bathinda.

based on facts.

In reply, six ULBs[124] stated (October 2024) that efforts would be made to construct, repair or efficiently utilise the available waste processing facilities. ULB SAS Nagar stated that as per action plan (2019) the requirement of compost pits was assessed but the requirement for more compost pits would be assessed and constructed accordingly. ULB Ludhiana stated that the plan prepared in 2019 assigned composting responsibilities to the concessionaire, leading to the non-construction of compost pits by it. ULB Amritsar stated that presently out of 67 pits, 56 pits were in use and the remaining would be used in due course. ULB Bathinda stated that it had established a 350 TDP RDF compost plant for the scientific processing of MSW. ULB Rajpura stated that out of total 80 damaged pits, 71 were got repaired.

The replies of ULBs do not address the key issues of shortfall of compost pits and poor planning as the processing/disposal facilities were inefficient as 66 *per cent* waste was left unprocessed in selected ULBs which could decompose in landfills leading to the generation of harmful gases like Methane, which is a potent greenhouse gas and contributes to climate change. Non-composting could also lead to the release of leachate, a toxic liquid that can contaminate groundwater and soil.

2.4.5.3 Undue benefit to the concessionaire in ULB Amritsar

The project of Integrated Management of Solid Waste was awarded to the concessionaire in March 2016 by ULB Amritsar. As per the agreement, the concessionaire was responsible for the management, collection, transportation, processing and scientific disposal of MSW.

Audit observed that the ULB constructed compost pits/MRFs at a cost of ₹ 1.59 crore from March 2020 to March 2021, even though this infrastructure was to be created by the concessionaire. This indicated that the concessionaire did not fulfil his obligations as per the agreement and the ULB had to incur the expenditure to construct the requisite infrastructure. Moreover, during JPV of Bhagtanwala, Chabbal Road and Chheharta processing facilities, it was noticed that the MRFs and compost pits were lying unused.

ULB Amritsar stated (October 2024) that the composting pits and MRF facilities had been constructed as per instructions of the Government for the purpose of decentralised waste processing. The reply is not justified as no such specific instructions were provided to audit.

The action of the ULB to construct the compost pits/MRFs by itself instead of getting them constructed by the concessionaire resulted in the extension of the undue benefit of ₹ 1.59 crore to the concessionaire.

[124] (i) Adampur; (ii) Sirhind; (iii) Mansa; (iv) Rupnagar; (v) Mehraj; and (vi) Qadian.

2.4.5.4 Bio-remediation of legacy waste

Bio-remediation is an environment-friendly technique to separate soil and recyclables from legacy waste. The CPCB noted that open dumps are becoming a source of pollution and the waste rotting in airless heaps produces leachate, killing vegetation and polluting groundwater. The heaps of garbage also produce Methane gas, thereby contaminating the air.

Further, Rule 22 (11) of the SWM Rules 2016 stipulates that local bodies would bioremediate or undertake capping of old and abandoned dump sites within five years from the date of notification of the Rules, i.e. by March 2021.

(i) As per information supplied (August 2022) by PMIDC, 62.35 lakh MT of legacy waste was lying unprocessed at dumpsites of ULBs in Punjab. Out of this, 33.76 lakh MT waste was at the dumpsites of the selected ULBs.

(ii) In Ludhiana, in a fire accident (April 2022) on the Jamalpur dump site, seven persons were burnt to death. The accident occurred due to the inability of the authorities concerned to bioremediate the garbage dump site on time. NGT, based on the recommendations of the monitoring committee[125], directed (July 2022) Corporation Ludhiana to deposit interim compensation of ₹ 100 crore with the Deputy Commissioner to be utilised for remedial actions as per the recommendations[126] (May 2022) besides compensation to the heirs of the deceased. Corporation Ludhiana deposited ₹ 42.86 crore from September to December 2022 by arranging funds from various sources, of which an expenditure of ₹ 5.14 crore had been incurred only on payment of tipping fees. Other recommendations of NGT's monitoring committee for SWM were not addressed till date of audit (August 2023).

Further, audit observed encroachment during JPV at Jainpur dumpsite as shown in the pictures below:

[125] The committee was setup to furnish a factual situation with regard to cause of death of seven persons in fire near Ludhiana dumpsite, persons responsible for failure, remedial action, including measure to prevent such incidents in future.

[126] Installing mechanical separator/screener, removal of garbage vulnerable points and to be beautified, operate the compactor in a scientific manner, packed wet and dry waste separately, waste deposition centres for domestic Hazardous waste, necessary agreement for lifting and management of waste generated by bulk waste generators, boundary wall and green belt, chain link fencing along the Budha Nallah, chalk out the plan for treatment of leachate generated at legacy waste dump, increase the frequency of lifting of solid waste twice in a day to remove the segregated solid waste.

Exhibit 13: Encroachment on dump site at Jainpur where legacy waste was lying

Other incidences of dumpsite fire were noticed during JPV in two ULBs[127].

Corporation Ludhiana stated (October 2024) that the work of bio-remediation is under process and will be completed soon.

Scrutiny of records of 20 selected ULBs and JPVs of processing sites showed that (***Appendix 2.14***):

- the biomining of legacy waste was not done in two ULBs[128] (March 2022).
- in 18 ULBs, no bio-remediation was carried out upto August 2020. However, bio-remediation was carried out during September 2020 to February 2023.
- in ULB Ludhiana, 21.55 lakh MT waste was accumulated at dump site Jamalpur. The work of processing was allotted (August 2022) for processing of five lakh MT waste scheduled to be completed by February 2024. Out of five lakh MT, 2.04 lakh MT legacy waste was processed (September 2023). Therefore, the ULB had no plan for disposal of remaining 16.55 lakh MT legacy waste besides accumulation of 1,100 TPD of waste.
- in ULB Doraha, 13,000 MT waste was lying at site. The work for biomining of waste was allotted (December 2021) to an agency which had processed 10,400 MT waste (June 2022). However processed waste was lying at dumpsite without its final disposal[129].
- in four ULBs[130], bio-remediation was carried out. But due to problem in constructed SLF/non-availability of SLF, the inert (residue after processing of waste) was spread over the dumpsites.

[127] (i) Amritsar; and (ii) Sirhind.

[128] (i) Moga; and (ii) Sirhind.

[129] The work was stopped as per direction of higher authority due to non-following the set procedure in allotment of tenders.

[130] (i) Kiratpur Sahib; (ii) Khamanon; (iii) Mehraj; and (iv) Qadian.

- in two ULBs[131], after biomining of legacy waste, soil/inert waste and separated polythene were found lying without final disposal.
- in ULB Ferozepur, after bio-remediation of legacy waste, the inert waste was filled in the SLF. During JPV, it was noticed that pipes for gasification[132], connection with leachate tank and covering of side walls with High Density Polyethylene (HDPE) was not found as per the specifications of SLF issued (December 2022) by PMIDC for construction of SLF. Moreover, the processed waste was spread over the dumpsite. In ULB Rupnagar, the inert waste along with clothes, sanitary napkins, diapers etc. was dumped in a temporary tranche.
- in the remaining nine ULBs[133], the bio-remediation was in progress.

Six ULBs[134] stated (October 2024) that the legacy waste had been remediated. Seven ULBs[135] stated that the processing of legacy waste was in progress. Five ULBs[136] stated that efforts would be made for bio-remediation of waste available in the ULB. ULB Amritsar stated that the concessionaire was responsible for bio-remediation of legacy waste, failing which the notices were being issued and penalties were also imposed. ULB Adampur stated that the legacy waste related to the Air Force station was to be bio-remediated, which would be completed shortly. However, the records related to waste bio-remediated/ bio-remediation in progress were not provided by the ULBs concerned in support of their replies.

The replies confirmed that the bio-remediation and closure of all dumpsites were not completed by March 2021, as per the SWM Rules. The ULBs could not adhere to the timelines and even faced environmental compensation due to non-compliance with the SWM Rules.

2.4.5.5 Non-utilisation of machinery for legacy waste

The SWM Rules provide that ULBs would facilitate the construction, the Operation & Maintenance (O&M) of solid waste processing facilities and associated infrastructure on their own or with private sector participation or through any agency for the optimum utilisation of various components of solid waste. PMIDC also directed (March 2022) the ULBs that available solid waste management machinery, mechanical separators and trommels should be optimally utilised for bio-remediation of legacy waste to avoid penalty.

Audit observed that out of 20 selected ULBs, the concessionaires were

[131] (i) Makhu; and (ii) Mansa.

[132] Vent gas emission from the SLF.

[133] (i) Amritsar; (ii) Bathinda; (iii) Ludhiana; (iv) SAS Nagar; (v) Doraha; (vi) Ferozepur; (vii) Mansa; (viii) Rajpura; and (ix) SBS Nagar.

[134] (i) Kiratpur Sahib; (ii) Makhu; (iii) Mehraj; (iv) Khamanon; (v) Ferozepur; and (vi) Sirhind.

[135] (i) Mansa; (ii) Rajpura; (iii) Doraha; (iv) Moga; (v) Bathinda; (vi) SAS Nagar; and (vii) Ludhiana.

[136] (i) Bilga; (ii) SBS Nagar; (iii) Kartarpur; (iv) Rupnagar; and (v) Qadian.

involved for managing the solid waste in three ULBs[137]. Thus, the O&M of machinery was also their responsibility. The remaining 17 ULBs purchased (July 2020 and September 2021) machinery (trommels/mechanical separators for management of legacy waste) at a cost of ₹ 185.40 lakh. However, in six ULBs[138], machines purchased during July 2020 and January 2021 were lying idle. This reflected the negligence of ULBs not only in the management of legacy waste despite the availability of machines but also resulted in an ungainful expenditure of ₹ 71.39 lakh ***(Appendix 2.15)*** on purchase.

In reply, ULB Kartarpur stated (October 2024) that the machinery would be used in future to remediate the waste as and when required. ULB Rajpura stated that the machinery was lying idle due to theft of motor. The same had been got repaired and was being utilised for the bio-remediation of legacy waste. ULB Doraha stated that the machine was lying idle due to non-availability of staff. ULB Sirhind stated the machinery was in use, but no records were maintained. ULB Mansa stated that the machinery was lying idle as the work of processing of legacy waste had been allotted to a contractor. ULB Moga stated that one machine was transferred to ULB Batala and the remaining were lying idle.

The replies were not acceptable as the SWM Rules and PMIDC directions fixed the responsibility of ULBs for ensuring optimal utilisation of machinery.

2.4.5.6 Sanitary Landfill Sites

Solid Waste Management Rules, 2016 describe Sanitary Land Filling (SLF) as the final and safe disposal of residual solid waste and inert waste on land in a facility designed with protective measures against pollution of ground and surface water, bad odour, animal menace etc. Schedule I(E)(i) of SWM Rules, 2016 provides that before establishing any landfill site, baseline data of ground water quality in the area would be collected and kept in record for future reference. SLFs were to be established by June 2020[139]. Rule 15 (w) also bound the ULBs to undertake construction, operation and maintenance of SLF and associated infrastructure. Schedule I (A) (vii) and Schedule 1(B) of the Rules also provide that the SLF would be constructed as per prescribed criteria[140] and the requisite facilities[141] should be available at SLF site.

[137] (i) Ludhiana; (ii) Amritsar; and (iii) Bathinda.

[138] (i) Rajpura; (ii) Doraha; (iii) Sirhind; (iv) Moga; (v) Kartarpur; and (vi) Mansa.

[139] Rule 22 of SWM Rules-The SLF were required to be constructed upto April 2018. This timeline had been revised by NGT upto June 2020.

[140] 100 meters away from river, 200 meters from a pond, 200 meters from Highways, Habitations, Public Parks and water supply wells and 20 km away from Airports or Airbase.

[141] Fenced or hedged with proper gate to monitor incoming vehicles, to prevent entry of unauthorised persons and stray animals; availability of internal roads to ensure free movement of vehicles and other machinery, waste inspection facility, provisions like weigh bridge to measure quantity of waste brought at landfill site, fire protection equipment, drinking water and sanitary facilities, lighting arrangements, facility of health inspections of workers, provisions for parking, cleaning and washing of transport vehicles carrying solid waste.

(i) Availability and utilisation of SLFs

- SLFs were constructed only in eight ULBs[142] but without ensuring/collection of baseline data of ground water quality ***(Appendix 2.14)***.
- Out of eight ULBs, the SLFs were found in use only in three ULBs[143] and in remaining five ULBs, SLFs were not in use due to various reasons[144].
- In Ferozepur ULB, pipes for gasification were not available at SLF. The banks of SLF were not covered with HDPE.

(ii) Non adoption of prescribed criteria in construction of SLFs

Analysis of constructed SLF with respect to criteria in eight ULBs (***Appendix 2.16)*** showed that:

- The SLF was constructed near the habitation in ULB Ludhiana.
- In SAS Nagar, SLF was constructed within 20 KMs from airport for which no approval was obtained from Airport Authority.
- SLF was constructed near the highway in ULB Rajpura.
- SLF was constructed within the boundaries of water works from where the drinking water was supplied to general public in ULB Khamanon.

(iii) Non availability of facilities at SLFs

Physical visit showed shortcomings in facilities at SLFs (***Appendix 2.17)***:

- In three ULBs[145] the SLFs were not fenced or hedged and gated to prevent stray animals.
- In four ULBs[146] the internal roads were not available, out of which in ULB Rajpura the road was covered under the waste.
- Pollution monitoring equipment was not available in any ULB.
- No record regarding utilisation of SLFs was maintained in any ULB.
- Weighbridge was available only in ULB Ludhiana.
- Firefighting equipment were not available in any of the eight ULBs.

[142] (i) Ludhiana; (ii) SAS Nagar; (iii) Ferozepur; (iv) Rajpura; (v) Kiratpur Sahib; (vi) Makhu; (vii) Bathinda; and (viii) Khamanon.

[143] (i) Ferozepur; (ii) SAS Nagar; and (iii) Bathinda.

[144] (i) Kiratrpur Sahib: due to increase of water table; (ii) Rajpura: the road was obscured under the waste; (iii) Ludhiana: concessionaire left the work; (iv) Makhu: reasons were not on records; and (v) Khamanon: the SLF was under construction.

[145] (i) Ludhiana; (ii) Rajpura; and (iii) Makhu.

[146] (i) Ferozepur; (ii) Makhu; (iii) Kiratpur Sahib; and (iv) Rajpura.

- The drinking water facilities were not available in four ULBs[147].
- Lighting facilities were available only in three ULBs[148].
- Health inspection facilities of workers were not available in any ULB.

In reply, eight ULBs[149] stated (October 2024) that SLF would be constructed in due course. In four ULBs[150] the SLF was under construction. Further, eight ULBs, where the SLFs were constructed, did not furnish replies pertaining to non-utilisation of SLF, construction of SLF against rules and facilities available at SLF site.

2.4.5.7 Leachate Management

Schedule-I D (iii) of SWM Rules, 2016 provides that to prevent pollution from landfill operations, the provisions for management of leachate[151] including its collection and treatment would be made. The treated leachate would be recycled or utilised as permitted, otherwise would be released into the sewerage line, after meeting the standards specified in Schedule-II[152]. In no case, leachate would be released into open environment.

Audit observed that in all the selected ULBs the legacy waste existed (March 2022). However, leachate coming out of legacy waste was not managed in any ULB. Instances of non-management of the leachate noticed during JPV are discussed below:

In Amritsar, the concessionaire processed the legacy waste during September 2020 to November 2022. But the leachate of waste was not being managed due to which the leachate was found filled around the dumpsite.	 **Exhibit 14: Leachate at dumpsite, Amritsar**

[147] (i) Ferozepur; (ii) Kiratpur Sahib; (iii) Makhu; and (iv) Khamanon.

[148] (i) Ludhiana; (ii) SAS Nagar; and (iii) Kiratpur Sahib.

[149] (i) Sirhind; (ii) SBS Nagar; (iii) Kartarpur; (iv) Doraha; (v) Mansa; (vi) Amritsar; (vii) Rupnagar; and (viii) Qadian.

[150] (i) Moga; (ii) Mehraj; (iii) Bilga; and (iv) Adampur.

[151] The leachate is a thick liquid with strong odour with very high biochemical oxygen demand and chemical oxygen demand.

[152] State Pollution Control Board was required to monitor the environmental standards and adherence to conditions as specified under the Schedule II for waste processing and disposal sites.

In Ludhiana, the processing of waste was carried out by the concessionaire upto January 2021 in the SLF constructed in 2020 which was lying unused due to arbitration case. Accordingly, the processed waste was not disposed of and was mixed with the unprocessed waste. During JPV lots of leachate was found near the dumpsite.	 **Exhibit 15: Leachate at dumpsite, Ludhiana**
In Ferozepur, the processed inert waste was being deposited in SLF without ensuring the connection with the tank where leachate was to be collected.	 **Exhibit 16: Leachate at SLF, Ferozepur**
During physical visit of NP Khamanon, it was observed that the work of construction of landfill site allotted in May 2021 for ₹ 7.67 lakh was lying incomplete (January 2023) which was to be completed by November 2021. Further, despite the provision made in estimates, the leachate collecting tank was also not constructed.	 **Exhibit 17: Leachate at SLF, Khamanon**
In Kiratpur Sahib, it was observed that 45.05 MT legacy waste was processed during November 2021 to September 2022. However, the landfill site was constructed during February 2021 and it was required to be used for filling the inert waste (residue of legacy waste) but the inert waste was lying at the dumping ground.	 **Exhibit 18: Leachate at dumpsite, Kiratpur Sahib**

During physical visit, leachate was also noticed in Corporation SAS Nagar at dumpsites.

In remaining ULBs, due to non-construction/ non-utilisation of SLF, management of leachate could not be carried out due to which seepage of leachate in the ground could not be ruled out. In six ULBs[153], leachate was coming out from compost pits.

[153] (i) SBS Nagar; (ii) Kartarpur; (iii) Adampur; (iv) Ferozepur; (v) Sirhind; and (vi) Rajpura.

Audit further observed that the PPCB tested[154] leachate for analysing the pH, Total Suspended Solid (TSS), Total Dissolved Solid (TDS), Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD) only in two ULB[155]. Analysis of test reports revealed that the parameters of leachate were beyond the prescribed levels as given in **Table 2.9**.

Table 2.9: Results of leachate testing at dumpsite of Corporations, Ludhiana and Amritsar.

Parameters	Prescribed standards	Outcome of results					
		1st test	Higher as compared to standards (3-2)	Percentage (compared to standards)	2nd test	Higher as compared to standards (6-2)	Percentage (compared to standards)
1	2	3	4	5	6	7	8
Ludhiana							
pH	5.5 to 9.0	7.8	--	--	8.2	--	--
TSS	600	2,970	2,370	395	724	124	21
TDS	2,100	15,770	13,670	651	24,372	22,272	1,061
COD	250	5,640	5,390	2,156	5,980	5,730	2,292
BOD	350	2,200	1,850	529	2,450	2,100	600
Amritsar							
COD	250	6,170	5,920	2,368	-	-	-
BOD	350	2,622	2,272	649	-	-	-

Source: PPCB data & NIT Jalandhar Report

In reply, ULB Sirhind stated (October 2024) that very less quantity of leachate was generated in the compost pits which was passing through underground pipelines and mixed in the drain near to dump site. ULB Amritsar stated that the construction of Leachate Treatment Plant was not started by the concessionaire till date. ULB Rajpura stated that the leachate coming out from the compost pits was collected in the tank and reused in the compost pits for moisture. Corporation SAS Nagar stated that an Effluent Treatment Plant (ETP) had been installed for leachate management. ULB Ferozepur stated that the SLF was constructed in 2021 and no leachate had been generated as the SLF was not in use due to theft of polythene and pipes etc. ULB Khamanon stated that now leachate tank had been completed for collection of leachates from SLF. ULB Makhu stated that leachate management would be carried out whenever, the SLF would be used by the ULB. Corporation Ludhiana stated that the SLF was not in use due to termination of agreement with the concessionaire. 11 ULBs[156] stated that leachate management would be carried out after construction of sanitary landfill site in the ULB. Corporation Bathinda did not provide the information due to pending arbitration case.

The replies are not acceptable as ULBs could not manage leachate despite clear SWM Rules. Leachate was found untreated at dumpsites and test results showed severe pollution indicating non-compliance.

[154] Two times in Ludhiana (15.04.2020 and 04.12.2020) and one time (August 2022) in Amritsar.

[155] (i) Ludhiana; and (ii) Amritsar.

[156] (i) Rupnagar; (ii) SBS Nagar; (iii) Mehraj; (iv) Bilga; (v) Adampur; (vi) Kartarpur; (vii) Doraha; (viii) Moga; (ix) Kiratpur Sahib; (x) Mansa; and (xi) Qadian.

2.4.5.8 Non-notifying of Buffer Zone

Under SWM Rules, 2016, the Secretary, Local Government Department through the Commissioner or Director of Municipal Administration or Director of local bodies has to notify buffer zone[157] around the solid waste processing and disposal facilities of more than five tons per day in consultation with the State Pollution Control Board. Accordingly, the CPCB issued guidelines (April 2017) regarding the creation of a buffer zone to restrict residential, commercial or any other construction activity from the outer boundary of the waste processing and disposal facilities.

Audit observed that 13 ULBs were required to notify the buffer zones since their daily processing and disposal/waste generation was more than five TPD. However, the buffer zone was notified only by Corporation Bathinda.

ULB Ferozepur stated (October 2024) that the same was not done as the dump site was on private land. ULB Amritsar stated that it was proposed that the green belt would be considered and designated as a buffer zone during the construction of the proposed waste processing facility. But till date, none of the buffer zones have been declared. Four ULBs[158] stated that the buffer zone would be declared after finalisation of SLF sites in the ULB. Five ULBs[159] stated that the same would be done in due course. Corporation Bathinda stated that the buffer zone was being maintained by the ULB. Corporation Ludhiana stated that neither the notification of buffer zone had been done nor had any buffer zone been created at the site.

The replies were not tenable as despite mandatory requirements under SWM Rules and CPCB guidelines, buffer zones were not notified by 12 out of 13 ULBs. The absence of a buffer zone could increase the risk of incidents such as fire or explosions due to hazardous waste materials, which could harm workers and neighbouring communities. Besides, contaminants and pollutants from the processing site could enter the nearby soil and water sources, polluting the environment and disrupting local ecosystems.

2.4.5.9 Dumping of waste in unauthorised spaces

As per Rule 22 of SWM Rules, 2016, the timeline for identification of suitable sites for setting up solid waste processing facilities was fixed upto April 2017. However, as per the judgement of NGT, the date was extended upto 30 September 2019 in the State Action Plan (notified on 06 March 2019) for monitoring of waste management.

Audit observed that in two out of 20 selected ULBs, the waste was being dumped at unauthorised sites:

[157] Buffer zone is a zone (area) where no development to be carried out around solid waste processing and disposal facility.

[158] (i) Rupnagar; (ii) SBS Nagar; (iii) Kartarpur; and (iv) Doraha.

[159] (i) Sirhind; (ii) Rajpura; (iii) Moga; (iv) Mansa; and (v) SAS Nagar.

(i) Municipal Council Doraha was dumping waste on the land which was leased out by the State Government to Ministry of Skill Development and Entrepreneurship, GoI in 1995. The Ministry had repeatedly asked the MC to suspend waste disposal activity at the site. However, no action had been taken by it (October 2022).

(ii) In ULB Kartarpur the suitable site for waste processing/dumping and landfill was not identified (September 2022) and solid waste of the city was being dumped on the land owned by some private person.

ULB Kartarpur stated (October 2024) that two acres of land for SWM had been purchased, and now the waste was being sent to the new dumpsite. ULB Doraha stated that the dump site had been used since 1995 by the ULB and the land pertained to GoI. Efforts were being made by the ULB to get the land on lease for the dump site and make an SLF. The reply of ULB Kartarpur was unacceptable as the legacy waste spread on the unauthorised site was not bio-remediated.

Thus, though the collection of waste was satisfactory (98.51 *per cent*), the processing/ disposal of the waste was only 32 *per cent* during 2017-22 in the State (as discussed in ***paragraph 2.4.2***) against the target of 100 *per cent.*

Further, the Department could not achieve SDG 11.6.1, which provides for regular collection and adequate final discharge out of total urban solid waste generated. To achieve this goal, the Department prepared (October 2019) a strategic plan for 2019-23.

2.4.6 Conclusion

Urban Local Bodies of the State could not utilise the available funds optimally as out of ₹ 1,011.33 crore available with the ULBs in the State for utilisation on SWM during 2017-22, expenditure of only ₹ 692.32 crore was incurred. Similarly, selected 20 ULBs, utilised only ₹ 306.87 crore against the available funds of ₹ 620.18 crore. The selected ULBs collected only ₹ 1.06 crore (0.52 *per cent*) as user charges against the projection of ₹ 204.84 crore during April 2019 and March 2022. The efficiency of the collection of waste was not appropriate, as evidenced by the instances of depositing waste into water bodies, the creation of Garbage Vulnerable Points, etc. The segregation of waste was inefficient as the unsegregated waste, including hazardous waste, sanitary waste and mixed waste was found at dumpsites during physical visits.

The processing of waste including legacy waste was deficient as the requisite number of Material Recovery Facilities, Compost Pits, Sanitary Landfill facilities were not constructed due to which 68 *per cent* collected waste remained unprocessed leading to accumulation of legacy waste. This would lead to generation of harmful gases like Methane, which is a potent greenhouse gas and contributes to climate change. Due to this, cases of fire

breakouts at dumpsites were observed and in one such incidence seven persons were burnt to death and NGT levied a penalty of ₹ 100 crore in this case.

2.4.7 Recommendations

The Government/ULBs may ensure:

- *optimum and full utilisation of available funds for creating better civic facilities for SWM to lessen the adverse effects of accumulation of solid waste;*
- *the collection of due user charges from waste generators for financial sustainability of ULBs; and*
- *compliance with SWM Rules to increase the efficiency in collection, segregation, transportation and disposal of solid waste including legacy waste in scientific manner to protect the public and environment from the hazardous effects of untreated waste.*

2.5 Implementation of SWM projects

Municipal Solid Waste Management projects can be made viable by prescribing appropriate fees or tipping fees for the services rendered, sale of end products from the processing of waste, allocation of funds from municipal internal resources and Government grants, viability gap funding from the Government (if any) and introducing Public Private Partnerships (PPP) by encouraging private sector investments. To assess the SWM projects, following Audit objective has been framed:

"Whether the implementation, operation and maintenance of Solid Waste Management projects in ULBs were effective, efficient and financially sustainable".

Issues related to identification and implementation of various SWM projects i.e. PPP; C&D waste management; carcass management; construction, operation and maintenance of slaughterhouses have been discussed in the succeeding paragraphs:

2.5.1 Identification of Public Private Partnership Projects

Government of Punjab, LGD prepared (January 2014) Municipal Solid Waste Management (MSWM) Plan. Scrutiny of records of PMIDC showed that the LGD adopted a cluster approach and formed eight[160] clusters to cover all the ULBs of the State (January 2014). LGD planned to develop these clusters on PPP basis and the Solid Waste Management was required to be carried out in all the ULBs.

[160] Each cluster had ULBs ranging between eight and 27.

Though PPP projects were identified in all the eight clusters, the projects could be started only in five clusters. Out of these, in four clusters, projects were under arbitration (September 2022) and only one project was in operation in ULB Amritsar.

Due to pending arbitration cases, records were not made available to Audit by two selected ULBs[161] for the period from April 2017 to March 2022. The audit findings pertaining to SWM projects in selected ULBs are discussed further.

2.5.2 Evaluation of Integrated Solid Waste Management

Municipal Corporation Amritsar allotted (March 2016) Integrated Solid Waste Management (ISWM) project to a concessionaire for 25 years (till 2041). The concessionaire was responsible for collection of segregated waste from the waste generators, elimination of secondary points, transportation and processing of waste. Bio-remediation of legacy waste at three dump sites[162] was also part of the project (to be completed by March 2017). The concessionaire was required to provide facilities of compositing, RDF plant, recycling unit and development of SLF for scientific disposal of rejects generated from processing of MSW. The agreement provided for collection & transportation and processing & disposal at the rate of ₹ 1350 per MT and ₹ 375 per MT respectively. Other concessions, *viz.* grant of ₹ 20 crore from GoP, the collection and utilisation of user charges from waste generators, the storage and sale of by-products and the use of unutilised space available at the project facilities for displaying advertisements were also to be extended to the concessionaire.

Despite lapse of more than six years since the project began and after a payment of ₹ 107.51 crore to the concessionaire as tipping fee for collection and transportation of waste apart from a grant of ₹ eight crore, the project was still not fully operational. Corporation Amritsar issued several notices to the concessionaire for deficiencies[163] in implementation of SWM project. However, the shortcomings[164] in waste management persisted which are discussed in following paragraphs.

2.5.2.1 Creation of SWM facilities

The concession agreement provided for proper implementation of project and time schedule to provide the processing facilities required for proper SWM. The inability of concessionaire to adhere to the timelines in creation of processing facilities are discussed below:

[161] (i) Bathinda (April 2017 to March 2022); and (ii) Ludhiana (April 2017 to January 2021).

[162] (i) Bhagtanwala; (ii) Chabbal Road; and (iii) Chheharta (Naraingarh).

[163] Deteriorating performance, lacunae in working and non-installation of facilities.

[164] Processing of waste, bio-remediation of legacy waste, non-installation of waste to energy plant and Sanitary Landfill Facility, non-removal of secondary points etc.

(i) Bio-remediation of legacy waste

As per Annexure 3.1 (g) read with Annexure 14 of the agreement, bio-remediation of accumulated waste and closure of all three old dumping sites was required to be done by the concessionaire by 12 March 2017[165].

Scrutiny of records showed that 12.35 lakh MT legacy waste was accumulated (November 2022) at three dumping sites[166]. However, the complete bio-remediation and closure of all the dump sites[167] was not done (December 2022) by the concessionaire even after lapse of more than seven years from the target date prescribed in the agreement and regular payment of tipping fees of ₹ 107.51 crore during the period August 2016 to March 2022. Examination of records revealed that only 4,96,988 MT legacy waste was bio-remediated during September 2020 to November 2022 by the concessionaire. The Environmental Engineer, PPCB, also reported during physical visit (March 2022) that no legacy waste was being bio-remediated.

Exhibit 19: Unprocessed legacy waste at Bhagtanwala dump site, Amritsar

The ULB stated (October 2024) that all bio-remediation machinery had been stopped by the concessionaire. Several notices were issued to the concessionaire to speed up the bio-remediation. Corporation Amritsar had sent one trommel for repair at the concessionaire's cost to restart the bio-remediation of legacy waste itself and will also get repaired four additional trommels and one ballistic separator to enhance bio-remediation capacity. Additionally, Corporation Amritsar was imposing a two *per cent* penalty for bio-remediation in accordance with the Concession Agreement.

The reply was not acceptable as the objective of the project was to manage MSW scientifically. Thus, due to the inability of the ULB to take timely action against the concessionaire, the legacy waste of 2.93 lakh MT (as per DPR 2016) at Bhagtanwala dumpsite increased to 11.35 lakh MT, creating environment hazards for the public despite regular payments of tipping fees. Moreover, the closure of the other two dumpsites was also not ensured by the ULB in timely manner.

(ii) Non-installation of weigh bridge

The agreement provided for mandatory installation and operation of weigh bridges by the concessionaire at the site having suitable systems to determine the quantity of MSW being received at the project/processing site.

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[165] Bhagtanwala dump site within 180 days; and Chabbal & Chhehrata dumpsites within 360 days from the date of agreement.

[166] (i) Bhagtanwala:11.10 lakh MT; (ii) Chabbal Road:0.80 lakh MT; and (iii) Chhehrta: 0.45 lakh MT.

[167] Total legacy waste bio-remediated: (i) Bhagtanwala dump site: 4.97 lakh MT; and (ii) Chhabal road: 0.10 lakh MT.

During scrutiny of records and physical inspection of the waste processing site at Bhagtanwala, it was observed that the concessionaire was using a private weigh bridge due to the non-availability of an installed weighbridge.

The ULB stated (October 2024) that multiple notices were issued to the concessionaire for non-installation of the weighbridge, and the concessionaire would be directed again to install its own weighbridge as per the terms of the agreement.

Audit analysed the details of weighbridge and tipping fee records for the month of March 2022 and compared the unladen weight of the same vehicles and observed as below:

(i) Unladen weight[168] of a vehicle bearing registration no. MH02 CE 8352 was 13,080 Kgs on 21.03.2022 whereas, it was 10,060 Kgs on 28.03.2022.

(ii) Unladen weight of vehicle bearing registration no. TR-8947 was 7,520 Kgs at 1:18 PM on 26.03.2022, whereas it was 5,490 Kgs at 4:21 PM on the same day.

(iii) Unladen weight of vehicle bearing registration no. PB02 CR 9660 was 11,400 Kgs on 08.03.2022, whereas it was 10,390 Kgs on 31.03.2022.

The ULB stated (August 2023) that sometimes leachate and remains of waste had been left in the vehicles, which might be a cause of variation. The reply was not acceptable as a significant variation up to 3.02 MT would be an unreasonable cause of leftover waste in the vehicles. This raised doubt over the actual transportation of solid waste. Audit noticed irregularities in the measurement of waste being transported. There was a need to provide adequate weighbridges at the processing facilities to ensure better monitoring and compliance.

(iii) Elimination of Secondary Collection Points

The 'scope of work' and performance parameters of the Agreement stipulated that 30 *per cent*, 60 *per cent* and 90-100 *per cent* secondary points[169] were required to be eliminated[170] in two, three and five years respectively from commencement of Collection and Transportation (C&T) operations. As per Annexure 18 (vii) of the Agreement it was stipulated that if the difference from target exceeds five *per cent*, for every decrease in elimination of these secondary points from stipulated target (mentioned month wise), the concessionaire would be penalised at the rate of two *per cent* of corresponding monthly fee payable against collection and transportation.

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[168] Unladen weight is weight of the vehicle when it is not carrying any passengers, goods or other items.

[169] Secondary storage points refer to locations such as primary container bins or open dumping areas where waste generators dispose of the waste.

[170] Annexure 3.4.2 (f) of the agreement provides that the concessionaire shall ensure that elimination of Secondary Collection Points means MSW free points.

Scrutiny of records showed that out of 300 secondary points in Amritsar (March 2016), 80 secondary points (26.66 *per cent*) were eliminated upto November 2021 i.e. after lapse of more than five years from the date of agreement whereas as per schedule there should have been *cent per cent* elimination by July 2021. As per the agreement, Corporation Amritsar should have imposed a penalty of ₹ 43.32 crore for the shortfall of 73 *per cent* which was not imposed.

The ULB stated (October 2024) that initially, there were 300 secondary points, and these points were gradually reduced and replaced with secondary bins. Therefore, the penalty for the removal of secondary points was not imposed on the concessionaire. The ULB added that, presently, there were 145 secondary bins/points for which notices had been issued to the concessionaire to make the city free of secondary bins/secondary points.

The reply was not acceptable as the removal of secondary collection points, including containers, was within the scope of work of the concessionaire, which was not ensured by the ULB.

(iv) Non-construction of Sanitary Landfill Site

Annexure 2 of the agreement provides that SLFs would be developed for scientific disposal of rejects or inert waste.

Scrutiny of records showed that out of three dumping sites, only one was operational in the ULB Amritsar. Examination of records from September 2020 to November 2022 showed that out of a total of 12.35 lakh MT of legacy waste, only 4.97 lakh MT of waste was bio-remediated. From this bio-remediated waste, an estimated 27,423 MT inert was recovered, which was required to be sent to the landfill site. However, the landfill site for final disposal of inert waste was not constructed by the concessionaire leaving the inert waste at the dumpsite.

The ULB stated (October 2024) that SLF would be constructed after the remediation of legacy waste. The reply was not acceptable as the concessionaire had already carried out bio-remediation and due to the non-construction of SLF, the inert waste would pollute the groundwater and surface water in the absence of scientific disposal.

(v) Non-construction of Leachate Collection and Treatment Plant

The concessionaire had to construct facilities adequately designed to meet minimum criteria including leachate[171] collection system and comply with instructions issued from time to time by any Government authority. The NGT issued (January 2020) instructions for disposal of leachate in a scientific and environment friendly manner.

[171] Leachate is the contaminated liquid which is generated from water percolating through a solid waste disposal site, accumulating contaminants and moving into sub surface areas.

Audit noticed that the leachate collection and treatment plant was not constructed by the concessionaire and Corporation Amritsar had instructed (May 2022) the concessionaire to begin construction of the leachate collection and treatment plant without further delay. During JPV, it was noticed (December 2022) that a huge quantity of untreated leachate was accumulated at Bhagtanwala dump/ processing site. The work for designing of leachate treatment plant was assigned (December 2021) to NIT Jalandhar against which the status report was prepared by the NIT (August 2022).

Exhibit 20: Leachate spread at dumpsite of Bhagtanwala in Amritsar

The ULB stated (October 2024) that the design for construction of leachate treatment plant was prepared (May 2023) by NIT Jalandhar. But the construction of Leachate Treatment Plant was not started by the concessionaire till date. The point remained that the designing and construction of the leachate treatment was within the scope of work of the concessionaire. However, the design of the leachate plant was provided in May 2023, after a delay of almost seven years from the date of agreement (i.e. March 2016) which delayed the construction of leachate treatment plant and leading to accumulation of leachate. This delay not only violated the orders of NGT but also adversely affected the environment and may lead to contamination of groundwater.

2.5.2.2 Benefit to the concessionaire due to overloading of vehicles

The agreement stipulated that no payment of overloading[172] would be considered. Payment of MSW transported would be governed by the maximum carrying capacity shown in the Registration Certificates (RC) of vehicles and be made on the difference of Gross Weight (subject to maximum of laden weight mentioned in RC) less tare weight[173]. The RCs of all vehicles deployed for collection and transportation of waste were to be submitted to the concessioning authority and the maximum carrying capacity of the vehicle was to be determined from the gross carrying capacity specified in the RC.

Corporation Amritsar provided records of tipping fee (paid on the basis of weight of the waste transported) for the period April 2020 to March 2022[174]. Audit cross-examined the weight of 58 vehicles in which the waste was transported with the maximum load capacity available with Ministry of Road Transport and Highways website. It was noted that the waste was transported beyond the carrying capacity by 22 vehicles ranging between 10 Kgs to as much as 7,870 Kgs. Corporation Amritsar did not make any deduction on

[172] Load above the approved carrying capacity of the vehicle.

[173] Tare weight called unladen weight, is the weight of an empty vehicle.

[174] Records from April 2017 to March 2020 along with RCs of the vehicles were not provided.

account of overloading of waste despite issuing notices regarding overloading in October 2020 as provided in agreement due to which excess payment of tipping fees of ₹ 5.69 crore was made to the concessionaire.

The ULB stated (October 2024) that there was no appropriate mechanism of measurement of weight at the time of loading of the vehicles, however concessionaire would be directed to carry the maximum permissible weight only in the vehicles. The reply was not acceptable as there were continuous defaults by the concessionaire in transporting solid waste beyond the permissible capacity for which the ULB had made extra payment in contravention of Rules.

2.5.2.3 Undue financial benefit to the concessionaire

Clause 3.2 (3) of the Agreement provides that project facility would be adequately designed to meet minimum criteria as per applicable laws and be able to cater to scope of the project specifically including site boundaries and buffer area.

Audit observed that boundary wall of the processing site was constructed by Corporation Amritsar on three sides of the dumping/processing site after incurring an expenditure of ₹ 1.12 crore in September 2021 although the construction of boundary wall/fencing was within the scope of the work of the concessionaire. Thus, an avoidable expenditure of ₹ 1.12 crore incurred in contravention of agreement provision.

The ULB stated (October 2024) that fencing of only internal processing facilities was in the scope of work of the concessionaire and the ULB constructed outer boundary of the processing facility to provide processing facility as per provisions of the agreement.

The reply was not acceptable as site boundaries were specifically included in Clause 3.2 (3) of scope of work of the concessionaire (the site boundaries were not defined separately as internal or external). Moreover, as per clause 3.3.6 of the agreement the scope of work also included the fencing of buffer area even outside the site boundaries with a minimum height of two meters surrounding the processing facility.

2.5.2.4 Non-adherence of various monitoring mechanism

The concessionaire did not maintain a website to provide details of the project as required under the agreement obligations despite receiving regular monthly tipping fees for the collection and transportation of MSW for a period of more than six years. This resulted in lack of effective complaint redressal mechanism[175] as per the requirement of the agreement.

[175] This system (includes phones, website, written complaints, information etc.) should be established by the concessionaire within 90 days from the commencement of collection and transport (C&T) operations.

As per the insurance clause of the agreement, the concessionaire was to purchase and maintain insurance policies covering various aspects[176] of the project at its cost. However, the concessionaire did not maintain insurance policies as per the requirement of the agreement.

The concessionaire did not submit annual reports to the concessioning authority as required under Rule 19 of SWM Rules, 2016, during 2017-22.

The Concessioning Authority[177] had neither appointed the Project Engineer (PE)[178] nor the Independent Expert (IE)[179] for monitoring of solid waste activities of the concessionaire.

The ULB stated (October 2024) that the concessionaire had been directed to make the website, ensure timely submission of annual reports and furnish the insurance details. It was also stated that the Project Engineer and Independent Expert would be appointed very soon in accordance with the concession agreement.

Despite the lapse of more than six years from the start of the concession agreement and regular payments of tipping fees to the concessionaire for transportation of waste, ULB Amritsar could not ensure the closure of three dumpsites, elimination of all secondary collection points and construction of SLFs and installation of weigh bridge etc. All these lacunae lead to poor implementation of this project and hence, ineffective municipal solid waste management.

2.5.3 Issues in Tendering

The MSWM Manual states that the tender should clearly specify the technical and financial capability required to perform the task proposed to be outsourced. The qualification criteria should be standardised and should provide equal opportunities to all parties interested in undertaking the task. Audit observed the following irregularities in tendering process:

2.5.3.1 Allotment of work deviating from tendering instructions

Local Government Department issued (August 2018) instructions regarding Standard Operating Procedure (SoP) for execution of all types of development works/O&M works, hiring of machinery and procurement of goods. As per

[176] (a) Builders'/contractors' all risk insurance; (b) Erection insurance and/or break down insurance; (c) Public liability insurance applicable for the concession period, closure and post closure period; (d) Statutory insurances such as workmen's compensation insurance or any other insurance required by the applicable laws; (e) Comprehensive Third-Party liability insurance including injury or death to Persons who may enter the site; (f) Insurance policies related to any of the concessionaire's obligations hereunder; and (g) any other insurance that may be considered necessary by the concessioning authority.

[177] Clause 2.2.2.1 of article 2 read with article 4 and annexures 10 and 11 of the agreement provides that a Project Engineer (PE) and Independent Expert (IE) would be appointed by the Concessioning Authority.

[178] The PE would be nodal person for supervision and monitoring of the project.

[179] The IE was responsible for monitoring of collection and transportation plan, review, inspection and monitoring of construction works and Operation and Maintenance.

the SoP, the most preferred competitive and transparent mode of tendering was to be adopted for open/advertised tenders. Further, the comparative statement of work having cost of more than ₹ five crore should be got approved from a committee comprising of three Chief Engineers (CEs).

(i) Scrutiny of records of Corporation Ludhiana showed that the work of collection, transportation, disposal and processing of waste generated in Ludhiana city was allotted to an agency in November 2011 with a concession period of 25 years. The work was done by the concessionaire upto January 2021. The contractor terminated (February 2021) the contract due to non-payment of arrears, non-declaration of no development zone, non-creation of market for sale of RDF etc. At the time of termination of the agreement, the contractor was being paid tipping fee at the rate of ₹ 324.18 per MT for collection and transportation of MSW.

It was observed that after termination of the agreement, the work was awarded (February 2021) to another contractor at the same tipping fee rate of ₹ 324.18 per MT without inviting tenders and without a formal agreement on the plea that the lifting of waste would be done by the new contractor till finalisation of fresh tender. The tipping rates were revised to ₹ 425 per MT in August 2021. During February 2021 to March 2022, the new contractor lifted 4,21,993 MT waste for which ₹ 16.19 crore was paid to the contractor. The contractor was still engaged in the work and Corporation Ludhiana did not proceed with any fresh tender notice till April 2024. Thus, engaging the contractor without any formal tender and making payment of ₹ 16.19 crore including ₹ 2.52 crore on account of revised[180] rates was irregular.

The ULB stated (October 2024) that the work was allotted to the contractor to avoid inconvenience to the public. The revised rates and work were allowed to continue with the contractor after passing the same in the House (i.e. by the Corporation). The reply was not acceptable as the allotment of work without inviting tenders or a formal agreement was not only a departure from standard instructions but could also lead to legal complications.

(ii) Scrutiny of records (October 2022) revealed that the tenders for management of legacy waste were floated (December 2021) in 10 ULBs[181] and the work was allotted (December 2021) to an agency without approval of the Committee of three CEs. Out of these, one ULB i.e. Doraha was selected in the Performance Audit. In this ULB, the agency processed 10,400 MT legacy waste out of 13,000 MT upto June 2022. However, due to non-obtaining approval from the competent authorities, the work was stopped by cancelling the agreement in August 2022. JPV revealed that the processed legacy waste along with compost and inert waste was lying at the site as

[180] Rates were revised from ₹ 324.18 to ₹ 425 per MT in August 2021.

[181] (i) Khanna; (ii) Doraha; (iii) Payal; (iv) Maloud; (v) Sahnewal; (vi) Samrala; (vii) Machhiwara; (viii) Raikot; (ix) Jagraon; and (x) Mullanpur Dakha.

depicted in the pictures below:

Exhibit 21: Processed waste lying at dumpsite of MC Doraha

While admitting the facts, the ULB stated (October 2024) that due to non-following of the SoP, the Headquarters' office had cancelled the tenders for remediation of legacy waste. However, the bio-remediated material had been lifted by the contractor and tenders for remaining legacy waste had been allotted.

Thus, due to the lapse on the part of ULB to allot the work without following the procedure, the work remained incomplete resulting in accumulation of huge quantity of waste at site besides creating environmental and health hazards for public residing near the dumpsite.

2.5.3.2 Cost overrun due to delay in tendering process

(i) Government of India, Ministry of Food Processing Industries (MFPI) approved (March 2015) a project for modernisation of existing slaughterhouse in Ludhiana at a cost of ₹ 15.86 crore[182] based on DPR prepared in March 2014 for ₹ 19.50 crore. Out of ₹ 15.86 crore, the GoI share was ₹ 7.93 crore and the remaining funds were to be provided by the ULB from its own sources.

Audit observed that although the project was approved in March 2015, Corporation Ludhiana appointed Project Management Consultant in August 2016 i.e. after lapse of more than 17 months from the date of approval and the Request For Proposal was sent to PMIDC in December 2016 which was returned by PMIDC in February 2017. It was observed that after a lapse of two years, the ULB called the tenders, but the same could not be finalised due to submission of single bid on four occasions. On fourth call, the single bid was submitted (December 2017) to higher authorities for approval which was approved (May 2018). However, again due to issues with the website, the tenders could not be finalised. Meanwhile, the Goods and Service Tax (GST) was introduced in July 2017. The tenders were again floated (June 2018) for ₹17.72 crore against which the bidder quoted a bid of ₹ 20.82 crore (₹ 17.65 crore *plus* additional GST of ₹ 3.17 crore) which was finalised (September 2018).

[182] Against the projected cost of ₹ 19.50 crore (including ₹ 17.72 crore for cost of civil work, plant & machinery and misc. assets).

Thus, had the ULB Ludhiana initiated and completed the tendering process timely after approval of the project, the cost overrun of ₹ 3.17 crore on account of implementation of GST could have been avoided.

The ULB stated (October 2024) that the time had elapsed in adopting the procedures and formalities and GST was introduced during this time. The reply was not acceptable as it had sufficient time (i.e. 41 months), to complete all the formalities from the date of approval to allotment of work.

(ii) The estimate for construction of nine sheds for MRFs at different locations in Ludhiana was sanctioned (November 2019) for ₹ 97.39 lakh and Administrative Approval (AA) was accorded in a resolution passed in November 2019 under SBM funds. Despite AA, Corporation Ludhiana delayed the tendering process for nine months without any reasons on record. Meanwhile, the Common Schedule of Rates (CSR) was revised (August 2020) and a revised estimate for ₹ 115.07 lakh was prepared and tenders were floated in September 2020. Due to applicability of new CSR rates, the rates were increased by ₹ 17.68 lakh (18 *per cent*).

Audit noticed that an estimate of a similar nature of other work i.e. construction of nine sheds for MRFs was sanctioned in August 2019 for ₹ 94.78 lakh. The work was allotted in December 2019 to a contractor for ₹ 87.30 lakh and it was completed after incurring an expenditure of ₹ 87.15 lakh. Had the earlier work been started on time, additional burden of ₹ 17.68 lakh due to revision of CSR rates could have been avoided.

The Corporation Ludhiana stated (October 2024) that CSR rates were due to be revised in 2020 and no contractor was ready to execute the work on the CSR rates of 2010. Hence, Corporation Ludhiana awaited the revision of CSR rates and after revision of CSR rates in August 2020, the estimate had been revised accordingly and work was allotted to the contractor. The reply is not acceptable as there was nothing on record to support their claim that the contractor was not ready to execute the work as the tenders were not floated prior to revision of CSR. Moreover, the work of similar nature under Corporation Ludhiana, allotted in December 2019, was completed timely by the agency.

2.5.4 Carcass management in selected ULBs

As per 20th Census of livestock, India had 535.78 million livestock in 2019 and it is estimated that about 25 million cattle die of natural causes every year. The carcasses of dead cattle are usually left for carrion after removal of hide. This is not only an environmental and health hazard but also a waste of valuable resources. The carcass and its by-products can be utilised for economic and public health importance with increased thrust on pollution control.

The guidelines for carcass disposal issued (November 2020) by CPCB

stipulate that carcass should be utilised by adopting rendering process or incineration and priority should be given to carcass utilisation plant. Disposal of carcass through deep burial should be done only in those cases where facilities of carcass utilisation plant or incinerator were yet to be developed.

Scrutiny of records of 20 selected ULBs revealed that carcass management was being done by disposing of carcass through various traditional methods[183]. However, only in Corporation Ludhiana, the modern carcass utilisation plant was installed and the status of carcass management in this ULB as well as in other selected ULBs is discussed below:

2.5.4.1 Ungainful expenditure on Modern Carcass Utilisation Plant

The Municipal Corporation Ludhiana proposed to establish a Carcass Utilisation Plant at village Nurpur Bet on five acres of land for the scientific disposal of dead animals. The DPR estimated the cost of the plant at ₹ 8.01 crore, which included seven years of O&M. The raw material for the proposed project was dead animals, with an expected daily intake of 100-150 small animals and 50-70 large animals.

Clause 6.2.4 of the DPR highlighted that if the project was not managed professionally, it could pose a serious threat to public health and environment and any objections from local residents could halt the construction and progress of the project.

The work was allotted (July 2019) for ₹ 7.99 crore, with a completion deadline of June 2020. However, the project was completed in May 2021 at a cost of ₹ 8.48 crore, after a delay of almost 11 months.

Audit observed that the project could not be inaugurated due to public protest as the Corporation undertook the project without securing consent from the local community despite the threat already being anticipated in the DPR. Corporation Ludhiana confirmed (October 2024) that Carcass Utilisation Plant could not be started due to public protest.

2.5.4.2 Unscientific carcass management

Audit observed that in 17 ULBs, the carcasses were being managed either by handing over the same to people of other villages engaged in this business or through tenders. In remaining two ULBs[184] the carcasses were being disposed of near the dumping sites. Corporation Amritsar provided the data of dead animals only for seven months (July 2021 to February 2022). As per data, 342 animals had died in the gaushalas. Dead animals were being disposed of unscientifically by burial at the existing Bhagtanwala dumping site. In addition, during JVP, dead animals' carcasses were seen abandoned at the

[183] Lifting of carcass by persons involved in this profession, disposal of carcass at identified land and carcass disposal by the people of nearby villages area outside the jurisdiction of ULBs.

[184] (i) Amritsar; and (ii) Rajpura.

Chhabal Road, Amritsar dumpsite. In MC Rajpura, the carcasses were also disposed of in open space near the dumpsite.

Exhibit 22: Unscientific disposal of carcass at Chabbal road site, Amritsar

Corporation Amritsar stated (October 2024) that there was no scientific plant for management of carcasses and the dead animal were lifted by the concessionaire and being buried at dumpsite or other places. Higher authorities would be approached for establishment of carcass utilisation centre. Five ULBs[185] stated that the issue is noted for compliance and necessary action will be made as per rule. 13 ULBs[186] stated that they had no site/plant for disposal of carcass waste and the dead animals were carried to the Hadda-rodi sites by the private persons engaged in this business. However, efforts would be made for scientific management of carcasses.

The replies of ULBs were inadequate as scientific management of carcasses was mandatory under SWM Rules, 2016. Non-utilisation of modern carcass utilisation plant in Ludhiana and current practices of open disposal and burial at dumpsites pose environmental and health risks.

2.5.5 Management of slaughter waste

Paragraph 7.6 of MSWM Manual stipulates that scientific processing and disposal of slaughterhouse waste is essential to recover useful fractions and for safe disposal of residual pathogenic biological wastes. Processes undertaken in a modern slaughterhouse include slaughtering, dressing, cutting, inspection of meats, refrigeration, curing and manufacturing of by-products. Audit observed:

Out of 20 selected ULBs, no organised slaughterhouse facility was available in 17 ULBs.

16 ULBs[187] stated (October 2024) that they had no slaughterhouse and shopkeepers slaughter the animals at their own. One ULB (*viz.* ULB Moga)

[185] (i) Moga; (ii) Khamanon; (iii) Ferozepur; (iv) Sirhind; and (v) Mansa.

[186] (i) Rupnagar; (ii) Adampur; (iii) Kartarpur; (iv) SBS Nagar; (v) Kiratpur Sahib; (vi) Bilga; (vii) Makhu; (viii) Mehraj; (ix) Qadian; (x) Doraha; (xi) Bathinda; (xii) Rajpura; and (xiii) SAS Nagar.

[187] (i) Bathinda; (ii) Ferozepur; (iii) Sirhind; (iv) Rupnagar; (v) Adampur; (vi) Kartarpur; (vii) SBS Nagar; (viii) Doraha; (ix) Rajpura; (x) Mansa; (xi) Khamanon; (xii) Kiratpur Sahib; (xiii) Bilga; (xiv) Makhu; (xv) Mehraj; and (xvi) Qadian.

stated that the ULB had constructed a slaughterhouse in 2012 but necessary consents from the PPCB would be obtained as per rule.

Further in three ULBs (Amritsar, Ludhiana and SAS Nagar) either the constructed slaughterhouses were not in use or were lying incomplete due to site specific issues as detailed below.

(i) Municipal Corporation Ludhiana

Ministry of Food Processing Industries approved (March 2015) a project for ₹ 15.86[188] crore for modernisation of existing slaughterhouse on the basis of DPR of ₹ 19.50 crore. The abattoir with capacity of daily slaughter of 250 small animals (Halal) and 250 small animals (Jhatka) as well as 2,000 poultry per hour and 150 pigs per day also included construction of an ETP with capacity of 100 kilo litre per day.

However, scrutiny of DPR in Corporation Ludhiana showed that no survey of slaughtering in the city was conducted. The work was allotted to a contractor (September 2018) for ₹ 20.82 crore with the schedule completion time of 16 months. The work was completed (January 2020) after incurring an expenditure of ₹ 20.57 crore. Audit observed that 2,215 small animals (sheep/goat) and 1,19,949 poultry were slaughtered during July 2021 to March 2022 against the installed capacity of 1,29,000[189] and 5,16,000[190] respectively. Despite under-utilisation of the slaughterhouse and also adverse media reports (November 2021), no efforts were made to run the slaughter house to its full capacity by the ULB.

The ULB stated (October 2024) that the slaughterhouse was completed in June 2020 but could not be operated as planned due to a lack of awareness. Efforts would be made to ensure it runs at full capacity.

(ii) Municipal Corporation SAS Nagar

With a view to dispose of the slaughtering waste scientifically, MoFPI sanctioned (November 2014) ₹ 8.09 crore for modernisation of the existing slaughterhouse in Corporation SAS Nagar and released (February 2015) ₹ 33.25 lakh as first instalment. The work was allotted to a contractor in January 2016 for ₹ 7.99 crore due to be completed in January 2017. The contractor started the work in February 2016 but stopped (April 2016) it as per instructions of the Corporation due to public protest. The Corporation had made efforts (June 2017) to change the site to any other area but since the new site was available near an industrial area, PPCB refused to issue (December 2017) No Objection Certificate. The Corporation had already paid ₹ 39.95 lakh to the contractor for execution of the work. In May 2021, GoI

[188] The difference between DPR cost and approved cost was due to fixing the eligible cost of the project.

[189] Total days 304 less 46 days due to closure *multiply* by 500 small animals .

[190] Total days 304 less 46 days due to closure *multiply* by 2000 birds.

cancelled the project due to inordinate delay and demanded refund of the released funds. Pursuant to the directions, Corporation SAS Nagar refunded ₹ 33.25 lakh in October 2021 to GoI from its own available funds.

Thus, due to non-selection of another suitable site for modern slaughterhouse, the Corporation had not only incurred unproductive expenditure of ₹ 39.95 lakh but could also not ensure the scientific disposal of slaughtering waste.

Municipal Corporation SAS Nagar stated (October 2024) that an ETP for liquid waste had been installed in ULB. Solid waste from slaughtered animals is presently disposed of by shopkeepers at their own level. Efforts would be made for scientific disposal of this waste at the earliest.

(iii) Municipal Corporation Amritsar

In Corporation Amritsar, the slaughtering was done and liquid waste was being disposed through ETP. However, the records of disposal of solid waste were not maintained. Neither the ULBs had any data in this regard nor any license was issued to shopkeepers as required under Section 331 and 334 of Punjab Municipal Corporation Act, 1976.

ULB Amritsar stated (October 2024) that an ETP for liquid waste had been installed in ULB. Solid waste from slaughtered animals is presently disposed of by shopkeepers at their own level.

The replies of the ULBs were not satisfactory as the ULBs were responsible for ensuring scientific disposal of slaughterhouse waste. Leaving waste management to shopkeepers without regulation violates the MSWM Manual. Non-operation of completed slaughterhouses and inability to maintain solid waste records indicate lapses in environmental management.

2.5.6 Construction and Demolition Waste Management

Solid Waste Management includes management of C&D Waste which is one of the most challenging issues being faced by a rapidly developing country like India. C&D waste consists of waste that is generated during new construction, remodeling, renovation, repair and alteration of residential and commercial buildings. It is estimated that the construction industry in India generates about 10-12 million tons of C&D waste annually. The presence of C&D waste and other inert materials is significant[191], but so far not much development has taken place for utilising this in an organised manner.

Rules 6 (2) of C&D Waste Management Rules, 2016 provides that the local authority is responsible to chalk out stages, methodology, equipment and material involved in the overall activity and final clean up after completion of the construction and demolition.

[191] Almost one third of total MSW on an average.

Scrutiny of records of 20 selected ULBs showed that 15 ULBs purchased C&D crusher machines at a cost of ₹ 33.69 lakh. Three ULBs[192] did not purchase the same and in two ULBs[193], it was not required as separate C&D Waste Management Projects were to be installed. Out of 15 ULBs, the machineries were used only in ten ULBs and in four ULBs[194], the machineries costing ₹ 10.46 lakh were not utilised whereas one ULB[195] did not provide details ***(Appendix 2.18)***.

Audit further observed that in nine[196] out of ten ULBs where the machines were in use, the processed C&D waste was lying at the places where machineries were installed and was not used for road construction.

Nine ULBs[197] stated (October 2024) that efforts would be made for management of C&D waste and utilisation of processed waste in the construction of road. Four ULBs[198] stated that plans would be made to use the C&D waste machine lying idle and the processed material would be used for road construction. ULB Moga stated that two sites for C&D waste had been identified and approved. Currently waste is being dumped at one site, a low-lying area, to fill it. Plans would be developed to utilise C&D waste. ULB Makhu stated that a crusher machine for C&D waste had been purchased and some material is being processed there. However, this processed material had not yet been used in construction. ULB Doraha stated that the C&D waste generated was being used for filling low-lying areas in the town or for creating road berms. ULB SAS Nagar stated that C&D processing plant was operational. ULB Bathinda didn't furnish reply.

The replies of the ULBs were inadequate as the ULBs were obligated to both process and utilise C&D waste. Idle machinery and non-utilisation of processed material reflect non-compliance with the C&D Waste Management Rules and Policy.

Good practice

C&D waste was used for making channels and kerbs in ULB SAS Nagar.

2.5.6.1 Non-completion/operation of C&D Waste Management Projects

In two Corporations *viz.* Ludhiana and Amritsar, the C&D waste management was to be done under Smart City Mission (SCM). Accordingly, projects for C&D waste management were prepared (August 2020) in Ludhiana and

[192] (i) Mansa; (ii) Moga; and (iii) Qadian.

[193] (i) Amritsar; and (ii) Ludhiana.

[194] (i) Doraha - ₹ 1.50 lakh; (ii) Ferozepur - ₹ 1.99 lakh; (iii) Rajpura - ₹ 4.98 lakh; and (iv) Kiratpur Sahib - ₹ 1.99 lakh.

[195] Corporation Bathinda.

[196] (i) Adampur; (ii) Kartarpur; (iii) Rupnagar; (iv) SBS Nagar; (v) Sirhind; (vi) Bilga; (vii) Khamanon; (viii) Makhu; and (ix) Mehraj.

[197] (i) Rupnagar; (ii) Adampur; (iii) kartarpur; (iv) SBS Nagar; (v) Mansa; (vi) Khamanon; (vii) Bilga; (viii) Mehraj; and (ix) Qadian.

[198] (i) Sirhind; (ii) Ferozepur; (iii) Rajpura; and (iv) Kiratpur Sahib.

Amritsar for ₹ 7.96 crore and ₹ 8.37 crore, respectively. The estimates were prepared in two parts Component A and B. In Component 'A', the processing plant unit comprising design, engineering, supply of plant and equipment for five years were included. In Component 'B', infrastructure site development was included. For the projects, the land was identified at Dhandari Kalan in Ludhiana and Fatahpur in Amritsar.

In Ludhiana, the work of component 'A' was allotted (June 2021) for ₹ 4.41 crore to be completed within six months. Similarly, in Amritsar, the work was allotted (September 2021) for ₹ 3.64 crore along with O&M for five years with the completion period of six months i.e. by March 2022.

The work of component 'B' was allotted in December 2021/June 2021 for ₹ 2.70 crore and ₹ 2.62 crore in Ludhiana and Amritsar for completion in four months and six months, respectively.

Audit observed (December 2022) that despite the lapse of scheduled completion time for both the components in Ludhiana, the work could not be completed (October 2024) due to incorrect selection of site, dumping of garbage at the execution site, non-supply of complete architectural design and structural working drawings and non-handing over of the site etc. It was also brought to the notice of the authority by the contractor that the site was being used by the garbage collectors to dump garbage and due to unhygienic conditions, the labour refused to execute the work.

In Corporation Amritsar, the work of Component B 'creation of infrastructure' was completed in April 2022 after incurring expenditure of ₹ 2.65 crore. However, the work of component 'A' i.e. supply, installation and commissioning was completed in March 2023 after lapse of one year from the scheduled completion time and after incurring expenditure of ₹ 0.28 crore for plant and machinery. Further, it was observed (October 2024) that the C&D waste processing facility was operational, however, against the capacity of 60 MT per day for first year, only 20 MT C&D waste was being collected and processed here. All the processed C&D waste was stored at the site and not used in any road construction activities etc. The actual input and output records were not shown to audit.

Corporation Ludhiana stated (October 2024) that the site was very old and earlier it was selected for construction of houses for the poor. During execution of work, the sludge upto 10-12 feet depth was noticed and hence the work could not be started. The work had since been started and was in progress, which would be completed upto December 2024. The ULB Amritsar stated that presently only 20 MT per day waste was being collected and processed through the processing plant. C&D waste collected would be increased in future. All the waste was being stored at the site and was not being used in road construction activities.

Thus, the Corporation Ludhiana could not manage C&D waste in scientific way despite lapse of more than seven[199] years which would not only adversely affect the environment but also attract financial loss as given in C&D Waste Management policy, 2020[200]. Further, Corporation Amritsar also could not utilise the processed C&D waste for construction activities and the plant was operated at a much lower capacity.

2.5.7 Non-completion of work related to Portable Compactors

A project for installation of 63 portable compactors was planned (February 2020) under SCM in Ludhiana for strengthening the secondary waste collection system with effective transportation facility to make the city bin-less and enhance the efficiency of primary collection system through arresting the waste at source.

Scrutiny of records of Corporation Ludhiana showed that the tenders for civil work of 22 sites to install the requisite compactors under the project were called for (May 2020) and the work was allotted (December 2020) to an agency at a cost of ₹ 13.57 crore with the stipulated period of 11 months to complete it. It was observed that as of 31 August 2022, an expenditure of ₹ 4.64 crore was incurred and physical progress of 55 *per cent* was achieved. In December 2021, the SCM authority issued show cause notice to the contractual agency and warned it that it will impose penalty for non-completion of the work. However, no action had been taken so far.

Corporation Ludhiana stated (October 2024) that the work was incomplete due to site issues and local objections, but civil work at all 22 compactor sites had been completed. Reply was not acceptable as the machineries had not yet been installed and no document in support of physical progress was produced to audit. Thus, due to the non-completion of the work, the objective to reduce the burden of handling a large volume of MSW at a centralised location by installing the portable compactors for intermediate storage was not achieved.

2.5.8 Conclusion

The Department identified eight Solid Waste Management PPP projects but only one was operative. Corporation Amritsar could not ensure closure of all three dumpsites, elimination of all secondary collection points, construction of Sanitary Landfills and installation of weigh bridge etc. Carcass Management was inefficient as Modern Carcass Utilisation Plant in Corporation Ludhiana installed at a cost of ₹ 8.48 crore was lying idle due to public protest. Slaughtering of animals was not done scientifically in the selected ULBs. The modern slaughterhouse in Ludhiana was not operating at its installed capacity despite spending ₹ 20.57 crore. Illegal and unscientific slaughtering in the ULBs was creating threats to environment and public. Construction &

[199] C&D waste management was to be started by September 2017.

[200] As per Rule 11 (c) of C&D Waste Management Policy, 2020.

Demolition waste management was not carried out in any of the selected ULBs except in Municipal Corporation SAS Nagar where C&D waste was used for construction of channels and kerbs.

2.5.9 Recommendations

The State Government/ ULBs may ensure:

- *identification of viable Public Private Partnership projects and professional management of these projects for scientific management of solid wastes in the State; and*
- *preparation of an integrated implementation plan for managing other wastes such as carcass waste, C&D waste and slaughterhouse waste as required under rules.*

2.6 Monitoring and Evaluation

Municipal Solid Waste Management system has several aspects to be monitored on daily, weekly, monthly or annual basis. The collected information should be appropriately analysed to assess service provisions and make requisite improvements. The performance of all components of MSWM system, from collection to processing and disposal, should be ensured on daily basis. A comprehensive Monitoring and Evaluation (M&E) mechanism should be adopted for proper implementation and assessing the progress of the MSWM plan.

To assess the effectiveness of M&E of MSWM, the following audit objective was framed:

"Whether the M&E of Solid Waste Management system including adequacy of awareness creation, citizen engagement for effecting behavioral change, assessment of environmental impacts and implementation of the internal control was adequate and effective."

2.6.1 Non-maintenance of records for monitoring

Paragraph 6.1.1 of MSWM Manual provides that the first step towards implementing an effective M&E system is to acquire the requisite data[201] for assessing the performance of the MSWM system. Reports generated should contain critical information which should be effectively used for decision making, identifying gaps and implementing corrective measures at the city, zone, or ward level. Further, ward level committee should be constituted consisting of one or more wards in a municipality having a population of three lakh or more.

[201] General information regarding ULBs, Door-to-door collection, quantity of waste collected and its segregation, availability of vehicles and human resources, identification of unauthorised waste dumping point, processing data, cost of operations, average number of carcasses removed each day etc. on daily, monthly, quarterly or annual basis as per the requirement.

Scrutiny of records (August 2022 to March 2023) revealed that in the selected ULBs, the record was either not maintained at all or was inadequately maintained as detailed below.

- out of 20 ULBs, the population/household (HHs) survey was conducted only by two ULBs[202] during 2019. However, the population data was not updated by Kiratpur Sahib ULB in its annual report (AR) and Mansa ULB did not submit annual report after this survey. In 18 ULBs, the population and HHs figure were taken almost same for the period between 2017-22 without any survey/basic records (***Appendix 2.19***).
- out of 20 ULBs, waste management was outsourced in three ULBs[203]. Two ULBs[204] did not produce the records due to pending arbitration cases. One ULB[205] produced only the records of transportation of waste and logbooks of processing of legacy waste.
- In three ULBs[206], the waste management was being done through waste picker association/ society. However, the logbooks of MRF for collection of waste was maintained only in one ULB[207] from April 2020.
- In the remaining 14 ULBs, the requisite records of door-to-door collection, quantity of waste collected and its segregation, availability of vehicles and human resources, identification of unauthorised waste dumping point, waste processing data etc. on required frequency[208] were not maintained. This resulted in lack of monitoring at the ground level.
- Three ULBs[209] with population of above three lakh had not constituted ward level committee for monitoring the SWM as required in *ibid* provisions.

It is evident from above that the ULBs were not prioritising the maintenance of necessary records as prescribed in the Manual. This deficiency would have consequential adverse impact, such as inaccurate reporting to higher authorities without any basic data/records, difficulty in tracking progress and challenges in identifying the areas for improvement.

Further, paragraph 6.1.2 of MSWM Manual provides that the assessment of Service Level Benchmarks (SLBs) is based on the analysis of information

[202] (i) Kiratpur Sahib: 7545 (AR) 7565 (after survey); and (ii) Mansa.
[203] (i) Amritsar; (ii) Bathinda; and (iii) Ludhiana.
[204] (i) Bathinda; and (ii) Ludhiana except records of transportation of waste.
[205] Amritsar.
[206] (i) Mansa; (ii) Moga; and (iii) Rajpura.
[207] Mansa.
[208] Daily, monthly, quarterly or annual basis.
[209] Municipal Corporations of Ludhiana, Bathinda and Amritsar.

collected to monitor the MSWM system on a regular basis. Thus, in the absence of records/data, it would not be possible for ULBs to ensure a proper assessment of SLBs.

Audit observed that data reported through SLBs did not match with the data available in the ULBs for the year 2018-19[210] as depicted in charts below:

Chart 2.14: Extent of segregation of MSW

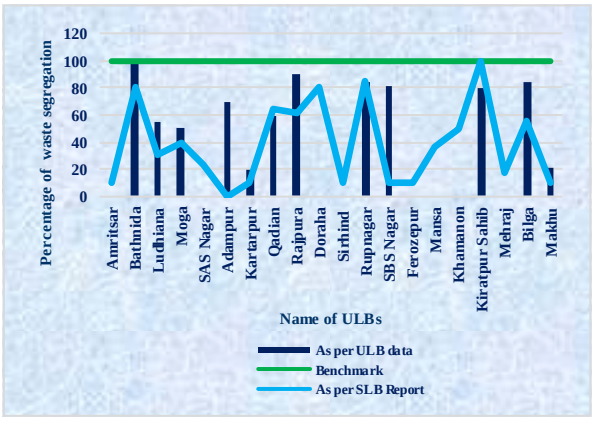
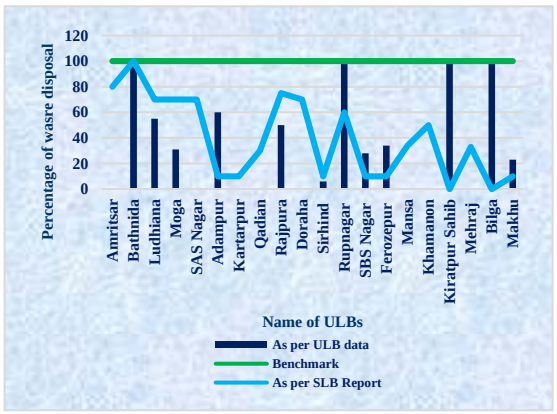


Chart 2.15: Extent of disposal of MSW



Source: Departmental data

Variations between zero to 80 *per cent* and zero to 100 *per cent* were noticed in segregation and disposal data as per ULB records and SLB figures respectively. This reflected non reliability of data depicted in SLBs.

Thirteen[211] ULBs stated (October 2024) that the ULBs had started (June 2024) maintaining some basic records *e.g.* collection, segregation and processing of waste on estimation basis. However, in future efforts will be made to keep all the records as per the provisions. Ludhiana ULB stated that efforts were being made to monitor the SWM through maintenance of records. Bathinda ULB stated that the records of waste collection and segregation were maintained on daily basis and there was pending case in Arbitration Tribunal and the concessionaire was providing only the reports of data processing. Five[212] ULBs stated that maintenance of records as per procedure given in the Manual was very challenging and trained staff was required to maintain the records.

The replies were not acceptable as reliance on estimation undermines data reliability, leading to inaccurate reporting. The audit observed that not only was the SLB reporting incorrect, but the annual reports submitted to the PPCB and subsequently by the PPCB to the CPCB were also based on estimations as discussed in ***paragraph 2.6.5***.

[210] SLB reports after 2018-19 were not made available by ULBs.

[211] (i) Bilga; (ii) Kartarpur; (iii) Makhu; (iv) Mehraj; (v) Rupnagar; (vi) Doraha; (vii) Moga; (viii) Amritsar; (ix) Qadian; (x) Adampur; (xi) Kiratpur Sahib; (xii) SAS Nagar; and (xiii) SBS Nagar.

[212] (i) Ferozepur; (ii) Khamanon; (iii) Mansa; (iv) Rajpura; and (v) Sirhind.

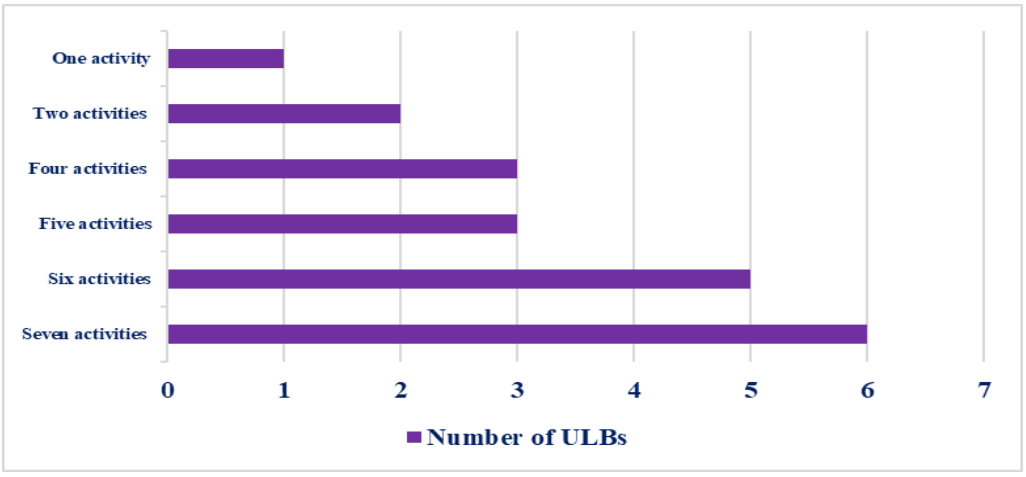
2.6.2 Effectiveness of Information, Education and Communication Mechanism

Rule 15 (zg) of SWM Rules, 2016 provides that the LGD through its designated agency[213] and all the ULBs were required to create public awareness through Information, Education and Communication (IEC) campaign and educate the waste generators about various components[214] of SWM. Paragraph 8.4 of SBM guidelines provides that States would prepare an annual action plan with details of State funding commitment for public awareness and IEC activities.

Audit observed that the PMIDC prepared annual IEC plans for ₹ 76.06 crore[215] under the SBM (Urban) during the period 2017-22 in which various IEC activities[216] were included to be undertaken by the ULBs in fixed frequency. Further, selected ULBs included IEC activities in their APSWM prepared during August 2018 and December 2019 without fixing frequency and targets. Moreover, expenditure against the budget as well as separate expenditure on IEC activities on SWM component and number of activities done against the plans were not made available to audit.

However, seven types of IEC activities (***Appendix 2.20)*** were conducted by the selected ULBs as given in **Chart 2.16.**

Chart 2.16: IEC activities conducted by selected ULBs



Source: Data provided by ULB.

It was noticed that 14 ULBs had not conducted all the seven planned IEC activities. As a result, the SWM components such as at source segregation,

[213] Punjab Municipal Infrastructure Development Company.

[214] Not to litter; minimise generation of waste; reuse the waste to the extent possible; practice segregation of waste; practice home composting; wrap securely used sanitary waste; storage of segregated waste at source in different bins; handover segregated waste to waste collectors; and pay monthly user fee or charges.

[215] 2017-18: ₹ 21.04 crore; 2018-19: ₹ 11.29 crore; 2019-20: ₹ 15.25 crore; 2020-21: ₹ 13.17 crore; and 2021-22: ₹ 15.31 crore.

[216] Awareness to HHs, Schools, Bulk Waste Generators, print media, audio and wall painting etc.

segregating sanitary and hazardous waste, encouraging home composting or community composting etc. were affected.

Eighteen[217] ULBs stated (October 2024) that the IEC activities were conducted regularly. However, the basic record in this regard would be maintained in future. Ludhiana ULB stated that the IEC activities were being undertaken whenever required under SBM (Urban) and the annual plan would be prepared. SAS Nagar ULB stated that IEC activities were being undertaken by Community Facilitators[218].

Due to inability of ULBs to prepare a well-designed and effective implementation of IEC plans for creating awareness among public about the importance of waste segregation and proper disposal, significant changes in waste management practices were not noticed during the period of audit.

2.6.3 Monitoring of SWM by State Level Advisory Body

Rule 23 (1) of SWM Rules, 2016 provides that LGD of the State or Union territory administration would constitute a State Level Advisory Body (SLAB) within six months of the date of notification of SWM Rules. Further, Rule 23 (2 and 3) provides that the SLAB would meet at least once every six months to review the matters related to implementation of the Rules and the review report would be forwarded to the State Pollution Control Board or Pollution Control Committee for necessary action.

In Punjab, the SLAB was established in October 2016. However, since establishment of the Committee, only seven[219] meetings were conducted against the required 11 meetings upto March 2022. The first meeting of SLAB was conducted only in September 2017 i.e. after one year since the establishment of SLAB. During 2018-19, only one meeting was conducted in February 2019. During 2021-22, only one meeting was held in September 2021. The issues related to SWM were discussed in the SLAB meetings ***(Appendix 2.21).*** However, the major issues related to management of legacy waste, construction of SLF, creation of infrastructure, integration of ragpickers/waste collectors, etc., were not resolved yet and discrepancies noticed in this regard have been discussed in this Performance Audit Report.

The Government stated (August 2023) that the meetings were conducted as and when required and the State was performing very well in the management of solid waste. The reply was not acceptable as the monitoring by the SLAB was required regularly. The effect of inadequate monitoring of implementation

[217] (i) Adampur; (ii) Amritsar; (iii) Bathinda; (iv) Bilga; (v) Doraha; (vi) Ferozepur; (vii) Kartarpur; (viii) Khamanon; (ix) Kiratpur Sahib; (x) Makhu; (xi) Mansa; (xii) Mehraj; (xiii) Moga; (xiv) Rajpura; (xv) Rupnagar; (xvi) SBS Nagar; (xvii) Qadian; and (xviii) Sirhind.

[218] Community Facilitators are engaged under the Swachh Bharat Mission in engaging the community to achieve the mission's objectives.

[219] During 2019-20 and 2020-21 required two meetings each year were conducted.

of Rules was reflected in the low ranking of the State in CPCB list. Further, the reply in this regard was awaited from PMIDC (October 2024).

Regular meetings and monitoring through SLAB, as mandated, could have facilitated timely resolution of SWM issues and supported more effective implementation of the SWM Rules in the State.

2.6.4 Shortfall in meetings by District Administration

Rule 12 (b) of SWM Rules, 2016 provides that the District Magistrate or District Collector or as the case may be, would review the performance of local bodies, at least once in a quarter on waste segregation, processing, treatment and disposal and take corrective measures in consultation with the Commissioner or Director of Municipal Administration or Director of local bodies and Secretary-in-charge of the State Urban Development Department. Further, NGT revised the frequency of meetings and ordered (January 2019) that the District Level Committee under Rule 12 of SWM Rules, 2016 would meet monthly and forward the report to State Urban Development Department with a copy to the State Level Committee.

During April 2017 to December 2018, seven quarterly meetings were required to be held whereas 39 monthly meetings from January 2019 to March 2022 were to be held by the District Administration to review the SWM management in the ULBs. Audit observed that against the requirement of 920 (monthly/quarterly) meetings in 20 selected ULBs, only 72 meetings (only eight *per cent*) were held during 2017-22 ***(Appendix 2.22)***.

All the selected ULBs[220] stated that the meetings were attended as and when called for by the District Administration and efforts would be made to collect the minutes of the meetings in future.

Audit also approached (December 2022, May 2023, April 2024 and September 2024) District Administration for which replies were awaited (October 2024). The reply of District Administration of Jalandhar was received (June 2024), from which it was evident that the meetings were conducted after the period covered in Performance Audit Report.

2.6.5 Annual Report

2.6.5.1 Non-submission/delayed submission of annual reports

Rule 24 (2) of SWM Rules provides that the local body should submit its Annual Report (AR) in Form-IV to the State Pollution Control Board and the Secretary-in-Charge of the Urban Development Department on or before the 30th day of June every year. The State Pollution Control Board would prepare and submit a consolidated annual report to the CPCB and

[220] (i) Doraha; (ii) Ferozepur; (iii) Khamanon; (iv) Kiratpur Sahib; (v) Ludhiana; (vi) Makhu; (vii) Moga; (viii) Rajpura; (ix) Rupnagar; (x) SAS Nagar; (xi) Sirhind; (xii) Adampur; (xiii) Bilga; (xiv) Qadian; (xv) Kartarpur; (xvi) Mansa; (xvii) Mehraj; (xviii) SBS Nagar; (xix) Amritsar; and (xx) Bathinda.

Ministry of Urban Development regarding implementation of these rules by the 31st of July each year in Form-V.

The details of submission of AR ***(Appendix 2.23)*** by ULBs to PPCB showed that:

- A total of 100 ARs were required to be submitted by 20 ULBs, against which only 74 ARs were submitted to higher authorities. Out of these, 40 reports were submitted with a delay ranging between one and 1530 days.
- Ten[221] ULBs submitted the requisite number of ARs to the authorities concerned. The remaining ten ULBs submitted their ARs with the shortfall ranging between one and four reports i.e. 20 and 80 *per cent.*
- In one ULB (*viz*. Adampur), the reports for the period 2017-22 were sent to PPCB in September 2022.
- The PPCB was required to submit compiled reports of all the ULBs to CPCB. During the period 2017-18 to 2021-22, the PPCB submitted compiled report for 2017-18 with a delay of 167 days due to which the data of solid waste was not included in the Annual Reports of CPCB for the year 2017-18. For other years reports were submitted in time.

Thus, the monitoring mechanism did not address the delay in submission/ non-submission of Annual Reports through which compliance of rules/regulations could have been monitored. The PPCB/PMIDC also did not take cognizance of non/late submission of ARs by ULBs.

Six[222] ULBs stated that the Annual Reports are now being submitted on time. Thirteen[223] ULBs stated that in future all the ARs would be submitted on time to all the higher authorities.

2.6.5.2 Inadequate Annual Reports

Rule 24 (3) of SWM Rules stipulates that the PPCB shall consolidate the ARs based on submissions by the local authorities and forward them to the CPCB. Further, Rule 14 (g) of SWM Rules, 2016 provides that the CPCB shall prepare an AR on implementation of these rules, based on the reports received from State Pollution Control Boards and Committees, and submit it to the Ministry of Environment, Forest and Climate Change. The report is also required to be made available in public domain. Thus, the data included in the Annual Report should be authentic and reliable.

[221] (i) Amritsar; (ii) Ludhiana; (iii) Adampur; (iv) Ferozepur; (v) Rupnagar; (vi) SBS Nagar; (vii) Sirhind; (viii) Khamanon; (ix) Makhu; and (x) Mehraj.

[222] (i) Adampur; (ii) Kartarpur; (iii) Kiratpur Sahib; (iv) Ludhiana; (v) Makhu; and (vi) Rupnagar.

[223] (i) Amritsar; (ii) Bilga; (iii) Doraha; (iv) Ferozepur; (v) Khamanon; (vi) Mansa; (vii) Mehraj; (viii) Moga; (ix) Rajpura; (x) SAS Nagar; (xi) SBS Nagar; (xii) Sirhind; and (xiii) Qadian.

Scrutiny of ARs of ULBs submitted to the PPCB during the period 2017-18 to 2021-22 revealed shortcomings in the data related to HHs, population, waste generation, waste collection and its processing ***(Appendix 2.19)*** as discussed below:

- Six[224] ULBs had taken similar population and number of HHs in the ARs during the last five years. Four[225] ULBs showed the change in population, but the HHs remained constant and four[226] ULBs changed the HHs, but population remained constant. Three ULBs[227] submitted only one report so the analysis could not be made. In Adampur ULB, the data of HHs and population remained constant during the period 2018-21.
- As per logbook of bio-remediation of legacy waste carried out by Corporation Amritsar, the quantity of RDF was 60,602 MT during the period September 2020 to December 2021, whereas as per ARs for the period 2020-21 and 2021-22, the RDF generated was shown as 1,080 MT.
- The quantity of waste generation, collection, processing and disposal was also incorporated randomly instead of taking them on the actual basis during 2017-18 to 2021-22.

Thus, the ULBs were reporting only estimated figures of SWM which were being accepted without cross checking or analysing the data. This encouraged use of inaccurate estimates of waste and lack of accountability in the reporting process.

Seventeen[228] ULBs stated that they had started maintaining the records of waste generation, segregation and processing. In future data/figures would be incorporated based on these records accurately in ARs. Amritsar ULB stated that in the filling of AR, sometimes the population of Census 2011 had been taken into the consideration and sometimes the population projection of DPR had been taken into the consideration. Therefore, there was a variation, however, in future the projection of DPR population would be taken into the consideration. Bathinda ULB stated that efforts would be made to remove the shortcomings and detailed reply would be given later. Ludhiana ULB attributed the inadequacy in reports to non-conducting any door-to-door survey of HHs.

The replies of the ULBs were inadequate, as they were required to report accurate and verified data. The use of estimated figures and inconsistencies in

[224] (i) Bathinda; (ii) Ludhiana; (iii) Qadian; (iv) SBS Nagar; (v) Bilga; and (vi) Mehraj.

[225] (i) Amritsar; (ii) SAS Nagar; (iii) Kartarpur; and (iv) Khamanon.

[226] (i) Ferozepur; (ii) Rupnagar; (iii) Kirartpur Sahib; and (iv) Makhu.

[227] (i) Mansa; (ii) Moga; and (iii) Rajpura.

[228] (i) Adampur; (ii) Bilga; (iii) Kartarpur; (iv) Kiratpur Sahib; (v) Rupnagar; (vi) SAS Nagar; (vii) Qadian; (viii) SBS Nagar; (ix) Doraha; (x) Ferozepur; (xi) Khamanon; (xii) Makhu; (xiii) Mansa; (xiv) Mehraj; (xv) Moga; (xvi) Rajpura; and (xvii) Sirhind.

the ARs reflect non-compliance with SWM Rules and undermine the reliability of these reports.

2.6.6 Effectiveness of Management Information System

Paragraph 6.1.3 of MSWM Manual, 2016 provides that collection and analysis of data related to MSWM is required to assess the existing situation and propose adequate measures for improving service delivery. Management information System (MIS) is a computerised system designed to capture, store, and retrieve data or information for decision makers. The MIS was started in July 2020 in the ULBs.

Further, PMIDC issued instructions (June 2021) that the data filled by all ULBs in MIS would be considered as the single source of truth for any reporting and assessment process. This step was initiated to address the differences between the data reported by ULBs and the data provided by the State in monthly reports.

Audit observed that the data capturing in MIS began in July 2020 and the information/data such as number of households, quantity of waste generation, number of commercial establishments, segregation of waste, availability of processing facilities etc. was being incorporated into monthly progress reports from the MIS. Audit collected the monthly reports from MIS and compared them with the data provided by the selected ULBs for 2021-22 and observed the following ***(Appendix 2.24)***:

- Out of 20 ULBs, in eight[229] ULBs, MIS indicated availability of SLFs whereas, during JPV, it was observed that they had not been constructed.
- MIS report showed collection of ₹ 24.59 crore as user charges in selected ULBs, whereas actual collection was only ₹ 0.52 crore.
- MIS report indicated that operating cost was ₹ 53.99 crore whereas actual figure of operating cost was ₹ 63.72 crore.
- There was a difference between data captured in MIS and information provided by ULBs in respect of number of HHs, details of collection of SWM and quantity of processing.

Thus, the data entered in the MIS was unreliable.

Eighteen[230] ULBs stated that they had started keeping the record of waste generation, segregation and processing and in future the MIS data would be entered as per the records maintained and other discrepancies would also be

[229] (i) Amritsar; (ii) Bathinda; (iii) Mansa; (iv) Rupnagar; (v) SBS Nagar; (vi) Sirhind; (vii) Bilga; and (viii) Moga.

[230] (i) Adampur; (ii) Bilga; (iii) Kartarpur; (iv) Kiratpur Sahib; (v) Rupnagar; (vi) SAS Nagar; (vii) Qadian; (viii) SBS Nagar; (ix) Amritsar; (x) Doraha; (xi) Ferozepur; (xii) Khamanon; (xiii) Makhu; (xiv) Mansa; (xv) Mehraj; (xvi) Moga; (xvii) Rajpura; and (xviii) Sirhind.

corrected. Bathinda ULB stated that the figures incorporated in MIS were taken erroneously. Ludhiana ULB stated that MIS data entered in the system was tentative as the maintenance of actual records to fill the data on monthly basis was not possible due to lack of staff as well as capacity building. Efforts would be made to fill the correct figures in MIS for accurate reporting.

Thus, capturing incorrect data in MIS would not only provide misleading information regarding waste management for planning, budgeting and implementation but also provide a wrong picture of SWM to the intended users/stakeholders. Therefore, the objective to consider MIS as the single source of truth was defeated.

2.6.7 Non-monitoring of Environmental Standards

Paragraph 6.5.1 of MSWM Manual, 2016 read with Rule 16 (4) and 16 (a) of SWM Rules stipulate that environmental monitoring data[231] should be reported to the State Pollution Control Board (SPCB) by the ULBs on annual basis. The SPCB should monitor and review the compliance of standards for groundwater, ambient air, leachate, compost quality and incineration as specified under schedules I and II at least once in a year. ULB would conduct a study/evaluation to assess the impact on environment and health caused by improper waste management and assess the contamination of air, soil and ground water due to improper waste management.

Scrutiny of records revealed that the ULBs neither reported the monitored data in respect of groundwater, ambient air, leachate, compost quality to the PPCB nor conducted any study/evaluation to assess impact on environment and health caused by improper waste management.

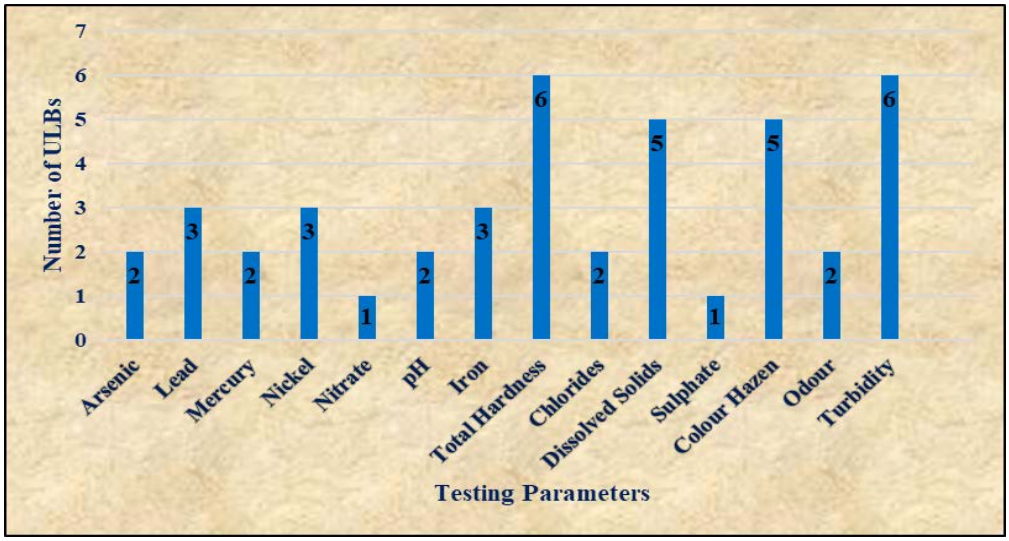
It was further observed that the PPCB did not review the performance of ULBs in implementation of SWM rules during the period 2017-18 to 2021-22. Out of 166 ULBs, the PPCB tested, the Water Quality only in 28 ULBs between 2018 and 2021, of which, six ULBs[232] were selected in the Performance Audit.

Chart 2.17 shows the number of selected ULBs where testing parameters of groundwater were found beyond prescribed limits.

[231] Monitoring of soil, water and air quality around the municipal waste processing, treatment and disposal facility.

[232] (i) Amritsar; (ii) Khamanon; (iii) SAS Nagar; (iv) Mansa; (v) Doraha; and (vi) Moga.

Chart 2.17: Results of ground water testing in selected ULBs



Source: PPCB data

Seventeen[233] ULBs stated that efforts would be made to conduct testing in future as per SWM rules. Two[234] ULBs stated that the monitoring of environment standard was being conducted by PPCB on regular basis. The results of the same would be obtained from PPCB and provided to audit for further scrutiny. Amritsar ULB stated that ULB installed a borewell at the dumping site and was in process of installing five Methane gas detector for monitoring the concentration of Methane in air and rest of the air quality monitoring was being done by the PPCB.

2.6.8 Conclusion

The ULBs featured in this Report did not maintain the records as required under MSWM Rules. The State Level Advisory Body did not meet as per the required frequency. The quarterly/monthly meetings were not conducted by the District Administration as required. Against the requirement of 100 annual reports to be submitted by 20 ULBs, only 74 reports were submitted to higher authorities during 2017-22. The variations between the records of ULBs and figures reported in MIS were noticed. Environmental monitoring of soil, water and air quality around municipal waste processing and disposal facilities was not carried out by the ULBs.

[233] (i) Adampur; (ii) Bilga; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Khamanon; (vii) Kiratpur Sahib; (viii) Makhu; (ix) Mansa; (x) Mehraj; (xi) Moga; (xii) Rajpura; (xiii) Rupnagar; (xiv) SAS Nagar; (xv) SBS Nagar; (xvi) Qadian; and (xvii) Sirhind.

[234] (i) Bathinda; and (ii) Ludhiana.

2.6.9 Recommendations

The State Government/ULBs may:

- *improve maintenance of records and data so that the performance of SWM system could be assessed to prepare precise planning for future projects;*
- *ensure that meetings of monitoring Committees/Boards are conducted as per required frequency and that decisions are strictly implemented to monitor the progress of SWM as per rules and regulations;*
- *ensure that the capturing of authentic and accurate data in the MIS for planning, budgeting and implementation of SWM Projects is carried out with rigour; and*
- *ensure regular monitoring of environmental standards for groundwater, ambient air and management of leachate etc.*

Chandigarh **(NAZLI J. SHAYIN)**
The 24 October 2025 **Principal Accountant General (Audit), Punjab**

Countersigned

New Delhi **(K. SANJAY MURTHY)**
The 12 November 2025 **Comptroller and Auditor General of India**