Audit Report of the Comptroller and Auditor General of India Performance Audit on Waste Management in Urban Areas for the year ended March 2021

लोकहितार्थ सत्यनिष्ठा

Dedicated to Truth in Public Interest

Government of Odisha

Report No. 6 of the year 2022

Audit Report of the

Comptroller and Auditor General of India
Performance Audit on Waste Management in Urban Areas
for the year ended March 2021

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Preface

Solid Waste Management (SWM) in Urban areas has emerged as one of the biggest challenges that our Municipalities faces today. Inadequate management of waste has significant negative externalities in terms of public health and environmental outcomes. SWM is governed by SWM Rules and other wastes such as plastic waste, bio-medical waste, e-waste, *etc*., are administered by SWM Rules and supplemented by specific rules.

There are 114 ULBs responsible for implementation of the SWM Rules 2016 in the State. The estimated solid waste generation in these ULBs was 2,208.60 Tonnes Per Day (TPD) during 2019-20. Out of the above, 2,123.30 TPD of waste were being collected, of which 202.40 TPD were being processed.

This report contains results of a Performance Audit of Waste Management in Urban areas in Odisha which was conducted with the objectives to assess whether the planning of waste management in ULBs were effective, efficient and economical; and monitoring and evaluation of waste management system including adequacy of awareness creation, citizen engagement for effecting behavioural change, complaint, redressal mechanism for citizens, assessment of environmental impacts and implementation of the internal control and monitoring mechanism was adequate and effective.

The Performance Audit covered 21 selected Urban Local Bodies, 21 district Health care units, Odisha Water supply & Sewerage Board, Odisha Water Corporation and State Pollution Control Board to assess the above Audit objective.

This Report of the Comptroller and Auditor General of India has been prepared for submission to the Governor of Odisha under Article 151 of the Constitution of India and under CAG's DPC Act 1971.

Audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

Executive summary

Introduction and Audit frame work

- Solid Waste Management (SWM) in Urban areas has emerged as one of the biggest challenges that our Municipalities faces today. There are 114 Urban Local Bodies (ULBs) responsible for implementation of the SWM Rules, (SWM) 2016 in the State. During 2019-20, the generation of estimated solid waste generation in these ULBs was 2,208.60 Tonnes Per Day (TPD), while Plastic waste accounted for 45,339.40 Tonnes Per Annum (TPA), C&D waste 1,646 TPD, e-waste 396.77 Tonnes Per Month and BMW 179.93 TPD.

(Paragraph 1.1)

- A Performance Audit on "Waste management in Urban areas" was conducted covering the period from April 2015 to March 2020 to obtain an assurance on the laid down principles, whether management of waste was effective, efficient and carried out economically and scientifically. Performance Audit revealed several deficiencies in the planning, implementation and monitoring of waste management.
- Out of 114 ULBs, 21 ULBs consisting of 5 Corporations, 10 Municipalities and 6 Notified Area Councils, were selected for audit along with the 2 Smart cities of Bhubaneswar and Rourkela.

(Paragraphs 1.4 and 1.6)

Financial Management

- Scrutiny of the financial statements of the test checked ULBs revealed that they were dependent of the grants from Government. The expenditure of ULBs on SWM ranged between 11 and 16 *per cent* of their total expenditure.

(Paragraph 2.2)

- User fees were leviable for the purpose of collection, transportation and disposal of solid waste. The by-laws of Waste management provide rates of user fees to be collected from households. Audit observed that out of 21 test checked ULBs, only seven ULBs collected user fees for SWM during 2017-21.

(Paragraph 2.3)

- In six test-checked ULBs, areas under the control of Indian Railways were within the municipal urban limits. The waste generated within the railway premises were handed over to municipalities. However, none of the ULBs collected the user fee for waste generation from Indian Railways.

(Paragraph 2.3.1)

- The by-laws of Waste management also provide spot fines for littering of solid waste. Audit observed that none of test checked ULBs have collected spot fines for littering from individual households, community based organisations (CBOs), market complexes, *kalyan mandaps etc*.

(Paragraph 2.3.2)

- As per the conditions of the FFC, due to non-achievement of service-level benchmarks and non-preparation of annual accounts, the ULBs did not get the central assistance of ₹333.58 crore.

(Paragraph 2.4)

Planning and Strategy of Solid Waste Management

- SWM Rules 2016 (notified on 08 April 2016) stipulated that the State Government should prepare a State Policy and strategy on SWM within one year of notification of the Rules. However, as of February 2022, the H&UD department had not notified a State Policy for integrated SWM.

(Paragraph 3.2)

- As the ULBs did not prepare short-term or long-term action plans for solid waste management, the planning and selection of infrastructure projects in ULBs were, to a large extent, driven by perceived availability of funds rather than need-based analysis.

(Paragraph 3.3.1)

- None of ULBs have ensured solid waste management provision in building plans for market complexes or for a group housing societies. As a result, community participation in waste management could not be ensured.

(Paragraph 3.3.2)

- None of test checked ULBs had prepared DPRs for SWM. In absence of DPRs, quantum of assessment of per capita waste generation, coverage of design capacity for waste processing, contingency plan for waste management, strategy for implementation of 3R approaches, involvement of stakeholders in planning and involvement of waste pickers in waste management could not be assessed in Audit.

(Paragraph 3.5)

- Government of Odisha had not initiated any strategy/policy for prevention, minimising, reuse and recycling of waste as of March 2021 resulting in 90 *per cent* of waste being deposited at landfill / dump sites without processing.

(Paragraph 3.11)

Segregation, Collection and Transportation of solid waste

- It was found that segregation at source was limited to 21 test checked ULBs. Also, Non-notification of domestic hazardous waste led to dumping the mixed waste in landfills.

(Paragraph 4.1.2)

- Due to non-adherences of 3R approach, per capita waste generation had increased from 423 gm/day in 2017-18 to 580 gm/day in 2019-20 as against CPCB norms of 413gm/day to 423 gm/day.

(Paragraph 4.3.2.4)

Processing and Disposal of Municipal Solid Waste

- In 11 test checked ULBs habitations were developed within a distance of 200 meters from landfills and within 500 meter of buffer zone in four ULBs

and causing possible health hazards to public. Landfills in five ULBs were within 20 kms from airport/air base

(Paragraph 5.1.2.2)

Special waste and Construction and Demolition Waste management

- None of the test checked ULBs except Bhubaneswar Municipal Corporation, has framed the by-laws incorporating the provisions of PWM Rules. By-laws of the Bhubaneswar Municipal Corporation were yet to be approved (March 2021).

(Paragraph 6.1.1)

- Plastic waste was not transferred to PWD, the alternate user for use in laying of roads.

(Paragraph 6.1.3)

- All waste generators shall pay such user fees as may be specified in the by-laws of the ULBs for plastic waste management. Neither of the ULBs have framed by-laws for Plastic waste management nor collected user fee for plastic waste. Non-framing/non-enforcement of by-laws for plastic waste management led to loss of revenue to the ULBs.

(Paragraph 6.1.5)

Solid waste management by Smart Cities

- Audit observed that 2,956 TPD of solid waste and 35,057 TPA of plastic waste was disposed to land fill without processing during 2015-20. Similarly, 134 TPA of C&D waste collected during 2018-20 was disposed to landfill without processing in the Smart cities.

(Paragraph 7.6)

- User charges towards Solid Waste Management were not collected by Bhubaneswar and Rourkela Smart cities. Bhubaneswar Municipal Corporation also did not collect user charges as of March 2021. Rourkela Municipal Corporation, however, started collection of user charges from May 2020.

(Paragraph 7.6.2)

Monitoring and Evaluation of Waste management system

- No meeting was held by the Urban Development Department to review measures taken by SLAB for improving SWM practices and execution of SWM projects during 2017-20 indicating poor monitoring by State level bodies.

(Paragraph 8.1.1)

CHAPTER - I
INTRODUCTION
AND
AUDIT FRAME WORK

CHAPTER-I

Introduction and Audit frame work

1.1 Introduction

Wastes are materials which have no further use for production, transformation or consumption, and which are required to be disposed. Wastes are generally classified into solid waste, bio-medical waste (BMW), construction and demolition Waste (C&D), E-waste, plastic waste, hazardous waste *etc*., by virtue of their nature. They are also classified as biodegradable, non-biodegradable, combustible, dry and inert based on their characteristics.

Waste Management in urban areas has emerged as one of the biggest challenges that our Municipalities faces today. The situation has been aggravated by rapid urbanisation. Eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally is one of the targets set in Sustainable Development Goals (SDGs). Inadequate management of waste has significant negative externalities in terms of public health and environmental outcomes. Besides, it has an adverse impact on the aesthetic appearance of the surroundings.

There are 114 Urban Local Bodies (ULBs) responsible for implementation of the Solid Waste Management Rules, (SWM) 2016 in the State. The estimated solid waste generation in these ULBs was 2,208.60 Tonnes Per Day (TPD) during 2019-20. Out of the above, 2,123.30 TPD of waste was collected and 202.40 TPD was processed. **There was no sanitary landfill in the State and dumping of solid waste is being done in open area**.

Out of 45,339.40 Tonnes Per Annum (TPA) of plastic and 1,646 TPD of C&D waste generated, 45,055 TPA of plastic and 1,646 TPD of C&D waste was disposed to landfill. **As there was no authorised recycler or refurbisher in the State, the information on e-waste recycled out of 396.77 Tonnes per month generated was not available with the State Pollution Control Board**.

Out of 179.93 TPD of BMW generated, 174.06 TPD was processed and 5.87 TPD was not processed in 2019-20.

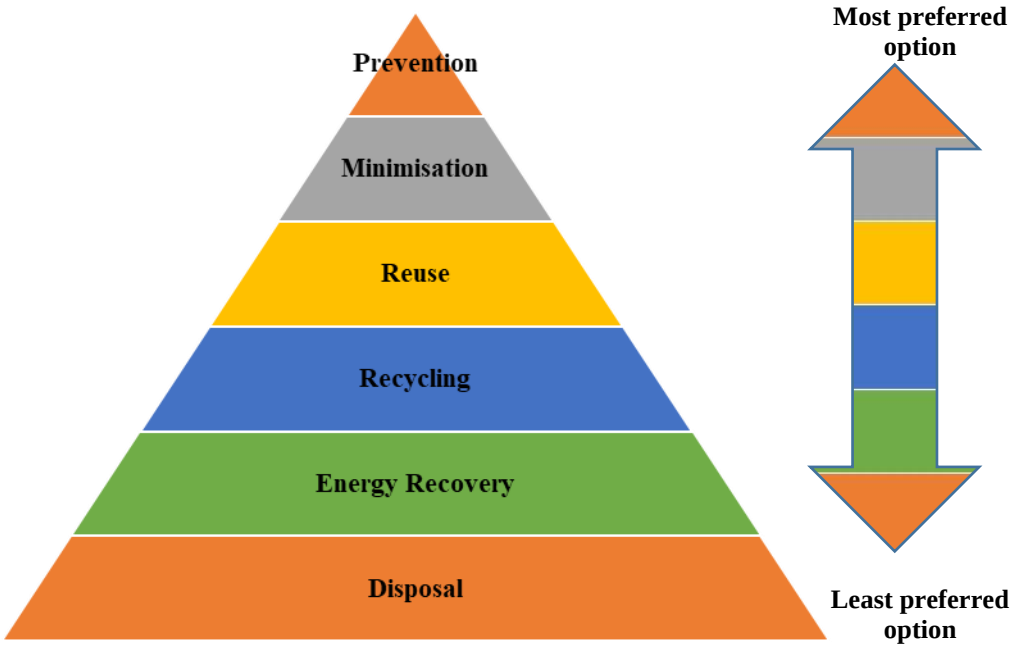
Environment (Protection) Act, 1986, provides a legal framework for disposal and management of waste. Guidelines for preparation of comprehensive plan for the prevention, control or abatement of pollution by using scientific[1] waste management methods have been issued by Government of India (GoI) from time to time. The Ministry of Environment, Forests and Climate Change (MoEFCC) notified (September 2000) the Municipal Solid Waste (Management and Handling) (MSW) Rules, 2000. The Solid Waste Management Rules, 2016 superseded MSW Rules, 2000. Section 221 of the

[1] Scientific disposal of solid waste would be to first segregate the waste into bio-degradable and non-degradable materials. The sanitary workers would be trained to collect the waste materials with due segregation at source. The bio-degradable materials are converted into compost/manure through MCC /vermin compost plants. The non-bio-degradable materials are to be sent to sanitary landfills to cover with thin layer of earth. GoO has mandated the above procedure from July 2019

Odisha Municipal Act 1950 and Section 339 to 345 of the Odisha Municipal Corporation Act, 2003 mandate scientific management of solid waste as an obligatory function of the ULBs. The thirteenth and fourteenth Finance Commissions of GoI and 4th State Finance Commission (SFC) also identified solid waste as one of the core sectors of civic services in Urban Sector besides water supply, sewerage and storm water drainage. Municipal Solid Waste (MSW) Rules 2000 envisages that every municipal authority shall be responsible for collection, segregation, storage, transportation, processing and disposal of solid waste. The basic principle to be adopted for managing waste is the hierarchy of 3Rs[2] *i.e.*, Reduce, Reuse and Recycle.

This Performance Audit would attempt to obtain assurance on the above laid down principles. Solid waste is a challenging issue since inefficient waste collection services have an impact on public health and aesthetics of towns and cities. With the solid waste generation increasing with time, the importance of recycling needs to be recognised and given due importance. The mostly widely accepted waste management hierarchy is depicted below:

Hierarchy of waste management



[2] 3Rs: Reduce- to avoid unnecessary waste generation, Reuse- to use again, and Recycle- to convert unwanted things into useful and marketable recycled products

1.2 Process of Waste Management

The process of waste management is depicted below:

Schedule II of the MSW Rules 2000 provides for segregation, storage, collection, transportation, processing and disposal of municipal solid waste for proper management of solid waste.

The waste that is generated should be segregated and collected at source. Thereafter, it should be transported and processed in accordance with the principles of 3Rs. The inert material remaining after processing has to be safely disposed. The process of segregation to disposal of waste management is the responsibility of the ULBs.

1.3 Organisation set up

The Principal Secretary of Housing and Urban Development Department (H&UDD) is responsible for implementation of the MSW Rules in the State. The Additional Chief Secretary, Forest, Environment and Climate Change Department is responsible for monitoring the compliance of the standards as prescribed under MSW Rules, assisted by State Pollution Control Board (SPCB) with 12 Regional Offices[3] in the State. SPCB is the prescribed authority to grant authorisation and oversee the implementation of the Rule in 114 ULBs in Odisha (5 Municipal Corporations, 45 Municipalities and 64 Notified Area councils (NACs). The organisational structure with respect to functioning of ULBs in the State is given in **Appendix-I.**

[3] Angul, Balasore, Berhampur, Bhubaneswar, Cuttack, Jharsuguda, Kalinganagar (Jajpur Kalinganagar Road), Keonjhar, Paradeep, Rayagada, Rourkela, and Sambalpur

1.4 Audit Objectives

The Performance Audit was conducted to assess whether:

- Strategy and planning of solid waste management in ULBs is commensurate with the wastes generated and concurrent with the prevailing legal frame work;
- Municipal tasks associated with solid waste management including collection, segregation, storage, transportation, disposal and social inclusion of informal waste workers were effective, efficient and economical;
- Planning, construction, commissioning, operation and maintenance of waste management projects in ULBs was effective, efficient and financially sustainable, and
- Monitoring and evaluation of waste management system including adequacy of awareness creation, citizen engagement for effecting behavioural change, complaint, redressal mechanism for citizens, assessment of environmental impacts and implementation of the "internal control and monitoring mechanism" was adequate and effective.

1.5 Audit Criteria

The following were the audit criteria:

- The Odisha Municipal Act, 1950
- The Odisha Municipal Corporation Act, 2003
- Manual of Municipal Solid Waste Management, 2000 and 2016 issued by GoI and Municipal Solid Waste (Management and Handling) Rules, 2000 and 2016;
- E-waste (Management) Rules, 2016;
- Plastic Waste Management Rules, 2016;
- Construction and Demolition Waste Management Rules, 2016;
- Biomedical waste Management Rules, 2016;
- The Environment (Protection) Act and Rules 1986;
- Water (Prevention and Control of Pollution) Act, 1974 ;
- Odisha Sanitary Policy, 2017;
- National Green Tribunal (NGT) Orders
- Swachha Bharat Mission guidelines;
- Instructions, guidelines, policies issued by Central Pollution Control Board (CPCB), SPCB, and GoI/GoO on waste management from time to time.

The regulatory framework governing the management of different types of waste is indicated in **Appendix-II.**

1.6 Audit scope and methodology

The Performance Audit on Waste management in urban areas was carried out during December 2020 to March 2021 and from July 2021 to September 2021 due to pandemic situation. The period of Audit coverage was from 2015-16 to 2019-20. It involved examination of the records relating to solid waste and plastic waste, E-waste, BMW and C&D waste. Out of 114 ULBs, 21 ULBs were selected by using stratified random sampling method based on 2011

census. Audit examination involved scrutiny of records at selected 21 ULBs (five Corporations[4], ten Municipalities[5] and six NACs[6]) and two smart cities (Bhubaneswar and Rourkela), office of the Principal Secretary to GoO, and Director of Municipal Administration (DMA) of H&UD Department, and Member Secretary, SPCB of Forest, Environment and Climate Change Department. Audit also scrutinised the records of other Apex units such as office of Additional Principal Secretary, Health and Family Welfare, office of the Principal Secretary, Industries Departments; Member Secretary, Odisha Water Supply & Sewerage Board (OWSSB); and Director, Water Corporation of Odisha (WATCO) for their involvement in BMW, E-waste and liquid waste management, respectively. Besides the above, records of 21 Health Care Establishments (HCEs)[7] within the jurisdiction of the above selected ULBs were also verified for Bio medical waste management within the Audit period.

Audit also analysed the usefulness of landfills by physical verification of the sites and also by utilising Geographic information system (GIS) and Global positioning system (GPS).

An Entry Conference with the Principal Secretary, H&UD Department and representatives from SPCB/ Health and Family Welfare and Industries Departments was held on 17 February 2021. The Audit objectives, criteria, scope and methodology were discussed.

Draft Performance Audit Report was issued on 17 January 2022 to Government. An Exit Conference was held on 18 April 2022 and the department furnished replies to the draft report on 23 May 2022. Replies of Government have been suitably incorporated in the report.

Audit acknowledges the co-operation and assistance extended by the State Government, all the ULBs, Health Care establishments and SPCB in conducting the Performance Audit.

1.7 Arrangement of Chapters

Audit covered the aspects on financial management, planning and strategies adopted, infrastructure taken for processing, disposal and monitoring of waste management. Accordingly, the report has been arranged in the following chapters:

- Chapter – II: Financial management
- Chapter – III: Planning and strategy of solid waste management
- Chapter – IV: Segregation, collection and transportation of solid waste

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4 Municipal Corporations: Bhubaneswar, Berhampur, Cuttack, Rourkela, and Sambalpur

5 Municipalities: Balangir, Bargarh, Baripada, Bhadrak, Choudwar, Jeypore, Jharsuguda, Puri, Rayagada, and Sundargarh

6 Notified Area Councils: Chandabali, Chhatrapur, Gunupur, Hinjilicut, Nuapada and Ranpur

7 Records of 21 HCEs covering (i) 13 District Headquarters Hospitals (DHHs) *i.e.*, Puri, Jeypore. Sundargarh, Nuapada, Sambalpur, Ganjam (Berhampur), Jharsuguda, Baragada, Bhadrak, Cuttack, Rayagada, Rourkela Government Hospital, and Capital Hospital Bhubaneswar (ii) four Community Health Centres (CHCs) *i.e.*, Chandabali, Ranapur, Hinjilicut and Kapileswar; Urban Primary Health Centre (UPHC) Choudwar (iii) two Sub-Divisional Hospitals (SDHs): Gunupur and Chhatrapur; and (iv) two medical colleges *i.e.*, Bhim Bhoi Medical College & Hospital, Bolangir and Pandit Raghunath Murmu Medical College & Hospital, Baripada

- Chapter – V: Processing and disposal of Municipal solid waste
- Chapter – VI: Special waste and Construction and Demolition waste management
- Chapter- VII: Solid waste management by Smart cities
- Chapter – VIII: Monitoring and evaluation of waste management system, and
- Chapter – IX: Conclusion & Recommendations

CHAPTER - II
FINANCIAL MANAGEMENT

Chapter – II

Financial Management

2.1 Assessment of requirement of funds

As per section 1.4.5.6.2 of Manual of SWM 2016, SWM services are sustainable only if they are financially viable on a stand-alone basis. Therefore, the assessment of financial viability is an important step in planning SWM system. Scrutiny of the financial statements of test-checked ULBs for the years 2015-20 revealed that ULBs were mainly dependent on Government grants for SWM. However, none of the test checked ULBs had prepared Detailed Project Reports (DPRs) for SWM. In absence of DPR, assessment for requirement of capital and revenue funds for SWM activities would not be realistic.

2.2 Receipts and expenditure

As per Clause 15(x) of SWM Rule 2016, ULBs are required to make adequate provisions of funds for capital investment as well as operation and maintenance of SWM services in annual budget ensuring that funds for discretionary functions of local bodies have been allocated only after meeting the requirement of necessary funds for SWM and other obligatory functions.

The 13th Finance Commission (TFC) (2010-15)/ 14th Finance Commission (FFC) (2015-20) included four[8] essential services sectors (including SWM) to be provided by local bodies. The TFC /FFCs provided grants to local bodies in two parts - a general basic grant and a performance grant. The details of receipt and expenditure of test checked ULBs for 2015-20 are given in table below:

Table 2.1: Details of receipt and expenditure of test checked ULBs

(₹in crore)

Year	OB	Revenue receipt	Capital receipt	Total funds	Revenue expr.	Capital expr.	Total expr.	Expr on SWM (percentage)	Balance funds
2015-16	103.90	146.12	253.06	503.08	112.26 (42.12)	154.29 (57.88)	266.55	81.57 (16.21)	236.53
2016-17	236.53	190.61	336.28	763.42	163.22 (43.77)	209.69 (56.23)	372.91	118.03 (15.46)	390.51
2017-18	390.51	209.56	352.88	952.95	184.96 (36.77)	318.03 (63.23)	502.99	133.33 (13.99)	449.96
2018-19	449.96	316.40	328.07	1,094.43	233.97 (45.21)	283.53 (54.79)	517.50	146.76 (13.41)	576.93
2019-20	576.93	242.51	650.95	1,470.39	204.53 (40.46)	301.03 (59.54)	505.56	168.74 (11.48)	964.83
Total		**1,105.20**	**1,921.24**		**898.94**	**1,266.57**	**2,165.51**	**648.43**	

(Source: Information furnished by ULBs)
(NB: The unutilised amount of previous year shown as opening balance)

It was observed that in spite of non-achievement of the prescribed percentage of Service Level Benchmark (SLB) ranging from 80 to 100 *per cent* for SWM performance as discussed in **Paragraph 3.6**, the expenditure on SWM was only 11 to 16 *per cent* of the funds available with the ULBs resulting in

[8] Essential services to be carried out: Water supply services, sewage management, solid waste management and storm water drainage

accumulation of balances of ₹964.83 crore[9] at the end of March 2020 as detailed in **(Appendix-III)**. Out of the above grants, there was an expenditure of ₹648.43 crore for day to day activities like segregation, collection, and transportation on SWM during 2015-20. Despite the fact that staff were employed by ULBs to discharge this function, the situation of SWM in the towns and cities remained far from satisfactory during 2015-20 as discussed in succeeding paragraphs. The State Government had also not devised adequate strategies for creating required capital investment for SWM. Deficiencies in creation of assets have been detailed in **Paragraph 5.1.1**. As a result, the issue of recycling of solid waste had not received due attention and ULBs did not utilise even the available funds for creation of assets for SWM activities up to March 2020 for processing/recycling. After issue of SOP (July 2019) for decentralisation of waste management, GoO released State grant (SWM) to the ULBs for creation of MCC /MRF for processing/recycling. However, ULBs did not utilise these funds for creation of assets for processing/recycling of solid waste.

- As per sanction order of FFC, the department had to release funds to concerned ULBs within 15 days of receipt from GoI. If the release of instalment to ULBs was delayed, the Department had to pay interest at bank rate for the number of days delayed along with the instalment. Audit observed that due to delay in release of funds of ₹425.39 crore to ULBs during 2019-20, department paid interest of ₹99.13 lakh to ULBs.

  While accepting the Audit comments, the Government stated (May 2022) that ULBs initiated steps for establishment of decentralised processing/ disposal facilities (MCC/MRF) for processing of MSW after issue of SOP 2019. Due to COVID-19 pandemic, the ULBs could not create required infrastructure. The fact however remained that ULBs did not utilise the available funds up to March 2020 for creation of infrastructure for processing of MSW.

2.3 Levy and collection of user charges for solid waste management

Section 131 and 132 of OM Act, 1950 and Section 193 of OMC Act 2003 and Clause 15(f) of SWM Rules, 2016 provides for levy of SWM user charges for purpose of collection, transportation and disposal of solid waste. The by-laws (Schedule-2) of Waste management provides rates of user charges to be collected from households. Audit observed that out of 21 test checked ULBs, only seven ULBs[10] collected user fee for SWM during 2017-21. Against the demand of ₹161.41 crore, only ₹0.70 crore was collected as of March 2021 resulting in loss of revenue of ₹160.71 crore as detailed in **(Appendix-IV)** due to laxity in enforcement of the provisions for levy and collection of user fees. Audit further observed that ULBs failed to provide 100 *per cent* basic facilities to

[9] ULBs: Bolangir (₹14.18 crore),Bhubaneswar (₹88.81 crore), Baragarh (₹31.23 crore), Baripada (₹25.29 crore), Berhampur (₹85.95 crore), Bhadrak (₹145.38 crore), Chandabali (₹22.44 crore), Chhatrapur (₹3.74 crore), Choudwar (₹13.00 crore), Cuttack (₹104.33 crore), Gunupur (₹10.59 crore), Hinjilicut (₹3.10 crore), Jeypore (₹42.15 crore), Jharsuguda (₹43.75 crore), Nuapada (₹10.09 crore), Puri (₹90.98 crore), Ranapur (₹4.52 crore), Rayagada (₹18.35 crore), Rourkela (₹78.96 crore), Sambalpur (₹119.03 crore), and Sundargarh (₹8.96 crore)

[10] Bhadrak(from August 2020), Rayagada (from August 2020), Baragarh (from April 2017), Chandabali (from January 2021), Choudwar (from April 2021), Gunupur (from April 2021) and Rourkela (from May 2020)

households like issue of bins for practicing source segregation, collection of solid waste, sweeping of streets/lane/roads of wards of ULBs on daily basis and creation of public awareness.

Due to low revenue collection, gap has increased between generation of own resources and revenue expenditure in relation to SWM activities during 2015-20. The resource-expenditure gap increased from ₹81.33 crore (2015-16) to ₹168.73 crore (2019-20) in the test-checked ULBs **Appendix-V**.

The Government stated (May 2022) that all the ULBs have been advised to create public awareness through IEC activities on collection of user charges from all waste generators. The fact, however, remained that instructions were not effective as user fee collected in test-checked ULBs as of March 2021 was negligible.

2.3.1 Non-collection of user charges from railway authorities/ other establishments

As per Section 2.2.1.5 of SWM Manual, SWM Rules, 2016 are also applicable to industrial townships, areas under the control of Indian Railways, Airports, Airbases, Ports and harbours, defence establishments, special economic zones, *etc*. As such, user fee should be collected from those authorities.

In six[11] test-checked ULBs, areas under the control of Indian Railways were within the municipal urban limits. The waste generated within the railway premises were handed over to municipalities. However, none of the ULBs collected the user fee for waste generation from Indian Railways.

The Government stated (May 2022) that Railway Authority was requested for implementation of provisions of SWM Rules 2016 in railway platforms and tracks. The reply was not acceptable since ULBs were responsible for management of solid wastes in the areas under the control of Indian Railways as per SWM Rules 2016.

2.3.2 Non-collection of spot fines

Clause 15 (zf) of SWM Rule stipulate that ULBs should frame by-laws and prescribe criteria for levying of spot fine for persons who litters or fails to comply with the provisions of these rules and delegate powers to officers or local bodies to levy spot fines as per by-laws framed. The by-laws (Schedule-2) of Waste management also provided for collection of spot fine for littering of solid waste.

Audit observed that none of test checked ULBs have collected spot fines for littering from individual households, community based organisations (CBOs), market complexes, kalyan mandaps *etc*., who failed to comply with the provision of SWM rules as of March 2021.

The Government stated (May 2022) that SWM by-laws were notified by all ULBs of the State. Squads were constituted in each ULBs for strict monitoring of compliances of the Rules. Spot fines were levied by the squad and the amount collected from the violators. The reply was not acceptable as none of

[11] Bhubaneswar Municipal Corporation, Cuttack Municipal Corporation, Sambalpur Municipal Corporation, Bhadrak Municipality, Jharsuguda Municipality, and Rayagada Municipality

the ULBs provided any documentary evidence for having levied and collected spot fines for violation of SWM Rules.

2.4 Loss of central assistance

As per paragraphs 9.70 and 9.71 of Fourteenth Finance Commission (FFC) recommendations, GoI allocates basic grants (BG) and performance grants (PG) for ULBs. The BG is to provide a measure of unconditional support to ULBs for delivering basic functions assigned to them. To be eligible for PG, ULBs have to submit audited annual accounts that relate to a year not earlier than two years preceding the year in which it seeks to claim. It will also have to show an increase in own revenues over preceding year, as reflected in audited accounts. In addition, ULBs have to measure and publish SLB for essential services. The details of BG and PG received from GoI during 2015-20 are given below:

Table 2.2: Details of FFC Grant recommended and shortfall during the period 2015-20

(₹in crore)

Year	FFC Grants Recommended			FFC Grants Received			Shortfall of Grants		
	BG	PG	Total	BG	PG	Total	BG	PG	Total
2015-16	170.10	0.00	170.10	162.44	0.00	162.44	7.66	0.00	7.66
2016-17	235.54	69.52	305.06	231.26	68.26	299.52	4.28	1.26	5.54
2017-18	272.14	78.67	350.81	258.84	0.00	258.84	13.30	78.67	91.97
2018-19	314.82	89.34	404.16	292.73	0.00	292.73	22.09	89.34	111.43
2019-20	425.39	116.98	542.37	425.39	0.00	425.39	0.00	116.98	116.98
Total	**1417.99**	**354.51**	**1772.50**	**1370.66**	**68.26**	**1438.92**	**47.33**	**286.25**	**333.58**

(*Source: Information furnished by DMA)*

From above table, it could be seen that there was a loss of central assistance of ₹333.58 crore (PG ₹286.25 crore + BG ₹47.33 crore) which was due to non-achievement of SLBs for four basic essential services, low revenue generation, non-conduct of elections to the ULBs and non-preparation of annual accounts.

In Exit Conference (April 2022), the DMA accepted Audit comments.

CHAPTER - III
PLANNING AND STRATEGY OF SOLID WASTE MANAGEMENT

Chapter – III

Planning and Strategy of Solid Waste Management

3.1 Planning

The framework for administration and management of SWM in India is broadly divided into three tiers - Central, State and local bodies. Other stakeholders that play a crucial role are households, businesses, industries, informal sector, non-governmental organisations (NGOs), Community Based Organisations (CBOs), Self-Help Groups (SHGs), *etc*. Involvement of all these stakeholders is necessary at several stages of SWM. The role and responsibilities of stakeholders involved in process of SWM in urban areas are given in Table-3.1 below.

Table-3.1: Responsibilities of stakeholders involved in process of SWM

Institution/stakeholders	Role and responsibilities in SWM
Central Government (MoEFCC, MoUD and CPCB)	Framing of Laws and Rules; Policies and Norms; Guidelines; Manuals; and technical assistance; financial support; Monitoring the implementation of laws and rules.
State Government (H&UDD headed by Pr. Secretary and SPCB headed by Member Secretary)	Policy framing, monitoring implementation of laws and rules in metropolitan cities; State Policy and SWM strategy; Guidelines, Manuals, and technical Assistance; financial Support; reporting on SLBs to the MoUD; capacity Building of local bodies; granting consent to set up treatment and disposal activities.
District Collector or Deputy Commissioner (DC) assisted by Project Director, District Urban Development Agency (DUDA)	Review the performance of ULBs on waste management process; facilitate identification and allotment of suitable land for solid waste processing and disposal facilities.
ULBs (headed by Commissioner, Municipal Commissioner or Chief Executive Officers/ Executive Officers)	Implementation of MSW Rules, providing SWM services; preparation of SWM plan; framing by-laws; levy and collection of fees; financing SWM system; creating public awareness; and involvement of informal sector in SWM.
Informal Sector (waste recyclers, NGOs, CBOs and private partners)	Resource recovery and recycling at different stages; providing support to the local recycling industry; involvement of community; creating awareness; collection and transportation of waste; and technology providers.

(Source: As per MSW Manual 2016)

3.2 State Policy and strategy on integrated solid waste management

MSW Manual 2000 (Section 25.2) read with Clause 11(a) (b) of SWM Rules 2016 (notified on 08 April 2016) stipulated that the State Government should prepare a State Policy and strategy on SWM within one year of notification of the Rules.

Audit observed that H&UD Department had not notified a State Policy for integrated SWM as of February 2022. In absence of the State Policy, no long-term and short-term management strategy and action plan was developed. As such, the waste generated was disposed to landfill sites without processing by the ULBs as of March 2020.

Government of Odisha issued (July 2019) a Standard Operating Procedure (SOP) creation of Micro Composting Centres (MCC) and Material Recovery

Facility (MRF)) for decentralisation of SWM system in the State and issued another SOP for operation and maintenance of MCC and MRF centers in December 2020. After introduction of above two SOPs, ULBs initiated action for creation of infrastructure of MCC and MRF. Out of 271 MCC and 173 MRF to be constructed in 114 ULBs, 165 MCC and 140 MRF centres were completed as of March 2021. In test checked ULBs, 55 out of 123 MCC and 38 out of 51 MRF centres were completed.

In reply the department stated (April 2022) that Odisha Urban Sanitation Policy and Odisha Urban Sanitation strategy were notified in 2017 which covers SWM. The fact, however, remained that no integrated/exclusive State Policy and strategy for SWM have been framed.

3.3 Municipal solid waste management plan

3.3.1 Short-term and Long-term action plan

MSW Manual, 2000 (Sections 26.1 and 26.2) and Manual 2016 (Section 1.4.5, 1.4.6 and 5.4) emphasised that ULBs are to prepare a detailed SWM plan with short-term (five years) and long-term (20-25 years) action plans apart from contingency plans. The short-term plan should lead to achievement of the long-term plan. Local authorities should ensure that short-term plans aligned with the long-term planning and implementation. Contingency plans were to prepare for appropriate storage of waste, to tide over situations of non-performance of processing/treatment/disposal facilities.

Audit observed that ULBs neither prepared short-term/long-term action plans nor contingency plans during 2015-20 for adopting a systematic approach to SWM. In the absence of these plans, planning and selection of infrastructure projects in ULBs were, to a large extent, driven by perceived availability of funds rather than need-based analysis.

The Government stated (May 2022) that the H&UD department had issued a SOP 2019 for decentralised SWM processing at State level. The reply was not acceptable since the MSW manual envisages for preparation of short and long term action plan at the ULBs level.

3.3.2 Building plans without provision of SWM

As per Clause 15(ze) of SWM Rule 2016, the ULBs should ensure that provisions for setting up of centres for collection, segregation and storage of segregated wastes are incorporated in building plans while granting approval of building plans of a group housing societies or market complexes.

Audit observed that none of ULBs have ensured solid waste management provision in building plans for market complexes or for a group housing societies as of March 2021. As a result, community participation in waste management could not be ensured. The EOs of Bolangir and Baragarh have noted the audit comments for future guidance.

3.4 Non-involvement of all stakeholders in planning

Manual on SWM, 2016 (Section 1.4.4.1) provided for constitution of a core

team or advisory team (internal stakeholders) involving departments[12] concerned with SWM services for developing the SWM plan and involvement of the community (external stakeholders comprising households, informal sector, NGOs, CBOs, SHGs, women's groups, secondary school and college students *etc.*), in SWM planning and implementation.

Audit noticed that no core team or advisory team involving internal/external stakeholders was formed in any of the test checked ULBs during 2015-20. Against requirement of 1,381 *swachha sathis* and 345 *swachha* supervisors, the test checked ULBs engaged 1,083 *Swachha Sathis* (*78 per cent*) from SHGs groups and 173 *swachha* supervisors (*50 per cent*) respectively, after introduction of SOP.

The Government stated (May 2022) that WATSAN committees[13] were constituted in each ward of the ULBs which is actively participating in the SWM process of the ULBs at the grass root level. However, the fact remained that the Government failed to constitute the mandated core/advisory team involving all internal and external stakeholders.

3.5 Non-preparation of DPRs for solid waste management

Government of India launched its flagship scheme 'Swachha Bharat Mission-Urban (SBM)' in October 2014 and SWM was one of its six components. As per Paragraph 7.2 and 7.3 of SBM Guidelines, ULBs were to prepare Detailed Project Reports (DPRs) for SWM of their city in consultation with State Government. It also stipulated that State Government may handhold ULBs in quickly preparing DPRs for SWM by shortlisting/identifying private or government agencies.

Audit observed that none of test checked ULBs had prepared DPRs for SWM. In absence of DPRs, quantum of assessment of per capita waste generation, coverage of design capacity for waste processing, contingency plan for waste management, strategy for implementation of 3R approaches, involvement of stakeholders in planning and involvement of waste pickers in waste management could not be assessed in Audit.

The Government stated (May 2022) that establishment of small scale processing centers does not require DPRs. The reply was not acceptable, as guidelines envisage that ULBs were to prepare DPRs for SWM in consultation with the State Government.

3.6 Service Level Benchmarks (SLB)

Ministry of Urban Development has set SLBs at the national level for service provision in four key sectors – water supply, sewerage, SWM and storm water management. Monitoring performance and improvements is envisaged as the goal of the Service Level benchmarking. Benchmarking should be used as a tool for undertaking objective performance analysis by ULBs to improve their activities. The benchmarking of services enables state level agencies and local

[12] i) Commissioner or Chief Executive of the ULB ii) Head of the SWM department iii) Environment engineer in the SWM department iv) Head of the town planning department v) Head of water supply, public health or sanitation and sewerage department vi) Head of the accounts department, vii) ward level official in the SWM department

[13] WATSAN Committee: It is a ward level water and sanitation user management committee in urban areas

level service providers to initiate a process of performance monitoring and evaluation against agreed targets. The Fourteenth Finance Commission (FFC) has also endorsed the principle of benchmarking and included in SLB as one of the conditions for the allocation of performance-based grants to ULBs. MoUD defined a common minimum framework for monitoring and reporting on performance indicators, of which eight performance indicators pertained to SWM as detailed below:

Table 3.2: SLB performance indicators and benchmarks pertaining to SWM

Sl. No.	Performance indicator	Unit as percentage of	Bench mark (in *per cent*)
1	Household level coverage of SWM services	households and establishments covered by daily doorstep collection system	100
2	Efficiency of collection of municipal solid waste	total waste collected against waste generated within the project area	100
3	Extent of segregation of municipal solidwaste	households and establishments that segregate their waste	100
4	Extent of municipal solid waste recovered	quantum of waste collected, which is either recycled or processed	80
5	Extent of scientific disposal of municipal solid waste	waste disposed in a sanitary landfill against total quantum of waste disposedin landfills and dumpsites	100
6	Extent of cost recovery in SWM services	recovery of all operating expenses related to SWM services that the ULBis able to meet from the operating revenues of sources related exclusively to SWM	100
7	Efficiency in redressal of customer complaints	total number of SWM related complaints resolved against total number of SWM complaints received within 24 hours	80
8	Efficiency in collection of SWM user charges	current year revenues collected against total operating revenues for the corresponding period	90

(Source: MSW manual 2016)

3.6.1 Targets and achievement in test checked ULBs

Analysis of SLB declarations (2019-20) by 21 test-checked ULBs in respect of these performance indicators (except efficiency in redressal of customer complaints) showed that extent of segregation, recovery of solid waste, scientific disposal and cost recovery of solid waste in majority of the test-checked ULBs were significantly below the benchmarks as shown in Table below.

Table No.3.3: Service Level Benchmarks achievement by 21 test checked ULBs

Particular of SLB declaration in test checked ULBs	Number of ULBs (range in percentage)			
	Zero to 20	20 to 50	50 to 80	80 to 100
Extent of segregation of SWM	12	03	02	04
Extent of SWM recovered	13	03	05	0
Extent of scientific disposal of SWM	19	01	01	0
Extent of household level coverage of SWM services	06	0	06	09
Extent of cost recovery in SWM recovered	17	02	02	0
Efficiency of collection of SWM	06	0	05	10
Efficiency in collection of user charges for SWM service	16	04	01	0

(Source: As per information provided by test checked ULBs)

It can be seen from the table above that scientific disposal of solid waste was in the range of zero to 20 *per cent* in respect of 19 ULBs.

The correctness of the achievements declared by ULBs could not be verified as ULBs did not furnish any documentary evidence in support of their claims. ULBs should strive to move towards highest/preferred level of reliability. As a result, ULBs were deprived to get the performance grant of ₹333.58 crore from FFC.

The EOs of Rayagada, Jeypore, Cuttack, Bhadrak, Sambalpur, Puri and Chhatrapur ULBs stated (January/April 2021) that steps would be taken to achieve SLBs. However, the fact remains that Government suffered loss of performance grant due to non-achievement of SLBs.

3.7 Capacity building

Manual on MSW, 2000 (Section 19.1) stipulated that measures must be taken for institutional strengthening and internal capacity building so that efforts made can be sustained over a period of time and system put in place could be managed well. Clauses 11(k) and 15 (zc) of SWM Rules, 2016, required H&UDD /ULBs to arrange for capacity building of staff (including contract workers) in managing segregation and transportation or processing of waste.

Audit observed that department had not organised any capacity building training programme for sanitation workers from 2015-19. It was, however, noticed that department organised two training programmes for sanitation workers and an exposure visit during 2019-20. As such, the capacity building for institutional strengthening was deficient during 2015-19.

3.7.1 Information, Education and Communication activities

As per Section 25.4.2.12 of MSW Manual 2000, State governments may develop appropriate Information, Education and Communication (IEC) material according to local needs and take up state-wide awareness campaign and help ULBs to build public awareness in their cities and towns and promote the principle of "Reduce, Reuse and Recycle" municipal waste.

The IEC[14] campaign should target households, shops, and commercial and institutional premises as well as other stakeholders such as municipal officials, elected representatives, schools, NGOs, the informal sector, media, *etc.*, to ensure their participation in managing city waste by discharging their role effectively.

Audit observed that State Government did not develop a strategy module/document for IEC activities with the objective of creating awareness among citizens, bulk waste generators and agencies involved in handling of solid waste. ULBs did not provide evidence of various IEC activities for target groups from public to municipal staff and officers including various associations from 2015-20. They claimed that IEC activities through *Swachha*

[14] IEC activities as per para 15(zg) of SWM Rule 2016: i) not to litter (ii) minimise generation of waste (iii) reuse the waste to extent possible (iv) practice segregation of waste into bio-degradable, non-biodegradable, sanitary waste and domestic hazardous waste (v) practice home composting, vermin composting and bio gas generation or community participation (vi) wrap securely used sanitary waste (vii) storage of segregated waste in different bin (viii) handover segregated waste to waste pickers and (ix) pay monthly user fee or charges to waste collectors or local bodies for SWM

Sathis were conducted by encouraging waste generators to segregate waste into 'wet and dry', by creating awareness through banners, stickers, wall paintings, *etc*. The status of various modes of communication used in test-checked ULBs is given below.

Table 3.4: Modes of communication used in the 21 test-checked ULBs during 2015-20

Sl. No	Modes of communication used	Yes	No
1	Audio	16	05
2	Video	09	12
3	Mass communication	08	13
4	Wall Paintings	17	04
5	Schools	10	11
6	Hoardings	17	04
7	Street Jatras	07	14
8	Pamphlets	14	07

(Source: Records of test-checked ULBs)

It was further observed that following issues relating to IEC were not addressed:

- Domestic hazardous waste included both toxic and bio-medical wastes. However, neither State level authorities nor district/ULB level authorities notified and publicised list of domestic hazardous wastes.
- E-waste consists of different components that are both hazardous and non-hazardous. Hence, E-waste should be segregated at source and should not be mixed with solid waste. However, no specific IEC activity focused on E-waste segregation was carried out.
- None of test-checked ULBs created awareness for levy of penalty for littering, non-segregation of different waste, *etc.*
- IEC activities conducted by test-checked ULBs did not emphasise 'not to burn, 'not to bury' and 'not to litter' solid waste, and did not propagate waste minimisation through 3R concept.
- None of test-checked ULBs encouraged community participation adequately.
- ULBs did not create adequate awareness amongst the work force for utilisation of protective equipment.

The Government stated (May 2022) that instructions and prototypes to ULBs for taking up IEC activities have been issued by the department from time to time. Government further stated that ward level meetings were being organised to generate awareness about sanitation. However, the fact remains that IEC activities were found deficient in effectively achieving SWM target. Further, Government did not furnish any documentary evidence in support of ward level meetings.

3.8 Generation and assessment of waste

A reliable assessment of different kinds of waste generated in the city limit is essential for planning and effective implementation of SWM. Section 3.3.6 of MSW Manual, 2000, stipulated that data on waste generation, weight and volume should be collected by each authority for application in its own area of

operation. However, Audit found the following deficiencies in assessment of waste generation.

3.8.1 Inadequate estimation of waste generated

Section 1.4.3.3.1 of Manual on SWM, 2016 stipulated that for the purpose of long term planning, average amount of waste disposed by a specific class of generators may be estimated only by averaging data from several samples. These samples are to be collected continuously for a period of seven days at multiple representative locations within jurisdiction of ULB, in each of three main season's *viz*., summer, winter and rainy seasons. Waste should be aggregated over seven-day period, weighed and averaged. These quantities could then be extrapolated to entire ULB and per capita generation assessed. For purposes of project identification, Section 3.3.6.2 of SWM Manual 2000 suggested municipal refuse generation rates[15] where an indication of service level must be estimated and data from project preparation stage have to be developed.

Audit observed that test checked ULBs did not conduct any survey adhering to the prescribed methodology but adopted population estimation/per capita method to arrive average waste generated. Audit also found wide variation in waste generation which ranged from 0.74 to 227.07 TPD as reported by ULBs and as calculated by Audit as per norms which is detailed in **(Appendix-VI)**. Non-taking of survey for arriving at quantum and type of waste generated by various sections of society has seriously impacted proper planning and strategy selection and implementation of SWM.

The Government stated (May 2022) that a sample survey was conducted by the ULBs taking the wastes of some households of each ward for 10 days to derive the *per capita* waste generation. The reply was not acceptable since none of the test checked ULBs, nor the Government, furnished any documentary evidence to Audit for conducting sample survey to arrive at the *per capita* waste generation.

3.9 Incomplete coverage of waste generators

Section 1.4.3.3.2 of Manual on SWM, 2016 stipulated that multiple samples at multiple locations need to be taken to determine waste composition as daily, seasonal, and temporal fluctuations which are usually observed within a ULB. Hence, data on waste generation should capture all types of waste generation (including temporal fluctuations) and existing quantity of unprocessed solid waste dumped in landfill sites in and around the city.

Audit observed that none of the ULBs had prepared DPRs for generation of solid waste from public buildings such as places of public worship, industrial buildings, community centres, kalyan mandaps *etc*., and existing quantity of unprocessed solid waste dumped in landfill sites in and around the city, but adopted population estimation/per capita method to arrive at average waste generated. Thus, waste assessment did not capture and include temporal fluctuations (festivals/functions like social, economic, religious, political, *etc*.) in generation of waste in urban limits. The database lacked complete and significant data required for waste assessment.

[15] Residential refuse: 0.3 to 0.6 kg/cap/day, Commercial refuse: 0.1 to 0.2 kg/cap/day, Street sweepings: 0.05 to 0.2 kg/cap/day and Institutional refuse: 0.05 to 0.2 kg/cap/day

The Government stated (May 2022) that during sample survey various types of institutions were covered and assessment made accordingly. The reply was not acceptable since none of the test checked ULBs had conducted sample survey for waste generators and no documentary evidence was provided in this regard to Audit.

3.10 Incorrect assessment of design capacity of MCCs

The SOP (July 2019) stipulated that for assessment of design capacity for MCC, ULBs are required to conduct quantification of waste through sample survey for a duration of ten days by selecting a few households in each ward which are representative in nature. Quantity of waste generated in a city needs to be assessed to establish adequacy of existing systems and to plan for augmentation of treatment and disposal facilities. As per the SOP, an MCC with a capacity of 1.5 TPD waste is required to be established to process waste generated from a population of 10,000 that is about 2,220 households.

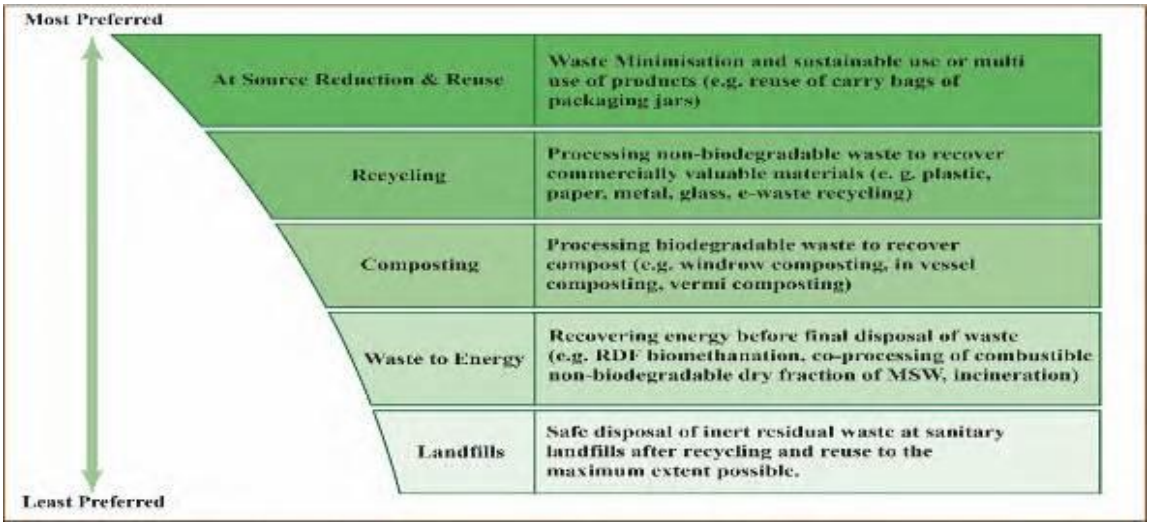
Audit observed that none of test checked ULBs had carried out mandatory survey for ten days for assessment of waste generation from selective households to assess required design capacity of MCC but adopted population estimation/per capita method to arrive at average waste generated resulting in over/under assessment of design capacity of MCC as detailed in **Appendix-VII**.

The Government stated (May 2022) that considering the households waste from each ward for 10 days, a sample survey was conducted by the ULBs. An action plan was prepared at State level on the basis of present population and waste generation for establishment of MCCs/MRFs. The reply was not acceptable since capacity of the MCCs was determined by adopting population estimation without any sample survey to arrive at average waste generated resulting in over/under assessment of design capacity of MCCs. Further no documentary evidence was furnished to Audit regarding the sample survey conducted by ULBs.

3.11 Absence of efforts for waste minimisation

MSW Manual, 2000 (Section 2.3) and 2016 (Section 2.1) prescribe a step-wise approach in order of environmental priority for different waste management options with prevention[16] being most preferred option and disposal the least preferred. It is closely linked to 3R approach, which helps to reduce quantity of waste, cost associated with its handling, and its environmental impacts. The Manuals also stipulated that waste minimisation strategies require policy interventions at national, state and local level. ULBs were to play a pioneering role by reducing the amount of waste to be handled.

[16] Waste prevention known as source reduction which means using less material to get a job done. Waste prevention methods help create less waste before recycling



(Source: MSW Manual, 2016)

Audit observed that GoO had not initiated any strategy/policy for prevention, minimising, reuse and recycling of waste as of March 2021 resulting in 90 *per cent* of waste being deposited at landfill / dump sites during 2015-20 without processing.

The Government stated (May 2022) that adequate processing facilities have been set up in all the ULBs in the State with meticulous planning. However, fact remained that GoO had not initiated any strategy/policy for prevention, minimising, reuse and recycling of waste during 2015-20 resulting in 90 *per cent* of waste being deposited at landfill / dump sites without processing.

CHAPTER - IV
SEGREGATION, COLLECTION AND TRANSPORTATION OF SOLID WASTE

Chapter – IV

Segregation, Collection and Transportation of solid waste

4.1 Segregation of waste

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

4.1.1 Segregation of waste at source/household level

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

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

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

4.1.1.1 Non-issuance of bins

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

Audit observed that three ULBs[17]procured 1,85,000 bins between July 2017 and September 2018 to distribute among 92,500 households for segregation at source by incurring an expenditure of ₹1.19 crore. Out of the above, ULBs issued 87,568[18] bins to 43,784 households during July 2017 and September 2018 and remaining 97,432 bins were not issued to households as of March 2021 and kept with the concerned ULBs. Audit further observed during JPV

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

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

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

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

4.1.2 Non-segregation of domestic hazardous waste

As per Clause 15(i)(j) of SWM Rules 2016, ULBs are required to establish waste deposition centres for domestic hazardous[19] waste and give directions to waste generator to deposit domestic hazardous wastes at the centres for its safe disposal. SWM Manual 2016 indicates different kinds of domestic hazardous waste.

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

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

4.1.3 Non-segregation of sanitary waste

As per clause 4 under Section 2.2.2.1 of SWM Manual, 2016 sanitary waste[20] generated by households was to be wrapped in old newspaper/pouches provided by the manufacturers and handed over to the waste collectors separately.

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

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

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

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

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

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

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

Photograph 1 Secondary transfer station Satichoura of CMC

Audit observed that source level segregation was absent/deficient in the test checked ULBs. Hence, there was a need for ensuring segregation of waste at least before it reaches the processing/landfill site. In test checked ULBs, the waste was transferred in mixed form from primary storage to secondary storage facility and from secondary storage to landfills. Failure to segregate waste at primary storage, secondary storage and dry waste centres resulted in failure to recover the recyclables, thereby leading to dumping these resources in landfills.

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

4.2 Collection of waste

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

4.2.1 Street sweeping and cleaning on daily basis

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

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

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

4.2.2 Non-integration of informal waste collectors in waste management

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

Audit observed that the State Government did not issue any guidelines for involvement of waste pickers/ rag pickers during 2015-20. In absence of state policy for waste management, services of informal sector could not be utilised. The GoO issued (January 2021) guidelines for integration of waste pickers/ rag pickers for SWM. After issue of the guidelines, test checked ULBs have identified 1,320 rag pickers[21] to be involved in SWM in wealth centres[22].Since, wealth centres in test checked ULBs were not fully operationalised, services of rag pickers / waste pickers were not utilised fully in test checked ULBs as of March 2021.

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

4.2.3 Discrepancies in collection of waste

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

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

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

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

[22] MCCs and MRFs are known as wealth centres

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

4.2.4 Inadequate storage facilities

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

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

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

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

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

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

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

4.2.4.1 Non-completion of underground dustbins

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

4.2.4.2 Dashboard module and maintenance for underground dust bins

As per agreement, agency should provide a dashboard module for quick and easy view to know overall fleet status on real time basis. The dashboard should also provide information such as bin number, bin type, bin location, time of empting each bin for indicating bin fill level[23] and vehicles to be deployed for lifting and transporting of waste. The operator shall ensure regular upkeep and cleaning of bins so that surrounding of bins are free from littering and odour.

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

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

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

4.2.5 Mechanical Sweeping

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

[23] Full capacity of the underground dust bin

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

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

4.2.5.1 Overlapping of mechanical sweeping works

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

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

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

4.2.6 Non operation and maintenance of screening of solid waste

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

Photograph 5:Drain near Shree leather ,Patia Bhubaneswar

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

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

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

4.2.7 Personal protection equipment

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

Photograph 6: Sweeping staff without protective equipment

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

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

4.3 Transportation of waste

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

4.3.1 Partial coverage of households due to shortage of vehicles

SOP (July 2019) envisaged use of BOVs/LCVs for door-to-door collection of solid waste. One BOV would cover 600 households and one LCV would cover 1,000 households for door to door collection of waste. As against requirement of 1,159 BOVs/LCVs in test checked ULBs, only 634 BOVs/LCVs were available as of March 2021. The status of availability of BOVs in the test-checked ULBs

Photograph 7: Idle BOVs at RMC for want of registration

as of March 2021 is given in **(Appendix-IX).** Audit observed that the test checked ULBs could cover 5.14 lakh households (62 *per cent*) out of 8.29 lakh households for door to door collection as of March 2021 resulting in partial coverage of households due to shortage of BOVs/LCVs despite availability of funds with ULBs. On the contrary, in three ULBs, due to technical problems and want of registration[24], 16 BOVs procured between September 2020 and February 2021 for ₹44.49 lakh remained idle.

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

4.3.2 Transportation of solid waste

4.3.2.1 Transportation of solid waste in open vehicles

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

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

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

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

4.3.2.2 Use of transportation vehicles without authorisation

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

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

- 95 out of 242 vehicles[25] (39.25 *per cent*) have no valid fitness certificate

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

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

- 25 vehicles[26] have no valid insurance, and
- 12 vehicles of BMC have no valid pollution certificates.

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

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

4.3.2.3 Non-monitoring of transportation vehicles through GPS

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

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

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

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

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

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

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

4.3.2.4 Avoidable extra expenditure on transportation of waste

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

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

Audit noticed that BMC had hired two trailers (August 2016) for transportation of dozer and excavator from Bhuasuni dumping yard to TTS at Sainik School to and fro daily at rate of ₹12,000 per day each for spreading of garbage in the landfill up to June 2020. However, from July 2020, the above two vehicles were retained inside the premises of dumping yard. BMC incurred ₹2.83 crore[27] (August 2016 to June 2020) towards hire charges of trailers which was avoidable.

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

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

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

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

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

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

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

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

CHAPTER - V
PROCESSING AND DISPOSAL OF MUNICIPAL SOLID WASTE

Chapter – V

Processing and Disposal of Municipal Solid Waste

5.1 Processing of Municipal Solid Waste

Clause 5 of Schedule II of MSW Rules 2000 provides that municipal authorities shall adopt suitable technology or combination of such technologies to make use of wastes so as to minimise burden on landfill. In this connection, biodegradable wastes shall be processed by composting, vermicomposting, anaerobic digestion or any other appropriate processing for stabilisation of wastes and shall ensure that compost or any other end product shall comply with standards as specified in Schedule-IV of MSW Rules 2000. The details of solid waste generated and processed by all ULBs in the State and test-checked ULBs for the period 2015-20 are given in Table below:

Table 5.1: Details of solid waste generated by all ULBs during 2015-20 (in TPD)

Particulars	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Waste generated	2574.70	18.55*	539.44**	2564.43	2208.60	7905.72
Collected	2283.90	14.28	471.58	2255.32	2123.30	7148.38
Uncollected	290.80	4.27	67.86	309.11	85.30	757.34
Processed	30	0	0	91.63	202.40	324.03
Waste to landfill	2253.90	14.28	471.58	2163.69	1920.90	6824.35
Percentage of processing	**1.31**	**0**	**0**	**4.06**	**9.53**	**4.53**

(Source: Data furnished by SPCB)
(NB: * Annual Report (ARs) submitted by three ULBs, ** ARs submitted by 19 ULBs)

Table 5.2: Details of solid waste generated by test checked 21 ULBs during 2015-16 to 2019-20 (in TPD)

Particulars	2015-16	2016-17	2017-18	2018-19	2019-20
Generated	536.26	583.19	1382.25	1380.34	1439.58
Collected	484.16	543.99	1330.57	1341.04	1411.09
Un collected	52.10	39.20	51.68	39.30	28.50
Processed	10	5	7.10	7	14.00
Waste to dump	474.16	538.99	1323.47	1334.04	1397.09
Percentage of processing	**2.07**	**0.92**	**0.53**	**0.52**	**0.99**

(Source: - As per information provided by ULBs)

It could be seen from the above tables that only 10 *per cent* of waste was processed in ULBs of the State and only one to two *per cent* of waste was processed by test checked ULBs during 2015-20. A major portion of remaining solid waste was dumped at landfills. Low rate of processing of waste in ULBs was due to inadequate infrastructure and lack of appropriate strategies as explained in subsequent paragraphs.

While accepting the audit comments, the Government stated (May 2022) that it was decided in the year 2019 to establish decentralised plants for waste processing. After that MSW were processed in MCCs set up in the ULBs. However, Audit found that waste processing was only to the extent of 10 *per cent* as of March 2020.

5.1.1 Inadequate infrastructure for processing

Schedule I of MSW Rules 2000 provided time schedule of December 2003 or earlier for setting up of processing and disposal facilities. Clause 22 of SWM Rule 2016 read with Schedule I of MSW 2000 make ULB authorities responsible for compliance to criteria specified for timely setting up of waste processing and disposal facilities and their monitoring, improvement of existing landfill site as well as identification of landfill sites for future use and making sites ready for operation. As per Clause 15(v) of SWM Rule-2016, ULBs should facilitate construction, operation and maintenance of solid waste processing facilities and preference shall be given to decentralised processing to minimise transportation cost and environmental impacts such as bio-methanation, micro composting, vermin composting, anaerobic digestion or any other appropriate processing for bio-stabilisation of bio-degradable wastes. Audit observed the following:

5.1.1.1 Processing of Waste to Energy

As per Clause 21 of SWM Rule 2016, non-recyclable waste having calorific value[28] of 1,500 kilocalorie per kilogram (kcl/kg or more shall not be disposed of to landfill and shall only be utilised for generating energy either through refuse derived fuel or by giving away as feed stock for preparing refuse derived fuel. High calorific wastes[29] shall be used for co-processing in cement or thermal power plants. The ULBs should propose to set up waste to energy processing plant of more than five TPD.

Audit observed that there was 15,84,400 tonnes of legacy waste at Bhuasuni dumping yard of BMC. BMC made agreement (May 2014) for establishment of waste to energy plant capacity of 11.5 MW and also to maintain landfill scientifically with M/s. Essel Infra Projects for a project cost of ₹222.00 crore. The project work could not be started due to protest by local people (May 2016). The matter was not resolved as of March 2021. The other ULBs have not taken up any step for establishing waste to energy plant as of March 2021.

The Government stated (May 2022) that waste materials of ULBs were now being processed through MCC and MRFs. Moreover, Ministry of Housing and Urban Affairs (MoHUA) has also advised not to take up waste to energy projects. However, Government did not furnish the documentary evidence for the above instruction of MoHUA.

5.1.1.2 Processing Waste to Bio mining

As per Clause (15 (zj and zk)) of SWM Rule 2016, Municipal authorities should investigate and analyse all old open dumpsites and existing operational dumpsites for their potential of bio-mining and bio-remediation and wherever feasible, take necessary action to bio-mine or bio-remediate the sites. Audit observed that tender for bio mining project for legacy waste of 15,84,400 tonnes at Bhuasuni was invited (September 2019) by BMC with an estimated project cost of ₹63 crore which was not finalised as of March 2021. The reasons for non-finalisation of tender were not on record. Other ULBs have

[28] CV of the waste depends on the composition of the waste. Waste with a lot of Polyvinyl Chloride (PVC) has a higher calorific value than waste with less PVC and more paper

[29] Useless PVC sanitary pipes and fittings, used medical instruments, *etc.*

not taken any steps to recycle or reuse of legacy waste dumped at site for bio-mining project as of February 2021.

The Government stated (May 2022) that steps were already taken for bio-mining of legacy waste. Technical feasibility reports of nine ULBs have been submitted to GoI (December 2020) for consideration. The fact however remained that ULBs failed to establish bio mining plant even after lapse of five years of implementation of rules.

5.1.2 Infrastructure creation

5.1.2.1 Non-setting up of sanitary landfills

Schedule-I of the MSW Rules 2000 provided the time schedule of December 2001 or earlier for improvement of existing SLFs and December 2002 or earlier for identification of landfill sites for future use and making site(s) ready for operation. Clause 11 (f) and 12 (a) of SWM Rules, 2016 also provides that the State and District authorities shall facilitate identification and allocation of suitable land for sanitary landfill for setting up solid waste processing and disposal facilities to local authorities within one year from the date of notification of the Rules.

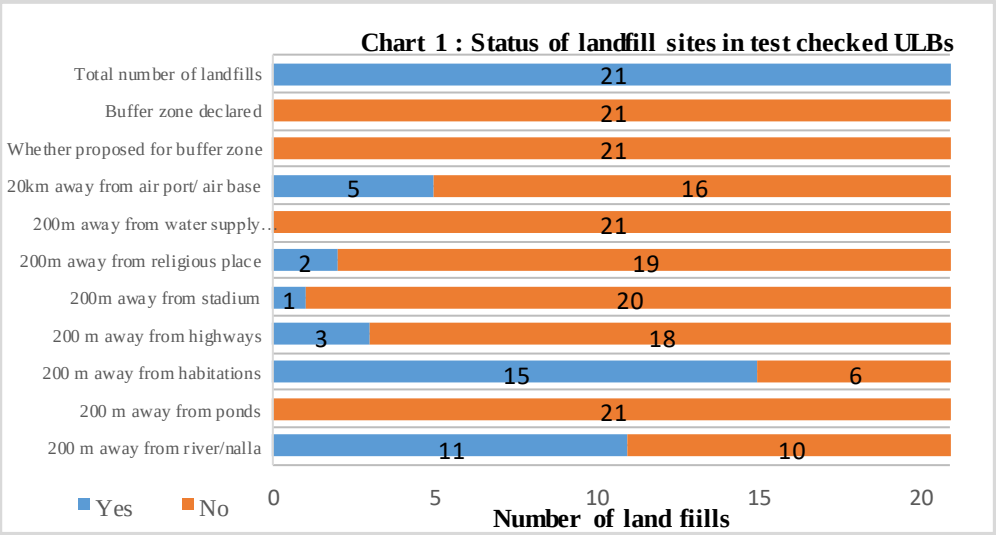
As per the Annual Report (2015-20) of SPCB, ULBs did not have sanitary landfill sites for disposal of solid waste. All ULBs used dumping yards for disposal of waste as of March 2021. ULBs were yet to identify land for setting up of sanitary landfills. Due to non-availability of sanitary landfills, ULBs disposed it on road sides of highways, river banks, and in open areas as observed during JPV causing unhygienic disposal of mixed solid waste posing health and environment hazards.

The Government stated (May 2022) that the garbage/wastes were not being disposed off on road sides of highways, river banks or open areas as all ULBs had established MCC and MRF wherein the wastes were processed/ disposed off. The reply was contrary to the findings of JPV in which it was found that waste was disposed on road sides of highways, river banks and in open areas. Moreover, MCCs/MRFs were not operational in test checked ULBs as of March 2020. ULBs failed to establish sanitary landfills even after lapse of 20 years of implementation of MSW Rules 2000.

5.1.2.2 Faulty selection and operation of landfill/ dumping yard sites

Schedule III of MSW Rules, 2000 and Schedule I (A) of SWM Rules, 2016 lay down criteria for selection of sites for landfills such as, landfill site shall be 100 meter away from river, 200 metre from a pond, highways, habitations, religious place and water supply wells and 20 km away from airports or airbase. As per Schedule I (ix) of SWM Rule 2016, a buffer zone should be maintained around solid waste processing and disposal facility, exceeding five tonnes per day of installed capacity. This will be maintained within the total area of the solid waste processing and disposal facility in consultation with SPCB. As per the SBM handbook paragraph 3.13, buffer zone should be 100 meters for sites accepting 50 tonnes waste per day, and up to 500 meters for large sites. It is necessary to prevent new residential and commercial development in a buffer zone around such locations.

As per the Clause 15(y) of SWM Rule 2016, ULBs are required to obtain authorisation from the SPCB for disposal of waste if the volume exceeds more than five tonnes per day including sanitary landfills. By using the techniques of Remote Sensing and Geographic Information System (GIS) through Google earth, audit analysed the fulfilment of compliances to above criteria in selecting landfills/dumping yards in all 21 test checked ULBs. The status of landfill sites is depicted in Chart-1.



Audit observed from the GIS data that ULBs selected landfill sites for SWM in deviation to SWM Rules which have been discussed below:

- None of the test-checked ULBs (21 landfills) declared a Buffer zone of no development around the landfills
- In 11 test checked ULBs[30] habitations were developed within a distance of 200 meters from landfills and in four ULBs (BMC, CMC, RMC and Puri) though the generated waste were more than 50 TPD, habitations were developed within 500 meter of buffer zone causing possible health hazards to public.
- Three ULBs had landfills located near National/State highways (Sundargarh, Chhatrapur and Bhadrak) within 200 meter.
- Eleven ULBs[31] had landfills located within 200 meters of river/ nallah and water bodies resulting leachate flowing to water bodies during rainy seasons causing water pollution.
- Landfill of three ULBs were located within 200 meters from religious places (Chhatrapur, Ranapur and Puri) and landfill of Ranpur ULB is also located within 200 meters from a school.
- Five ULBs had landfill located within 20 kms from airport/air base (Bhubaneswar, Rourkela, Jeypore, Jharsuguda, and Sundargarh).

[30] Bhadrak, Baripada, Chandabali, Choudwar, Rayagada, Chhatrapur, Baragarh, Bolangir, Nuapada, Jeypore and Ranapur

[31] Bhubaneswar,Cuttack, Sambalpur, Baripada, Chandabali, Ranapur, Hinjilicut, Baragarh, Bolangir, Puri and Sundargarh

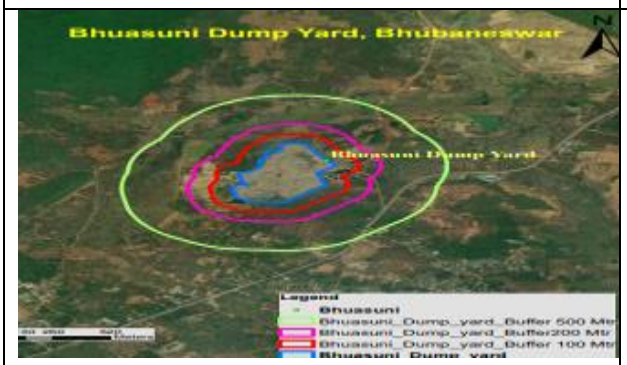
- Landfills of the test checked ULBs were operated without authorisation from SPCB.
- Few Photographs of landfills with GIS data showing violations of SWM Rules are depicted below:

Photograph-10: One Nallah passing through within 100 meters and habitations present within 200 meters

Photograph 11: One Nallah passing through within 100 meters and habitations present within 200 meters

Photograph 12: One Nallah passing through within 100 meters and habitations present within 200 meter of Baripada ULB

Photograph 13 : One NH 16 passing within 100 meters and habitations present within 200 meters



Photograph 14: One Nallah passing through within 200 meters and habitations present within 500 meters and airport within 20 kms

Photograph 15: One Nallah passing through within 100 meters and habitations present within 200 meters

(Source: Photographs of dumping yards taken by using GIS data from Google earth)

Thus, all the landfills/dumpsites identified and operated by the test checked ULBs were susceptible to environmental hazards.

5.1.2.3 Absence of basic facilities in landfill/ dump site

Schedule III of MSW Rules, 2000 and Schedule I (B) of SWM Rules, 2016 laid down the facilities that should be available at landfill sites.

Audit checked the availability of basic facilities in landfill in 21 test checked ULBs and found the following:

- 20 landfills did not maintain any records and were not equipped with waste inspection facilities to monitor waste brought to landfill (except BMC). Hence, there was no check/preventive mechanism to reduce mixed waste brought to landfills.

- None of the landfills had leachate drains, weighbridges, approach road, fire fighting equipment, drinking water and toilet facility, and

- Only two ULBs (BMC and Chhatrapur) constructed boundary wall around the landfills in the test-checked ULBs.

The Government stated (May 2022) that action plan for bio-remediation of legacy wastes for 76 ULBs have been prepared alongwith budget plan for ₹130.15 crore and submitted to MoHUA (February 2022). However, fact remains that ULBs failed to adhere to landfill selection and operation criteria and provide the basic facilities at the landfill sites even after lapse of 20 years of implementation of the rules.

5.1.3 Non-functioning of Bio Gas cum de-composting plant

As per Clause 15(m) of SWM Rule 2016, ULB shall collect waste from vegetable, fruit, flower, meat, poultry and fish market on day to day basis and promote setting up of decentralised compost plant or bio-methanation plant at suitable location in markets or in the vicinity of market ensuring hygienic conditions.

Audit observed that MoU was signed between BeMC and Urban Development Resource Centre (UDRC) in July 2018 for operation and maintenance of Bio Gas cum de-composting plant of Mardaraj vending zone. The above MoU was valid for a period of 11 months from the date of signing of the MoU, *i.e.*, upto June 2019. Though this Bio Gas cum de-composting plant functioned from August 2018 to April 2020 (21 months) only, UDRC was paid ₹3.05 lakh for 21 months even beyond agreement period without renewal of MoU. It was noticed during JPV (August 2021) that the said plant was defunct as shown in photograph 11 since BeMC did not initiate measures for renewal of MoU with UDRC for operation and maintenance.

Photograph 16: Idle of Bio gas plant at Mardarajpur

Deputy Commissioner, BeMC stated that action would be taken for operation of the bio gas decomposing plant at Mardarajpur without explaining any reasons for non-renewal of MoU as of September 2021.

5.1.4 Issues relating to creation of infrastructure

5.1. 4.1 Undue benefits extended to agency

The Berhampur Municipal Corporation (BeMC) had a Memorandum of Understanding (November 2019) with M/s AGRTA CLF (agency) for operation and maintenance of 25 composting processing units of 01 TPD capacity each for two years. An amount of ₹25 per household will be paid to SHGs as incentive per month through the agency. Accordingly, the agency collected wastes from February 2020 in three wards (Ward Nos. 01, 02 and 03) consisting 7,975 households. A survey was conducted (September 2019) by BeMC which showed that each household generates wet waste of 1.04 Kg per day. Audit observed that the said agency failed to collect and process total wet waste generated by 7,975 households of three wards. Against the target of 2,272.56 tonnes of waste to be collected, only 210.81 tonnes (being nine *per cent*) waste was collected which was three *per cent* of its processing capacity of 6,850 tonnes during February 2020 to October 2020. Despite non achievement of 100 *per cent* performance for collection and processing of waste, ULB released full amount of ₹17.94 lakh towards incentive to the agency without any deduction which led to undue benefit to agency.

The Government stated (May 2022) that the incentive was paid to CLF from February 2020 to June 2021. The reply was not acceptable since the agency had collected lesser quantity of waste than the surveyed quantity and received full amount towards incentive which led to undue benefit to the agency.

5.1.4.2 Non-recovery of liquidated damages

As per clause 15 of national competitive bidding for design-build-operate and transfer MSWM project for BeMC read with Clause 2.3.6(2) of the agreement, maximum liquidated damages for delays shall be 10 *per cent* of the design build service. It was observed that expansion of processing facility of 150 TPD capacity to 300 TPD capacity along with solid waste window compost plant including pre-sorting facility was taken up (June 2018) by BeMC for ₹42.15 crore for completion within 18 months. The agency could not complete the project within contractual period and executed work for only ₹30 crore as of January 2022. The progress of work was very slow and ULB did not recover liquidated damage amounting to ₹4.21 crore as per contract for delay in execution as of May 2021.

Deputy Commissioner, BeMC stated that SWM project would be completed by the end of August 2021 and thereafter it would be fully operational. The reply of the DC was not tenable as the agency could not complete the work as of January 2022. Further, non-recovery of liquidated damages as per the contractual clause was not explained.

5.2 Disposal of Municipal Solid Waste

5.2.1 Zero discharged of waste to landfills

As per Para 3.7 of SOP (July 2019), ULBs should make an action plan indicating street, number of households, vehicle number, time of collection of waste, delivery of waste in MCC/MRF, time and location for unloading of

saleable and non-saleable dry waste, supervision mechanism *etc.* with an ultimate objective of Zero discharging to the landfill sites.

Audit observed that none of test checked ULBs had prepared action plan for Zero discharging to landfill sites. As a result, unprocessed waste was allowed to go to landfill sites.

The Government stated (May 2022) that as per SOP 2019 for decentralised SWM, the landfill or dumping yard is no more required for waste deposition because the wet waste is being processed at MCCs and dry wastes at MRFs. The reply was not supported by any data to assure processing of all the waste generated at MCCs and MRFs.

5.2.1.1 Disposal of unprocessed waste to landfills

As per para A (iii) of Schedule I of SWM Rule 2016, waste processing facility shall be planned as an integral part of the land fill site. Audit observed that one MCC of 5 TPD constructed (March 2020) at Sarbodaya Nagar, Puri (ward 28) instead of landfill site with an expenditure of ₹53.70 lakh was closed from August 2021 due to agitation by public for odour smell and environment pollution rendering the expenditure unfruitful.

Photograph 17: Sarbodaya Nagar MCC in W. No.28 of Puri closed & locked since August 2021 for agitation by public

In other test checked ULBs, audit could not find any vermi compost or bio compost plant or bio-methanation plant in operation for processing of solid waste for vermi compost/bio- fertilizer despite availability of funds up to June 2019. As a result, solid waste was disposed off to landfills without processing in an unscientific manner affecting the environment. However, after introduction of two SOPs (July 2019/December 2020) for decentralisation of SWM, ULBs were initiating action for creation of infrastructure of MCC and MRF. As of September 2021 the above test checked ULBs had generated 913.70 quintal of bio-fertilizers (*Mo Khata*[32]) and ₹18.27 lakh revenue was generated through waste processing.

The Government stated (May 2022) that the MCC of five TPD at Sarbodayanagar, Puri has been closed since August 2021 due to public agitation and now it has been transformed to MRF of 10 TPD capacity. The reply was not acceptable since MCC and MRFs were to function at the same place as per SOP.

5.2.1.2 Mixed waste received at landfills

Schedule II (6) of the MSW Rules 2000 provide that land filling shall be restricted to non-biodegradable, inert and other wastes that are not suitable either for recycling or for biological processing. It also provides that land filling of mixed waste shall be avoided unless the same is found unsuitable for waste processing and the landfill sites shall meet the specifications as given in Schedule-III of MSW Rules.

[32] *Mo khata* is the name given for the bio-fertilizer converted out of decomposed wet waste of ULBs

Audit observed in test checked ULBs that landfill sites received mixed waste in violation of the above rules. The deficiencies in planning for establishment of Sanitary Landfill Sites[33] (SLFs) and their functioning are discussed below:

5.2.2 Incineration of Municipal solid waste at landfills

As per Section 17.8.4.7 of MSW Manual 2000, it is important for site operators to be aware of the dangers how to treat fires at a landfill site. All fires on-site should be treated as a potential emergency and dealt with accordingly. Further, Schedule II (I) (vii) of Rule 2000 envisages that waste garbage, dry leaves shall not be burnt. Necessary precautions shall be taken to reduce nuisance of odour, flies, rodents, birds menace and fire hazard. As per SDG-11-Sustainable Cities and Communities[34], open burning of uncollected waste produces pollutants that are highly damaging locally and globally.

Photograph 18: Fire at dumping yard Baliapanda on 10.12.2020 of Puri ULB

Photograph 19: Fire at dumping yard Daruthenga on 05.01.2021 of BMC

Audit noticed that ULBs had not made any provisions for treatment of fire management at landfill sites. However, Audit observed during joint field visit that solid waste were burning at landfills in all test checked ULBs. This reflected indifferent attitude of the concerned authorities in managing waste. Burning of solid waste was not only a violation of MSW Rules but was also fraught with severe environmental and health hazards like asthma, cough, malaria fever and allergic diseases as reported by public living adjoining to landfills.

The Government stated (May 2022) that actions were already taken for bio-remediation of legacy wastes. However, the reply was silent on fire management at landfill sites, posing a serious risk for environment and public health.

5.2.3 Capping layer of earth covering waste and leachate treatment

As per Schedule 1 (Clauses ii and iii of C) of SWM Rule 2016, wastes shall be covered immediately or at the end of each working day with minimum 10 cm of soil, inert debris or construction material. Prior to monsoon season, an intermediate cover of 40- 65 cm thickness of soil should be placed on landfill

[33] Disposal of non-biodegradable, inert and other waste that are not suitable either for recycling or for biological processing

[34] Indicator 11.6.1 measuring the progress of the performance of city's MSWM under SDG 11 – Sustainable cities and communities

with proper compaction and grading to prevent infiltration during monsoon. Proper drainage berms should be constructed to divert run-off away from the active cell of the landfill to prevent further damage to the environment.

Photograph 20 : Dumping yard at Bhuasuni , BMC

Photograph 21 : Dumping yard at Baliapanda , Puri Municipality

Audit observed (December 2020 to March 2021 and from July 2021 to September 2021) in test checked ULBs that no such capping layer of earth covering was made over waste neither daily nor prior to monsoon season to avoid erosion and collection of leachate at landfills sites.

The Government stated (May 2022) that bio mining is advantageous than bio-capping, therefore, bio mining has been preferred. The fact however remained that the government has not taken up any bio-mining projects in any of the ULBs as of March 2021.

5.2.4 Reclamation of old dumps/ closure of old landfill sites

Schedule-I (j) of SWM Rule 2016 stipulates that solid waste dumps which have reached their full capacity or those which will not receive additional waste after setting up of a new and proper landfill, should be closed and rehabilitated with any other method suitable for reducing environmental impact to acceptable level.

The H&UD department had submitted action plan for NGT compliance (2015) stipulating that ULBs shall reclaim the dump yard in a time bound manner. The SWM project also included reclamation of dump yard as a key component stipulating the following:

- The compacted old waste is loosened and scraped off in layers by a tractor-harrow.
- Composting bio-culture is sprayed from a tanker-truck with high pressure pump.
- The waste is turned weekly by JCB. At each turning, hired rag pickers retrieve buried recyclables which partly cover their labour cost.
- After three to four weeks' turnings, the waste is dry, volume reduced and ready to sieve by either manual or motorized simple portable sieves.
- The reclamation process shall be completed within one year from setting up of processing plant and scientific land fill facility.

Audit observed that no such activity was carried out by any of the test checked ULB authorities at dumping sites in response to compliance submitted to NGT as of March 2021. No periodic review was made nor was any proposal submitted to SPCB for closure of the old landfills sites resulting accumulation of huge quantity of waste at landfill sites creating environment pollution.

The Government stated (May 2022) that steps were already taken for bio-mining of legacy waste. The feasibility report for bio-mining has already been submitted (December 2020) to GoI. The fact, however. remained that GoO had not taken up any bio-mining projects in any of the ULBs as of March 2021.

CHAPTER - VI
SPECIAL WASTE AND CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

Chapter VI

Special waste and Construction and Demolition Waste management

As per Section 7.1 of MSW Manual, 2016, the following wastes are defined as special waste namely (a) Plastic waste, (b) Electric and Electronic waste (E-waste), (c) Bio-medical waste (BMW) and (d) Slaughterhouse waste.

6.1 Plastic Waste Management (PWM)

Ministry of Environment, Forest and Climate Change, GoI notified (February 2011) the Plastic Waste Management (Management and Handling) Rules, 2011 (PWM Rules, 2011). It was replaced by the Plastic Waste Management Rules, 2016 (PWM Rules, 2016) notified by GoI (March 2016). These rules shall apply to every waste generator, local body, manufacturer, importers and producer.

6.1.1 Status of compliance to Plastic waste management Rule by ULBs

Clauses 5 and 6 of PWM Rules, 2016 spell out the responsibility of the municipal authority/local body for plastic waste management. The status of compliance to these provisions in the test-checked ULBs is shown in Table below:

Table 6.1: Status of compliance to PWM Rules 2016

Sl. No.	Requirement	Provision under PWM Rules, 2016	Compliance/Remarks
1	Ensuring segregation, collection, storage, transportation, processing and disposal of plastic waste	Rule 6 (2)(a)	Test checked ULBs were collecting and transporting mixed waste to the landfill site. After implementation of SOP (July 2019/December 2020) ULBs have taken up construction of MCC/MRF projects where plastic wastes were being segregated. As MCC/MRF projects in all the ULBs have not been completed and functional, segregation of plastic wastes is being done partially.
2	Creating awareness among all stakeholders about their responsibilities	Rule 6 (2)(e)	Awareness on use of alternative products in place of plastic was not promoted by the test-checked ULBs.
3	Engaging civil societies or groups working in waste management including waste pickers	Rule 6 (2)(f)	The *Swachha Sathis* from SHG groups were engaged after issue of SOP in July 2019 for waste management. Since MRF projects were not fully functional in the ULBs, rag pickers were not engaged.
4	For setting up of system for plastic waste management, the local body shall seek assistance of producers in line with the principle of Extended Producer Responsibility (EPR)	Rule 6(3)	None of the ULBs (test-checked by Audit) established the EPR based plastic waste management system.
5	The ULBs to frame by-laws incorporating the provisions of PWM rules.	Rule 6(4)	None of the test checked ULBs except BMC, have framed the By-laws incorporating the provisions of PWM Rules. By-laws of BMC were yet to be approved (March 2021).

(Source: Compiled by Audit)

Thus, failure of ULBs to follow prescribed provision in the rules for PWM (2016) resulted in low segregation rate. Thus, unsegregated mixed waste reached the landfill sites. The JPV in all test checked ULBs (December 2020 to September 2021) also showed that banned plastic waste was dumped in the landfill site.

The EO, Rayagada ULB stated (March 2021) that steps would be taken to establish plastic processing facilities. The EOs of Jeypore/ Sambalpur ULBs have noted audit comments.

6.1.2 Use of banned plastic

Clause 5 (c) of PW Rules, 2011 prohibit manufacture, stock, distribution or sale of any carry bag made of virgin or recycled plastic, which is less than 40 microns in thickness. Subsequently, as per Clause 4(c) of PWM Rules, 2016, carry bag made of virgin or recycled plastic, shall not be less than 50 microns in thickness.

Government of Odisha notified (September 2018) ban on manufacture, supply, sale and usage of plastic carry bags, banners, buntings, flex, plastic flags, plastic plates, cups, plastic spoons, cling films and plastic sheets made of thermocol and plastic, which use plastic micro beads in State.

As per Annual Reports (2015-20) submitted by SPCB to CPCB, average 99.90 TPD of plastic waste was generated in the State. To ensure compliance to ban plastic, DMA stated that 114 ULBs had seized 16,286 kg and 34,124 kg of banned plastic and collected ₹36.44 lakh and ₹50.59 lakh towards penalty during 2019-20 and 2020-21 respectively. Test checked 21 ULBs had seized 27,258 kg of banned plastic and collected penalty of ₹45.22 lakh during 2019-21. The banned plastics were stored within premises of ULBs and dry waste collection centres. ULBs were yet to initiate action for disposal of the banned plastic as only two ULBs transmitted 541.38kg (Baragarh 191.38kg, Rourkela 350 kg) to nearest cement factories for processing. Audit observed that banned plastic waste was collected at source from households indicating that plastic ban was not implemented effectively.

6.1.2.1 Produce of plastic less than 50 microns

Clause 13 of PWM Rules, 2016 stipulated that no person should manufacture carry bags or containers irrespective of its size or weight unless the HCEs of the unit had registered with SPCB. As per Clause 4(b) of PWM Rule 2016, no vendor shall use plastic carry bags or products made of recycled plastic and shall not be used for storing, carrying, dispensing or packaging ready to eat or drink food stuff.

Photograph 22: Plastic used for packing of food stuff

Audit observed during Joint Physical Verification (JPV) that despite ban for production of plastic carry bags or containers, they were used for packing food stuffs, vegetables *etc*. There were 99 un-authorised plastic manufacture units in Odisha as of March 2020 as reported by SPCB. The SPCB did not issue any notice to unauthorised plastic manufacturing units to close the units in

violation of rules as of March 2020. It indicates that PWM Rules were not being enforced fully resulting in availability of banned plastic products in the market for carrying materials other than garbage.

6.1.2.2 Use of sachets of plastic

Clause 4(f) (i) of PWM Rule 2016 envisages that sachets using plastic materials shall not be used for storing, packing or selling Gutkha, tobacco and pan masala.

Audit observed during JPV in the markets of all test-checked ULBs that sellers/ vendors were using sachets of plastic material for storing, packing, selling gutkha, tobacco and pan masala indicating laxity in enforcement of the PWM Rule in the State.

The Government stated (May 2022) that ban on plastic was reinforced through a committee constituted at ULB level. Massive awareness through IEC and behavioural change activities are also carried out to make people aware of the banned plastic. However, the fact remained that steps taken have been ineffective in implementation of plastic ban despite five years of implementation of PWM Rules.

6.1.3 Non-use of plastic for alternative users

Clause 5(b) of PWM Rules, 2016 stipulate that municipal authorities/local bodies shall encourage use of plastic waste (preferably the plastic waste which cannot be further recycled) for road construction as per Indian Roads Congress (IRC) guidelines or energy recovery or waste to oil, *etc*. IRC has also issued guidelines for use of waste plastic in hot bituminous mixes in wearing course (IRC-SP-98-2013) for road construction works as plastic waste have great potential for use in bituminous construction. It helps improving stability, strength, and other properties of bituminous mix, leading to improved longevity and pavement performance.

Audit observed that none of the test-checked ULBs adopted use of plastic waste in formation of roads/energy recovery/waste to oil, *etc*. Audit did not come across any instance that seized plastic and plastic waste were being transmitted by ULBs to any Works Wing for usage in laying roads indicating lack of initiation by ULBs.

The Government stated (May 2022) that co-processing of plastic at cement factories is being followed by all the ULBs. The reply was not acceptable as only two out of 21 test-checked ULBs have transmitted plastic waste to nearest cement factories. Moreover, the reply was silent on use of plastic waste in formation of roads/energy recovery/waste to oil, *etc.*

6.1.4 Ingestion of plastic by cattle

As per Schedule II (vii) to MSW Rules, 2000, storage facilities should be maintained in such a way that stray animals do not have access to the waste. Poor segregation at source from households resulted in kitchen waste/discarded food packed in plastic bags being improperly disposed at dumping yard/landfills. Cattle eat leftovers food including the plastic. The GoO, F&E Department issued order (September 2018) that if plastics are swallowed by cattle, it may cause death due to obstruction of their intestines.

Photograph 23: Stray animals feeding plastic waste at Bhuasuni, BMC dumping yard

Photograph 24:Stray animals feeding plastic waste at Baliapanda, Puri dumping yard

During JPV audit noticed that stray animals/cattle were seen feeding at solid waste dumping yard and found pulling out or scattering/consuming food waste that was packed in plastic bags creating untidy and unhygienic surroundings apart from consuming plastic also. In response to the audit query, Chief District Veterinary Officer Puri stated that out of 107 cases of ingestion of plastic by stray animals/cattle during 2015-21, in 84 cases, though surgeries were conducted, the animals had died.

The Government stated (May 2022) that actions were already taken for remediation of dumpsites. The reply was not acceptable as stray animals/cattle were still consuming food waste that was strewn in plastic bags.

6.1.5 Non collection of user fee for plastic waste

As per Clause 8(3) of PWM Rule 2016, all waste generators shall pay such user fee or charges as may be specified in the by-laws of the local bodies for plastic waste management such as waste collection or operation of the facility thereof *etc.*

Audit observed that neither of the ULBs have framed by-laws for Plastic waste management nor collected user fee for plastic waste. Non-framing/non-enforcement of by-laws for PWM led to loss of revenue to the ULBs.

The Government stated (May 2022) that draft by-laws had been framed and vetted by Law Department after insertion of the amendment made by GoI (August 2021) which will be published shortly. However, fact remained that department failed to publish the Plastic waste by-laws for more than five years of implementation of Rules.

6.2 E-waste Management

E-waste (EW) (Management & Handling) Rules were notified in 2011 and came into force with effect from 1st May, 2012. This was replaced by E-waste Management Rules, 2016 which came into effect from 1st October 2016. These rules are applicable to every producer, consumer/bulk consumer, collection centre, dismantler and recycler of E-waste involved in manufacture, sale, and purchase and processing of electrical and electronic equipment or components specified in Schedule-I including their components, consumables, parts and spares which make product operational.

6.2.1 Status of E-waste management

As per information furnished by SPCB, 14,894 MT of E-waste was collected in the State during the period 2015-20 which were not recycled/channelised.

Audit noticed that SPCB issued consent for establishment to five dismantlers, two collection centres, one captive collection centre and Nil recyclers/refurbishers for recycling of E-waste. In absence of recyclers/ refurbishers, E-waste could not be channelised for further processing and finally disposed of to dumpsite. During Entry conference, the DMA, H&UD Department confirmed (February 2021) that ULBs have not implemented E-waste Management Rules.

Government stated (May 2022) that ULBs have taken initiative for collecting e-waste on two dedicated days. However, implementation of e-waste management rules remained lackadaisical.

6.2.2 Retention of E-waste by ULBs

Clause 15 of EWM Rules, 2016, stipulate that every manufacturer, producer, bulk consumer, collection centre, dealer, refurbisher, dismantler and recycler may store the E-waste for a period not exceeding 180 days and shall maintain a record of collection, sale, transfer and storage of E-waste and make these records available for inspection. Retention of huge quantity of E-waste would occupy more space in the premises of ULBs and causes unclean/unhygienic condition in the area. Therefore, periodical disposal of E-waste was required to be done by ULBs.

Audit observed that huge quantity of E-waste generated by the ULBs and H&UD department like tube lights, old monitors/desktop computers/batteries were found dumped within the premises of ULBs as shown in photographs below. This indicates that these are not disposed of by ULBs for years. The retention of E-waste by ULBs for more than 180 days of generation was in contravention of the Rules.

Photograph 25: E Waste deposited inside the Municipality campus store room at Bhadrak

Photograph 26: E Waste deposited inside the Municipality campus store room at Puri

6.2.3 Non-compliance to E-waste management rule by ULBs

Schedule IV(3) of EWM Rules, 2016 stipulates that it is the responsibility of ULBs to ensure that E-waste if found to be mixed with solid waste or pertains to orphan products[35] is properly segregated, collected and channelised to authorised dismantler or recycler.

Audit observed that there were no authorised recyclers in the State for processing/ channelising for E-waste as of March 2021. E-waste was not

[35] Orphan products mean non-branded or assembled electrical and electronic equipment as specified in Schedule-I of the Rules or those produced by a company which has closed its operations or has stopped product support

handed over separately by households in any test-checked ULBs and was getting mixed with solid waste. After Audit commented (January 2021), BMC had initiated (July 2021) campaign to collect E-waste from households. However, initiatives to handhold Non-Government Organisations/Self-Help Groups/Startups/private enterprises to maximise processing of e-waste were absent.

The Government stated (May 2022) that all the ULBs were instructed for collection and disposal of E-waste to authorised dismantlers/recyclers. However, fact remains that none of the test checked ULBs had collected E-waste from the households as of March 2021, indicating lack of commitment for e-waste management.

6.3 Bio Medical Waste Management

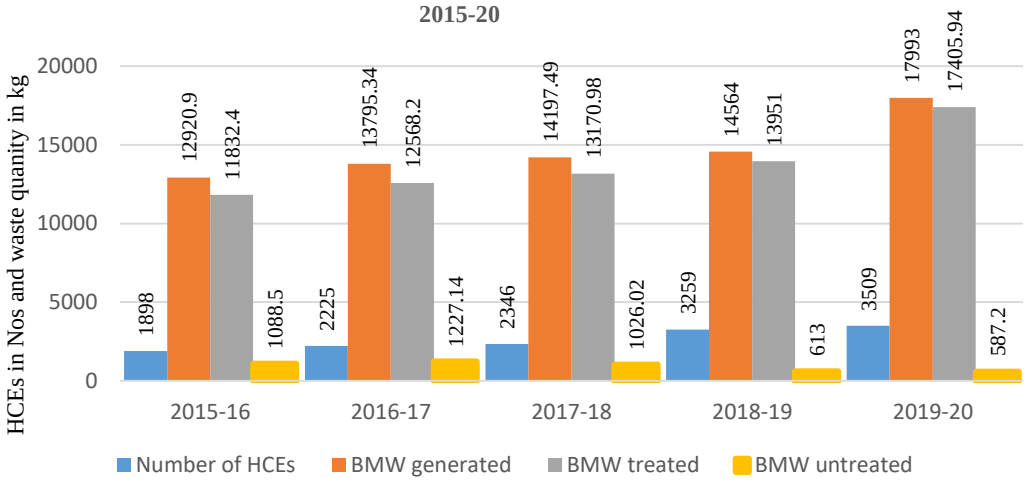
GoI notified (July 1998) Bio-medical Waste (Management and Handling) Rules, 1998 (BMW Rules), which provided a regulatory framework for management of BMW generated in the country. This was replaced by the BMW Rules, 2016 notified (March 2016) by GoI.

SPCB is the authority designated for implementation of provisions of these rules. Every HCEs or operator handling BMW, irrespective of quantity should obtain authorisation from SPCB and shall hand over segregated waste to a Common Bio-Medical Waste Treatment Facility (CBMWTF) for treatment, processing and final disposal. Disposal by deep burial is permitted only in rural or remote areas where there is no access to CBMWTF and needs to be carried out with prior approval from prescribed authority as per the Standards specified.

6.3.1 Status of Bio Medical waste in Odisha

The quantum of BMW generated and disposed of in State during the period 2015-16 to 2019-20 is given in **Chart-2**.

Chart-2: Status of Bio-medical waste generation and treated in Odisha during 2015-20



(Source: As per information furnished by SPCB)

Above Chart indicates that the number of HCEs functioning in State during 2015-16 has been increased from 1,898 to 3,509 (*85 per cent)* during 2019-20 and the quantum of waste generated has increased from 12,921 kg per day to

17,993 kg per day (*39 per cent*). Though there was increase in HCEs and BMW generated, the quantity of untreated BMW declined from nine *per cent* (2015-16) to four *per cent* (2019-20) due to creation of own captive treatment facilities or deep burials and CBMWTFs. The initiative for treatment of BMW by HCEs is commendable.

6.3.2 Status of authorisation of Health care establishments

Audit observed (December 2020) that there were 3,603 Health Care Establishments (HCE) functioning in Odisha as of November 2020, which include hospitals, nursing homes and other units such as veterinary institutes, diagnostic laboratories, clinical research, *etc*. The details of bedded and non-bedded HCEs of Government and Non-Government HCEs having authorisation are given in table below:

Table 6.2: Authorisation status of State Government Health Care Facilities (HCFs)/other than State Government HCFs as of November 2020

Category of Governmen t HCEs	Total HCEs in authorisation administration	HCFs having authorisation (in per cent)	HCFs whose applicatio n are under process	HCFs not applied for renewal of authorisation
Bedded	545	440 (80.73)	87	18
Non-Bedded	1,239	1,233 (99.52)	06	0
Total (A)	**1,784**	**1,673 (93.78)**	**93**	**18**
Authorisation status of HCFs other than State Government				
Bedded	861	677 (78.63)	110 (4 are refused)	74
Non-Bedded	958	886 (92.48)	42	30
Total (B)	**1,819**	**1,563 (85.93)**	**152**	**104**
Total A+B	**3,603**	**3,236 (89.81)**	**245**	**122**

(Source: As per information furnished by SPCB in annual reports and review meetings)

As of December 2020, three *per cent* of HCEs (122) were functioning without a valid authorisation from SPCB. No action so far has been taken by SPCB against HCEs for functioning without valid authorisation. Audit test checked the records of 21 Government hospitals (13[36] DHH, four[37] CHC, two SDH and two[38] medical colleges) located within the jurisdiction of 21 test checked ULBs. Out of 21 test checked HCEs, audit found authorisation deficiencies in 10 HCEs as follows:

[36] DHHs: Puri, Jeypore, Sundargarh, Nuapada, Sambalpur, Ganjam (Berhampur), Jharsuguda, Baragada, Bhadrak, Cuttack, Rayagada, Rourkela Government Hospital , Capital Hospital Bhubaneswar

[37] CHCs: Chandabali, Ranapur, Hinjalicut and Kapileswar UPHC, Choudwar, SDH: Gunupur and Chhatrapur

[38] Medical Colleges: Bhim Bhoi Medical College & Hospital, Bolangir and Pandit Raghunath Murmu Medical College & Hospital, Baripada

Table 6.3: Authorisation status of test checked government HCEs

Name of the HCEs	Authorisation received for operating beds (in number)	Authorisation valid up to	Number of beds operational in HCEs without authorisation
Baragarh	91	31.03.2024	230
Pandit Raghunath Murmu Medical College & Hospital, Baripada	350	31.03.2021	Not renewed
RGH, Rourkela	276	31.03.2023	400
DHH, Puri	270	31.03.2023	450
Bhim Bhoi Medical College & Hospital, Bolangir	440	31.03.2023	550
DHH, Bhadrak	223	31.03.2023	317
Capital Hospital, Bhubaneswar	563	31.03.2021	700
DHH, Rayagada	176	31.03.2023	234
SDH, Hinjilicut	16	31.03.2024	30
DHH, Jharsuguda	300	31.03.2021	Not renewed

(Source: Information furnished by the test checked government HCEs)

While accepting the audit comments, Member Secretary, SPCB stated (February 2021) that HCEs were issued show cause notices for operating without authorisation. The CDMO, DHH, Puri and DMO-cum Superintendent, DHH, Bhadrak stated that they have applied for authorisation to SPCB which was yet to be received. The replies of the CDMO and SPCB were not tenable since HCEs were operating with additional beds without authorisation and generating excess BMW.

6.3.3 Mixing of BMW with solid waste

Schedule-II of MSW Rules 2000 and clause 4 (d) (e) and (f) of BMW Rule 2016, provide that BMW shall not be mixed with solid waste and such wastes shall be disposed of following the Rules separately specified for the purpose. As per Para 8(7) of BMW Rule 2016, untreated BMW shall not be stored beyond a period of forty-eight hours.

Photograph 27: At old dum yard of DHH Jeypore

i. During JPV of four HCEs[39] it was noticed that BMW mixed with solid waste were kept in open and were finally dumped in landfills. It was also noticed at DHH Jeypore, BMW were kept with solid waste for further disposal in different colored containers[40]. During JPV at Bhim Bhoi Medical College & Hospital, Bolangir it was observed that clearance of waste from storage yard was not done within the period prescribed in the Rules. In five out of 21 test checked HCEs[41], the BMW were being lifted between three to 10 days. The

[39] HCEs: Baragarh, Jeypore, CHC, Chandabali, and Bhim Boi Medical Coolege & Hospital, Bolangir

[40] Yellow colour container used for human anatomical waste, Red colour container for contaminated waste, White container for waste sharp items including metals, blue container for glassware and black container for solid waste

[41] Frequency of BMW lifting: RGH, DHH (two to five days) Cuttack(three to four days), SDH Gunupur(twice in a week), Bolanir Medical college (seven days), and SDH Chandabali (10 days)

waste deposited in the dumping yard inside the campus and the outflow from the wastes created insanitary condition emanating foul smell. This not only violated BMW Rules but also caused contamination and public health hazard due to insanitary condition.

Photograph 28:Mixed BMW insisde the campus of BBMC&H Bolangir

Photograph 29: Mixed BMW at open area of SDH Gunupur

The DC Sanitation, CMC and EO Sambalpur have noted (January /April 2021) audit comments. The Superintendent, SDH Gunupur stated that a protection wall existed earlier but JCB machine had broken the protection wall while dumping solid waste. The DMO(MS)-cum-Superintendent, DHH, Koraput at Jeypore stated that outsourcing agency was issued a notice to not use other color containers except black ones for solid waste. The reply was not tenable since BMW waste of empty saline bottles, medicinal strips were mixed with solid waste at dumping place for transportation to landfill.

ii. During JPV of eleven[42] HCEs it was observed that containers were placed in different wards in open and in a unscientific manner. Keeping BMW in open manner may invite health issues to others and was in violation of BMW Rule 2016. It was further noticed that BMW were collected from different wards and kept in open roof of the hospital (CHC,Chandabali) without containers/bags. The periphery of hospital drain (CHC Chandabali) had not been cleaned for months and medicine covers and other medical related waste thrown to drains resulting drain choking, foul smell creating environment pollution. It was, however, further noticed during JPV of SDH, Hinjilicut that daily collected bio medical waste were kept in back side of hospital wall.

Photograph 30: BMW kept in open manner at DHH Sambalpur

Photograph 31: BMW kept in open roof of the CHC Chandabali

[42] DHH Nuapada, Sambalpur, Puri, Cuttack, Bhadrak, Ganjam (Berhampur) SDH Gunupur ,Chhatrapur, Hinjilicut, Chandabali and Pandit Raghunath Murmu Medical College & Hospital, Baripada

The Superintendent of SDH, Gunupur stated that open container was being removed and replaced with a new closed container immediately. The DMO, DHH Bhadrak stated that steps would be taken to observe BMW Rules. The CDMO, DHH Puri stated that care had been taken for the segregation of the Bio-medical Waste and it was not always possible to attain 100 *per cent* segregation due to excessive work load in the ward and due to shortage of nursing and other supportive staff. The reply was not tenable since it indicated laxity of monitoring by hospital authorities and lack of awareness among health workers.

6.3.4 Inadequate common BMW treatment facilities in the State

Clause 7 (i) of BMW Rules 2016 envisaged that BMW shall be treated and disposed of in accordance with Schedule I, and in compliance with standards in Schedule-II. HCEs shall hand over segregated waste as per Schedule-I to CBMWTF for treatment, processing and final disposal. It was further envisaged that the HCEs shall stop operating captive facilities gradually and enroll as members of CBMWTF.

Audit observed that only five CBMWTF[43] have been established in the State as of March 2020. The State has 3,509 HCEs, out of which 694 HCEs were utilising service of CBMWTF, 2,705 HCEs were having their own captive treatment and disposal facilities and the balance 110 HCEs were using deep burials for treatments. No action so far has been taken to include all HCEs into CBMWTF facilities so that captive/ deep burial facilities could be minimised.

The Member Secretary, SPCB stated (February 2021) that on relentless persuasion by the Board, H&FW department initiated steps towards setting up of adequate number of new CBMWTFs distributed throughout the State so that all the HCEs could have access to CBMWTFs and to minimise captive facilities. This indicated laxity of the department in establishment of adequate CBMWTFs even after five years of enactment of BMW Rules.

6.3.4.1 On-site treatment of BMW without shredder and autoclave

Audit observed during JPV at DHH Bhadrak that waste shredder and autoclave machine was not functional since June 2016. A new waste autoclave machine received during August 2020 and installed (September 2020) was without a shredder. Hence the on-site treatment of BMW could not be achieved.

Photograph 32: Non-functional autoclave at DHH Bhadrak

While accepting the audit comments, the DMO, DHH Bhadrak stated that the shredder machine has already been received and is to be installed shortly. The reply was not acceptable since without shedder, possibility of untreated BMW mixed with other waste being handed over to recyclers could not be ruled out.

[43] CBMWT facilities: (i) M/s Sani Clean Pvt Ltd, Khurda (ii) M/s Medi aid Marketing Services, Bhubaneswar at SCB Medical College and Hospitals, Cuttack (iii) M/s Medi aid Marketing Services, Bhubaneswar at Rourkela Government Hospital, Rourkela (iv) M/s Bio-Tech Solutions at VSS Medical College and Hospital, Burla, Sambalpur and (v) M/s Medi aid Marketing Services, Bhubaneswar at MKCG college and hospital, Berhampur

6.3.4.2 Absence of liquid chemical waste treatment system

As per clause 4 (J) and (K) of BMW Rules-2016, it shall be the duty of HCEs to ensure segregation of liquid chemical waste at source and ensure pre-treatment or neutralisation prior to mixing with other effluent generated from HCEs and ensure treatment and disposal of liquid waste in accordance with Water (Prevention and Control of Pollution) Act, 1974.

Audit observed that out of 3,509 HCEs, only 70 HCEs installed liquid waste treatment facility *i.e.,* effluent treatment plants (ETPs)[44] before disposing it to drains and 1,426 HCEs were undertaking pre-treatment for laboratory generated BMWs. The others were directly disposing of contaminated liquid waste to drains without treatment causing harm or injury to public health and animal health. It was further observed that out of 34 sewage treatment plants (STPs) only three STPs, one each in Capital Hospital, Bhubaneswar, DHH Sambalpur and IDH Puri (connected with STP of Puri town) were functional (March 2021).

While accepting audit comments the Deputy Secretary to Government, H&FW Department stated (April 2021) that OWSSB has submitted DPRs for establishment of STPs for which funds would be provided shortly. The reply was not tenable since delay in establishment of STPs consequently delayed in achieving the development goal of sustainable cities.

6.3.5 Handling of Bio Medical Waste

Audit observed the following deficiencies in bio-medical waste

6.3.5.1 Handling of Bio Medical Waste without protective equipment

As per clause 4 (L) of BMW 2016, it shall be the duty of every HCE to ensure occupational safety of all its health care workers and others involved in handling of BMW by providing appropriate and adequate personal protective equipments. Handling of BMW without adequate personal protective equipment may cause infections and health issues to the handlers.

During JPV in five[45] out of 21 test checked HCEs it was observed that officials were handling BMW without wearing personal protective equipment.

The DMO (MS)-cum-Superintendent, DHH, Koraput at Jeypore stated that the official was instructed to use PPE at the time of handling of BMW. The official was issued show cause notice for negligence of duty. While noting audit comments, the CDMO, DHH, Puri admitted that due to lack of awareness, the staff was not using PPE while handling BMW. The reply was not tenable as awareness training for handling of BMW properly was the responsibility of management of the HCEs.

[44] ETPs are used by leading companies in the pharmaceutical and chemical industry to purify water and remove any toxic and non toxic materials or chemicals from it. These plants are used by all companies for environment protection

[45] DHH Jeypore, Puri, Chhatrapur, Hinjilicut, and Rourkela Government Hospital, Rourkela

6.3.5.2 Handling of syringes for BMW management

As per clause 11 of Part-2 (Schedule-I) of BMW Rule 2016 that syringes should be either mutilated or needles should be cut and stored in tamper proof, leak proof and puncture proof containers for sharp storage. Wherever an HCE is not linked to a disposal facility it shall be the responsibility of HCEs to sterilize and dispose in the manner prescribed.

Photograph 33: At store room of DHH, Jeypore

During JPV in five[46] out of 21 test checked HCEs it was observed that used syringes were not stored in leak proof containers and were scattered in store room violating provisions of BMW Rules.

The DMO (MS)-cum-Superintendent, DHH, Koraput at Jeypore stated that outsourcing agency was instructed to store needles in puncture proof containers in the store room. The CDMO, Puri have noted the audit comments for future guidance. The CDMO, Sambalpur stated that all the staff nurses have been instructed to follow the BMW guidelines.

6.3.5.3 Transport of BMW without Bar-coding

As per Clause 4(i) and 8 (4&5) of BMW Rule- 2016 the vehicles and containers used for transportation of BMW should have bar code and global positioning system.

Photograph 34: BMW containers at Capital Hospital without bar codding

Photograph 35: vehicles carrying BMW of DHH Cuttack without bar coding

It was observed in all 21 test checked HCEs, BMWs were carried in vehicles/bags/containers by service provider without bar coding as shown in photographs. No records for installation of GPS in vehicles carrying BMW were produced to audit. Even after expiry of five years of implementation of the Rules, system of bar-coding and GPS tracking had not yet been started.

The Deputy Secretary to Government, Health & Family Welfare Department stated (April 2021) that during 2019-20, twenty-two districts were provided funds for installation of bar coding and GPS system.

[46] DHH Sambalpur, Jeypore, Puri, and SDH Gunupur and Hinjilicut

6.3.5.4 Dilapidated condition of deep burial site

The clause 5 (5) Schedule –II of BMW Rules-2016 provides for standards for deep burial. As per rule, deep burial site should be relatively impermeable and shallow well should be close to the site. The institution should maintain a record of all pits for deep burial sites.

During JPV it was noticed that SDH Gunupur had a deep burial system for BMW. The cover of pits of deep burial site was in dilapidated condition which could cause health issues. It was further observed that pits of deep burial of CHC, Chandabali remained uncovered.

Photograph 36: Deep burial of SDH Gunupur

Photograph 37: Deep burial of CHC Chandabali

The Superintendent, SDH, Gunupur stated that new hospital building was being constructed at hospital premises. After construction of new building, old deep burial site would be closed. The reply was not tenable since old deep burials were not maintained as per BMW Rule 2016.

6.3.6 Online emission monitoring system at common treatment plant

Clause C (i) of Schedule-II of BWM Rule 2016 stipulates that HCEs or operator of CBMWTF shall install continuous emission monitoring system for the parameters as stipulated by SPCB and transmit the real time data to servers at SPCB and CPCB for monitoring.

Audit observed that out of five CBMWTFs, only one CBMWTF (M/s Sani Clean) had online continuous emission monitoring system. While accepting audit comments, Member Secretary, SPCB stated (February 2021) that others had been issued public notices through newspapers for violation of BMW Rule 2016. The reply was not tenable since SPCB did not follow up for violation and thereby failed to monitor emission continuously and to transmit real time data.

6.4 Sewerage treatment plants in Odisha

As per Sections 25 and 26 of Water Prevention, Control and Pollution Act 1974 (WPCP), no person shall, without previous consent of State Board shall establish any industry, operation or process, or any treatment and disposal system or any extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land.

6.4.1 Status of Sewerage treatment plants

Audit observed that H&UD department had taken up establishing 12 STPs[47] between March 2006 to February 2020 in four[48] corporations and two

[47] 12 STPs: Bhubaneswar-5, Cuttack -2, Sambalpur-1 , Rourkela-1 , Puri -2 and Talcher-1

[48] Corporations: Bhubaneswar, Cuttack, Sambalpur and Rourkela, Municipality: Puri and Talcher

municipalities at a cost of ₹1,740.83 crore for completion by March 2007 and December 2021. Out of these, five STPs (two at Puri (15+5MLD[49]), Cuttack (two STPs of 16+36 MLD) and Talcher (one STP of 2 MLD) were commissioned between February 2018 and December 2021 and other seven STPs were in progress with an expenditure of ₹1,831.78 crore as of March 2021.

Further, out of the targeted sewer network of 1,308.883 kms covering 4,54,133 households for sewer connection to these STPs, only 965.037 kms (being 74 *per cent)* and 64,222 households (14 *per cent*) could be connected as of March 2021.

It was observed that the progress of works of STPs and sewer network connections was very slow due to which the executing agencies (WATCO and OWS&SB) could not utilise the funds resulting in blockage of funds of ₹582.03 crore[50] as of August 2021.

Due to non-completion of these STPs and sewer network, sewage from households were allowed to nearby water bodies causing water pollution. This was also being reported in the Annual reports of SPCB that water pollution is caused from discharge of untreated domestic water from households/townships to nearby water bodies.

On this being pointed out, Managing Director, WATCO and Project Engineer, OWS&SB stated (March 2021) that completion of projects was slow due to frequent lockdown/night curfew related to COVID 19 Pandemic, and frequent occurrence of cyclone namely *Fani, Phaillin, Hud Hud etc.* The reasons attributable were not tenable as the commencement of construction of STPs was as early as in March 2006.

6.4.2 Sewerage entering water bodies

Audit further noticed that STP (5 MLD) near Bankimuhan, Puri which was commissioned (February 2018) with an expenditure of ₹1.73 crore was not functional and untreated waste water and froth was flowing to Bay of Bengal near Niladri Sea Beach, Puri as shown in **Photograph-38** besides emanating foul odour, rendering the expenditure unfruitful. The mixed solid waste with untreated sewage in the absence of STP was allowed to flow into river Mahanadi by Sambalpur ULB as shown in photograph 39.

Photograph 38: Sewage effluent of Puri allowed to sea at Niladri sea beach, Banki Muhan, Puri

Photograph 39: Solid waste mixed with sewage allowed to river Mahanadi at Sambalpur Ward No 32

[49] MLD: million liters per day

[50] ₹398.54 crore with WATCO for five projects of Cuttack and Bhubaneswar and ₹183.49 crore with OWS&SB for two projects at Rourkela and Sambalpur

In other test-checked ULBs which were not provided with STP facilities for treatment of sewage were directly letting out the sewage to nearby water bodies causing water pollution and health hazards.

The EO Rayagada ULB stated (March 2021) that the construction of STP was under consideration of Government. While noting audit comments, the EO Jeypore ULB stated (March 2021) that proposal for sewage treatment plant would be submitted to Government. The DC Sanitation CMC noted audit comments for future guidance.

6.5 Management of slaughterhouses

Waste material produced in slaughterhouses is of three types: solid, liquid, and gas. Solid waste is generated from manure, intestinal contents, hair, horns, hooves, trimmings, internal organs, condemned carcasses or body parts, carton, and plastics. Liquid wastes of slaughterhouses come from urine, blood, and waste water from slaughter processes. Gaseous waste materials (odour and emissions) are also produced in operations. These waste materials if not handled and managed properly pose a hazard to health and environment. High concentration of animal blood and fat, dirt, and other pollutants in slaughterhouse renders it very toxic and pose hazard to health and environment.

6.5.1 Operation of slaughterhouses without authorisation

Section 25 and 26 of the Water (Prevention and Control of Pollution) Act, 1974, stipulate that any industry, operation or process, or any treatment and disposal system or any extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land is required to obtain Consent for Establishment (CFE) and Consent for Operation(CFO) from OSPCB. Accordingly, slaughterhouses were also required to obtain the consent from OSPCB to operate.

Audit observed that CMC had not obtained CFE and CFO from SPCB though CMC slaughter houses were operational. Operation of slaughterhouses without authorisation of SPCB amounted to illegal slaughtering of animals in the urban limit. This implies that the compliance criteria were not adhered to, which would result in health hazards as well as contamination of the environment.

6.5.2 Non-adherence to the provisions of management of slaughterhouse

Scientific processing and disposal of slaughterhouse waste is essential to recover useful fractions and for safe disposal of residual pathogenic biological waste. In absence of a proper slaughterhouse waste processing or disposal facility, ULBs could practice deep burial of carcasses and animals killed in accidents with adequate precaution (Section 7.6 of MSW Manual, 2016).

Audit observed that none of the slaughterhouses had waste processing and disposal facilities. The liquid waste generated were allowed directly into the drainage system. Solid waste generated in the slaughterhouses and retail mutton/chicken/fish shops, were mixed with solid waste and transported to landfill sites. Deep burial of carcasses and animals was not practiced by ULBs, instead they were disposed to the landfill. In all the test-checked

slaughterhouses, control equipment for odour/ air emissions were not also provided. Thus, the ULBs failed to manage slaughterhouse waste effectively, causing unhygienic conditions and contamination of environment, besides possible threat to health.

While accepting the Audit comments, DC, Sanitation, CMC stated (January 2021) that necessary steps would be taken in the future for management of slaughterhouses.

6.5.3 Idle expenditure on construction of slaughterhouses

Rule 3(1) of Prevention of Cruelty to Animals (Slaughterhouse) Rules, 2001, stipulate that no person shall slaughter any animal within a municipal area except in a slaughterhouse recognised or licensed by the concerned authority empowered under the law for the time being in force to do so. Further, Section 562 of the Odisha Municipal Corporation Act 2003 provides that there shall be complete ban on roadside slaughter of any animal in the corporation areas.

Audit observed that there were six slaughter houses in test checked ULBs (Cuttack-05, Bhubaneswar-01). BMC had constructed a slaughter house at Gadakana (August 2017) at a cost of ₹7.02 crore which remained idle as of January 2021 due to non finalisation of tender for operation and maintenance leading to blockage of funds besides paving way for illegal slaughtering within the urban limits.

Photograph 40: Dilapidated slaughter house at Khannagar of CMC

The other five slaughter houses constructed (1990) by CMCs were in dilapidated conditions due to non-maintenance by the CMC authorities causing foul smell all around it and creating environment pollution. Indecisiveness of BMC and CMC authorities in tendering for O&M of slaughterhouses rendered the premises of slaughterhouses unhygienic and led to illegal slaughtering of animals.

6.6 Management of Construction and Demolition (C&D) Waste

Clause 4.6 of MSWM, 2000 stipulates that C&D waste, being predominantly inert in nature does not create chemical or biochemical pollution. Hence maximum effort should be made to reuse and recycle them. It was only in 2016 that separate rules *viz.*, Construction and Demolition Waste Management Rules, 2016 for Management of C&D waste was notified by GoI. In the meantime, H&UD Department, GoO issued (January 2021) guidelines for strategic management of C&D waste.

The SPCB was not able to provide the details of C & D waste generated and processed in the State during the period 2015-17 for scrutiny. However, as per information furnished by SPCB 24,191 MT of C&D waste was generated during 2017-20.

The C&D waste generated/collected were not recycled or reused and disposed to landfills during 2017-20 since ULBs are yet to establish C&D waste

processing facilities. In the Entry Conference DMA, H&UD Department has confirmed that the department has initiated the C&D waste management only from January 2021.

6.6.1 State Policy for Construction and Demolition Waste

As per Clause 9 (1) of C&D Waste Management Rules 2016, Secretary in charge of the department shall prepare their policy document with respect to management of C&D waste in accordance with provisions of rules within one year from date of notification of rule *i.e.,* February 2017[51].

Audit observed that the Principal Secretary, H&UD Department had not notified a State Policy for C&D waste Management as of December 2020. In the absence of a State Policy, no action plan was developed by the department even after lapse of five years since implementation of the Rule 2016 and C&D waste generated were only disposed of to landfill sites without processing for its reuse.

However, the GoO issued (January 2021) guidelines for strategic management of construction and demolition (C&D) waste which are yet to be implemented by ULBs (March 2021).

6.6.2 Processing units for C&D Waste

Clause 6 (5) and 6(11) of C&D Waste provides that the local authority shall get the collected waste transported to appropriate sites for processing / disposal and make provision for giving incentives for use of material made out of C&D waste in the construction activity.

Audit observed that ULBs had not prepared a comprehensive plan for utilisation of C&D waste, processing facility for its re-use.

The Government stated (May 2022) that the State was at the preliminary stage of implementation of C&D waste. Processing was the next step forward after collection of C&D waste from wards that are being transferred to a dedicated storage point for processing. The fact, however, remained that ULBs failed to prepare a plan for utilisation of C&D waste and establish processing facility even after five years of implementation of the C&D Rules 2016.

6.6.3 Authorisation for C&D Waste management in cities

As per Clause 8(2) of C&D Management Rule 2016, the SPCB shall grant authorisation to C&D waste processing facility in Form- III as specified under rule after examining application received in Form-I.

Audit observed that none of ULBs have applied for authorisation for processing facility of C&D waste resulting C&D waste dumped in open places without any processing or reuse creating environmental pollution.

The Government stated (May 2022) that necessary steps will be taken for applying for authorisation for processing of C&D waste in due course.

[51] Management of C&D Waste Rules given effect from march 2016 by GoI

6.6.4 Non-use of C&D Waste for construction works

Photograph 41:C&D waste deposit site near BPUT at Rourkela

Clause 11 of C&D Waste Management Rules 2016 stipulates that Bureau of Indian Standards (BIS) and Indian Roads Congress (IRC) shall be responsible for preparation of code of practices and standards for use of recycled materials and products of construction and demolition waste in respect of construction activities and the role of IRC shall be specific to the standards and practices pertaining to construction of roads. IRC-121-2017 provided for use of C&D waste in road works.

Audit observed that none of ULBs have utilised C&D waste in construction of road works resulting in dumping of C&D wastes in open area creating environmental hazards.

The Government stated (May 2022) that the quantity of wastes collected was not enough for economically viable project. So, C&D waste are being used in preparation of road subgrade, sub-base, raising low lying areas. The reply was not acceptable since none of the test checked ULBs have utilised C&D waste in construction of road works but were dumped in open area creating environmental hazards.

6.6.5 Non implementation of dust mitigation measures

Photograph 42: Open vehicle used for transportation of construction materials at Rourkela ULB

As per Gazette notification 25th January 2018 (clause 106 and 107), grinding and cutting of building materials in open area and road side storage of construction materials shall be prohibited. No uncovered vehicles carrying construction material and waste shall be permitted. Audit observed that the building construction materials were transported by the public and other establishments without covering the vehicles as shown in Photograph 42. The ULBs have not taken any action for violation of rules causing environment pollution.

Government stated (May 2022) that suitable instruction has been issued to ULBs for needful action.

6.6.6 Non levy of user charges for C&D waste from bulk generators

As per Clause 4(5) of C&D Waste Management Rule 2016, every waste generator shall pay relevant charges for collection, transportation, processing and disposal as notified by the authorities designated by the State Government. Audit observed that none of the ULBs have notified prescribed rate, norms for collection of C&D waste from C&D waste generators.

The Government stated (May 2022) that the ULBs were directed for issuing notification for collection of charges from the C&D waste generators. However, ULBs failed to collect user charges as of March 2021, indicating that the ULBs were not pro-active in own revenue generation and were not stringent towards violators.

CHAPTER - VII
SOLID WASTE MANAGEMENT BY SMART CITIES

Chapter – VII

Solid Waste Management by Smart Cities

7.1 Objectives of Smart Cities

Government of India had introduced Smart City Mission (June 2015) covering 100 cities in the country. Out of the 100 cities in country, two cities (Bhubaneswar and Rourkela) of Odisha have been identified as smart cities.

The objective of Smart City Mission was to promote cities that provide core infrastructure and give a decent quality life to its citizens, a clean and sustainable development. The idea was to develop compact areas, create a replicable model which will act like a light house to other aspiring cities. The Smart city Mission guidelines provided ten[52] core infrastructure elements which would be completed within the mission period of five years (2015-20). The SWM was one of the core elements out of ten infrastructure elements of a Smart City.

7.2 Institutional Mechanism envisaged for Smart Cities

As per the guidelines, implementation of the mission at the city level will be done by a special purpose vehicle (SPV) created for the purpose. The SPV will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart city development projects. Each Smart city shall have a SPV which is headed by Chief Executive Officer and nominees of Central / State Government and ULBs on its Board to implement the project. To monitor the SPV functions under the directions of the Board, there are 13 Directors from Government of Odisha along with five independent directors out of which seven directors are women. The SPV is further advised by a city level advisory forum headed by the mayor and having other members from city leaders for implementation of the smart city projects.

The Board is headed by the Chairman who is ex-officio Development Commissioner-cum-Additional Chief Secretary, Planning and Convergence Department, Government of Odisha. The SPV is spearheaded by Commissioner of Municipal Corporation, as the Managing Director and day to day operations & business affairs are handled by a full time Chief Executive Officer.

7.3 Strategic action plan

As per the guidelines, the smart city proposal (SCP) will consist of strategic action plans for area developments based on the three typologies (a) area improvement (b) city renewal and (c) city extension and at least one city wide (Pan city) initiative that applies smart solutions to the physical, economic, social and institutional infrastructure.

[52] Ten core elements of Smart city Mission: i) adequate water supply, ii) assured electricity supply iii) sanitation, including solid waste management iv) efficient urban mobility and public transport v) affordable housing, especially for the poor vi) robust IT connectivity and digitalisation vii) good governance, especially e-governance and citizen participation viii) sustainable environment ix) safety and security of citizens, particularly women, children and the elderly and x) health and education.

It was observed that no such strategic action plan was prepared by either of the smart cities for solid waste management as of March 2021.

7.4. Financial action plan

As per the guidelines, the SCP will include financing plan for the complete life cycle of the proposal. This financial plan will identify internal (taxes, rents, licenses and user charges) and external (grants, assigned revenues, loans and borrowings) sources of mobilising funds for capital investments and operation and maintenance over the life cycle of the project. The financial plan will provide source for repayment of project cost over a period of 8-10 years or more, O&M cost and also include resource improvement action plan for financial sustainability of ULBs.

It was observed that no such financial plan was prepared by either of the smart cities for waste management as of March 2021.

7.5 Citizen driven action plan

As per the guidelines, SCP will lead to creation of smart citizenry. The proposal will be citizen driven from the beginning, achieved through citizen consultations, including active participation of group of people, such as resident welfare associations, tax payer's associations, senior citizens and slum dwellers associations. During consultations, issues, needs and priorities of citizens and groups of people will be identified and citizen driven solutions would be generated.

It was observed in audit that no such action plan for SWM was developed by either of the smart cities for involvement of citizens' participation in waste management. As such, ground level inputs by citizen participation in waste management in the smart cities could not be obtained.

7.6 Implementation of SWM component

The implementation of SWM component of Mission at the city level will be done by SPV. The States/ ULBs shall ensure that (a) a dedicated and substantial revenue stream is made available to the SPV so as to make it self-sustainable and could evolve its own credit worthiness for raising additional resources from the market and (b) government contribution for smart city is used only to create infrastructure that has a public benefit outcome. These funds will be utilised only for the purposes for which the grants have been given and subject to the conditions laid down by the Ministry of Urban Development.

Accordingly, the Bhubaneswar Smart City Ltd (BSCL) was established on 08 March 2016 and Rourkela Smart City Ltd (RSCL) on 03 October 2016. The status of solid and other wastes in these smart cities prior to establishment of SPVs is as shown below in the Table:

Table 7.1 : Status of waste generated during 2011-12 to 2014-15*(Quantity in Tonnes)*

BSCL				RSCL		
Year	**SW**	**Plastic**	**C&D wastes**	**SW**	**Plastic**	**C&D wastes**
2011-12	450	NA	NA	80	NA	NA
2012-13	450	NA	NA	125	NA	NA
2013-14	450	NA	NA	125	NA	NA
2014-15	450	NA	NA	125	NA	NA

(Source: As per Annual reports of SPCB)

It was observed in audit that SPVs had not made any action plan for waste management in both the smart cities. As a result, waste generated and collected in both the cities could not be processed and was finally dumped in landfills as detailed below:

Table 7.2: Status of different types of waste generation, collection and processing in the Smart cities from 2015-16 to 2019-20

Particular	2015-16	2016-17	2017-18	2018-19	2019-20
Solid waste in tonne per day					
Solid waste Generated	575	575	640	640	640
Solid waste collected	545	545	622	622	622
Solid waste Processed	0	0	0	0	0
Solid waste to landfill	545	545	622	622	622
Plastic waste in tonne per annum					
Plastic waste generated	85*	NA	2160*	15292	17520
Plastic waste collected	85	NA	2160	15292	17520
Plastic waste processed	0	NA	0	0	0
Plastic waste to landfill	85	NA	2160	15292	17520
C&D waste in tonne per annum					
C&D waste generated	NA	NA	NA	67	67
C&D waste collected	NA	NA	NA	67	67
C&D waste processed	NA	NA	NA	0	0
C&D waste to landfill	NA	NA	NA	67	67

*(Source: progress report furnished by SPCB * Data for only Rourkela Smart city)*

It could be seen from the above table that of 2,956 TPD of solid waste and 35,057 TPA of plastic waste was disposed to land fill without processing during 2015-20. Similarly, 134 TPA of C&D waste collected during 2018-20 was disposed to landfill without processing due to inadequate infrastructure facilities in ULBs as well as in Smart cities. Neither of the Smart cities have taken up SWM projects for processing as of March 2021. This indicates the non-accountability of these SPVs in attaining the objective of a litter-free smart city.

The basic principle to be adopted for managing waste is the hierarchy of 3Rs *i.e.*, **Reduce**-to avoid unnecessary waste generation, **Reuse**-to use again and **Recycle**-to convert unwanted things into and marketable recycled products . It is closely linked to 3R approach, which helps to reduce quantity of waste, cost associated with its handling, and its environmental impacts. The SWM Manuals also stipulated that waste minimisation strategies require policy interventions at National, state and local level.

Audit observed that either of the Smart cities had not initiated any strategy/policy for prevention, minimising, reuse and recycling of waste as of March 2021 resulting in 100 *per cent* waste being deposited at landfill / dump sites during 2015-20 without processing.

7.6.1 Diversion of funds

Smart City Mission guidelines recommended waste management in cities like waste to energy and fuel, waste to compost, waste water to be treated and recycling and reduction of Construction and demolition waste.

Audit observed (December 2020) that for execution of a SWM project "Waste-Lets-Recycle" (*i.e.*, waste to energy and fuel, waste to compost, treatment of waste water and recycling and construction and demolition

waste), BSCL released funds of ₹25.00 crore[53] to BMC in two phases (March 2017/ March 2018). However, BMC submitted utilisation certificate (March 2017/ March 2018) for ₹25.00 crore by diverting the funds for expenditure towards hire charges of excavator, water tanker, vehicles, mini truck, transportation of solid waste, supply of bleaching powder, purchase of dustbin, conservancy materials *etc*., without accomplishing the objective of "Waste-Lets-Recycle". No Waste management project was taken up by the BSCL to make the Bhubaneswar as clean city despite completion of the mission period. Evidently, the lackadaisical attitude of BSCL proves the fact that the intention of the SPV was to obtain funds under SWM component and not executing projects to attain the goal of clean city and sustainable community. The Smart city Rourkela had not taken up any SWM project as of March 2021.

The Government stated (May 2022) that due to audit objection, the said utilisation certificate issued by then Chief Financial Officer was not considered and BMC executed an agreement with BSCL for utilisation of the fund. The reply was not acceptable as BMC had already utilised the fund for purpose other than for "Waste-Lets-Recycle" project.

7.6.2 Non collection of user charges

As per the guidelines, smart cities as determined shall collect user charges as authorised by the urban local bodies.

Audit observed that no such user charges were collected by Bhubaneswar and Rourkela Smart cities. Bhubaneswar Municipal Corporation also did not collect user charges for solid waste management as of March 2021. Rourkela Municipal Corporation, however, started collection of user charges from May 2020 only and an amount of ₹32 lakh was collected by the Corporation as of March 2021.

7.7 Fluctuation in ranking under 'Swachha Sarvekshan' survey

"Swachha Sarvekshan" is a yearly assessment of smart cities under different categories such as cleanliness, hygiene, sanitation, garbage free city *etc*., by MoHUD. The Bhubaneswar city was number one smart city in the country in 2016 based on the technologies used for resolving urban challenges and improving the lives of the citizens. According to the Swachha Survekshan survey, Bhubaneswar was at 24th position in 2016. It slipped down to 274th position in 2019, and again risen up to 144th ranking in the year 2021 improving by 130th position in the annual survey for cleanliness, hygiene and sanitation. Whereas, Rourkela was the only city to get "One Star" ranking[54]. It ranks 57th with population of 1-10 lakh in garbage free city category.

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53 For SMW project under Smart City Mission, GoI and State Government released fund (50 *per cent* each).

54 For one Star: (i) Mandatory at least 40 *per cent* (Door to door collection ,segregation at ward level, sweeping, litter bins, storage bins, waste processing (wet waste), waste processing capacity, waste processing (dry waste), (ii) Essential at least 30 *per cent* (penalty , spot fine, segregation at city level, user charges, plastic bans, C&D waste collection, scientific landfills availablity and use, scientific landfill waste disposal, non visible solid waste in water bodies, and screening of storm water drains/ nalahs)

It has been observed that the veracity of the survey and rankings by MoHUD was incomprehensible as the situation of SWM in these smart cities was not satisfactory as evident from the following:

7.7.1 Lack of monitoring of Smart city mission at State level

There shall be a State level high powered steering committee (HPSC) chaired by the Chief Secretary, which would steer the mission programme in its entirety. The HPSC will have representatives of State Government departments[55]. The Mayor and Municipal commissioner of the ULB relating to the Smart city would be represented in the HPSC. There would also be a State Mission Director who will be an officer not below the rank of Secretary to the State Government, nominated by the State Government. The State mission director will function as the Member-Secretary of the State HPSC. The key responsibilities of the HPSC are i) to provide guidance to the mission and provide Sate level platform for exchange of ideas pertaining to development of smart city and ii) review the smart city proposals and send to the MoUD for participation in the challenge.

Audit observed that in 3rd and 4th HPSC meeting, smart city proposals for BSCL and RSCL were submitted to GoI during December 2015 and June 2016 respectively. The H&UD department of GoO had delegated (November 2017) the powers to the SPV of both the smart cities for effective implementation/execution of smart city projects under the smart city mission. However, HPSC had not taken any review meetings for the projects executed by these smart cities. It indicates poor support to effective implementation of Smart city projects.

7.7.2 Deficient monitoring of Smart city mission at City level

As per the guidelines, a smart city advisory forum will be established at the city level for all Smart cities to advise and enable collaboration among various stakeholders[56] for development of the smart city. The SPV is advised by the city level advisory forum headed by the mayor and having other members of the city to monitor the smart city projects

Audit observed that no such city level forum committee was established in both the smart cities to monitor waste management as there was no Mayor in these corporations from January 2019 (BMC)/November 2014 (RSCL) to March 2021 in the absence of ULB elections. As such, community participation in smart city development programme for waste management was missing.

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[55] Composition of High power steering committee: i) Principal Secretary, Finance, ii) Principal Secretary, Planning iii) Principal Secretary/ Director, Town & Country Planning Department iv) Representatives of MoUD v) Select Chief Executive officer of SPV in the State as and when it is formed vi) Select Mayors and Municipal Commissioners/ Chief Executives of the ULBs vii) Secretary/ Engineer-in-Chief, Public Health Engineering Department and viii) Principal Secretary, Urban Development- Member Secretary

[56] Stake holders includes: District Collector, MP, MLA, Mayor, Chief Executive Officer (CEO) of special purpose vehicle (SPV), local youths, technical experts, and at least one member from the areas who is a i) President/ secretary representing registered resident welfare association ii) Member of registered tax payers association/ rate payers association iii) President/ secretary of slum level federation and iv) Members of a non-governmental organisation or Mahila mandali/ chamber of commerce/ youth associations

CHAPTER - VIII
MONITORING AND EVALUATION OF WASTE MANAGEMENT SYSTEM

Chapter – VIII

Monitoring and Evaluation of Waste Management System

8.1 Institutional mechanism for monitoring waste management

8.1.1 Lack of monitoring of SWM by State Level Advisory body

Section 1.4.5.4 of MSWM Manual 2016 envisaged that for planning, an efficient and advanced MSWM system, it is essential to have an efficient institutional structure besides having adequate infrastructure and equipment. Accordingly, GoO constituted (April 2017) State level Advisory Bodies (SLAB) for improving SWM practices and execution of SWM projects. Clause 23(2) of SWM 2016 envisages that SLAB shall meet at least once in six months to review all matters related to implementation of SWM Rules, 2016 and implementation of State policy and strategy on SWM, and give advice to State Government regarding necessary measures for expeditious and appropriate implementation of these rules. It was, however, observed that SLAB had only four[57] meetings against 8 times during 2017-21. No meeting was held by the Urban Development Department to review measures[58] taken by SLAB for improving SWM practices and execution of SWM projects during 2017-20 indicating poor monitoring by State level bodies.

Audit observed inadequacy in monitoring by State Level Advisory Committee (SLAC) as given in Table below:

Table: 8.1: showing monitoring of SLAC for Special Waste

Special Waste	Criteria	Audit findings
Plastic waste	As per Clause 16 of PWM Rules 2016, the State Level Advisory Committee (SLAC) shall meet at least once in six months and may invite experts, if it considers necessary.	Audit observed that SLAC had met only three[59] times during 2015-21 which indicates deficiency in monitoring enforcement of the Plastic Waste rules.
BMW	As per clause 11 of BMW Rule 2016, every State Government shall constitute a State Level Advisory Committee (SLAC)[60] to oversee implementation of rules in the State and to advice any improvements. The SLAC constituted shall meet at least once in six months and review all matters related to implementation of the provisions of BMW Rules in the State.	Audit observed that GoO had constituted SLAC in June 2015 for monitoring implementation of BMW Rule in the State. It was, however, observed that SLAC had met only four[61] times against required 12 times during 2015-21 indicating poor support to effective implementation of BMW plans.

(Source: Compiled by Audit)

[57] 1st meeting on 16.02.2018, 2nd meeting on 31.10.2018, 3rd meeting on 29.06.2019 and 4th on 27.11.2020

[58] (i) Provision of site for SWM mater plan (ii) Action plan on SWM (iii) Project Management consultancy for establishing of decentralised compost plant (iv) Publication of SWM By-laws *etc.*

[59] 1st SLAB on 25.09.2017, 2nd SLAB on 29.06.2019 and 3rd SLAB on 24.11.2020

[60] The SLAC shall include representatives from Departments of Health, Forest and Environment, Urban Development, Animal Husbandry and Veterinary Sciences, SPCB, ULBs, representatives from Indian Medical Association, CBWTF and non-governmental organisation

[61] SLAC meetings held on 14.02.2017, 11.03.2019, 07.09.2019 and 05.11.2020

The Government stated (May 2022) that periodic review was done for monitoring SWM in the State. The model adopted by Odisha was appreciated by the MoHUA. However, number of meetings of SLAC for special waste remained deficient, indicating lack of adherence to the Rules.

8.1.2 Deficiencies in monitoring at district and ULB level

As per Clause 12 of SWM Rule, 2016, at district level, District Collector should review the performance of ULBs on waste segregation, processing, treatment and disposal and take corrective measures in consultation with the DMA. Audit observed that though District Collectors have conducted meetings on SWM, action taken on the report of previous meetings was not followed up.

As per Section 6.1 of MSW Manual 2016, ward level committees should be constituted for ensuring and monitoring SWM services including segregation, collection, transportation, street sweeping, drain cleaning, and prohibition of littering. However, in test-checked ULBs, ward level committees were not constituted indicating deficiencies in monitoring of SWM activities. The Committee-wise details are in **Appendix-XI**.

The Government stated (May 2022) that the district level review committees under SBM (Urban) was constituted for monitoring of the scheme in which SWM was one of the components. The reply was not acceptable though District Collectors have conducted meetings on SWM, action taken report of previous meetings was not followed up indicating poor monitoring at district level. Moreover, Government reply is silent on constitution of ward level committees for SWM.

8.1.3 Monitoring by SPCB

As per Clause 16(1) of SWM 2016, SPCB should enforce the rules in the State through ULBs and review implementation of these rules at least twice in a year in close coordination with concerned Directorate or Municipal Administration or Secretary in charge of State Urban Development Department.

Audit observed that no such meeting was held by the SPCB during 2015-20 to review implementation of SWM Rules resulting in violation of these rules by ULBs.

8.1.3.1 Facilities without authorisation and environmental clearance

Clause 4(2) of MSW Rules 2000 provide that the municipal authority or an operator of a processing or disposal facility shall make an application for grant of authorisation for setting up waste processing and disposal facility including landfills from the SPCB. GoI notification (September 2006) and Manual for CMSWMF stipulates for obtaining environment clearance from SPCB before establishment of processing facilities.

Audit observed that out of 114 ULBs, the percentage of authorisations obtained from SPCB by ULBs for disposal facility was up to 25 *per cent* during the period 2015-20. Out of above valid authorisation, 15 ULBs have not renewed them from March 2020, 14 ULBs have not renewed them from March 2019 and BMC did not renew it from March 2018. Further, none of the ULBs had applied for environmental clearance for construction of MCC/MRF

projects and landfills as stipulated in. The reasons for non-obtaining authorisations and renewals from SPCB by the ULBs were not on record.

The Government stated (May 2022) that there was no requirement for environmental clearance for processing facilities below 5 TPD as per instruction issued by the SPCB. The reply was not acceptable as the processing facilities created by the 67 ULBs are of 5 TPD capacity each and no documentary evidence was furnished that 5 TPD capacity processing facilities do not require environmental clearance. Moreover, reply was silent on non-obtaining and non-renewal of authorisation of disposal facilities.

8.1.3.2 Monitoring of pollution levels

Audit observed laxity in monitoring of pollution levels by SPCB as detailed in Table below:

Table 8.2: Showing the deficiencies in monitoring of pollution levels by SPCB

Nature of Pollution	Criteria	Audit findings
Ambient air quality	As per Schedule III Rule 29 of SWM Rule 2000, the ambient air quality monitoring shall be carried out by the concerned authority as per the following schedule, namely:- • Six times in a year for cities having population of more than fifty lakhs; • Four times in a year for cities having population between ten and fifty lakhs; • Two times in a year for town or cities having population between one and ten lakhs	Audit observed that SPCB did not adhere to the prescribed frequency to check ambient air quality monitoring on the boundary of processing plant/ landfill sites of ULBs causing air pollution. SPCB monitored (2019-20) ambient air quality at different 38 locations under 17 ULBs. In all cases, the annual average concentration of Respirable Suspended Particulate Matter (RSPM or PM_{10}[62]) remained above the prescribed limit of 60 ug/m^3 whereas annual average value of $PM_{2.5}$[63] remained within the limit of 40ug/m3 at 14 locations, indicating possibility of causing health hazards to habitations. Besides, ULBs did not install gas control system at landfill sites to minimise odour generation, prevent off-site migration of gases as of March 2021.
Water quality	As per Clause E of Schedule I of SWM Rule 2016, before establishing any landfill/ dumpsites, baseline data of water quality in the area shall be collected and kept on record for future reference. The ground water quality	Audit observed that ULBs did not assess water quality in the periphery of landfill area in violation of above provision in SWM Rule and possibility of ground water contamination

[62] PM_{10} is known as respirable particulate matter. Particulate matter is a complex mixture of soot, smoke, metals, nitrates, sulphates, dust water and rubber etc. PM_{10} particles are small enough to get into throat and lungs. High levels of PM_{10} can cause cough, running nose and eye sour

[63] $PM_{2.5}$ is an air pollutant that is a concern for people's health when levels in air are high. $PM_{2.5}$ are tiny particles in the air that reduce visibility and cause the air to appear hazy when levels are elevated. Fine particles ($PM_{2.5}$) pose the greatest health risk. These fine particles can get deep into lungs and some may even get into the bloodstream. Exposure to these particles can affect a person's lungs and heart

Nature of Pollution	Criteria	Audit findings
	within 50 metres of the periphery of landfill site shall be periodically monitored covering different seasons in a year, that is, summer, monsoon and post monsoon period to ensure that the ground water is not contaminated. Usage of ground water in and around landfill sites for any purpose (including drinking and irrigation) shall be considered only after ensuring its quality.	around landfill area, therefore, could not be ruled out.

(Source: Compiled by Audit)

8.1.4 Management Information System

As per Clause 1.3 and 6.1.1 of SWM Manual 2016, a management information system (MIS) should be set up to record and monitor all information or data on MSWM and is the best way to ensure achievement of target through a computerised MIS.

Audit observed that no such MIS was developed by the ULBs. In the absence of MIS, online monitoring of SWM activities by the ULBs was not possible.

The Government stated (May 2022) that *Ama sahar* mobile application had been developed at State level for online data/information which were being used by the ULBs. The fact, however, remained that *Ama sahar* mobile application was introducted only in August 2020 which could not provide complete information on waste management. It was mainly a citizen centric application dealing with complaint redressal for waste management services.

8.1.4.1 Wasteful expenditure on SWM monitoring software

Bhubaneswar Municipal Corporation (BMC) prepared (February 2015) a request for proposal (RFP) for web-based monitoring system for SWM as part of e-Governance initiative and requested (November 2014) to Odisha Computer Application Centre (OCAC) being technical directorate to GoO for comments. Accordingly, OCAC submitted (February 2015) the RFP for development, implementation & support of web-based monitoring system for SWM with four modules[64].

The project work was awarded (March 2016) to M/s CMS Pvt Ltd for ₹56.93 lakh for completion within one year. But in the meantime, the Smart City Programme was introduced (March 2016) in Bhubaneswar and SWM became part of the Smart City programme. As the project was not in consonance with the SWM system of the Smart City programme, it had to be shelved. However, the Commissioner, BMC issued (March 2016) letter of acceptance for execution of the project to M/s CMS Pvt Ltd for ₹56.93 lakh and entered into an agreement on 22 June 2016. The agency was paid (January 2017) ₹13.89

[64] (i) Construction Waste Management (Registration, Construction (Waste) Permit, Complaint & Grievance Management, Waste Management Facilities, and Billing & Collection (ii) Bio-Medical Waste Management -Registration (Hospitals, Medical Institutes, Clinics & Patho-lab); Bio-Medical (Waste) Permit; Complaint & Grievance Management; Transit Management; BWM facilities and Billing & Collection (iii) Animal Waste Management (Request for service, Reports unclaimed, Burial Site Management) and (iv) Monitoring Tool (Transparency Portal, Web GIS, GPS Tracking and Mobile Application)

lakh for partial development of applications. Finally, BMC decided to terminate (April 2018) the above project. This resulted in wasteful expenditure of ₹13.89 lakh on SWM monitoring software.

The Government stated (May 2022) that after formation of Bhubaneswar Smart City, many IT based interventions were under the scope of master system integrator of the Smart City. As the selected agency had completed certain milestones as envisaged in the agreement, BMC was liable to make payment. The fact, however, remained that in November 2015, Deputy Commissioner, Sanitation of BMC had suggested for cancellation of RFP of this project as it was not in consonance with the SWM system of Smart City programme. However, despite Deputy Commissioner's suggestion, Commissioner, BMC entered into an agreement which resulted in wasteful expenditure.

8.1.5 Monitoring of reporting on Waste Management

Audit observed failure in monitoring control mechanisms on reporting under Waste Management as detailed in Table below:

Table 8.3: Showing non-submission of annual reports in Waste Management

Criteria	Audit observation	Response
Clause 24(2) of SWM Rule 2016 stipulates that ULBs shall submit Annual Reports (AR) in Form-IV to SPCB or Pollution Committee and Secretary-in-Charge of the Department by 30 June of every year. SPCB, in turn, shall prepare and submit its AR to CPCB with regard to the implementation of the SWM Rules by 31st July every year	Audit observed that out of 111 ULBs, only three ULBs submitted annual reports during 2016-17 and 19 ULBs (out of 114) submitted annual reports during 2017-18 to SPCB. It indicates that the SPCB did not closely monitor SWM activities done by the ULBs.	EO Jeypore ULB stated (March 2021) that due to shortage of staff, all records could not be maintained and annual reports could not be submitted. EOs of Rayagada, Bhadrak, Sambalpur, Puri and Cuttack ULBs stated to have noted audit comments.
As per clause 13(1) and (4) of BMW Rule 2016, every HCEs or operator of CBMWTF should submit an ARs to prescribed authority in Form IV on or before the 30th June of each year. The ARs shall also be available online on website of HCEs, as well as on SPCB and CPCB.	During review of ARs from 2015-20 for BMW, it was observed that non-submission of ARs by HCEs or operator of CBMWTF ranged between 0.61 and 3.27 *per cent*. SPCB, however, issued show cause notices to 125 (out of 3,509) HCEs for non-submission of ARs and non-compliance of BMW Rules during 2020-21.	
As per clause 9(4) of EWM Rule, 2016, bulk consumers of electrical and electronic equipment shall file annual returns in Form-3 to the concerned S P C B on or before the 30th day of June following the financial year to which that return relates.	Audit observed that none of the test-checked ULBs filed annual returns from 2016-17 to 2019-20 to SPCB. Thus, ULBs did not take measures to put in place requisite mechanisms which resulted in deficient/improper management of E waste.	EOs Rayagada, Jeypore, Cuttack, Bhadrak, Sambalpur, Chhatrapur ULBs stated (March 2021) that monitoring of EWM Rule, 2016 would be implemented henceforth.

(Source: Compiled by Audit)

8.1.6 Environment and health impact assessment

Section 22 of SWM Manual 2000 envisages that improper handling of solid wastes create potential risks to environment and health. More serious impact is transfer of pollution to water, ground water and air. Air pollution is caused from by burning of wastes, either in open air, or in plants that lack effective treatment facilities from gaseous effluents.

Audit observed that no such environment and health impact assessment was made by the ULBs as of March 2021 since wastes were burnt at landfill sites in all ULBs and deterioration of health conditions of inhabitants living near landfill sites was also reported during survey as discussed in earlier paragraphs.

Government stated (May 2022) that steps were taken for bio-remediation in the existing dump sites. The fact, however, remained that ULBs failed in proper handling of solid waste and also could not conduct environment and health impact assessment.

8.1.7 Manpower/ staff constraints for SWM

Section 1.4.5.4 of SWM Manual 2016 stipulates that ULBs should have an SWM cell or SWM department having staff with technical and managerial skills specific to SWM like public health officer, sanitary officer, junior engineer, sanitary sub inspector, environmental engineer for SWM and sanitation activities.

Audit observed that an SWM cell was created (October 2020) after lapse of more than four years from the date of notification of SWM Rule 2016. However, there was shortage of manpower at all cadres *viz.*, Environment Engineer (25 *per cent*), health inspector (20 *per cent*) and sweeper (29.52 *per cent* in eight ULBs).

The EOs of Rayagada, Sambalpur, Chhatrapur, Bhadrak ULBs stated (March 2021) that action would be taken to get required staff in sanitation cell. The EO Jeypore ULB stated (March 2021) that shortage of staff would be intimated to government for filling up the posts. The staff position for SWM-cum-sanitation activities in the test-checked ULBs are given in **Appendix–XII.**

CHAPTER - IX
CONCLUSION & RECOMMENDATIONS

Chapter-IX

9 Conclusion and Recommendations

9.1 Conclusion

Performance Audit on Waste Management in Urban areas revealed that the State Government had not devised adequate strategies for creating required capital investment for SWM. The test checked ULBs did not collect user fee from 2017-20 resulting in short realisation of user fee of ₹160.71 crore. Due to non-achievement of Service Level Benchmarks, ULBs had lost central assistance of ₹333.58 crore. Besides, funds of ₹25 crore deposited by BSCL with BMC for Waste Management project was also diverted for regular expenditure of BMC.

Test-checked ULBs had not conducted any survey on waste generation during the period 2015-20 but had adopted per capita estimates that had low level of reliability. Non-taking of survey for arriving at the quantum and type of waste generated by various sections of society has seriously impacted proper planning and strategy selection and implementation of SWM. As ULBs did not prepare short-term or long-term action plans for waste management, the planning and selection of infrastructure projects in ULBs were, to a large extent, driven by perceived availability of funds rather than need-based analysis. In the absence of waste minimisation strategy of the State Government, the ULBs did not take up initiatives to promote waste minimisation activities during 2015-20.

Segregation of waste at different levels was either absent or partial in all the test-checked ULBs. Non-notification of domestic hazardous waste and depositing the mixed waste in landfills could possibly lead to toxic waste residue seeping underground and contaminating the ground water apart from air and soil pollution. During joint survey by Audit and ULB officials, it was reported by the inhabitants residing near the landfills that their health condition has deteriorated.

Open vehicles were used for transportation of waste spilling them on roads and emanating foul smell. Absence of functional GPS and tracking systems resulted in unauthorised dumping of waste near the river banks.

Test-checked ULBs generated 7,905.72 TPD of solid waste during 2015-16 to 2019-20 of which 7,148.38 TPD (90 *per cent*) were collected. Out of the above collected solid waste, 324.03 TPD (4.53 *per cent*) were processed. Audit observed that a substantial portion of budget is spent only on garbage collection, transportation and disposal. However, the situation in the towns and cities remain far from satisfactory since recycling of solid waste had not received due attention during 2015-20. This was because of non-creation of required infrastructure for waste processing facilities during 2015-20.

The ULBs were operating disposal facilities without valid authorisation from SPCB and the necessary environmental clearance. The required buffer zone around the landfill sites were not maintained. Activities that do not conform to the provisions of MSW/SWM Rules were taken up in the landfill sites. Many of the landfills test-checked lacked basic infrastructure such as waste inspection facilities, weighbridges, fire-fighting equipment, toilets *etc*. There was

evidence of unscientific dumping and burning of mixed waste in the landfills causing environment pollution.

Absence of proper segregation of waste led to mixing of solid waste with plastic waste, bio-medical waste, e-waste and slaughterhouse waste. Plastic waste, though found feasible for use in laying of roads and cement kilns, was not used indicating lack of initiation by ULBs. Besides, mismanagement of plastic waste even resulted in deaths of cattle due to its consumption.

Test-checked ULBs did not collect and channelise e-waste to authorised dismantlers/recyclers and e-waste was found mixed with solid waste. Health care institutions were functioning without authorisation and resorting to unauthorised disposal of bio- medical waste. While on one hand a slaughterhouse constructed was not put to use, on the other hand indecisiveness of municipal authorities in tendering operation and maintenance of slaughterhouses rendered the premises of slaughterhouses unhygienic and led to illegal slaughtering of animals.

SPVs established under Smart City Mission did not consider implementation of SWM being one of the core elements of the mission. As a result, the accountability of these SPVs in attaining the objective of a litter free smart city was lacking.

Though requisite committees were formed at the State level, the District and ULB level Committees were not formed in any of the test-checked districts leading to poor support for effective implementation of SWM plans. There was shortage of manpower in all cadres especially in posts of Environment Engineers (25 *per cent*); Health Inspectors (20 *per cent*) and sweepers (29 *per cent*) who are directly accountable in management of waste.

Audit is constrained to note the lackadaisical attitude of the implementing officers in responding to Audit with the assurance that views of Audit would be considered for the future.

The above lapses indicate lack of basic monitoring by ULBs and district /State level authorities to ensure compliance to statutory requirements and posed a serious threat to the environment besides leading to health hazards.

9.2 Recommendations

- *The State Government may devise a suitable mechanism for collection of SWM user fee and market recyclable material out of waste to bridge resource gaps and strive for self-sustenance.*
- *The State Government should initiate appropriate strategies for SWM enabling ULBs for creation of infrastructure.*
- *The State Government may expedite promulgation of a State policy for waste minimisation and its management.*
- *State Government should ensure that all the ULBs prepare DPRs for comprehensive planning for waste management*
- *Surveys need to be taken up to estimate waste generation so that appropriate policy initiatives could be taken up.*
- *State Government should encourage community participation and strengthen IEC activities for involvement in waste management*
- *State Government should provide adequate storage bins to households enabling easy segregation for further processing.*

- *ULBs need to strictly ensure segregation of recyclable waste material at storage centres in order to facilitate recycling and reusing.*
- *Accountability needs to be fixed on the officers for irregular transportation of waste and causing avoidable extra expenditure.*
- *The State Government/ULBs should handhold Non-Government Organisations/Self-Help Groups/Startups/private enterprises to maximise processing of waste and innovate recyclable marketable material.*
- *ULBs should strictly enforce adherence to MSW Rules for management of landfills and waste disposals ensuring sustainable cities and communities.*
- *The State Government may enforce use of plastic waste in laying of roads, cement kilns, etc., as this would enable considerable reduction of plastic waste reaching the landfills.*
- *The State Pollution Control Board needs to ensure that all health care institutions, slaughterhouses, recyclers etc., obtain necessary authorisation for their functioning and enforce adherence to prescribed standards.*
- *The State Government may expedite establishment of adequate CBMWTFs for covering all HCEs for treatment of BMW.*
- *The State Government may speed up operationalisation of treatment plants in order to prevent solid waste/ liquid waste entering river/ water bodies causing water pollution and health hazards.*
- *State Government may hasten implementing SWM projects through SPVs established for the purpose of overall area development and litter free cities.*
- *The State Government should activate monitoring committees and strengthen control mechanisms envisaged in Waste Management and allied Rules, and accountability must be fixed on the officers responsible for not adhering to the specified monitoring mechanisms.*

Bhubaneswar **(Vishwanath Singh Jadon)**
The 02 SEP 2022 **Accountant General (Audit-II)**

Countersigned

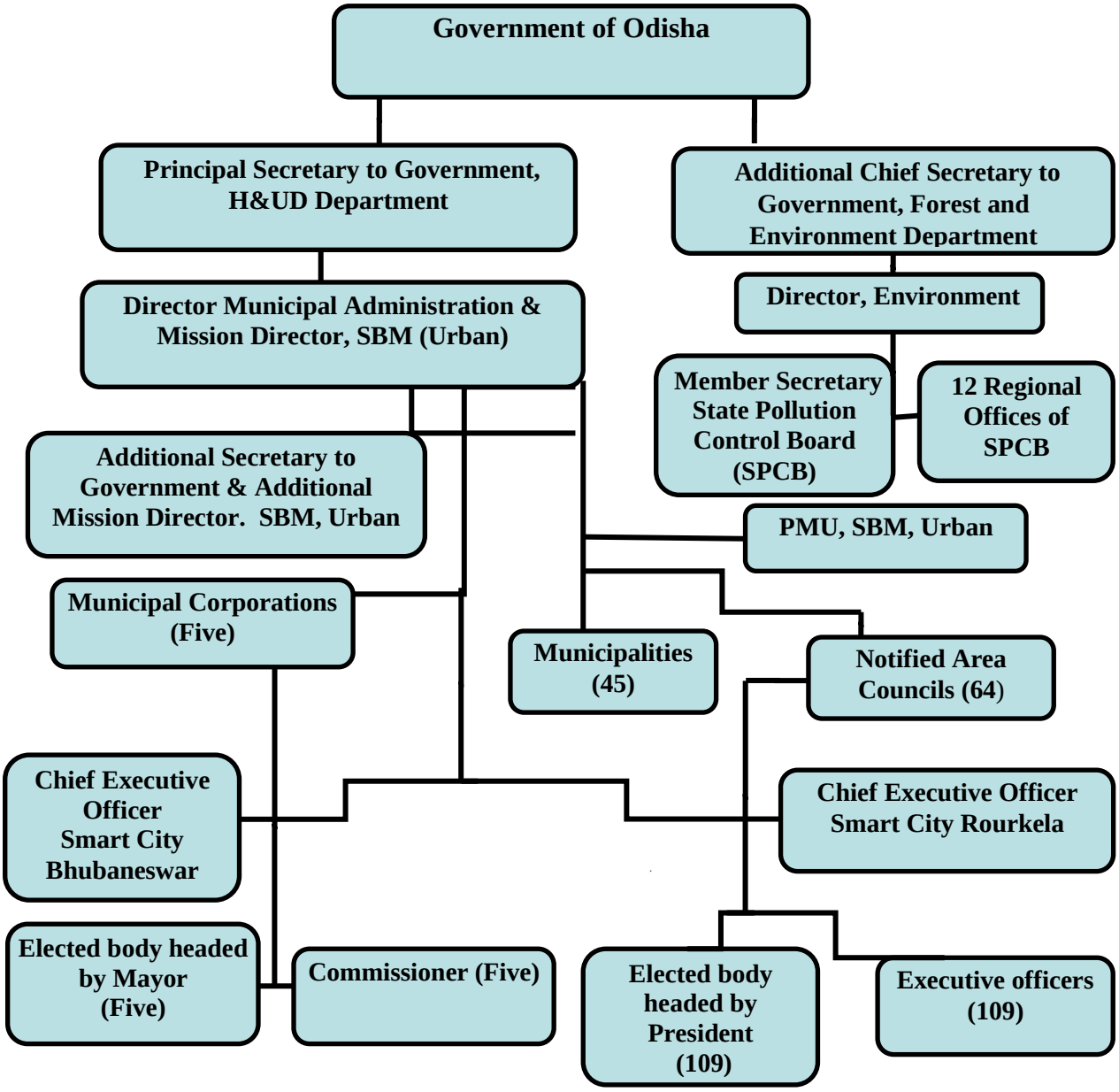
New Delhi **(Girish Chandra Murmu)**
The 06 SEP 2022 **Comptroller and Auditor General of India**

APPENDICES

Appendix- I

(Refer paragraph 1.3 at page 3)

Organisational structure with respect to functioning of ULBs in the State for Waste Management in Urban Areas



Appendix-II
(Refer paragraph 1.5 at page 4)

Regulatory framework governing the management of different types of waste

Municipal solid waste	• MSW (Management and Handling) Rules, 2000 • Manual on MSW management and handling Rules, 2000 • Manual on MSW (Management and Handling) Rule 2016 • Solid Waste Management Rules, 2016
Biomedical waste	• The Bio-medical Waste (Management and Handling) Rules, 1998 • The Bio-medical Waste (Management and Handling) Rules, 2016
Plastic waste	• Plastic Waste (Management & Handling) Rules, 2011 • Plastic Waste Management Rules, 2016
E-waste	• E-waste (Management & Handling) Rules, 2011 • E-waste (Management) Rules, 2016
Construction & Demolition Waste	• Construction and Demolition Waste Management Rules, 2016

Appendix-III
(Refer paragraph 2.2 at page 8)

Details of utilisation of funds in test checked ULBs during the period from 2015-16 to 2019-20

(₹in crore)

Sl. No	Name of the ULB	13th Finance Commission				14th Finance Commission				SBM			
		OB	R	E	CB	OB	R	E	CB	OB	R	E	CB
1	Bhubaneswar (MC)	14.26	1.47	12.47	3.26	0.00	188.92	136.28	52.64	0.00	0.00	0.00	0
2	Bhadrak (M)	4.20	5.87	8.15	1.92	0.00	26.78	13.72	13.06	0.00	6.07	3.66	2.41
3	Raygada (M)	1.42	0.00	1.29	0.13	0.00	18.65	9.67	8.98	0.00	4.52	1.49	3.03
4	Hinjilicut (NAC)	0.39	0.00	0.19	0.2	0.00	0.00	0.00	0	0.00	1.25	1.25	0
5	Cuttack (MC)	0.00	0.00	0.00	0	0.00	137.66	98.64	39.02	0.00	0.00	0.00	0
6	Chhatrapur (NAC)	0.00	0.00	0.00	0	2.32	5.83	6.25	1.9	0.00	0.38	0.26	0.12
7	Jeypore (M)	3.89	0.17	3.33	0.73	0.00	19.77	9.29	10.48	0.00	2.82	1.57	1.25
8	Sundargarh (M)	0.00	0.00	0.00	0	0.00	11.33	7.12	4.21	0.00	1.00	0.00	1
9	Rourkela (MC)	0.00	0.00	0.00	0	8.90	87.36	41.50	54.76	0.00	12.39	0.00	12.39
10	Sambalpur (MC)	5.15	10.99	12.57	3.57	0.00	66.07	19.80	46.27	4.37	16.24	9.51	11.1
11	Gunupur (NAC)	0.03	0.05	0.08	0	0.00	6.16	3.26	2.9	0.00	3.99	1.15	2.84
12	Puri (M)	3.03	0.36	3.39	0	0.00	44.84	19.08	25.76	0.00	14.63	3.24	11.39
13	Ranapur (NAC)	0.00	0.00	0.00	0	0.00	3.00	2.12	0.88	0.00	0.78	0.35	0.43
14	Jharsuguda (M)	0.00	0.00	0.00	0	0.00	21.83	12.38	9.45	0.00	5.67	2.18	3.49
15	Choudwar (M)	1.03	0.09	1.12	0	0.00	11.38	9.38	2	0.00	5.94	1.81	4.13
16	Chandabali (NAC)	0.00	0.00	0.00	0	0.00	3.94	1.90	2.04	0.00	2.42	1.06	1.36
17	Berhampur (MC)	8.74	18.01	26.75	0	0.00	90.37	68.11	22.26	0.00	8.05	5.91	2.14
18	Baragarh (M)	1.84	6.90	8.74	0	0.00	12.70	6.92	5.78	0.00	10.34	4.14	6.2
19	Balangir (M)	1.97	2.89	4.48	0.38	0.00	16.85	11.47	5.38	0.00	2.14	1.91	0.23
20	Baripada (M)	1.51	0.00	1.36	0.15	0.00	28.74	19.64	9.1	0.00	8.48	3.06	5.42
21	Nuapada (NAC)	0.07	0.00	0.07	0	0.00	3.62	1.64	1.98	0.00	0.82	0.57	0.25
	Total	47.53	46.80	83.99	10.34	11.22	805.80	498.17	318.85	4.37	107.93	43.12	69.17

Sl. No	Name of the ULB	Municipality Fund				4th SFC-Entry tax devolution				State Grant/SWM			
		OB	R	E	CB	OB	R	E	CB	OB	R	E	CB
1	Bhubaneswar (MC)	0.00	144.07	124.40	19.67	7.80	115.22	122.42	0.6	0.70	345.96	334.02	12.64
2	Bhadrak (M)	0.39	19.22	13.37	6.24	2.68	15.99	5.57	13.1	1.65	155.61	48.61	108.65
3	Raygada (M)	0.00	0.00	0.00	0	0.00	13.99	10.10	3.89	0.00	2.90	0.58	2.32
4	Hinjilicut (NAC)	0.30	3.29	3.49	0.1	1.70	10.12	11.61	0.21	1.34	4.18	2.93	2.59
5	Cuttack (MC)	0.00	0.00	0.00	0	0.00	83.62	75.25	8.37	0.00	64.69	7.75	56.94
6	Chhatrapur (NAC)	1.83	4.90	6.54	0.19	0.36	3.04	3.00	0.4	0.00	1.60	0.47	1.13
7	Jeypore (M)	0.00	0.00	0.00	0	1.34	42.89	20.38	23.85	0.00	6.47	0.63	5.84
8	Sundargarh (M)	0.00	0.00	0.00	0	0.00	18.40	18.40	0	0.00	4.12	0.37	3.75
9	Rourkela (MC)	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.20	11.91	0.30	11.81
10	Sambalpur (MC)	0.00	30.72	28.94	1.78	1.41	46.79	22.56	25.64	0.00	221.49	190.82	30.67
11	Gunupur (NAC)	0.00	0.00	0.00	0	0.00	4.87	2.78	2.09	0.00	3.08	0.32	2.76
12	Puri (M)	0.00	0.00	0.00	0	0.00	159.89	129.87	30.02	3.73	25.33	5.25	23.81
13	Ranapur (NAC)	0.50	1.39	0.00	1.89	0.00	1.77	1.00	0.77	0.55	0.00	0.00	0.55
14	Jharsuguda (M)	0.00	13.30	7.70	5.6	0.00	60.69	49.32	11.37	0.00	27.58	13.74	13.84
15	Choudwar (M)	0.73	7.74	7.56	0.91	0.82	8.90	6.63	3.09	0.00	3.45	0.58	2.87
16	Chandabali (NAC)	0.00	12.32	2.12	10.2	0.00	2.22	2.10	0.12	0.00	13.75	5.03	8.72
17	Berhampur (MC)	0.00	0.00	0.00	0	5.45	51.33	41.18	15.6	0.00	118.31	72.36	45.95
18	Baragarh (M)	3.94	87.99	83.33	8.6	0.00	12.81	10.11	2.7	1.57	18.49	12.11	7.95
19	Balangir (M)	0.00	10.75	10.61	0.14	0.00	10.03	5.87	4.16	0.00	6.99	3.10	3.89
20	Baripada (M)	0.00	0.00	0.00	0	0.84	14.97	6.65	9.16	0.00	2.21	0.75	1.46
21	Nuapada (NAC)	0.03	4.16	1.40	2.79	0.27	2.22	1.23	1.26	0.65	8.18	5.02	3.81
	Total	**7.72**	**339.85**	**289.46**	**58.11**	**22.67**	**679.76**	**546.03**	**156.4**	**10.39**	**1046.30**	**704.74**	**351.95**

(Source: Information furnished by test-checked ULBs)

OB: Opening balance; R: Receipts; E: Expenditure, CB : Closing Balance,

Source of funds	OB During 2015-16	Receipts During 2015-20	Total fund	Total Expenditure under scheme	Closing balance	Percentage of unspent amount
13th FC	47.53	46.80	94.33	83.99	10.34	10.96
14th FC	11.22	805.80	817.02	498.17	318.85	39.03
Swachha Bharat Mission (SBM)	4.37	107.93	112.30	43.12	69.18	61.61
4th SFC-Entrytax devolution	22.67	679.76	702.43	546.03	156.40	22.27
Municipal Fund	7.72	339.85	347.57	289.46	58.11	16.72
Others (SFC tied, State grant and SWM)	10.39	1,046.30	1,056.69	704.74	351.95	33.30
Total	**103.9**	**3,026.44**	**3,130.34**	**2,165.51**	**964.83**	

Appendix-IV
(Refer paragraph 2.3 at page 8)

Status of levy and collection of user charges for SWM (2017-18 to 2020-21) in test checked ULBs

(₹in crore)

Sl. No.	Name of the ULB	No of households in number	Rate of user fee for SWM (per Year)	Total demand for the year 2017-2020	SWM user charges collected	Loss of revenue due to non-collection
1	Bhubaneswar (MC)	211538	600	50.76	0	50.76
2	Cuttack (MC)	164233	720	47.29	0	47.29
3	Bhadrak (M)	19636	300	2.04	0.01	2.03
4	Rayagada (M)	16362	300	1.96	0	1.96
5	Jeypore (M)	19973	300	2.39	0.00	2.39
6	Puri (M)	41140	300	4.93	0	4.93
7	Chhatrapur (NAC)	6089	300	0.73	0	0.73
8	Hinjilicut (NAC)	6004	180	0.43	0.04	0.39
9	Ranapur (NAC)	1710	240	0.16	0.00	0.16
10	Baripada (M)	24718	360	3.56	0.00	3.56
11	Balangir (M)	21980	540	4.75	0.00	4.75
12	Baragarh (M)	20441	420	3.43	0.01	3.42
13	Berhampur (MC)	70760	360	10.19	0.00	10.19
14	Chandabali (NAC)	5052	360	0.73	0.01	0.72
15	Choudwar (M)	9172	600	2.20	0.27	1.93
16	Gunupur (NAC)	4700	264	0.50	0.01	0.49
17	Jharsuguda (M)	22146	264	2.34	0.00	2.34
18	Nuapada (NAC)	3794	300	0.45	0.03	0.42
19	Rourkela (MC)	69609	360	10.02	0.32	9.70
20	Sambalpur (MC)	78803	360	11.35	0.00	11.35
21	Sundargarh (M)	10107	264	1.20	0.00	1.20
	Total	827967		161.41	0.70	160.71

(Source: Information furnished by test-checked ULBs)

Appendix-V
(Refer paragraph 2.3 at page 9)

Increase in resource- expenditure gap in test checked ULBs from 2015-16 to 2019-20

(₹in crore)

Sl. No	Name of the ULB	Year	Own revenue , expenditure and resource gap for SWM						
			Collection of cess for SWM	Auction sale on SWM	Sale on products like Mo khata	Sale on compost	Total revenue receipt	Total expenditure on SWM	Resource gap
1	Bhubaneswar (MC)	2015-16	0.00	0.00	0.00	0.00	0.00	49.19	49.19
2	Bhadrak (M)	2015-16	0.00	0.00	0.00	0.00	0.00	0.84	0.84
3	Raygada (M)	2015-16	0.00	0.00	0.00	0.00	0.00	0.53	0.53
4	Hinjilicut (NAC)	2015-16	0.00	0.00	0.00	0.00	0.00	0.12	0.12
5	Cuttack (MC)	2015-16	0.00	0.00	0.00	0.00	0.00	13.1	13.10
6	Chhatrapur (NAC)	2015-16	0.00	0.00	0.00	0.00	0.00	0.7	0.70
7	Jeypore (M)	2015-16	0.00	0.00	0.00	0.00	0.00	0.78	0.78
8	Sundargarh (M)	2015-16	0.00	0.00	0.00	0.00	0.00	0.38	0.38
9	Rourkela (MC)	2015-16	0.00	0.00	0.00	0.00	0.00	3.81	3.81
10	Sambalpur (MC)	2015-16	0.00	0.00	0.00	0.00	0.00	2.13	2.13
11	Gunupur (NAC)	2015-16	0.00	0.00	0.00	0.00	0.00	0.17	0.17
12	Puri (M)	2015-16	0.00	0.00	0.00	0.24	0.24	1.16	0.92
13	Ranapur (NAC)	2015-16	0.00	0.00	0.00	0.00	0.00	0	0.00
14	Jharsuguda (M)	2015-16	0.00	0.00	0.00	0.00	0.00	2.1	2.10
15	Choudwar (M)	2015-16	0.00	0.00	0.00	0.00	0.00	0	0.00
16	Chandabali (NAC)	2015-16	0.00	0.00	0.00	0.00	0.00	0	0.00
17	Berhampur (MC)	2015-16	0.00	0.00	0.00	0.00	0.00	5.08	5.08
18	Bargarh (M)	2015-16	0.00	0.00	0.00	0.00	0.00	0.44	0.44
19	Balangir (M)	2015-16	0.00	0.00	0.00	0.00	0.00	0.66	0.66
20	Baripada (M)	2015-16	0.00	0.00	0.00	0.00	0.00	0.12	0.12
21	Nuapada (NAC)	2015-16	0.00	0.00	0.00	0.00	0.00	0.26	0.26
	Total (A)		**0.00**	**0.00**	**0.00**	**0.24**	**0.24**	**81.57**	**81.33**
1	Bhubaneswar (MC)	2016-17	0.00	0.00	0.00	0.00	0.00	60.88	60.88
2	Bhadrak (M)	2016-17	0.00	0.00	0.00	0.00	0.00	1.71	1.71
3	Raygada (M)	2016-17	0.00	0.00	0.00	0.00	0.00	1.86	1.86
4	Hinjilicut (NAC)	2016-17	0.00	0.00	0.00	0.00	0.00	0.16	0.16
5	Cuttack (MC)	2016-17	0.00	0.00	0.00	0.00	0.00	20.74	20.74
6	Chhatrapur (NAC)	2016-17	0.00	0.00	0.00	0.00	0.00	0.78	0.78
7	Jeypore (M)	2016-17	0.00	0.00	0.00	0.00	0.00	0.89	0.89
8	Sundargarh (M)	2016-17	0.00	0.00	0.00	0.00	0.00	0.63	0.63
9	Rourkela (MC)	2016-17	0.00	0.00	0.00	0.00	0.00	9.75	9.75
10	Sambalpur (MC)	2016-17	0.00	0.00	0.00	0.00	0.00	4.42	4.42
11	Gunupur (NAC)	2016-17	0.00	0.00	0.00	0.00	0.00	0.17	0.17
12	Puri (M)	2016-17	0.00	0.00	0.00	0.27	0.27	2.96	2.69
13	Ranapur (NAC)	2016-17	0.00	0.00	0.00	0.00	0.00	0.15	0.15
14	Jharsuguda (M)	2016-17	0.00	0.00	0.00	0.00	0.00	3.13	3.13

Sl. No	Name of the ULB	Year	Own revenue , expenditure and resource gap for SWM						
			Collection of cess for SWM	Auction sale on SWM	Sale on products like Mo khata	Sale on compost	Total revenue receipt	Total expenditure on SWM	Resource gap
15	Choudwar (M)	2016-17	0.00	0.00	0.00	0.00	0.00	0.83	0.83
16	Chandabali (NAC)	2016-17	0.00	0.00	0.00	0.00	0.00	0	0.00
17	Berhampur (MC)	2016-17	0.00	0.00	0.00	0.00	0.00	5.67	5.67
18	Bargarh (M)	2016-17	0.00	0.00	0.00	0.00	0.00	0.68	0.68
19	Balangir (M)	2016-17	0.00	0.00	0.00	0.00	0.00	2.05	2.05
20	Baripada (M)	2016-17	0.00	0.00	0.00	0.00	0.00	0.19	0.19
21	Nuapada (NAC)	2016-17	0.00	0.00	0.00	0.00	0.00	0.38	0.38
	Total (B)		**0.00**	**0.00**	**0.00**	**0.27**	**0.27**	**118.03**	**117.76**
1	Bhubaneswar (MC)	2017-18	0.00	0.00	0.00	0.00	0.00	61.03	61.03
2	Bhadrak (M)	2017-18	0.00	0.00	0.00	0.00	0.00	2.37	2.37
3	Raygada (M)	2017-18	0.00	0.00	0.00	0.00	0.00	0.28	0.28
4	Hinjilicut (NAC)	2017-18	0.00	0.00	0.00	0.00	0.00	0.3	0.30
5	Cuttack (MC)	2017-18	0.00	0.00	0.00	0.00	0.00	24.35	24.35
6	Chhatrapur (NAC)	2017-18	0.00	0.00	0.00	0.00	0.00	0.79	0.79
7	Jeypore (M)	2017-18	0.00	0.00	0.00	0.00	0.00	2.11	2.11
8	Sundargarh (M)	2017-18	0.00	0.00	0.00	0.00	0.00	0.76	0.76
9	Rourkela (MC)	2017-18	0.00	0.00	0.00	0.00	0.00	11.83	11.83
10	Sambalpur (MC)	2017-18	0.00	0.00	0.00	0.00	0.00	7.94	7.94
11	Gunupur (NAC)	2017-18	0.00	0.00	0.00	0.00	0.00	0.17	0.17
12	Puri (M)	2017-18	0.00	0.00	0.00	0.08	0.08	1.48	1.40
13	Ranapur (NAC)	2017-18	0.00	0.00	0.00	0.00	0.00	0.38	0.38
14	Jharsuguda (M)	2017-18	0.00	0.00	0.00	0.00	0.00	2.33	2.33
15	Choudwar (M)	2017-18	0.00	0.00	0.00	0.00	0.00	1.14	1.14
16	Chandabali (NAC)	2017-18	0.00	0.00	0.00	0.00	0.00	0.33	0.33
17	Berhampur (MC)	2017-18	0.00	0.00	0.00	0.00	0.00	11.98	11.98
18	Bargarh (M)	2017-18	0.00	0.00	0.00	0.00	0.00	1.03	1.03
19	Balangir (M)	2017-18	0.00	0.00	0.00	0.00	0.00	1.79	1.79
20	Baripada (M)	2017-18	0.00	0.00	0.00	0.00	0.00	0.36	0.36
21	Nuapada (NAC)	2017-18	0.00	0.00	0.00	0.00	0.00	0.58	0.58
	Total (C)		**0.00**	**0.00**	**0.00**	**0.08**	**0.08**	**133.33**	**133.25**
1	Bhubaneswar MC)	2018-19	0.00	0.00	0.00	0.00	0.00	65.5	65.50
2	Bhadrak (M)	2018-19	0.00	0.00	0.00	0.00	0.00	2.46	2.46
3	Raygada (M)	2018-19	0.00	0.00	0.00	0.00	0.00	0.66	0.66
4	Hinjilicut (NAC)	2018-19	0.00	0.00	0.00	0.00	0.00	0.87	0.87
5	Cuttack (MC)	2018-19	0.00	0.00	0.00	0.00	0.00	23.91	23.91
6	Chhatrapur (NAC)	2018-19	0.00	0.00	0.00	0.00	0.00	0.85	0.85
7	Jeypore (M)	2018-19	0.00	0.00	0.00	0.00	0.00	2.22	2.22
8	Sundargarh (M)	2018-19	0.00	0.00	0.00	0.00	0.00	1.4	1.40
9	Rourkela (MC)	2018-19	0.00	0.00	0.00	0.00	0.00	5.93	5.93
10	Sambalpur (MC)	2018-19	0.00	0.00	0.00	0.00	0.00	7.18	7.18
11	Gunupur (NAC)	2018-19	0.00	0.00	0.00	0.00	0.00	0	0.00
12	Puri (M)	2018-19	0.00	0.00	0.00	0.07	0.07	7.25	7.18

Sl. No	Name of the ULB	Year	Own revenue , expenditure and resource gap for SWM						
			Collection of cess for SWM	Auction sale on SWM	Sale on products like Mo khata	Sale on compost	Total revenue receipt	Total expenditure on SWM	Resource gap
13	Ranapur (NAC)	2018-19	0.00	0.00	0.00	0.00	0.00	0.39	0.39
14	Jharsuguda (M)	2018-19	0.00	0.00	0.00	0.00	0.00	3.25	3.25
15	Choudwar (M)	2018-19	0.00	0.00	0.00	0.00	0.00	1.41	1.41
16	Chandabali (NAC)	2018-19	0.00	0.00	0.00	0.00	0.00	0.38	0.38
17	Berhampur (MC)	2018-19	0.00	0.00	0.00	0.00	0.00	17.02	17.02
18	Bargarh (M)	2018-19	0.00	0.00	0.00	0.00	0.00	1.73	1.73
19	Balangir (M)	2018-19	0.00	0.00	0.00	0.00	0.00	2.74	2.74
20	Baripada (M)	2018-19	0.00	0.00	0.00	0.00	0.00	0.98	0.98
21	Nuapada (NAC)	2018-19	0.00	0.00	0.00	0.00	0.00	0.63	0.63
	Total (D)		**0.00**	**0.00**	**0.00**	**0.07**	**0.07**	**146.76**	**146.69**
1	Bhubaneswar MC)	2019-20	0.00	0.00	0.00	0.00	0.00	74.86	74.86
2	Bhadrak (M)	2019-20	0.00	0.00	0.00	0.00	0.00	3.16	3.16
3	Raygada (M)	2019-20	0.00	0.00	0.00	0.00	0.00	1.29	1.29
4	Hinjilicut (NAC)	2019-20	0.00	0.00	0.00	0.00	0.00	1.18	1.18
5	Cuttack (MC)	2019-20	0.00	0.00	0.00	0.00	0.00	24.04	24.04
6	Chhatrapur (NAC)	2019-20	0.00	0.00	0.00	0.00	0.00	1.39	1.39
7	Jeypore (M)	2019-20	0.00	0.00	0.00	0.00	0.00	2.9	2.90
8	Sundargarh (M)	2019-20	0.00	0.00	0.00	0.00	0.00	0.83	0.83
9	Rourkela (MC)	2019-20	0.00	0.00	0.00	0.00	0.00	10.48	10.48
10	Sambalpur (MC)	2019-20	0.00	0.00	0.00	0.00	0.00	8.92	8.92
11	Gunupur (NAC)	2019-20	0.00	0.00	0.00	0.00	0.00	0.32	0.32
12	Puri (M)	2019-20	0.00	0.00	0.00	0.01	0.01	6.68	6.67
13	Ranapur (NAC)	2019-20	0.00	0.00	0.00	0.00	0.00	0.38	0.38
14	Jharsuguda (M)	2019-20	0.00	0.00	0.00	0.00	0.00	3.85	3.85
15	Choudwar (M)	2019-20	0.00	0.00	0.00	0.00	0.00	1.83	1.83
16	Chandabali (NAC)	2019-20	0.00	0.00	0.00	0.00	0.00	0.83	0.83
17	Berhampur (MC)	2019-20	0.00	0.00	0.00	0.00	0.00	20.09	20.09
18	Bargarh (M)	2019-20	0.00	0.00	0.00	0.00	0.00	1.48	1.48
19	Balangir (M)	2019-20	0.00	0.00	0.00	0.00	0.00	1.32	1.32
20	Baripada (M)	2019-20	0.00	0.00	0.00	0.00	0.00	1.84	1.84
21	Nuapada (NAC)	2019-20	0.00	0.00	0.00	0.00	0.00	1.07	1.07
	Total (E)		**0.00**	**0.00**	**0.00**	**0.01**	0.01	**168.74**	**168.73**

(Source: Information furnished by test-checked ULBs)

Appendix-VI
(Refer paragraph 3.8.1 at page 17)

Variations in *per capita* estimation indicated by ULBs and as worked out by Audit for 2019-20

Sl.No	Name of the ULB	Base year Population as of 2011 census	Year	Population	Residual refuse (0.3)	Commercial refuse (0.10)	Street sweeping (0.05)	Institutional refuse (0.05)	Total in Kg/day (f+g+h+i)	Total in TPD k=j/1000	Waste generation by ULB in TPD	Difference M=I-k
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
1	Bhubaneswar (MC)	840834	2019-20	1107217.81	332165.34	110721.78	55360.89	55360.89	553608.90	553.61	520	-33.61
2	Cuttack (MC)	610189	2019-20	803502.40	241050.72	80350.24	40175.12	40175.12	401751.20	401.75	174.68	-227.07
3	Bhadrak (M)	107463	2019-20	141508.20	42452.46	14150.82	7075.41	7075.41	70754.10	70.75	90.00	19.25
4	Jeypore (M)	84830	2019-20	111704.90	33511.47	11170.49	5585.25	5585.25	55852.45	55.85	27.00	-28.85
5	Raygada (M)	71208	2019-20	93767.34	28130.20	9376.73	4688.37	4688.37	46883.67	46.88	27.00	-19.88
6	Puri (M)	200564	2019-20	264104.50	79231.35	26410.45	13205.23	13205.23	132052.25	132.05	110.00	-22.05
7	Hinjilicut (NAC)	24671	2019-20	32487.00	9746.10	3248.70	1624.35	1624.35	16243.50	16.24	18.00	1.76
8	Chhatrapur (NAC)	22027	2019-20	29005.35	8701.61	2900.54	1450.27	1450.27	14502.68	14.50	10.63	-3.87
9	Rourkela (MC)	272721	2019-20	359121.50	107736.45	35912.15	17956.08	17956.08	179560.75	179.56	120.00	-59.56
10	Sundargarh (M)	45036	2019-20	59303.81	17791.14	5930.38	2965.19	2965.19	29651.91	29.65	13.50	-16.15
11	Sambalpur (MC)	184000	2019-20	242292.86	72687.86	24229.29	12114.64	12114.64	121146.43	121.15	110.00	-11.15
12	Gunupur (NAC)	24162	2019-20	31816.74	9545.02	3181.67	1590.84	1590.84	15908.37	15.91	13.00	-2.91
13	Nuapada(NAC)	16208	2019-20	21342.84	6402.85	2134.28	1067.14	1067.14	10671.42	10.67	4.96	-5.71
14	Balangir (M)	98238	2019-20	129360.69	38808.21	12936.07	6468.03	6468.03	64680.34	64.68	26.02	-38.66
15	Bargarh (M)	80625	2019-20	106167.73	31850.32	10616.77	5308.39	5308.39	53083.86	53.08	42.00	-11.08
16	Ranapur (NAC)	21865	2019-20	28792.03	8637.61	2879.20	1439.60	1439.60	14396.01	14.40	2.00	-12.40
17	Baripada (M)	109743	2019-20	144510.57	43353.17	14451.06	7225.53	7225.53	72255.29	72.26	45.00	-27.26
18	Chandabali (NAC)	12515	2019-20	16479.87	4943.96	1647.99	823.99	823.99	8239.93	8.24	7.50	-0.74
19	Berhampur (MC)	356598	2019-20	469571.47	140871.44	46957.15	23478.57	23478.57	234785.73	234.79	143.00	-91.79
20	Choudwar (M)	42784	2019-20	56338.36	16901.51	5633.84	2816.92	2816.92	28169.18	28.17	12.84	-15.33
21	Jharsuguda (M)	97730	2019-20	128691.75	38607.52	12869.17	6434.59	6434.59	64345.87	64.35	28.82	-35.53

NB: minimum consideration taken as per Para 3.3.6.2 of MSW Manual 2000 and para 1.4.3.3 MSW Manual 2016 for 3.5 percent population growth, Source: Information furnished by test checked ULBs

Appendix-VII
(Refer paragraph 3.10 at page 18)

Design capacity requirement and provided for MCCs in test checked ULBs

Sl. No	Name of the ULB	Population in base year 2011	Population in 2019-20	No of house holds	*Per capita* waste generation in gm/day	Bio degradable waste in gm/day	Design capacity required in TPD	Design capacity provided in TPD	Excess (+)/ Less (-) provision in TPD
A	B	C	D	E= D/4.5	F	G=F/2	H=(1.5*G*E)/ (150*2220)	I	J=I-H
1	Bhubneswar (MC)	840834	1107217.81	246048.40	580	290	321.41	207	-114.41
2	Cuttack (MC)	610189	803502.39	178556.09	234	117	94.10	81	-13.10
3	Sambalpur (MC)	184000	242292.86	53842.86	280	140	42.44	65	22.56
4	Rourkela (MC)	309689	359121.48	69609.00	350	175	54.87	45	-9.87
5	Berhampur (MC)	356598	469571.47	104349.22	370	185	86.96	0	-86.96
6	Puri (M)	200564	264104.49	58689.89	589	294.5	77.86	65	-12.86
7	Jeypore (M)	84830	111704.91	24823.31	300	150	16.77	10	-6.77
8	Jharsuguda (M)	97730	128691.75	28598.17	300	150	19.32	10	-9.32
9	Rayagada (M)	71208	93767.34	20837.19	245	122.5	11.50	15	3.50
10	Bolangir (M)	98238	129360.69	28746.82	264	132	17.16	15	-2.16
11	Baragada (M)	80625	106167.73	23592.83	350	175	18.60	10	-8.60
12	Bhadrak (M)	107463	141508.25	19636.00	214	107	9.46	8	-1.46
13	Sundargarh (M)	45036	57298.37	12732.97	300	150	8.60	15	6.40
14	Baripada (M)	109743	144510.57	32113.46	300	150	32.91	25	-7.91
15	Choudwar (M)	42784	56338.36	12519.64	300	150	8.46	8	-0.46
16	Chhatrapur (NAC)	22027	29005.35	6445.63	135	67.5	1.96	15	13.04
17	Hinjilicut (NAC)	24671	32487.00	7219.33	250	125	4.06	15	10.94
18	Chandabali NAC	12515	16479.87	3662.19	350	175	2.89	2	-0.89
19	Ranpur (NAC)	21865	28792.03	6398.23	150	75	1.01	3	1.99
20	Nuapada (NAC)	16208	21342.84	4742.85	250	125	2.67	3	0.33
21	Gunupur (NAC)	24162	31816.74	7070.39	450	225	7.17	10	2.83

(Source: information furnished by test checked ULBs and DMA)

NB1: 1.5 TPD capacity of MCC project could carter 10000 population or 2222 households (population= 4.5 times of households) for bio degradable waste of 150 gram/day as per SOP

NB:2 : Bio degradable waste taken as 50 percent of per capita waste generation (50 percent of waste generation) as per SOP

NB3: Population growth 3.5 percent per year considered as per MSW manual 2016

NB 4: For Berhampur Municipal Corporation, no MCC projects taken since the ULB has one centralised plant for waste processing

Hence Required capacity of MCC in TPD= $\frac{1.5\text{TPDXNo of Households required Bio degradable waste}}{2220 \text{ X } 150}$

Appendix-VIII
(Refer paragraph 4.2.1 at page 24)

Coverage of daily sweeping of roads by the test checked ULBs

Sl. No	Name of the ULB	No of wards	Total road distance KM	Daily coverage of road sweeping (in KM)	Percentage of Road sweeping made on daily basis	Percentage of non-coverage of roads for daily sweeping
1	Bhubaneswar (MC)	67	915.12	640.58	70	30
2	Bhadrak (M)	30	210	105.00	50	50
3	Raygada (M)	24	192	192.00	100	0
4	Hinjilicut (NAC)	21	82.8	57.96	70	30
5	Cuttack (MC)	59	860.57	774.51	90	10
6	Chhatrapur (NAC)	14	40	40.00	100	0
7	Jeypore (M)	28	45	11.25	25	75
8	Puri (M)	32	246.46	221.81	90	10
9	Sundargarh (M)	19	60.01	60.01	100	0
10	Rourkela (MC)	40	470.67	353.00	75	25
11	Sambalpur (M)	41	484	484.00	100	0
12	Gunupur (NAC)	17	201.54	185.42	92	8
13	Ranapur (NAC)	15	26.91	26.91	100	0
14	Baripada (M)	28	271	245.00	90	10
15	Chandabali (NAC)	15	52	19.00	37	63
16	Nuapada (NAC)	14	7.8	7.02	90	10
17	Balangir (M)	21	427	385.00	90	10
18	Bargarh (M)	19	425	300.00	70	30
19	Berhampur (MC)	40	439.78	439.78	100	0
20	Choudwar (M)	19	112	112.00	100	0
21	Jharsuguda (M)	24	397.5	149.35	37.57	62
	Total	**587**	**5967.16**	**4809.6**		

(Source: Information furnished by test-checked ULBs and ARs)

Uncovered KM = 5967.16 km – 4809.60 km = 1157.56 km being 19.39 percentage

Appendix-IX
(Refer paragraph 4.3.1 at page 29)

Details of BOVs/LCVs available with test checked ULBs for door to door collection of waste

Sl. No.	Name of the ULB	Total number of house holds	No of BOVs available with ULB	House holds covered by BOVs	No of LCVs available with ULB	Households covered by LCVs	Total house holds covered	Percentage of Shortfall in coverage
1	Bhubaneswar (MC)	211538	100	60000	150	150000	210000	0.73
2	Cuttack (MC)	164233	6	3600	25	25000	28600	82.59
3	Puri (M)	41140	20	12000	0	0	12000	70.83
4	Bhadrak (M)	19636	10	6000	4	4000	10000	49.07
5	Rayagada (M)	16362	5	3000	0	0	3000	81.66
6	Jeypore (M)	19973	20	12000	6	6000	18000	9.89
7	Hinjilicut (NAC)	6004	3	1800	2	2000	3800	36.71
8	Chhatrapur (NAC)	6089	0	0	3	3000	3000	50.73
9	Sundargarh (M)	11372	6	3600	10	10000	13600	Excess
10	Rourkela (MC)	69609	44	26400	15	15000	41400	20.05
11	Sambalpur (MC)	78803	0	0	63	63000	63000	19.18
12	Gunupur (NAC)	4700	6	3600	2	2000	5600	Excess
13	Ranapur (NAC)	1710	3	1800	0	0	1800	Excess
14	Baripada (M)	24718	10	6000	6	6000	12000	51.45
15	Chandabali (NAC)	5052	6	3600	0	0	3600	28.74
16	Nuapada (NAC)	3794	2	1200	4	4000	5200	Excess
17	Balangir (M)	21980	8	4800	0	0	4800	78.16
18	Bargarh (M)	20441	7	4200	5	5000	9200	54.99
19	Berhampur (MC)	70760	0	0	40	40000	40000	43.47
20	Choudwar (M)	9172	6	3600	0	0	3600	60.75
21	Jharsuguda (M)	22146	37	22200	0	0	22200	Excess
	Total	829232	299	179400	335	335000	514400	

(Source: Information furnished by test checked ULBs)

NB: As per the SOP, each BOV and LCV will cover 600 and 1000 households for door to door collection

To cover balance 314832 households= 314832/600=525 BOVs required

Total requirement= 299+335+525= 1,159 vehicles Total available vehicles= 299+335= 634

Appendix-X
(Refer paragraph 4.3.2.4 at page 31)

Excess quantity of solid waste transported to landfill due to non-adherence of 3R approaches

Year	Population	Per capita waste as per norms per day (350-400 gm/day) in kg	Per capita waste generated per day in gm as per report of BMC in kg	Waste generated in a year as per capita generation in MT as per BMC report E=B*D*365/1000	Waste to be generated as per norms in year in MT F=B*C*365/1000	Actual Transported quantity of waste to TTS in year MT during 2017-20	Amount paid in crore	Excess quantity in MT during the year I=G-F
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
2017-18	1033600	0.413	0.45	169768.80	155810.03	201948.35	47.04	46138.32
2018-19	1069776	0.418	0.45	175710.71	163215.72	228359.70	53.06	65143.98
2019-20	1107218	0.423	0.58	234398.05	170948.92	245644.60	56.69	74695.68
Total				**579877.56**	**489974.68**	**675952.65**	**156.79**	**185977.97**

- Base year 2011 population taken as 840834 as per 2011 Census for arriving population of the city for 2017
- Year wise population growth at rate 3.5 *per cent* taken as per Section 1.4.3.3 of MSW Manual 2016
- Waste quantity generation increasing by 1.3 percent as per Section 1.4.3.3 of MSW Manual 2016
- Minimum per capital waste generation taken as 400-600 g/capita/day in cities with a population above 10,00,000 as per Section 1.4.3.3 of MSW Manual 2016

Appendix-XI
(Refer paragraph 8.1.2 at page 72)
Status of committees prescribed to oversee the implementation of SWM

Sl.No	Committee (Chairperson)	Purpose	Remarks
1	State High Powered Committee (Chief Secretary)	To guide implementation of waste management in cities	Constituted in April 2017.
2	State Level Advisory Body	To review the matters related to implementation of SWM rules, state policy and strategy on SWM and give advice to State Government	Constituted in October 2017 and conducted three meetings till March 2021 against 12 meetings from 2015-21.
3	State level Committee (Retired Judge of High Court)	To guide implementation of waste management in cities	Constituted in February 2019. Conducted six meetings till March 2021
4	State Level Technical Committee under SBM	To examine the technical feasibility of SWM projects	Not constituted as of March 2021
5	State level Monitoring cell	To monitor the MCC/MRF and wealth centres	Constituted in October 2020. No inspection note issued.
6	District Level Review and Monitoring Committee (Member of Lok Sabha from the district)	To ensure successful implementation and monitoring of sanitation outcomes at district level as required Odisha Urban Sanitation Strategy 2017	Constituted in May 2015 Despite a lapse of five years, District Level Review and Monitoring Committees were yet to be conduct any meeting for waste management.
7	District level Review Committee (PD, DRDA/ DUDA)	To implement and monitor the SWM activities at district level	Despite a lapse of four years, District Level Review and Monitoring Committees were yet to be formed. Although District collectors reviewed the waste management, action taken report of previous meetings not addressed. H&UD department issued instruction in April 2019 to form the committee, no such committee was formed in test checked ULBs.
8	City Level Task Force	To review action plans and to review progress of SWM projects	Issued instructions by H&UD department in March 2019 for constitution of Task Force Committee for plastic waste
9	Ward Committees	To monitor SWM service provision at committee level and publicise contact details of ward committee members	No ward committee constituted in test checked ULBs

(Source: Information furnished by DMA, H&UD Department)

Appendix-XII
(Refer paragraph 8.1.7 at page 76)
Staff position (sanctioned strength as per norms, men-in-position and vacancy) for SWM activities in test-checked ULBs as on March 2020

Sl. No	Name Of the ULB	Population as per annual report	No of house hold as per annual report	Environment Engineer			Health Inspector			Sweeper		
				SS as per SWM guide line	MIP	Vacancy (-) / Excess (+)	SS as per SWM guide line	MIP	Vacancy (-) /Excess (+)	SS as SWM guide line	MIP	Vacancy (-) /Excess (+)
1	Balangir (M)	98238	21980	0	0	0	0	0	0	275	251	-24
2	Baragarh (M)	80625	20441	0	0	0	1	1	0	226	287	61
3	Baripada (M)	109743	24718	0	0	0	0	0	0	307	281	-26
4	Berhampur (MC)	356598	70760	0	0	0	1	1	0	996	1118	122
5	Bhadrak (M)	107643	19636	0	0	0	0	0	0	301	222	-79
6	Bhubaneswar (MC)	840834	201873	3	3	0	11	10	-1	2354	3064	710
7	Chandabali (NAC)	26848	5041	0	0	0	0	0	0	75	44	-31
8	Chhatrapur (NAC)	23633	6089	0	0	0	0	0	0	66	84	18
9	Choudwar (M)	42784	9172	0	0	0	0	0	0	120	155	35
10	Cuttack (MC)	739048	164233	1	0	-1	3	1	-2	2069	1088	-981
11	Gunupur (NAC)	28870	4700	0	0	0	0	0	0	81	100	19
12	Hinjilicut (NAC)	25129	6004	0	0	0	0	0	0	70	75	5
13	Jeypore (M)	84830	19973	0	0	0	0	0	0	238	252	14
14	Jharsuguda (M)	97730	22146	0	0	0	1	1	0	274	261	-13
15	Nuapada (NAC)	16208	3794	0	0	0	0	0	0	45	63	18
16	Puri (M)	200564	41140	0	0	0	1	1	0	562	649	87
17	Ranapur (NAC)	19500	2960	0	0	0	0	0	0	41	48	7
18	Rourkela (MC)	309689	69609	0	0	0	0	0	0	867	771	-96
19	Rayagada (M)	71208	16362	0	0	0	0	0	0	199	160	-39
20	Sambalpur (MC)	335761	78803	0	0	0	1	1	0	940	1400	460
21	Sundargarh (M)	45036	10127	0	0	0	1	0	-1	126	259	133
	Total			**4**	**3**	**-1**	**20**	**16**	**-4**	**10232**	**10632**	**400**

(Source: Information furnished by test-checked ULBs SS: Sanctioned strength; MIP: Men -in-position)

NB- 1. Sweeper Excess in six ULB for 1696, Less sweeper in six ULBs 1519 numbers

2. No Environmental engineer in two ULBs and excess environmental engineer in two ULBs for four nos.

3. Vacancies of Health Inspection in eight ULBs for 27 numbers

GLOSSARY

Glossary of Abbreviations

Abbreviation	Description
ACS	Additional Chief Secretary
AFR	Alternative Fuel and Raw Material
BMC	Bhubaneswar Municipal Corporation
BMW Rule 2016	Bio Medical Waste Management Rule 2016
BeMC	Berhampur Municipal Corporation
BSCL	Bhubaneswar Smart City Ltd
C&D Waste Management Rule 2016	Construction and Demolition Waste Management Rule 2016
CBMWTF	Common Bio-medical Waste Treatment Facility
CBO	Community-based organisations
CFC	Central Finance Commission
CFE	Consent for Establishment
CFO	Consent for Operation
CMC	Cuttack Municipal Corporation
CPCB	Central Pollution Control Board
DC	Deputy Commissioner
DMA	Director of Municipal Administration
DPRs	Detailed Project Reports
DUDC	District Urban Development Cell
EPR	Extended Producer Responsibility
EW Rules, 2011	Electronic Waste (Management and Handling) Rules, 2011
EWM Rules, 2016	Electronic Waste Management Rule 2016
FC	Finance Commission
GoI	Government of India
GoO	Government of Odisha
GPS	Global Positioning System
H&FW Department	Health and Family Welfare Department
HCE	Health Care Establishment
HDPE	High Density Polyethylene
IEC	Information, Education and Communication
JPV	Joint Physical Verification
MoEFCC	Ministry of Environment, Forest and Climate Change
MoUD	Ministry of Urban Development
MSW	Municipal Solid Waste
MSW Rules, 2000	Municipal Solid Waste (Management and Handling) Rules, 2000
MSWM Manual 2000	Municipal Solid Waste Management Manual 2000
MT	Metric tonne
NGO	Non-Government Organisation
NGT	National Green Tribunal
O&M	Operation and Maintenance
OB	Opening Balance
OM Act 1950	Odisha Municipality Act 1950
OMC Act, 2003	Odisha Municipal Corporations Act, 2003
OWS&SB	Odisha Water Supply& Sewerage Board

Abbreviation	Description
PIP	Persons in Position
PW Rules, 2011	Plastic Waste (Management and Handling) Rules, 2011
PWM Rules, 2016	Plastic Waste Management Rules, 2016
RDF	Refuse-derived Fuel
RMC	Rourkela Municipal Corporation
RPCB	Regional Pollution Control Board
SBM	Swachha Bharat Mission
SEIAA	State Environment Impact Assessment Authority
SFC	State Finance Commission
SHG	Self Help Group
SLB	Service Level Benchmark
SMC	Sambalpur Municipal Corporation
SPCB	State Pollution Control Board
SS	Sanctioned Strength
STP	Sewerage Treatment Plant
SWM Rule 2016	Solid Waste Management Rule 2016
SWM Manual 2016	Solid Waste Management Manual 2016
TPD	Tonnes per day
UDD	Urban Development Department
ULB	Urban Local Body
WATCO	Water Corporation of Odisha
Water Act, 1974	Water (Prevention and Control of Pollution) Act, 1974