

**BEFORE THE NATIONAL GREEN TRIBUNAL  
EASTERN ZONE KOLKATA BENCH  
Original Application No.56 of 2024/EZ.**

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Sarat Chandra & Others ..... Petitioner / Appellant

**Vs.**

State of Odisha & Ors. .... Respondent / Defendant

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SPCB Odisha, R.No.3

Through

*Papiya Banerjee Bihani*

Kolkata

Date:

**Smt Papiya Banerjee Bihani,**  
Advocates for the Respondent No.3  
(State Pollution Control Board, Odisha)  
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Phone No.:9831493390

**BEFORE THE NATIONAL GREEN TRIBUNAL**  
**EASTERN ZONE KOLKATA BENCH**  
**Original Application No.56 of 2024/EZ.**

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**Sarat Chandra & Others** ..... Petitioner / Appellant

**Vs.**

**State of Odisha & Ors.** .....Respondent / Defendant

**ADDITIONAL AFFIDAVIT ON BEHALF OF STATE  
POLLUTION CONTROL BOARD, ODISHA,  
RESPONDENT NO.3 IN COMPLIANCE TO ORDER  
DTD.31.07.2024 OF THIS HON'BLE TRIBUNAL.**

---

I, Dr. Kailasam Murugesan, IFS, son of late Paramasivam Kailasam aged around 56 years, at present working as Member Secretary, State Pollution Control Board, having my office at Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, P.O. Nayapalli, Bhubaneswar, Dist – Khurda, Odisha-751012, do hereby solemnly affirm and state as under:



12 SEP 2024

1. That I am the Member Secretary of the Respondent No.3 Board and, as such, am well-acquainted with the facts and circumstances with the case and competent to swear this affidavit.



2. That this Hon'ble Tribunal after taking note of the affidavit dtd.28.06.2024 filed by the R-3 Board in their order dtd.31.07.2024 at para-4 directed the R-3 Board to file fresh affidavit. The relevant portion of para-4 of the order dtd.31.07.2024 is reproduced below:

4. The Odisha State Pollution Control Board is directed to file fresh affidavit within three weeks showing which actions have been taken regarding Standard Operating Procedure (SOP)/siting criteria for setting up of Micro Composting Centre. It should also specify whether Micro Composting Centres in question is SOP/siting criteria compliant and if not then any alternative site has been identified and other necessary actions have been taken or not.

3. That in compliance to the order the committee constituted by the Hon'ble Tribunal, PB, New Delhi vide their order dtd.15.02.2024 in OA No.19/2024/PB has again visited the site on 05.09.2024 and deliberated the matter. As per deliberation, the R-2 vide letter No.37331 dtd.11.09.2024 intimated the Nodal Officer about the Standard Operating Procedure (SOP) for Micro Composting Centres (MCCs) and



requested to file fresh affidavit in compliance to the aforesaid direction dtd.31.07.2024 of this Hon'ble Tribunal.

4. That in the letter dtd.11.09.2024, the R-2 has stated that the R-2 has operated all the MCCs as per defined SOP developed by Housing & Urban Development Department, Govt. of Odisha issued vide letter No.21681 dtd.20.12.2022. A copy of the said letter has been enclosed as Annexure-A and the site specific SOP for MCCs operating near residential area is enclosed as Annexure-B in the letter dtd.11.09.2024 of the R-2.
5. That it is humbly submitted that the committee after deliberation of the matter has submitted their report by annexing the letter dtd.11.09.2024 of the R-2 together with its annexures i.e. Annexure-A and Annexure-B relied upon by the R-2, which is enclosed and marked as **ANNEXURE – R3/4 Colly** for kind perusal of the Hon'ble Tribunal.
6. That this affidavit is filed by the R-3 Board in compliance to the order dtd.31.07.2024 of this Hon'ble Tribunal.



MANJULA KUMAR PRADHAN  
NOTARY PUBLIC  
BHUBANESWAR  
REGD. NO. ON-71/2006  
PH-9437627119 (M)

12/09/24

- 7. That the annexure annexed to the present affidavit is true and correct copy of its original.
- 8. That the contents of the above paragraphs are true and correct to the best of my knowledge, as derived from the official records, and that nothing material has been concealed therefrom.

  
**DEPONENT**  
 Member Secretary  
 State Pollution Control Board  
 Odisha, Bhubaneswar

**VERIFICATION:**

I, the above named deponent, do hereby verify that the contents of the above affidavit are true and correct to the best of my knowledge, as derived from official records, and that nothing material has been concealed therefrom.

Verified at Bhubaneswar on this the 12<sup>th</sup> day of September, 2024.

**SWORN BEFORE ME**

  
**DEPONENT**  
 Member Secretary  
 State Pollution Control Board  
 Odisha, Bhubaneswar



MANJULA KUMAR PRADHAN  
 NOTARY PUBLIC  
 BHUBANESWAR  
 REGD. NO. ON-71/2006  
 PH-9437627119 (M)

12/09/24

## ANNEXURE-R3/4 Colly.

**REPORT OF THE JOINT COMMITTEE VISIT ON DTD. 05.09.2024 SUBMITTED BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL, EASTERN ZONE BENCH, KOLKATA IN COMPLIANCE TO THE DIRECTION OF ORDER OF HON'BLE NGT DTD. 15.02.2024 OF O.A. NO. 56/2024/EZ (IN THE MATTER OF ORIGINAL APPLICATION NO. 19/2024/PB)**

That in pursuance to the order dtd. 31.07.2024 of the Hon'ble NGT EZB, Kolkata regarding formulation of a site specific Standard Operating Procedure (SOP) for Micro Composting Centre (MCCs) with operating capacity of 5 TPD situated near residential areas with emergency plan to accommodate waste during monsoon period for sound management of waste without any environmental concern, the joint committee once again visited the site of MCC at Mahinsakhil, BJB Nagar, Bhubaneswar. The joint committee observed the followings:




- (i) The present MCC at Mahinsakhil, BJB Nagar, Bhubaneswar is complaint to SOP issued by H & UD Department, Govt. of Odisha, which has been communicated Vide Letter No. 37331 Dtd. 11.09.2024 from Bhubaneswar Municipal Corporation, Bhubaneswar. .
- (ii) There is no siting criteria for setting up of Micro Composting Centre (MCC). The GA & PG Deptt., Govt. of Odisha vide its letter No. 24400, dtd. 03.11.2020 has accorded permissive possession of Government land in favour of Housing & Urban Development Department to be used by Bhubaneswar Municipal Corporation for construction of Micro Composting Centre and the land details is as below,

Sl. No.	Mouza	Khata No.	Plot No.	Area	Kissam
9	BJB Nagar, Unit-29	348 (GA Deptt.)	494 (pt.)	Ac. 0.298 dec.	Gharabari-II

Since, the aforesaid site has been allocated by GA & PG Dept., Govt. of Odisha, no alternate site has been identified.

- (iii) As per Rule No. 15 (y) of Solid Waste Management Rules, 2016, Authorization from State Pollution Control Board, Odisha for setting up waste processing treatment or disposal facility, if the volume is not exceeding 5 MT per day including sanitary landfill is exempted.
- (iv) The MCCs having cover shed has been categorized as white category and the same has been exempted from Consent administration of the Board vide Board's Notification No. 6488, dtd. 08.05.2017 and this Notification has been submitted in previous Joint Committee report submitted before Hon'ble NGT. .

That it is humbly submitted that, Bhubaneswar Municipal Corporation has been operating the Micro Composting Centre (MCCs) as per the defined Standard Operating Procedure (SOPs) issued by Housing & Urban Development Department, Govt. of Odisha as per given in **Annexure-A**, which has been communicated Vide Letter No. 37331 Dtd. 11.09.2024 from Bhubaneswar Municipal Corporation, Bhubaneswar. Bhubaneswar Municipal Corporation has also developed site specific Standard Operating Procedure (SOPs) with emergency plan for MCCs operating near Residential areas which is enclosed as **Annexure-B**, *which* has been communicated Vide Letter No. 37331 Dtd. 11.09.2024 from Bhubaneswar Municipal Corporation, Bhubaneswar

Signature 	Signature 	Signature 
Name & Designation  Dr. Manoranjan Sahu (Deputy Commissioner (Sanitation), BMC	Name & Designation  Shri Nitish Kumar Tripaty Sub-Collector, Bhubaneswar	Name & Designation  Dr. B. B. Dash (Additional Chief Environmental Scientist), State Pollution Control Board, Odisha (Nodal Agency)



# Bhubaneswar Municipal Corporation

Phone no. 0674-2431253, e-mail: [info@bmc.gov.in](mailto:info@bmc.gov.in)

Letter No. 37331 /BMC, dtd. 11-9-24 /  
XXXXX-II-SBAC/132/2024

To,

Dr. Binod Bihari Dash,  
 Addl. Chief Env. Scientist & Nodal Officer,  
 Odisha State Pollution Control Board,  
 Bhubaneswar, Odisha.

Sub: Standard Operating Procedure for Micro Composting Centres (MCCs).

Ref: Hon'ble NGT order dtd. 31.07.2024

Sir,

In inviting a reference to the subject cited above and in pursuance to the order dtd. 31.07.2024 of the Hon'ble NGT EZB, Kolkata regarding formulation of a site specific Standard Operating Procedure (SOP) for MCCs with operating capacity of 5 TPD situated near residential areas I am directed to inform you that Bhubaneswar Municipal Corporation has operated all the Micro Composting Centre (MCCs) as per the defined Standard Operating Procedure (SOPs) developed by Housing & Urban Development Department, Govt. of Odisha issued vide letter no. 21681 dtd. 20.12.2022 the detail Operating Procedure for MCCs referred in Section 8 (8.1 to 8.14) of this Standard Operating Procedure (SOP). A copy of letter no. 21681 dtd. 20.12.2022 of H & UD, Dept. Govt. of Odisha along with copy of SOP is enclosed herewith *as Annexure-A*. Similarly, the site specific Standard Operating Procedure for MCCs Operating near Residential areas is *enclosed as Annexure-B*.

In view of the above, you are requested to file a fresh affidavit of the Standard Operating Procedures as mentioned above before Hon'ble NGT in compliance to Order dtd. 31.07.2024.

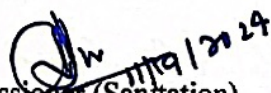
Yours faithfully

Encl: As above.

  
 Dy. Commissioner (Sanitation)  
 Bhubaneswar Municipal Corporation

Memo no. 37332 / Dated 11-9-24 /

Copy to P.A. to Hon'ble Mayor/ P.A. to Commissioner, BMC/ CA to Additional Commissioner-III, BMC for kind information of Hon'ble Mayor, Commissioner & Additional Commissioner-III respectively.

  
 Dy. Commissioner (Sanitation)  
 Bhubaneswar Municipal Corporation

Tel -0674-2392104/2390147  
 e-mail : [sanitationhud@gmail.com](mailto:sanitationhud@gmail.com)  
 Website: [www.urbanodisha.gov.in](http://www.urbanodisha.gov.in)



Government of Odisha  
 Housing & Urban Development Department  
 3rd floor, Kharavel Bhavan, Unit-V, Bhubaneswar, PIN: 751001

\*\*\*\*\*

File No.: HUD-SANT-SCH-0026-2019 Letter No.: 21681 Date: 20.12.2022

From

G. Mathi Vathanan, IAS  
 Principal Secretary to Government

To

All the Commissioners of Municipal Corporations  
 All the Executive Officers of Municipalities and NACs

Sub: SOP 2.0 on Wealth Centres – Issue of revised SOP

Madam / Sir,

In July, 2019 we have made paradigm shift in the municipal solid waste management strategy by adopting decentralised and community driven model with Wealth Center as our hub of activities for such processing. In December, 2020 another SOP was issued to streamline the process flow.

Taking into consideration the learnings from the experiences gained so far and accordingly making the relevant course correction and assimilating all salient aspects covered under the previous SOPs issued in this Department Letter No. 19700 Dated 18.12.2020 and Letter No. 13408 Dated 30.07.2019 a revised SOP has been prepared and enclosed herewith for reference and strict observance.

It is requested to implement the directives in letter and spirit so as to make the "Wealth Centre" a vibrant infrastructure of solid waste management, which is also an ingredient under the 5T Governance framework. An Executive Summary is enclosed herewith for easy reference of the actionable points incorporated in the SOP sent herewith.

Yours faithfully,

*G. Mathi Vathanan*  
 20/12/22

Principal Secretary to Government

//2//

Memo No. 21682 /HUD.

Date : 20.12.2022

Copy along with copy of the enclosure forwarded to the Engineer-in-Chief, OWSSB for information and necessary action.

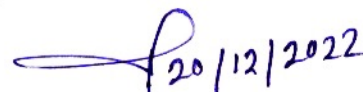


Additional Secretary to Government &  
Additional Mission Director, SBM (Urban)

Memo No. 21683 /HUD.

Date : 20.12.2022

Copy along with copy of the enclosure forwarded to all the Collectors / Project Director, District Urban Development Agencies for information and necessary action.

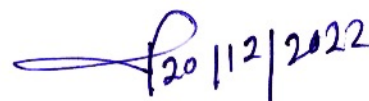


Additional Secretary to Government &  
Additional Mission Director, SBM (Urban)

Memo No. 21684 /HUD.

Date : 20.12.2022

Copy along with copy of the enclosure forwarded to the Professionals, TSU, FSSM and SWM / Professionals in PMU, SBM (Urban) for information and necessary action.



Additional Secretary to Government &  
Additional Mission Director, SBM (Urban)



# **STANDARD OPERATING PROCEDURE FOR WEALTH CENTRE 2.0**

**Housing & Urban Development Department  
Government of Odisha**



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## **Preface**

The Housing & Urban Development (H & UD) Department, Government of Odisha assigns high priority to management of municipal solid waste in consonance with the provisions contained under the Solid Waste Management Rules, 2016. With the vision of “Swachha Odisha, Sustha Odisha” and based on the principles of circular economy, the State aims to recover “wealth” from “waste”. The State has adopted the decentralized model for solid waste management for all the ULBs except Berhampur Municipal Corporation having a centralised unit.

The decentralised model brings in less land requirement, transparency and cost efficiency compared to a conventional centralized model. Besides, it shifts the management of infrastructure from a contractor centric mode to a community driven model bringing ownership and livelihoods for the women members of the Mission Shakti Groups, Transgenders and Waste Pickers.

Consequent upon adoption of decentralised solid waste management system for processing of municipal solid waste in the State, Micro Composting Centres (MCCs) and Material Recovery Facilities (MRFs) have been established which are usually co-located and are generating wealth out of waste and also found to have larger scope for which these institutions have been aptly termed as “Wealth Centres”.

The purpose of this SOP is to prescribe an updated process flow to manage solid waste by associating Community Partners, viz. women members of the Mission Shakti Groups, Transgenders and Waste Pickers in the Operation and Maintenance (O&M) of the “Wealth Centres” in the State of Odisha considering the learnings after implementing the decentralised model adopting Standard operating Procedure issued by this Department in Letter No. 13408 Dated 30.07.2019 and Letter No. 19700 Dated 18.12.2020. This revised version of SOP is meant to supersede the aforesaid SOPs.

### **1. Vision for the “Wealth Centres”**

“Waste” has “Wealth” hidden in it, we can unfold & discover wealth, only if we adopt a scientific, systematic, and sincere approach for the purpose.

Households, Educational institutions, commercial establishments, offices, etc. generate “Waste”, which are normally viewed as unwanted or unusable materials that are disposed of or discarded after their primary use.

It has been experienced that, “Processing” i.e. efficient handling of waste is not only a mandate for the Urban Local Body to safeguard the ecology, which is being fulfilled, but also when the entire solid waste management value chain is driven by women members of the Mission Shakti Groups and further moving a step ahead, associating the Transgender Groups in this process also provides *inter alia* a new horizon for these members of the Society, which ploughs back resources, creates employability and provides a new dignified identity to them.

It has also been envisaged to identify the Waste Pickers, informal waste collectors and integrate them in the solid waste management and thereby formalise their occupation through the system.

This vision has been translated into action throughout the State, augmenting its stature, utilising the infrastructures established for the decentralised solid waste management system, i.e. the Micro Composting Centres (MCC) and Material Recovery Facilities (MRF), the “Wealth Centres”, institutionalising these, streamlining management of the said establishment for smooth and productive utilisation of all resources.

After careful observation, the Housing & Urban Development Department aims to further streamline the solid waste management value chain through this SOP, which is required to be diligently followed by each and every ULB.

## 2. Generation of Municipal Solid Waste in Urban Odisha

Sample survey on different aspects pertaining to generation of municipal solid waste taken up by the ULBs in respect of the households during August to December, 2019 reveals average waste to be 300 grams per person per day of a household in Urban Odisha on an average & wet waste and dry waste in the ratio of 60: 40. However, aforesaid ratio when taken up with waste generated by the commercial establishments, Bulk Waste Generators etc. may be revisited to be 50 : 50 which is also an indicative one.

**Assumptions:** Without delving deep into the numerical of waste generation and assuming the rate of waste generation and ratio of wet and dry waste as above the following assumptions may be made for designing operational strategy for the “Wealth Centres”.

*Table 1: Generation of Municipal Solid Waste in Urban Odisha*

Sl. No.	Assumption in generation of municipal solid waste in Urban Odisha	Quantity (Gram)
1	Average waste generation by a person per day	300
2	Average wet waste generation by a person per day (50% of total municipal solid waste)	150
3	Average dry waste generation by a person per day (50% of total municipal solid waste)	150
4	Average wet waste generation by a family (of 4.5 persons) per day (150 x 4.5)	675

5	Average dry waste generation by a family (of 4.5 persons) per day (150 x 4.5)	675
6	Total waste (Wet and Dry) generation by a family (of 4.5 persons) per day (300 x 4.5)	1350

### 2.1. Quantum of waste management

Urban Local Bodies with variation in demography is to manage waste in proportion thereto as indicated below.

*Table 2: Quantum of Waste to be Managed by ULB*

Sl. No.	Type Of ULB	Population Range	Household Range [Population/4.5 (average number of member)]	Quantum of Waste to be managed per day (indicative) (@ 1350 gm. per household per day)	Number of 5 Ton MCCs and MRFs required
1	Municipal Corporation	> 3,00,000	>66,666	>89999100 g. (66,666 x 1350 g.) or >89999.100 Kg. or >89.999 Ton or 90 Ton	18+18
2	Municipality	25,000 to 3,00,000	5,555 to 66,666	7499250 g. (5,555 x 1350 g.) or 7499.250 Kg. or 7.499 Ton or 7 Ton to 89999100 g. (66,666 x 1350 g.) Or 89999.100 Kg. or 89.999 Ton or 90 Ton	2+2  To  18+18
3	NAC	10,000 to 25,000	2,222 to 5,555	2999700 gm. (2,222 x 1350 g.) or 2999.700 Kg. or 2.9 Ton to 7499250 g. (5,555 x 1350 g.) or 7499.250 Kg. or 7.499 Ton 7 Ton	1+1  to  2+2

## 3. Capacity of MCCs and MRFs

MCCs and MRFs have been designed for processing of municipal solid waste ranging from one and half Ton per day (TPD) to five Tons per day (TPD) to be adopted suitably by the ULBs taking into consideration various factors such as availability of land, quantum of waste generated etc.

### 3.1. “Cluster” approach in managing waste

The Table below indicates at a glance the quantum of waste that can be processed, requirement to be fulfilled by one Wealth Centre i.e. one cluster having one unit of MCC and one unit of MRF, as these two are co-located and therefore to be considered as a “Cluster”.

Table 3: Coverage by One Wealth Centre (Cluster with one MCC &amp; one MRF)

Sr. No.	Capacity of one MCC (TPD)	Population to be covered (Capacity of one MCC ÷ Processing of 150 g. wet waste per person)	Households to be covered (With 4.5 persons on an average in each HH)
1.	5	33,333 (5000000 g. ÷ 150 g.)	7,407 (33,333÷4.5)
2.	4	26,666 (4000000 g. ÷ 150 g.)	5,925 (26,666÷4.5)
3.	3	20,000 (3000000 g. ÷ 150 g.)	4,444 (20,000÷4.5)
4.	2	13,333 (2000000 g. ÷ 150 g.)	2,962 (13,333÷4.5)
5.	1.5	10,000 (1500000 g. ÷ 150 g.)	2,222 (10,000÷4.5)

#### 4. Stakeholders across SWM value chain

The solid waste management system in the state of Odisha has various stakeholders involved across its value chain. Each of the stakeholder has different role in different stages of SWM value chain as it is represented below.

Table 4: Responsibilities of stakeholders across the SWM value chain

Stakeholders	Source Segregation	Collection & Transportation	Processing	Disposal	Citizen awareness
Sr. Sanitation Expert					
Sanitary Inspector/ Health Inspector					
Swachha Sathis*					
Swachha Supervisors					
Swachha Karmis* with Collection Vehicles					
Wealth Centre- Nodal Officer					
Wealth Centre In-charge/Manager					
Swachha Karmi* at Wealth centre					

\* are from Mission Shakti Groups/ Transgender Groups/ Waste Picker Groups

##### 4.1. Engagement of Swachha Sathi

Swachha Sathi would be the Community Link & act as a change agent to bring about collective behavioural changes in the household level in the ward areas towards door-to-door collection of segregated waste and to ensure decentralised composting of wet waste & collection of dry waste.

###### 4.1.1. Who can be engaged as a Swachha Sathi?

- One of the Dynamic Mission Shakti SHGs (MSG) of that locality will nominate suitable members as Swachha Sathi for different areas in the assigned wards having educational qualification not below +2 level (preferably). However, the educational qualification

- may be relaxed in case of non- availability of suitable candidate.
- b. Mission Shakti SHGs member having experience in community mobilisation and keen interest to work towards Solid Waste Management may be given preference by the Mission Shakti SHGs.
  - c. Persons having criminal track records, political affiliation should not be used as Swachha Sathi.
  - d. ULB may also explore the possibility of engaging the services of Area Level Federation (ALF) wherever they are active & dynamic for performing this.

#### **4.1.2. Role and Responsibilities of Swachha Sathi**

- a. Swachha Sathi should sensitise all households in the locality to do the source segregation at household level itself.
- b. If people are not doing source segregation at home, she must demonstrate the source segregation before the family members in the premises of the house while collecting the garbage.
- c. Swachha Sathi must sensitise local markets/Schools / institutions / Parks regarding Source segregation and demonstrate the same for better understanding.
- d. She must generate awareness regarding various method of composting preferably Micro Composting in the locality.
- e. She must explain and sensitise people about Micro Composting and may provide handholding support and guide the people for undertaking Micro Composting Centre (MCC) facilities by the individual household/bulk waste generators.
- f. She has to assist ULB in undertaking IEC activities in the locality.
- g. They will collect “User Fee” under the SWM Bye-laws in respect of all the households, institutions etc. at the prescribed norm.
- h. They should promote sale of “Mo Khata” at the household level, institutional level etc. for which they may be paid incentive by the ULBs @ 10% or as deemed suitable over and above the said norm.
- i. They should be vigilant of any Garbage Vulnerable Point, intimate the ULB officials and facilitate in taking steps for its removal.
- j. The ULB, shall interact with the WSHG for any improvement of the services to be rendered by the members nominated by the WSHG for being associated as Swachha Sathis in case of non-performance etc.
- k. The monthly incentive payable to the Swachha Sathis will be remitted directly to the Bank Account of the Swachha Sathi by the ULB.

#### **4.1.3. Coverage & incentive to Swachha Sathi**

An incentive of Rupees **4000/-** per month may be paid to the Mission Shakti SHG / ALF for every 600 households by the ULB on the basis of the work done by it.

#### **4.1.4. Capacity Building of Swachha Sathi / MSG / ALF**

ULB will organise orientation sessions/meetings for Swachha Sathi / MSG / ALF to make them aware about different components of Solid Waste Management to improve their performance.

#### **4.1.5. Assessment of performance**

The ULB authority must assess the performance of Swachha Sathis and may take needful action for better result either by replacing the existing Swachha Sathi / MSG / ALF or through proper reorientation of the approach.

## **5. Collection of segregated waste**

### **5.1. Collection of Wet and Dry Waste**

Collection of “segregated waste” from the households being the fulcrum of success of this model, due diligence need to be applied and all out efforts should be made to collect segregated waste, i.e., wet and dry waste collected separately from the households on daily basis. Swachha Sathis must continuously educate, motivate and take up appropriate Information, Education Communication (IEC) and Behavioural Change Communication (BCC) activities to ensure the same.

It may be ensured that horticulture, parks and garden wastes are collected separately in the service area of the MCC and processed in the Parks and Gardens. Necessary appropriate arrangements may be made to compost them.

### **5.2. Collection of domestic hazardous waste and E-waste**

Domestic hazardous waste and e-waste are collected on a fixed day i.e., Saturday of every week and deposited at MRF in Wealth Centre for channelizing to the agencies identified by the ULB. No other dry waste would be collected on Saturday.

## **6. Route Rationalization and Transportation of waste**

Route rationalization is an exercise which helps in optimizing the waste collection process and to ensure 100% collection coverage. This exercise includes identification of waste generators, identification of routes (lanes) for door-to-door collection of waste.

Route Mapping/ Rationalization help in the following -

- Identifying areas to be covered under Door to Door (D2D) waste collection
- Investigate the extent of source segregation of waste
- Identifying existing gaps in planning and engagement of vehicles in D2D waste collection
- Identifying various underlying issues in solid waste collection such as waste burning spots, littering spots, etc.
- Ensuring regularity of D2D services
- Strengthening monitoring of D2D waste collection services
- Efficiently managing the D2D waste collection services

### **6.1. Route mapping**

Route mapping can be done manually using local area maps/ sketches. The routes of vehicle are mainly dependent on the following factors:

- Route for waste collection
- Type, capacity and number of the vehicle
- Number of points of intersect/gates/waste collection points

The process of route rationalization includes mapping of existing vehicle routes, households, road/streets, and other landmarks, planning of trips for each route and identification of points of waste collection or gates.

### **6.2. Pre-requisites for route rationalization**

The following are the prerequisites for the route rationalization process:

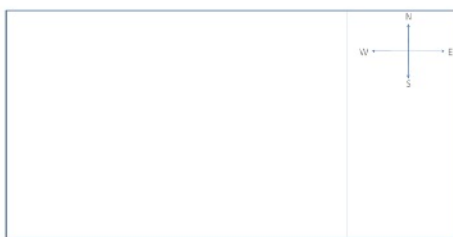
- Waste quantification must be carried out to manage and optimize the route rationalization process
- Knowledge of the existing waste collection routes and ward boundaries
- Waste carrying capacity of the vehicles
- Location and distance of the wealth centres from respective areas

## Information Box

### Steps for route rationalization

#### STEP-1

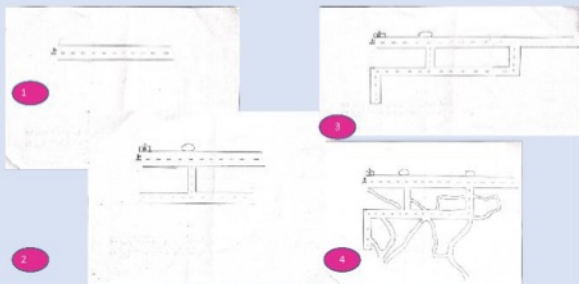
First put the directional symbol on the upper right corner of drawing sheet



#### STEP-2 Identify legends and list them

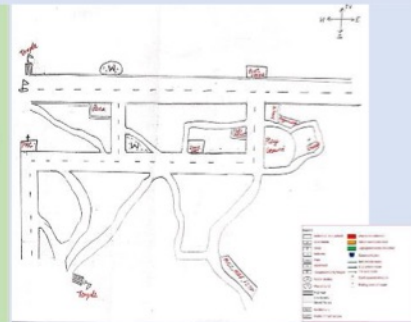
Legend			
	Individual Household		Waste not collected
	Apartment		Mixed waste collected
	Shop		Segregated waste collected
	Industry		Community bin
	Park		Bus/vehicle route
	Agamadi		LCV vehicle route
	Temple/Church/Mosjid		T/cycle route
	Water Bodies		Starting point of route
	Playground		Ending point of route
	Highways		
	Link Roads		
	Streets/Lanes		
	Institutions: Write the name of Institution in the box - bank, post office, news book, etc. in nearby hall, school, university or college, etc.		
	Public Infrastructure: Write the name of infrastructure in the box - MCD, NRI, RDP, PHC, etc.		

#### STEP-3 Start marking roads, lanes, streets from the starting point of the route



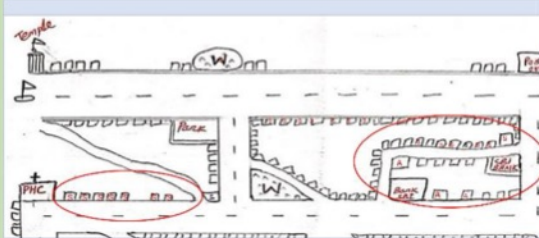
#### STEP-4

Start marking landmarks as defined in the legend such as Banks, Post office, Waterbodies, Playground, Religious places, etc.



#### STEP-5

Taking that as a base, mark lane wise households, apartments, shops, public infrastructure, other properties as defined in the legend



#### STEP-6

Colour the boxes in yellow, red and green based on the status of waste segregation as mentioned in the legend.

Make sure that the initial written in the box doesn't fade away. If so, re-write it after colouring the box



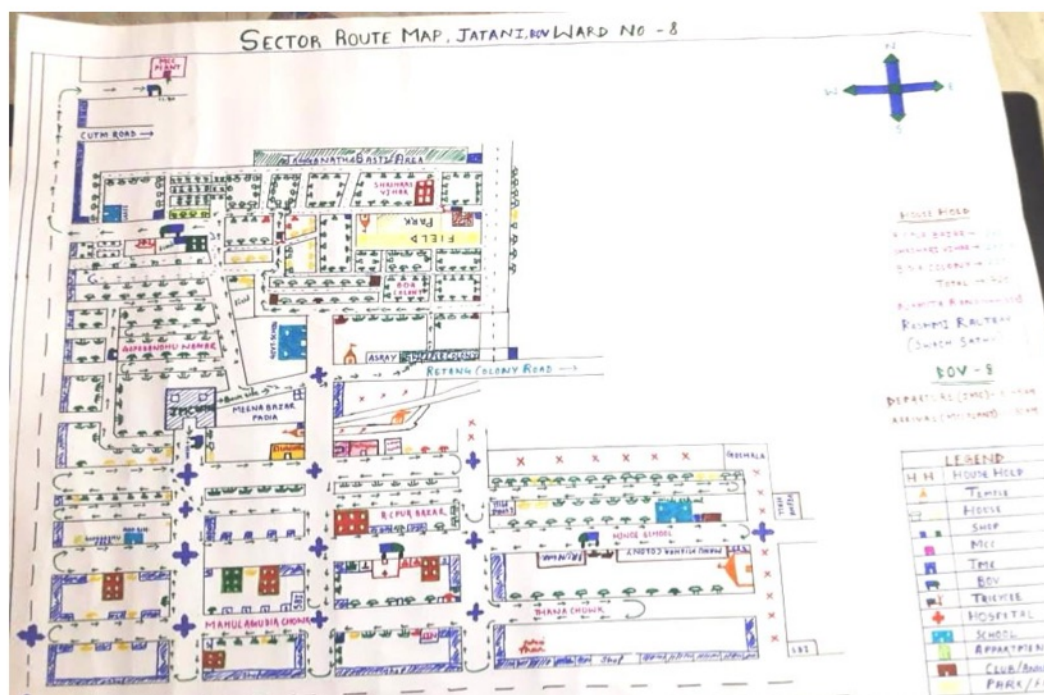
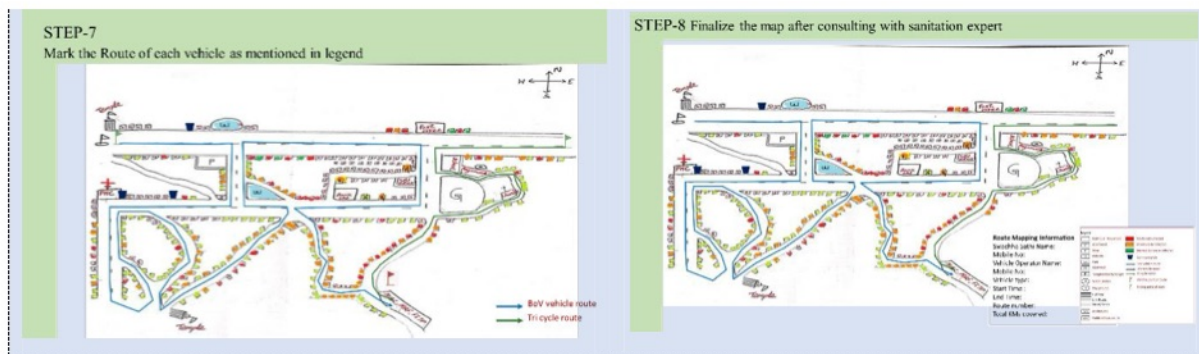


Figure 1: Route Map of an Area for Collection of Waste

Route Maps are prepared by Swachha Sathis and fixed in the vehicles along with target of solid waste to be collected by each vehicle. A register with title "Vehicle Deployment and Waste Collection Register" shall be maintained at every wealth centre as per format given in the table below:

Table 5: Format for Vehicle Deployment and Waste Collection Register

1	Trip No.	Trip 1	Trip 2
2	Location of MCC		
3	Vehicle Registration No. & Type		
4	Name of the Driver & Mobile No.		
5	Streets / Area covered		

1	Trip No.	Trip 1	Trip 2
6	No. of Households covered (Through Swachha Sathi)		
7	Population covered		
8	Quantity of MSW generated		
9	Quantity of organic waste to be collected		
10	Remarks		

### 6.3. Use of BoV- “Swachha Sabari”:

In order to facilitate the collection with ease and dignity, Battery operated Vehicles (with separate chambers for the wet and dry waste) has been introduced through Government e-market (GeM Portal) gradually phasing out Push Carts, Tri-cycles etc.

The BoV utilised for door to door collection are designated as “Swachha Sabari” as these are smokeless and environment friendly. All the vehicles used in collection of segregated waste from the household should reach a household within a specified time, with a soothing miking arrangement (Volume must be within the permissible limit) to inculcate confidence among the waste generator that the waste shall be collected everyday on time.

## 7. Weighing and receiving waste at Wealth Centre

Weighing and Receiving of Waste comprises of the following steps:

- The source segregated waste from the households and bulk consumers is transported to the designated wealth centres.
- The waste-loaded vehicle (BoV/LCV) is weighed at the weigh bridge at the wealth centre
- The wet waste chamber is unloaded at the at MCC and the vehicle is weighed to ascertain the weight of wet waste\*
- The dry waste is unloaded at the receiving yard of the MRF.
- Then the empty vehicle is weighed.
- The weight of the dry waste\* is ascertained by simple calculation
- The process is repeated for each trips and captured in a register.



Figure 2: Swachh Karmi is unloading waste

The cumulative data for wet and dry waste for all trips for the day is calculated by adding the weight of wet and dry waste for each trip in the day and entered in Ama Sahara App.

\*Weight of loaded vehicle – Weight of vehicle after unloading wet waste = Weight of Wet Waste received

\*\*Weight of vehicle after unloading wet waste (vehicle with dry waste) – Weight of empty vehicle = weight of dry waste received

## 8. Micro Composting Centre

### 8.1. Conceptual Design

Micro Composting Centres is designed for “composting” biodegradable waste (wet waste) which means a controlled process involving microbial decomposition to generate organic compost through aerobic composting.

### 8.2. Type of waste processed at MCC

All biodegradable waste as mentioned in the picture below from households and commercial units are processed at MCC.

		
<p style="text-align: center;"><u>Kitchen waste</u> Discarded food grains Vegetable/fruit peels</p>	<p style="text-align: center;"><u>Plant waste</u> Flowers Leaves Grass</p>	<p style="text-align: center;"><u>Leftover food</u> Leftover cooked Food Egg shells Expired packaged food (without packaging)</p>

Figure 3: Biodegradable waste that can be processed at MCC

### 8.3. Area required for MCC

As per the provisions contained under rule 12(a) of the SWM Rules, 2016 the Collector of the District shall facilitate identification and allocation of suitable land (including advance possession) at various locations in the ULB.

Table 6: Criteria for space requirement for MCC

Processing capacity of biodegradable waste in TPD	No. of Tubs	Size of each Tub	Required area for processing centre in Sq.m.*
5	14	3.9mx 1.8m x 1.0m	600
4	14	3.0m x 2.0m x 1.0m	410

3	14	3.0m x 1.5m x 1.0m	360
2	14	2.4m x 1.2m x 1.0m	260
1.5	14	2.0m x 1.2m x 1.0m	200

\*Facilities for provisioning of shredding machine with conveyor belt, sieving machine, weighing machine, office room, washrooms (for men and women separately), Lounge, Locker facilities, assured source of water supply along with adequate drinking water supply system etc. should be provided.

Source: (Standard Operating Procedure for Decentralised Solid Waste Management in Odisha, 2019 issued by this Department)

Suitable location and capacity of Micro Composting Center (MCC) may be determined based on the extent of land available. For example, a land parcel of 410 square meter can be used for establishing MCC of 4 Tons per Day (TPD) capacity. Based on the capacity of MCC, the coverage area comprising ward(s) can be determined. For example, a 1.5 TPD MCC can get waste from 10,000 people that is about 2,220 households. Therefore, the coverage area of 2,220 households shall be delineated. (Refer calculation given below)

Additional MCCs, if required, may be taken up immediately for construction and operationalisation. All equipment required should be procured and installed. It should be ensured that, the ULB has the infrastructure in position to process all the municipal solid waste generated in it.

**Calculation:**

*Capacity of MCC = 1.5 TPD = 15,00,000 grams per day*

*Per capita waste generation (assumed) = 300 grams per day*

*Bio-degradable per capita waste generation (assumed 50%) = 150 gram per day*

*The MCC can cover (15,00,000 grams per day / 150 gram per day) = 10,000 population*

*10,000 population = 10,000/4.5 = 2,222 Households (Assumed population per Household = 4.5)*

*Hence, a 1.5 TPD MCC can cater to 10,000 population that is about 2,220 households.*

#### 8.4. Layout Design of MCC

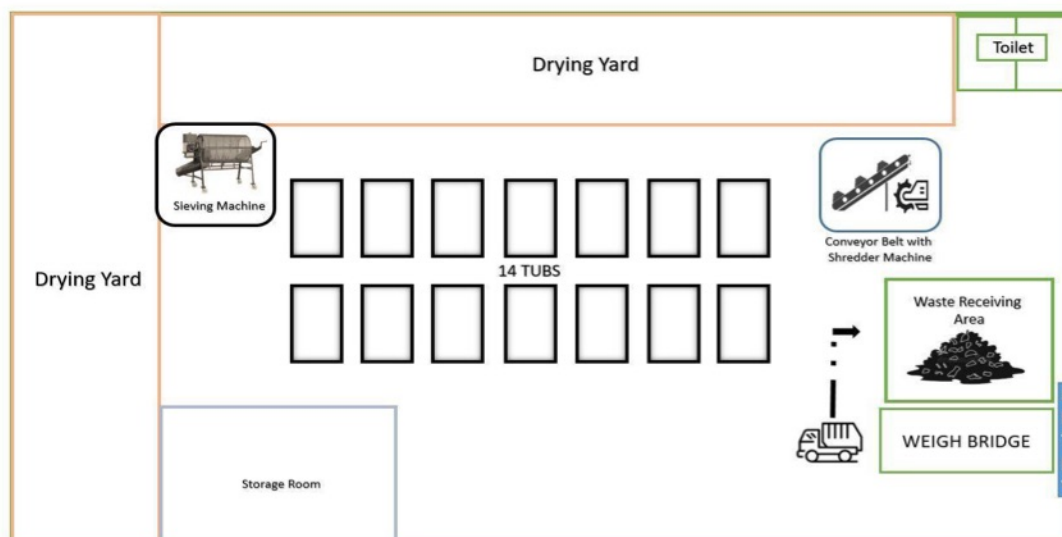


Figure 4: Model Layout design of MCC



Figure 5: Truss with sheets installed

- Roofing - Truss with corrugated sheets for roofing



Figure 6: Side walls with mesh and wall paintings

- Side Wall - For proper ventilation and protection, wire mesh with appropriate gapping



Figure 7: Entrance with concrete flooring and slope

- Flooring - Concrete floor (anti-skid) with proper slope at the main entrance of the MCC



Figure 8: All tubs at MCC

- Tubs:
  - a. The MCC will have 14 tubs in two trains of 7 tubs in each train\*.
  - b. Each Tub may have dimensions as indicated in the Table-7 below:

- a. The floor of each tub shall be sloped to one side and have a drain point with jalli to collect leachate.
- b. Leachate drain points from each tub shall be connected to underground pipes to form a leachate drainage network and connected to a chamber for safe collection.
- c. The accumulated leachate will be rich in bacterial consortium and can be used as inoculum. The leachate can be sprinkled a little on the waste in tubs. But too much of liquid may block the pores that will create anaerobic condition in the tubs.
- d. Each tub will have sufficient number of holes on the side walls. The holes will be connected through pipes and will have a cowl installed on the top to help proper ventilation.
- e. There shall be adequate space for movement (approximately 1meter) around each tub.



Table 7: Tub dimensions as per the processing capacity of MCC

Processing Capacity of Bio-degradable waste in Tons Per Day	No. of Tubs	Size of Each Tub	Required Area for Processing Centre in Square Meter
5	14	3.9m x 1.8m x 1.0m	600
4	14	3.0m x 2.0m x 1.0m	410
3	14	3.0m x 1.5m x 1.0m	360
2	14	2.4m x 1.2m x 1.0m	260
1.5	14	2.0m x 1.2m x 1.0m	200

Source: (HUDD, Standard Operating Procedure for Decentralised Solid Waste Management in Odisha, 2019)

### 8.5. Infrastructure and Machineries in MCC:

Table 8: Infrastructure and machineries at MCC

	Equipment and Infrastructure		Specification	Quantity	Operational area required
1	Digital Weigh Bridge		Digital weigh bridge capacity up to 10 ton	1	12ft X 15ft
2	Belt Conveyor		Speed control from 5 ft/min to 30 ft/min, and 5Hp Motor-output – 500 kg/hr	1	10ft x 40ft

3	Shredder Machine		5Hp Motor, Capacity of Baling 50- 80 kg	1 for 3-5 TPD MRF	6ft X 6ft
4	Weighing scale		25-100 kg weighing capacity	1	3ft X 3ft
5	Sieving Machine/ Screening Machine		Sanitary Napkin-15- 20 pieces per hour; Diaper- 1 to 2 per hour 900-degree min operation temperature	2 for 5 TPD MRF	5ft X 5ft
6	Fire Extinguisher		As recommende d by Fire local authority		
7	Fabricated Trolley/ push carts			2-3	




8	Ancillary sorting tool: Fork tool, Shovel		As required		
9	Air tight drum (3 nos)				
10	Water Jet Machine				
11	Fly Trap				
12	Turbo Fan				



Figure 10: Shredding machine with conveyor belt

- Shredding Machine with conveyor belt shall be placed at the receiving bay to shred the waste to 20-40 mm size.



Figure 11: Sieving machine

- Sieving Machine shall be installed to screen the compost after 40 days.



Figure 12: Fly traps installed at MCC

- Fly traps should be installed to control fly nuisance



Figure 13: Mo Khata- Compost packed and stored

- Storage room /Godown to be provided for storing finished product.

## 8.6. Processing of Biodegradable Waste (Wet waste) at MCC

The wet waste is processed at the Micro Composting Centre (MCC) to convert into organic compost by following a step by step process –

- Separating non-biodegradable waste from wet waste
- Preparation of Effective Micro Organism Solution (EM Solution)
- Preparation of tubs before loading waste
- Shredding of waste using a shredder
- Sequential loading of shredded wet waste in tubs and adding EM Solution
- Turning of waste and allowing aeration for decomposition of waste to convert into compost
- Removing compost from the tubs and drying
- Sieving the compost and packaging
- Quality check of compost





Figure 17: Thoroughly checking waste on conveyor



Figure 18: Collecting shredded waste to load in tubs

After this, the waste is ready to be put inside the composting tubs.

Before placing the wet waste in the composting tubs, some prior preparations are required such as (a) preparation of Effective Microorganism (EM) solutions and (b) preparation of tubs as shown here in detail below:

### 8.6.2. Preparation and use of Effective Microorganism (EM) Solution

EM stands for “Effective Micro-organisms”. EM consists of a wide variety of effective, beneficial and non-pathogenic microorganisms produced through a natural process and not chemically synthesized or genetically engineered. It is prepared as follows:

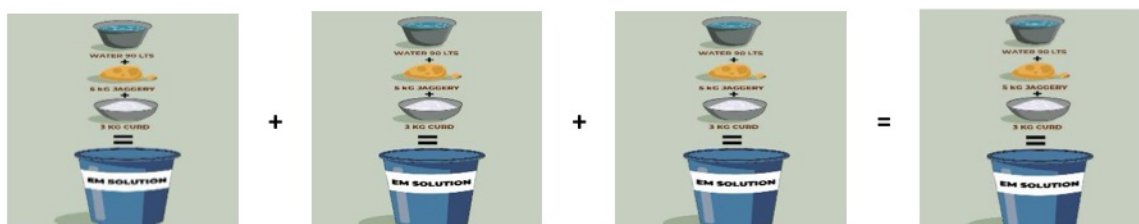


Figure 19: Process of preparing EM solution

- Take a barrel of 100 liters capacity.
- Add 3 liters of curd and 5 Kgs of jaggery. Mix it to form a homogeneous solution.
- Close the barrel and keep it fermented for 7 days.
- After 7 days, open the barrel and the EM Solution is ready to use.
- Take some EM solution in a jar and mix it with equal proportion of Rice bran and Rice husk.
- It should be used within three days of its preparation.

The quantity of EM solution should be such that the mixture can be turned into balls of the size of a coconut without breaking as shown in the figure-20. If it crumbles, add a little more EM solution to the mixture. If it is too much of watery, add more Rice bran and Rice husk.



Figure 20: Preparation of EM Solution



Figure 21: Preparation of EM solution balls

- f. Keep the mixture ready to add on fresh waste.
- f. The EM solution should be used within 3 days of preparation.

Table 9: EM Solution as per MCC's utilization capacity

EM Solution as per waste quantity received at MCC						
	Waste received at MCC Tons Per Day (TPD)	Divide into 3 Barrels and Balls				
		E. M. SOLUTION M. C. C. Parodip Municipality 2019 EM solution (Litre)	Use of EM Solution			Make ball (Numbers)
			Day-1 (Litre)	Day-2 (Litre)	Day-3 (Litre)	
In Tons	5	98	32.67	32.67	32.67	
	4	78	26.00	26.00	26.00	
	3	57	19.00	19.00	19.00	
	2	39	13.00	13.00	13.00	
	1.5	29	9.67	9.67	9.67	

• Prepare "EM solution" in every 3 days interval keep it for 7 days for fermentation and used it for next 3 days after preparation

EM solution is prepared in a sequence in every three days to keep the cycle continue and there is always ready-to-use EM Solution in stock at the MCC. The sequential preparation and use of EM Solution is shown in the following figure-21.

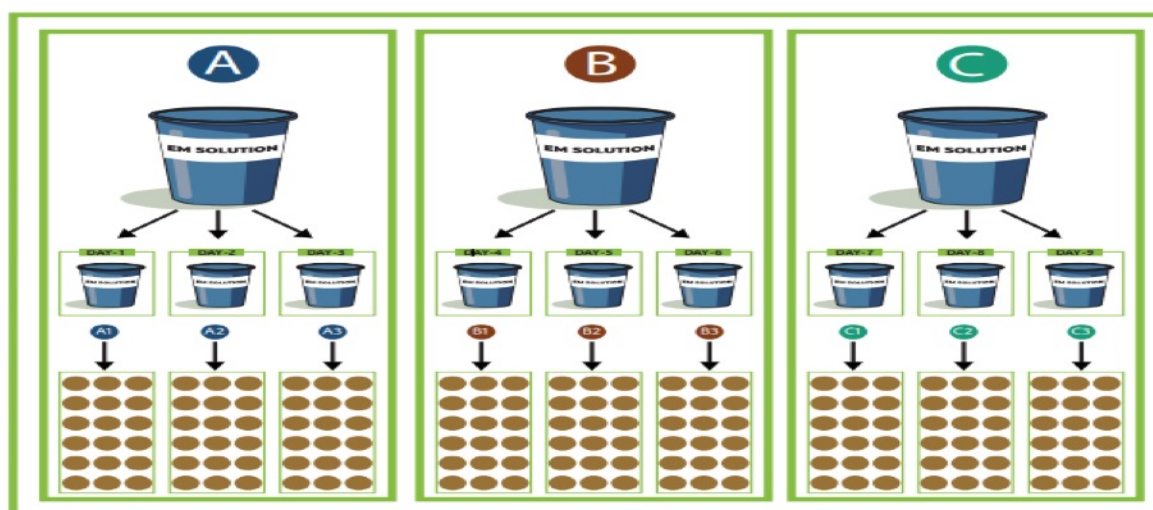


Figure 22: Preparation and use of EM Solution

### 8.6.3. Preparation of compost tubs to receive shredded waste for the first time

- Put a 2-inch-thick dry cow dung at the floor of each tub, before putting waste in the compost tub for 1st time. This process is called bio-dozing.
- Then put the shredded biodegradable waste mixed with the rice-husk-mixed-effective microorganism-solution if not mixed during the shredding process
- Place the waste inside the tub and carry on the same process for next tub on next day.



Figure 23: Bio dozing of the tubs before loading waste

### 8.6.4. Loading of waste in tubs

Once the pre-required activities are done, the processing of wet waste is initiated.

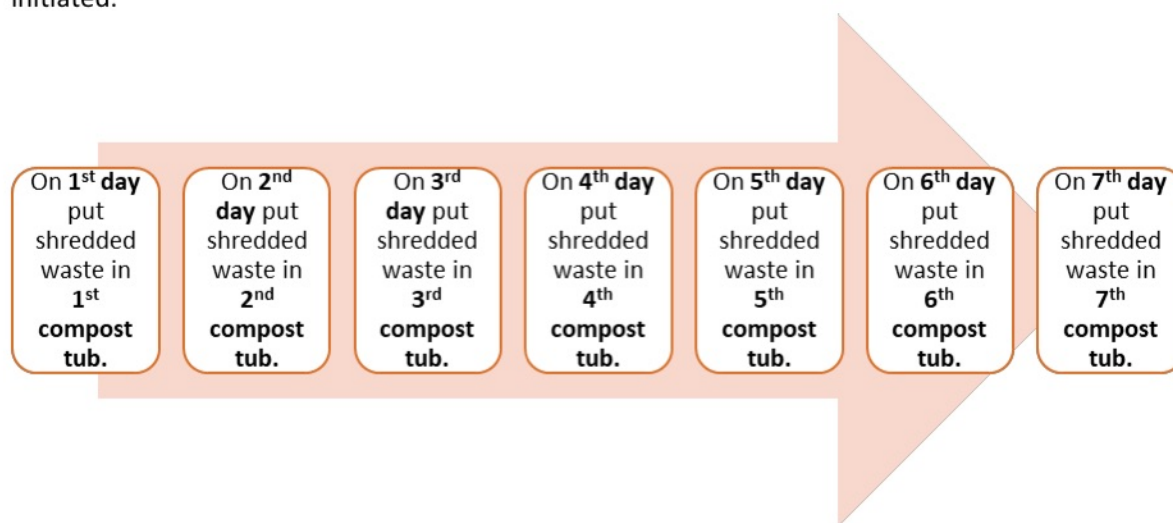


Figure 24: Sequence of putting waste in Tubs

- On 1st day, put the shredded waste mixed with prepared media in 1st tub.
- On 2nd day, put the shredded waste mixed with prepared media in 2nd tub.
- This method is to be continued till 7th day, on which the shredded waste mixed with prepared media will be put in 7th tub.
- The sequence of putting waste in tubs is: 1st day - 1st tub, 2<sup>nd</sup> day - 2<sup>nd</sup> tub, 3<sup>rd</sup> day - 3<sup>rd</sup> tub, 4<sup>th</sup> day - 4<sup>th</sup> tub, 5<sup>th</sup> day - 5<sup>th</sup> tub, 6thday - 6<sup>th</sup> tub, 7thday - 7<sup>th</sup> tub. For better understanding, the Figure-25 can be referred.

The same process has to be repeated every week, starting from day-1 to day-21 for putting waste in one train of tubs.

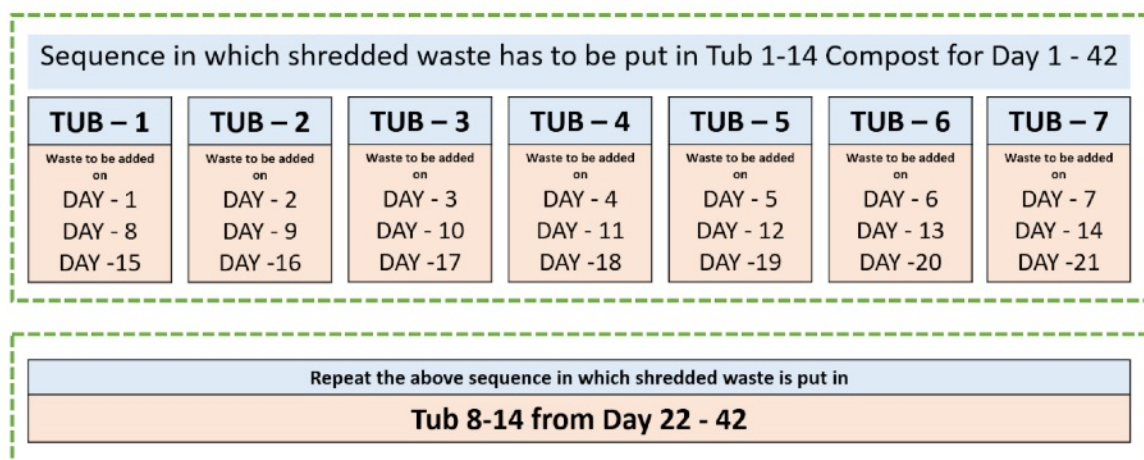


Figure 25: Sequence of putting waste in 7 tubs from Day 1 to Day 42

- e. Turn the waste up and down once in every two days for better aeration.
- f. With each passing day, the waste will degrade due to bacterial activity and there will be reduction in volume of waste. The colour of the waste will slowly turn brown and ultimately become black in final stage.
- g. After 42 days of adding waste in any tub, the waste in the tub would have turned black colour indicating matured compost.
- h. The matured compost shall be removed from the tub and sieved for uniform size.
- i. The rejects from the sieving shall be put again in the tub for further decomposition.
- j. The screened compost shall be kept for seven days for stabilization.

#### 8.6.5. Turning of waste and aeration

After sequential loading of wet waste in the tubs, turning of waste in every two days are key to aeration, which is important for decomposition of wet waste and quality of compost prepared. A detailed chart of loading of wet waste in the tubs and turning of waste in every 2nd day of loading waste for better aeration is provided below in the Table- 10, where green colour stands for loading of waste and yellow colour is for turning of waste.



It is important to ensure that 3/4 of the tub is filled with shredded wet waste, and 1/4 of the space remains vacant for better aeration. By turning the compost properly, the waste gets aerated and is mixed properly inside the tub, which will help foster aerobic conditions to break down the particles and fasten the composting process. Besides, good aeration within the tubs reduces foul odour in MCC.







Table 10: Loading and turning of waste in the tubs at MCC




Day	Table-1						
	Tub-1	Tub-2	Tub-3	Tub-4	Tub-5	Tub-6	Tub-7
1							
2							
3							
4							
5							
6							
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42							

### 8.7. Bio-degradable waste that cannot be processed in the tubs at MCC

There are some biodegradable wastes which take long time for decomposition because of their composition, therefore, cannot be composted in the tubs of MCC. Some of these wastes are listed below for reference –

Sl. No	Not Easily Decomposable Waste	Images
1	Green Coconut	
2	Coconut cell	

3	<b>Meat bones</b>	
4	<b>Banana stem and leaf</b>	
5	<b>Garden waste like stem</b>	
6	<b>Corn Waste</b>	
7	<b>Drum stick</b>	
8	<b>Elephant apple</b>	

9	<b>Rice straw</b>	
10	<b>Sugarcane substances</b>	
11	<b>Mango seeds</b>	

## 8.8. Management of Leachate

Leachate is the juicy fluid that drains from wet waste. Leachate contains high value nutrients for decomposing. On the other hand, excess leachate slows down the decomposition process due to excess liquid content. Therefore, it is important to control the excess liquid by adding rice husk, sawdust, etc., which absorbs its liquid substance.

Besides, it is also important to allow the excess leachate drain through the strainer at the end of the tubs. Excess leachate pass through the leachate channel constructed between the tubs and connected to the leachate pit where it accumulates. For smooth draining of excess leachate, the tubs need to be constructed in such a way that the floor of each tub should be sloped to the side of leachate channel and have a large strainer fixed to the drain. The accumulated leachate will be rich in bacteria and can be used to moist the waste and accelerate decomposition. A small amount of leachate can be sprinkled on waste in tubs. However, care should be taken while doing so as more leachate creates an anaerobic condition in the tubs.

Leachate hole in the tub needs to be cleaned at least once in a week, so also the pipe connecting the hole to the Leachate Pit so that free flow of the Leachate from the Tub to the Pit takes place enhancing efficiency of the decomposting process.

Each tub needs to have sufficient number of holes on the side walls, which needs to be cleaned periodically to allow ventilation.

### 8.8.1. How to reduce foul odour, flies and maggots at MCC

In general, MCC cannot be absolutely free from odours as waste if not fully decomposed would create foul odour. However, it is possible to control the odour if reason for the same is known. Primarily, foul odour is caused by the process of decomposition or breaking down of organic material. Reaction of bacteria on organic matter produces Hydrogen Sulphide (H<sub>2</sub>S), the main cause of foul odour.

In order to reduce the foul odour in MCC, the following actions are required -

Actions	Effect
Every 2 days, turn the waste in the composting tub	Internal odour will reduce
Add rice husk, sawdust to the waste in the tubs, if excess leachate is found	Reduces flies, maggots, and foul odour
Clean the leachate drainage line regularly (At least once in a week)	
Cover the leachate collection chamber properly with a lid which can be removed while cleaning	
Do not put fish or meat waste in the compost tub	Stops formation of maggots and flies
Install fans over the compost tubs and turbo fans on the roof to blow out air	Vents out air and odour
Install fly traps over each composting tub	Controls flies
Plant scented plants in the MCC premises	Reduces foul smells and creates a pleasant working environment
Do not leave post-processing waste lying around in the MCC for more than a day	Reduces foul odour and maggots
Clean the MCC premises, waste storage place, and waste carriers (cart, trolley, or tray) daily after waste is loaded in the tubs	Reduces foul smell
Do not leave used water in the open and properly clean the drains	Controls flies
Ensure free flow of air to the MCC as the basic principle of decomposition is "Aerobic". The current structure of sheet dropping down at the end point of roof should be modified to allow free flow of air into the MCC. So also wall from plinth should be of minimum height to allow flow of air.	Facilitates decomposition and thereby odour controlled

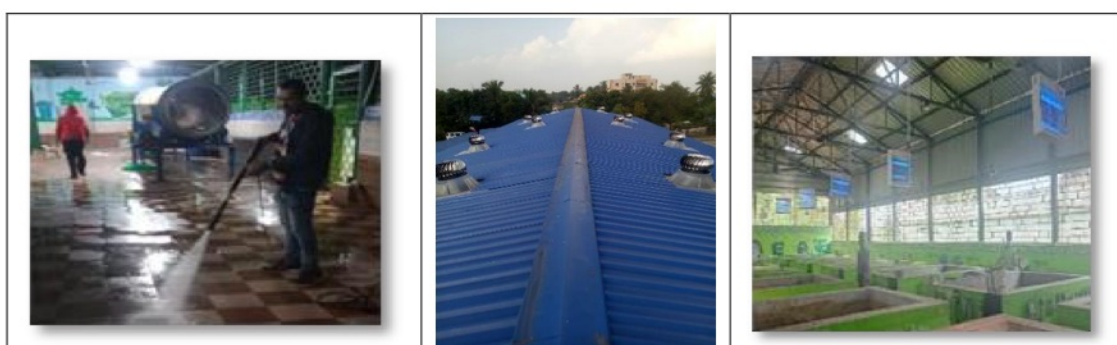


Figure 26: reduce the foul odour

### 8.9. Drying yard and Layout

Every MCC must have at least two drying yards for spreading the compost after removing from the tub on the 42<sup>nd</sup> day for drying and stabilising.

**Layout:** The drying yard with concrete floor should be ideally of 50" X 10" (however, the ULB may decide depending on availability of space in the Wealth Centre) each with all the four sides open. The compost may still have moisture content when removed from the tubs. This makes it difficult for oxygen to penetrate the piles and can lead to unpleasant odours. So, drying yard must have saucer drain to allow the fluid drain out and these drains may be connected to the leachate chamber.

**Roofing:** Trusses with polycarbonate sheets for roofing may be used.

**Leachate drain** points must be connected to the drainage network for safe collection of leachate

### 8.10. Compost Maturity



*Figure 27: Compost put for drying for stabilization*

The term “compost maturity” can be generally referred to the completion of the composting process. Maturity of compost can be determined through a simple test known as “Stink Bag Test”. The compost is placed in a plastic bag and moistened to about 60% water content; the mouth of the bag is then closed (preferably sealed to prevent any airflow). The plastic bag containing the moist material is allowed to sit for 24–48 hours at room temperature (30°–35°C). If foul odour released when the bag is opened at the end of 24–48 hours, it indicates that the material is not fully matured and needs to undergo further decomposition. Generally, anything that smells bad is not good for crop or plant amendment.

The cured compost does not release odour because of carbon stabilization during aerobic decomposition of biodegradable material in tubs. Microbial activity continues during the curing phase also, but at a slower rate compared to the main composting phases.

### 8.11. Efficiency of wet waste processing –

Under ideal operational practices at MCC, the yield of compost can be around 20% of segregated processed municipal wet waste which also indicates good efficiency of the processing. The table-given below provides the monthly quantity of compost to be generated from wet waste at different level of efficiency rate of processing in MCC.

Table 11: Quantity of compost to be generated at different level of efficiency of processing in MCC (Tons per month)

	Capacity of MCC in Metric Tons Per Day	Capacity of MCC in Tons Per Month	Efficiency Rate		
			10%	15%	20%
In Tons	5	150	15	22.5	30
	4	120	12	18	24
	3	90	9	13.5	18
	2	60	6	9	12
	1.5	45	4.5	6.75	9

### 8.12. Quality of “Compost” generated out of wet waste

In order to ensure safe application of compost generated out of wet waste the specifications for its quality as indicated in Schedule-II of the Solid Waste Management Rules, 2016 [Copy attached as Annexure-4] shall be met.

#### 8.12.1. Fertilizer Control Order:

The end product compost shall meet the standards prescribed under “Fertilizer Control Order” notified from time to time.

#### 8.12.2. Features of Compost:

Compost is particularly useful as organic manure; it contains macronutrients (nitrogen, phosphorous, and potassium) as well as micronutrients (boron, iron, zinc, etc.). The use of compost reduces the dependency on chemical fertilisers for agricultural operations. When used as a soil amendment, compost reduces the need for water, fertilisers, and pesticides. Compost acts as a soil conditioner, therefore supporting long-term fertility of the soil. The benefits of compost use include improved soil quality, enhanced water retention capacity of the soil, increased biological activity, micronutrient content, and improved pest resistance of crops. Also, consistent, high quality compost is essential for building and sustaining the trust on the organic manure out of the Wet waste.

#### 8.12.3. Concentration Limits:

Compost (Final product) exceeding the concentration limits stated under Schedule-II shall not be used for food crops. However, it may be utilized for purposes other than growing food crops. In other cases, it may be used for crops including food crops.

#### 8.12.4. Testing of compost:

Department of Fertilizers, Govt. of India has identified laboratories throughout India for testing of compost. Testing of the compost may be conducted in the designated Laboratory / Testing Centres at least once in a month.

Table 5: List of Government approved laboratories for compost quality testing in Odisha

Sl. No.	Address of the Laboratories
1	Analytical Chemist, State Fertiliser Quality Control Lab., Plot No. 646, Sahid Nagar,

	Bhubaneswar-751007 (Odisha)
2	Analytical Chemist, Fertiliser Quality Control Lab., Farm Road, P.O. Modipara, Sambalpur-768002 (Odisha)

The Department of Agriculture, Cooperation & Farmers Welfare, Govt. of India in consultation with State Governments has furnished (Letter No. F. No.11 026/08/2016-M&E, Dated 19th December 2019) the list of Soil Testing Laboratories identified by State Governments and the list of laboratories under the administrative control of the State Governments for use of testing of City Compost samples. The list of such laboratories in the state of Odisha is provided in below.

*Table 13: List of Soil Testing Laboratories for Testing of Compost*

Sl. No.	District	Address of Laboratory
1.	Angul	Soil Testing Laboratory, Near Krishi Bhawan, Angul – 759122
2.	Balangir	Soil Testing Laboratory, Agriculture Office Campus, Cold Storage Road, Balangir
3.	Balasore	Soil Testing Laboratory, At-Balia, Via Kuruda, Pin-758001
4.	Bargarh	Soil Testing Laboratory, Ekamra Chowk, At/Po- Sarsara, Barharh, Pin-768040
5.	Bhadrak	Soil Testing Laboratory, Bye pass, Haldidiha, Bhadrak
6.	Boudh	Soil Testing Laboratory, DAO Office Campus, Boudh, Pin- 762014
7.	Cuttack	Soil Testing Laboratory, Jagatpur, Cuttack
8.	Deogarh	Soil Testing Laboratory, Near College Road, Deogarh
9.	Dhenkanal	Soil Testing Laboratory, Dhenkanal
10.	Gajapati	Soil Testing Laboratory, Po-Parlakhemundi, Dist-Gajapati
11.	Ganjam	Soil Testing Laboratory, Ankuli, Berhampur
12.	Jagatsinghpur	Soil Testing Laboratory, Jagatsinghpur, At-Nimakana, Po- Manijanga Block - Tirtol -754160
13.	Jajpur	Soil Testing Laboratory, At-Mansapola, O/o DDA, Jajpur
14.	Jharsuguda	Soil Testing Laboratory, O/o DDA Near SP Office, OMP line Jharsuguda
15.	Kalahandi	Soil Testing Laboratory, Near Arkabahali Farm, Bhawanipatna
16.	Mayurbhanj	Soil Testing Laboratory, Takhatpur, Baripada
17.	Kandhamal	Soil Testing Laboratory Agriculture Colony, Mandikunda Square, Phulbani
18.	Kendrapada	Soil Testing Laboratory, Kendrapada

19.	Keonjhar	Soil Testing Laboratory, DOA office campus, Madhapur, Keonjhar
20.	Koraput	Soil Testing Laboratory, Semiliguda, Dist.-Koraput Pin- 764036
21.	Khurda	State Quality Control Laboratory Building, Saheed Nagar, Bhubaneswar
22.	Malkangiri	Soil Testing Laboratory, Malkangiri
23.	Nuapada	Soil Testing Laboratory, Nuapada, Pin-766105
24.	Nabarangpur	Soil Testing Laboratory, DDA Office Campus, Miriganguda, Nabarangpur
25.	Nayagarh	Soil Testing Laboratory, Campus of Office of DDA Old Hostel Road, Nayagarh
26.	Puri	Soil Testing Laboratory, DAO Office campus, Chakratirtha Road, Puri
27.	Rayagada	Soil Testing Laboratory, Rayagada
28.	Sambalpur	Soil Testing Laboratory, Modipara, Sambalpur
29.	Sonepur	Soil Testing Laboratory, O/o DAO Campus, Near Royal Field, Sonepur
30.	Sundargarh	Soil Testing Laboratory. Rani Bagicha, Sundargarh

### 8.13. Packaging and marketing of compost (“Mo Khata”)

In the Micro Composting Centres (MCC), after aerobic composting “wet waste” begets a new life and shape after being converted to the final product of “Compost” branded throughout the State as “Mo Khata”. This compost is the precious organic manure which needs to be made available to the customers (farmers) with pride and prudence. In the age of presentation and face value packaging is equally important as the quality of the product. Packaging should disseminate vital information to the customer, display the brand and quality guarantee and should look more attractive than the other brands of organic manure or chemical fertilizers.



Figure 28: Compost packaging in various sizes

The quality, texture, and even “look and feel” must be strategically designed. A branding of the “Mo Khata” should be consciously decided to popularize the product. The compost should be packed in bags of **various sizes** and it should be made up of **suitable materials**. The packaging should

be such that it is **handy to carry** and has a clear and attractive printing to attract customers. The **basic information** regarding the product should be displayed on the bag appropriately. The bags should be **sealed** properly using sealing machine to maintain the quality of product. Overall, the packaging should be informative to the customer, display a reliable brand and quality guarantee, and look at least as compelling as that of competing soil amendments.

### 8.13.1. Promoting compost

For marketing purposes all the Line Departments concerned having programme of plantation should be kept in touch for obtaining indent well ahead of the commencement of plantation season from them for timely supply of compost which may be delivered at the designated place by own arrangement by the ULBs.

Nearby Blocks and other offices may be contacted for reaching out to various stakeholders under their administrative set up. Agriculture / Horticulture authorities may be consulted for reaching out to the farmers.

IEC activities may be carried out to popularise “Mo Khata” amongst people.

The In-Charge of the Wealth Centre shall enter the relevant entries on production and sale of the compost on daily basis in the Mobile App “AMA SAHARA” and verify the stock of the day.

### 8.13.2. Managing inventory of “Mo Khata”

The inventory of “Mo Khata”, the compost generated from the processing of wet waste at MCC, is maintained in a register as well as recorded in the Ama Sahara App. While recording the stock of Mo Khata, only ready-to-sale stock is to be entered, not the compost kept in the drying yard for stabilising.

### 8.13.3. Expenditure out of resources generated from sale of “Mo Khata”

The “Mo Khata” generated in the MCC shall be the deemed property of the ULB. The resources generated from the sale of “Mo Khata” @ Rs. 20/- [Rupees twenty only] per kilogram as approved by Government shall be deposited in the Corpus Fund of the Wealth Centre and shall be utilized to meet operation and maintenance cost of the “Wealth Centre”, payment of monthly incentive to the Community Partners, cost of transportation of “Mo Khata” for delivery to the Line Departments and matters ancillary and incidental with maintenance of records on all such expenditures. Money Receipts should be issued for receipt of the amount towards sale of “Mo Khata” and the data should be entered in “Ama Sahara App”.

Use/ sale of “Mo Khata”	
Complimentary supply to households	To realize the importance of source segregation, to deliver the message that the “Waste is Wealth”, and to replace a chemical fertilizer with “Mo Khata”, “Mo Khata” should be supplied to the households in the service area as per request. Incentive of 10% may be paid to the Swachha sathi or Supervisor or any Community Partner for promoting sale on own endeavour.
Use in parks	ULB should use “Mo Khata” in the plantation made in places under its administrative control such as parks, plantations made in the road dividers and other places. But it has to pay the required amount for lifting “Mo Khata”
Memento	It can be presented as mementos in different competitions, awareness campaign, felicitation, Orientation meetings etc. as it carries a significant message on Environmental Protection, care for the waste, and in promoting the use of organic compost. Behavioral change in exponential form can take

### Use/ sale of “Mo Khata”

place through this activity. However, cost towards the amount of “Mo Khata” taken for use as Memento should be deposited with the “Wealth Centre”. The district administration and other Govt & private organizations may be impressed upon to use “Mo Khata” as a memento in their functions & events to promote the cause of environmental protection.



Figure 29: Presenting “Mo Khata” as memento in felicitation programmes

#### Outlets for sale

ULBs may through the members of the Mission Shakti Groups/ Transgender Groups or on their own open outlets in suitable places and make available “Mo Khata” for purchase by people at the aforesaid price. An incentive of 10% or more as deemed suitable by the ULB may be paid to the Groups concerned for venturing into the marketing aspect, which will encourage them to take up the challenge and make available to the people, “Mo Khata” as per demand.



Figure 30: Outlets for sale of “Mo Khata”

#### Online sale

ULBs may also take up in a professional approach to enter the market, to make available their proud product to people in the highest level of circulation. On-line marketing being one such tool, they may take up the needful action to popularize the product not only inside Odisha but join in a Pan India movement.

#### Sale through GeM portal

Currently, compost is not sold in Government e Market (GeM) Portal. Therefore, ULBs may explore scope to sell compost via this transparent channel of marketing through GeM Portal.

#### Supply to line Departments

Departmental Authorities of the Agriculture & Farmers’ Empowerment Department, Forest Environment & Climate Change Department etc. may be supplied with the compost at the aforesaid price on receipt of the indent. Proactive steps be taken for supply to the Line Departments in time.

<b>Use/ sale of “Mo Khata”</b>	
Request by households	Request for door delivery of “Mo Khata” made by the households through the Swachha Sathis under her coverage area may be accepted and small quantities may be supplied through the Battery-operated Vehicles for door delivery, in case of larger requests, special BoV may be deployed engaging the Members of the Mission Shakti Groups / Transgender groups assigned with operation of the “Wealth Centres”. Incentive as indicated above may be paid to the Community Partners (Individual members / Group as the case may be).
Bulk buyer	The Bulk Purchaser (Purchase of 100 Kg. or more in one go) may be issued with a Letter of Appreciation by the ULB for promoting the use of organic manure and thereby aiding in Environmental Protection and sustenance of the Wealth Centre side by side.
Farmers	Farmers may be the target Group for sale of compost and to promote use of compost so as to fulfil the obligation to phase out the use of chemical fertilizer.
Other modalities/ strategy	Any other modalities / strategy found suitable for sale / disposal of “Mo Khata” may be taken up to make available “Mo Khata” to the persons/ institutions / Department requesting for the same.

#### **8.14. Performance Indicators for MCC**

The performance level of the MCC is to be assessed by examining / evaluating on the basis of the following criteria:

- a. Percentage of days the compost plant was not operational
- b. Quantity of waste received
- c. Compost production (kg)
- d. Pre-processing reject in percentage
- e. Post-processing rejects in percentage
- f. Compost yield (with an acceptable limit)
- g. Percentage of Reject (with an acceptable limit)
- h. Capacity utilization of the compost plant
- i. Quantity of compost sold
- j. Revenue generated from selling of compost
- k. Expenditure on the operations
- l. Expenditure on maintenance
- m. Shredder downtime (in days) in percentage
- n. Sieving machine downtime (in days) in percentage
- o. Flytrap downtime (in days) in percentage
- p. Total stock of compost
- q. Percentage of absenteeism of human resources
- r. Monthly Testing of compost in approved Laboratory

## **9. Material Recovery Facilities (MRF)**

### **9.1. Conceptual design**

As per the SWM Rules 2016, a MRF is defined as a facility where non-compostable solid waste can be temporarily stored by the local body or any other entity or any person or agency authorised by

any of them to facilitate segregation, sorting and recovery of recyclables from various components of waste by authorised informal sector of waste pickers, informal recyclers or any other work force engaged by the local body or entity mentioned in rule 3 for the purpose before the waste is delivered or taken up for its processing or disposal.

The Material Recovery Facility (MRF) is an essential part of a “zero waste” management programme that reduces dependence of landfill as it recovers recyclables from the discarded materials and adds value to those for marketing to end-user manufacturers. The main function of the MRF is to maximize the quantity of recyclables recovered from collected waste that will generate the highest possible revenue in the market.

## 9.2. Evaluation of the market and economics of operation

It is important to devise a recycling strategy whereby the waste management value chain is functional and no residual waste stream is left behind and. The primary objective of MRF is to sort, store and pre-process dry waste like baling before sale to buyers/recyclers. Since waste streams vary in composition and volume from one place to another, the MRF should be designed specifically to meet the waste management goals of the city and its adjoining rural areas in the long term. Odisha aims at a seamless convergence of rural and urban waste management. Therefore, the cities should do a careful assessment the quantity of non-bio degradable waste generated in the city as well as in the rural areas tagged to it and accordingly plan the MRF. The previous SOP focussed on processing urban waste from ULBs. In addition to that, the current SOP also takes into account that MRFs also process plastic waste emanating from rural areas as part of urban rural convergence.

On the other hand, it is important to map the recyclers’ market and tie up with them to maximise the uptake of the recyclable materials at a competitive price. The ULBs need to short list and empanel the recycler/ buyer of recyclables with item-wise rate by adhering to the prescribed process.

## 9.3. Infrastructure Planning for MRF

The land and human resources requirement for establishment of MRF depend upon the quantity of dry waste to be processed. According to advisory on MRF published by CPHEEO in 2020, an MRF of capacity of 5 TPD would require an area of 1500-2500 sqm.

Based on the learning from the existing MRFs in Odisha, it is calculated that the average area required per tonne is about 160 sqm per tonne (i.e. 0.06 tonnes processed per sqm). Also, the per capita dry waste generation in the State is estimated to be 150 g per day.

ULBs can use these conversion rates to optimize the available space and estimate the population that can be served by building MRF in a given area. The detail calculation is provided in Table-2 below.

Additional MRFs should be constructed to meet the demand and have adequate facility to process the dry waste with ease.

*Table 6 Sample Calculation of area for processing waste*

Space available: 1000 sqm
Waste processed per sqm: 0.006 tonnes or 62.5 kg
Total waste processed: $1000 * 0.006 = 6.25$ tonnes
Population served per tonne: 1,50,000
Total population covered: $6.25 * 150000 = 937500$
Average size of households: 4.5 people
Total household covered: $937500 / 4.5 = 208333$

Also, based on empirical evidence, two human resources are required per tonne to process dry waste at the MRF. A one tonne processing capacity MRF can process the waste of 1.5 lakh

population, which covers 33 thousand households. The above estimate can be used in estimating the additional area and human resources required for expansion of an existing MRF.

The Table -3 below provides a detailed estimate of area and human resources required per tonne of waste received at MRF per day. This includes basic infrastructure for sorting shed, storage space for sorted recyclables and other basic infrastructure such as record room and water and sanitation facility, etc. (CPHEEO & MoHUA, 2020)

*Table 15: Estimate of area and human resources for MRF*

S.no	Capacity of MRF (TPD)	Area Required (sqft) @160 per tonne	HR required @1.6 per tonne	Population	Household covered
1	1	160	2	150000	33333
2	2	320	3	300000	66667
3	3	480	5	450000	100000
4	4	640	6	600000	133333
5	5	800	8	750000	166667
6	6	960	10	900000	200000
	7	1120	11	1050000	233333
8	8	1280	13	1200000	266667
9	9	1440	14	1350000	300000
10	10	1600	16	1500000	333333

The above table considers a single shift. The second shift, if needed, can be decided with 40% of the human resources as primary sorting would be completed in the first shift itself. These numbers are indicative and may vary based on local scenario.

#### **9.4. Type of Municipal Solid Wastes managed in MRF**

##### **9.4.1. Non-Biodegradable wastes/ Dry wastes**

As mentioned earlier, MRF manages the “dry waste” means waste other than bio-degradable waste and inert street sweepings such as and includes recyclable and non-recyclable waste, combustible waste and sanitary napkin and diapers, etc.

Under the dry waste/ non-biodegradable waste, several other waste types find their way into the municipal solid waste stream, which require special handling and disposal because of their quantity, concentration, physical and chemical characteristics, or biological properties (CPHEEO & MoUD, Municipal Solid Waste Management Manual - Part 2, 2016) which are also managed at MRF:

##### *Sanitary Waste*

Wastes comprising of used diapers, sanitary towels or napkins, tampons, condoms and any other similar waste (CPHEEO & MoUD, Municipal Solid Waste Management Manual - Part 2, 2016). The waste generators are required to handover sanitary waste safely wrapped in pouches to the waste collector of the local body. Upon collection of sanitary waste, it should be preferably disposed of in biomedical or MSW incinerators at the MRF, as applicable to the local context or as directed by the SPCB as per the standards mentioned in the SWM rules, 2016.

##### *Domestic hazardous waste*

As per the SWM Rules, 2016 the “domestic hazardous waste” means discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines, broken mercury thermometers, used batteries, used needles and syringes and contaminated gauge, etc., generated at the household level. It is local bodies responsibility to safely handle and dispose of the domestic hazardous waste under the directions from SPCB through the MRF.

##### *Plastic Waste*




The “plastic waste” means any plastic product such as carry bags, pouches or multi-layered packages which have been discarded after use or after their intended life is over. (CPHEEO & MoUD, Municipal Solid Waste Management Manual - Part 2, 2016). Plastic waste is managed at MRF - segregation, collection, storage, transportation, processing and disposal through authorized Plastic Waste Processors (PWP) - as mentioned in the rule 6(1) of the Plastic Waste Management (Amendment) Rules, 2018.

#### E-Waste

Means electrical and electronic equipment, whole or in part or rejects from their manufacturing and repair process, which are intended to be discarded as waste. The waste generators will hand over the E-waste to the waste collector of ULB. The e-waste management rules specify that the collected e-waste at the MRF should channelize the e-waste to recyclers and play the role of Extended Producer Responsibility (EPR).

### 9.5. Equipment and Infrastructure at MRF

The basic equipment/machineries and furniture used in a semi-automated MRF are provided in the Table -16 below.

	Equipment and Infrastructure		Specification	Quantity	Operational area required
1	Digital Weigh Bridge		Digital weigh bridge capacity up to 10 ton	1	12ft X 15ft
2	Horizontal Belt Conveyor		Speed control from 5 ft/min to 30 ft/min, and 5Hp Motor-output – 500 kg/hr	1	10ft x 40ft
3	Baling machine		5Hp Motor, Capacity of Baling 50- 80 kg	1 for 3-5 TPD MRF	6ft X 6ft

4	Weighing scale		25-100 kg weighing capacity	1	3ft X 3ft
5	Incinerator		Sanitary Napkin-15-20 pieces per hour; Diaper- 1 to 2 per hour 900-degree min operation temperature	2 for 5 TPD MRF	5ft X 5ft
6	Fire Extinguisher		As recommended by Fire local authority		
7	Fabricated Trolley/ push carts			2-3	
8	Collection Bins: for sorted recyclable wastes and for inert waste		Large bins size 3ft x 2.5ft		




9	Ancillary sorting tool: Fork tool		As required		
10	Furniture Cane/ Plastic Stools		Height 30 inch		
11	Aluminium Ladder		6-8ft height		

Table 76: Equipment and Infrastructure at MRF

### 9.6. Facility Design and Layout of MRF

The facility design plan of MRF should accommodate all the equipment discussed above and their operation along with all the activities which promote efficient and effective operation of the MRF. The facility design and layout is furnished below in Figure -23.

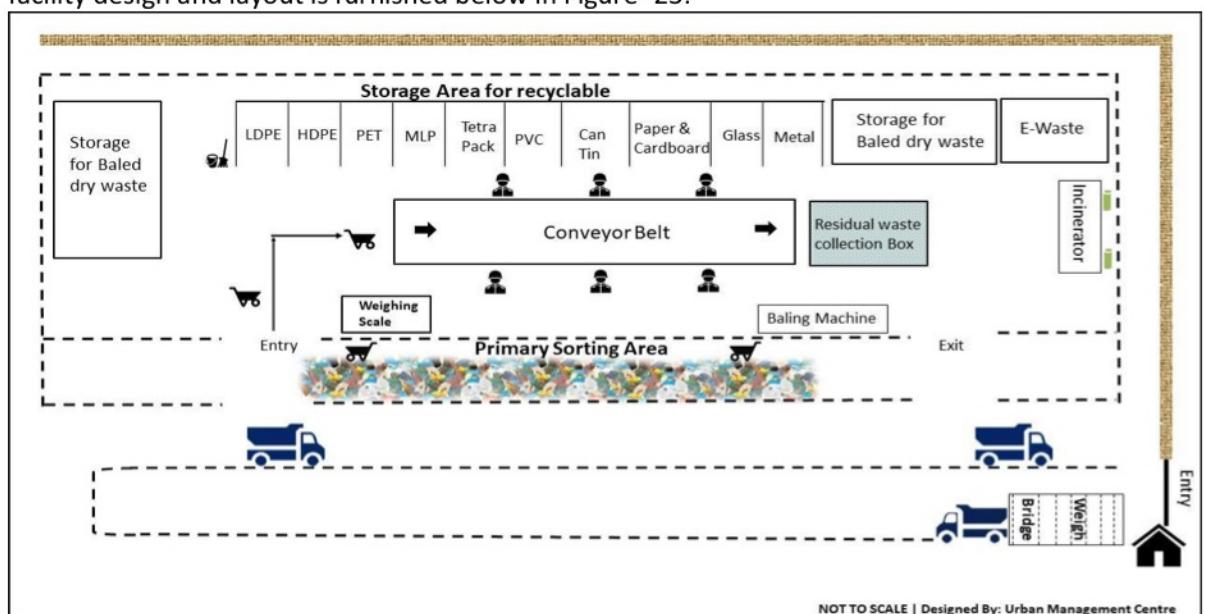


Figure 31: Layout Design of MRF

## 9.7. Operation process of MRF

The operation process flow of an MRF in Odisha has broadly six steps:

1. Preliminary segregation of sortable dry waste for loading on conveyor
2. Detailed sorting of dry waste into various categories on conveyor
3. Baling and bundling of Dry Waste
4. Storage of dry waste
5. Sale of dry waste to empanelled sellers/recyclers
6. Consignment of non-recyclable fraction of dry waste to cement companies for co-processing

Table 17 below provides a broad list of materials, their type and recyclability is provided as a reference for the ULBs.

The MRF should have weighbridge and conveyor system to bring in efficacy to the system, Funds placed for the purpose may be utilised immediately for placing these in place.

*Table 17: Classification of Materials as per type and recyclability*

Material Classes	Material Types	Recyclability
Recyclable Paper	Cardboard	Recyclable
	Newspaper	Recyclable
	Cartons	Recyclable
	Mixed Paper	Recyclable
Recyclable Glass	Glass Containers	Recyclable
Recyclable Metal	Aluminium Cans	Recyclable
	Aluminium Foil and Trays	Potentially Recyclable
	Tin Food Cans	Recyclable
	Empty Aerosol Cans	Potentially Recyclable
Recyclable Plastic	PET (#1) Bottles and Jars	Recyclable
	PET (#1) Small Rigid Plastics	Potentially Recyclable
	Clear HDPE Bottles and Jars	Recyclable
	Coloured HDPE (#2) Bottles and Jars	Recyclable
	HDPE (#2) Other Containers	Potentially Recyclable
	LDPE (#4)	Potentially Recyclable
	PP(#5) Bottles and Jars	Potentially Recyclable
	PP (#5) small Other Rigid Plastics	Potentially Recyclable
	PS (#6) Rigid Plastics	Potentially Recyclable
Foam Plastic	EPS Food Packaging	Potentially Recyclable
	EPS Foam Blocks and Shapes	Potentially Recyclable
Film Plastic	Clean Plastic Bags and Film	Potentially Recyclable
	Disposal Bags	Potentially Recyclable
	Other Plastic Film	Potentially Recyclable
Other materials	Household Hazardous Waste	hazardous - needs safe disposal
	Electronics and Small Appliances	Recoverable
	Diapers and sanitary napkins	Contaminates – needs safe disposal by incineration
	Textiles/ Shoes	Non-recyclable – needs safe disposal
	Furniture	Recoverable

	Mixed Residue	Contaminates – needs safe disposal
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### 9.7.1. Preliminary segregation of sortable dry waste

- The dry waste received at MRF is thoroughly checked for residual wet/mixed waste at the primary sorting area.
- The wet waste is removed and transported to MCC



### 9.7.2. Detailed sorting of dry waste on a conveyor belt

The detailed sorting of dry waste will be as per the following steps:

- The dry waste is taken to a horizontal conveyor belt using a trolley or push cart.
- Figure 32: Detailed sorting on conveyor belt
- The dry waste is placed on the horizontal conveyor belt to sort the dry waste into the different categories based on details provided in Table 18 below –

Table 18: Categories of dry waste for sorting at MRF

Sr. No.	Category of dry waste	Type	Examples of Waste
1	Plastic	Polyethylene Terephthalate (PET)	Jars, Bottles, Ropes, Carpet, Tote Bags, Combs
		High-Density Polyethylene (HDPE)	Containers, Grocery Bags, Shampoo Bottles, Toys, Trash Bags
		Polyvinyl Chloride (PVC)	Plumbing Pipes, Tiles, Shoes, Ducts, Sewage Pipes
		Low-Density Polyethylene (LDPE)	Cling Wrap, Frozen Food Wrapping, Condiments
		Polypropylene (PP)	Tupperware, Kitchenware, Plastic Diapers, Disposable plates and cups, bottle caps
		Polystyrene (PS)	Disposable coffee cups, Plastic Cutlery, Peanut packaging
		OTHERS/Multi-Layer Plastics (MLPs)	CD's, DVD's, Eyeglasses, bottles, Tetra packs, Food Packaging (Potato Chips Packets)
2	Paper	Corrugated Cardboard	Packaging boxes, Egg Cartons, Shoe boxes, cereal boxes
		Mixed Paper	Mail, Catalogues, Phonebook's magazines
		Newspapers (ONP)	Newspapers
		High Grade Inked Paper	Envelopes, Copy Paper, Letter Heads
3	Metals	Aluminium	Aerated Beverage Cans, Aluminium Foils
		Steel	Food Cans, Stainless steel mugs, Toys, Lids

		Tin	Cans, Household containers
		Iron	Cooking Instruments
4	Wood	Wood	Broken Furniture, Blocks, Boxes
5	Glass	Container Glass	Bottles, Jars, Glassware, Bulbs
6	Leather, Rags and Rubber	L and R	Garments, Shoes, Bands, Wires
7	Thermocol	Polystyrene Foam	Styrofoam, Small or Large Packaging

The use of conveyor belt enhances the sorting efficiency by three times compared to conventional method of sorting. Besides, it also improves the posture and convenience of Swachh Karmis making the process easier and comfortable.

### 9.7.3. Baling and bundling

The baling and bundling of dry waste comprises of the following steps -

- High volume of plastic waste/PET bottles, MLPs, cardboard etc. is baled into rectangular bales and bound and stack in the storage area.
- Other materials are similarly packed in bags or bundled and stored in the storage area
- Lightweight materials can be stacked on top of each other to optimize space.



Figure 33: Baling of sorted waste

Sanitary Waste and domestic hazardous wastes like used diapers, sanitary towels or napkins, tampons, condoms, incontinence sheets, masks and any other similar waste is separated from the dry waste and incinerated in the napkin incinerator in MRF till the waste is reduced to ash.

The ash residue after incinerator is collected and stored in a specific container for onward safe disposal.



Figure 34: Incinerator at MRF

### 9.7.4. Cleaning and upkeep of MRF

The daily operation of MRF will be closed with sweeping of the floor of the primary sorting area and cleaning with water by using a jet spray if it has residue of wet waste or mixed waste.

All MRFs should keep the primary sorting area clean to receive fresh waste next day. No MRF should have mixed waste dumped at the primary sorting area.



Figure 5: Cleaning of floor after primary sorting

## 9.8. Marketing and sale of recovered materials and safe disposal of non-recyclables

### 9.8.1. Downstream Processing and Compliance

After segregation of dry waste in multiple categories, the waste is sold to either scrap dealers or recyclers. The dry waste can be categorised into three waste streams based on downstream

processing.

The Table-19 below gives details of type of downstream processor and statutory required for different types of dry waste

Table 19: Downstream process and compliances for different types of waste

S.no	Type of Waste	Type of Processor	Compliance Requirement
1	Paper	Reseller/Paper Mills	Relevant Compliances
2	Recyclable Plastic Waste (PET, PVC, HDPE, LDPE)	Reseller/Plastic Waste Recycler	CTE and CTO required for resellers if operations are more than 5 TPD Authorization under Plastic Waste Management Rules 2016 required for Plastic Waste Recyclers
3	Metal	Reseller/Foundries	Relevant compliances
4	Non-Recyclable Waste	Cement Companies	Authorization from OSPCB
5	E-Waste	Recyclers/Dismantlers	OSPCB Authorization
6	Domestic Hazardous Waste	Hazardous Waste Recyclers/TSDF	OSPCB Authorization

### 9.8.2. Empanelment of buyers/recycler

The MRF can either sell the waste directly to Recyclers/Processor authorized by ULB (under the Plastic Waste Management Rules 2016), if they have sufficient quantities or an intermediary reseller, who will then aggregate waste from other sources and sell the waste to a recycler.

The e-waste and domestic hazardous waste has to be sold to an authorized recycler under e-waste management rules. The ULBs can empanel the reseller/recycler through a tendering process. The MRF can also store the e-waste/domestic hazardous in case the empanelled recyclers requires a minimum quantity for picking up the material.

### 9.8.3. Procedure of selling to recyclers

The ULBs should follow the following steps for empanelment of vendors.

- a. Set up a benchmark for selection of vendors
- b. Draft an RFP for the empanelment of vendor

- c. Invite applications for interested parties for sale of waste to RFP
- d. Onboard agencies for sale based on the benchmarks and cost
- e. Maintain sale register to capture sale details
- f. Enter sale details in Ama Sahara App.

The RFP should contain the following points:

- Details of statutory requirement as per the SWM Rules, 2016 and
- Details of downstream partners
- Indemnification of the ULBs
- Rate Contract and frequency of collection

In addition to this, officials of the ULBs should visit the facilities of reseller to ensure that no malpractices like child labour and use of potentially hazardous techniques for processing of waste is followed by the resellers/recyclers, which is violating the existing norms.

#### 9.8.4. Safe Disposal of non-recyclables

The non-recyclable materials may be stored, baled and sent to cement factories for co-processing. H&UD Department through Letter No. 11387 Dated 01.07.2019 has partnered with 4 cement factories in Odisha for safe disposal of non-recyclable materials. H&UD Department has designated nodal ULBs located in the proximity of these cement factories, which can aggregate waste from other ULBs and sent the cumulative waste to cement factories.

The Table-20 below gives an indication for cement plants who can co-process non-recyclable dry waste at the facility –

Table 20: List of Empanelled Cement Factories in Odisha

	<b>Name of Empanelled Cement Factory</b>	<b>Nodal ULB</b>
1	<b>ACC Ltd.</b> Bargarh H&UD Dept. Letter No. 11387 Dated 01.07.2019 Cement Works Cement Nagar, Bardol, Bargarh	Bargarh
2	<b>OCL India Ltd.</b> Rajgangapur, Sundargarh	Rajgangapur
3	<b>Shiva Cement Ltd.</b> Unit – II, Telighana, Kutra, Sundargarh	Rajgangapur
4	<b>Toshali Cement (P) Ltd.</b> Ampavalli, Koraput	Koraput

## 10. Managing sales proceed

The proceeds from the sale of materials will be deposited in the Corpus Fund of the Wealth Centre. The revenue so generated may be utilised in the manner as indicated in the preceding paragraphs.

## 11. Monitoring of Wealth Centre

### 11.1. State Level Monitoring Cell

For effective supervision, monitoring, guidance, support, remedial measures, evaluation etc. and to bring up these “Wealth Centres” i.e., the MCCs and MRFs to an ideal performance level and to maintain the standard, improvise upon the experience gathered, a State Level Monitoring Cell has been constituted by this Department. (HUDD, 2019)

### 11.2. AMA SAHARA App

The mobile app “AMA SAHARA” is a citizen engagement and performance management app created for Department of Housing and Urban Development, Government of Odisha.

The app facilitates

- citizens to post requests for garbage pickups and raise complaints if they are not happy with solid waste management services.
- facilitates government officials, sanitation workers and facility managers input data on the daily basis helping government to monitor the performance of the processes and solid waste management in the State of Odisha.

The app can be used at every node of the solid waste management value chain starting from the waste deposition at the wealth centre.

- The amount of dry waste and wet waste received at the wealth centre is weighed and the corresponding quantity is entered in the “AMA SAHARA” app by the Swachha Karmi duly checked by the In-charge of the wealth centre.
- The daily production of the compost and its sale is also recorded in the app.
- The quantity of recyclables sorted out from the dry waste, quantity of non-recyclables and income generated from the sale of recyclables is also entered in the app.
- Apart from this the app is also used for user fee collection from households for solid waste management service.

The app helps in periodic assessment of performance and improve quality of service. The state level monitoring cell “Suo Motu” uses the app for constant monitoring and smooth functioning of the wealth centres.

### **11.3. Wealth Centre In-Charge/ Manager**

The ULB will engage Wealth Centre In-Charge/ Managers from Mission Shakti/Transgender/Waste Picker group, who will supervise the entire operation and maintenance of the wealth centre.

#### **11.3.1. Roles and Responsibilities of Wealth Centre In-Charge/ Manager**

The Wealth Centre In-Charge/ Manager’s role and responsibilities would include the following –

##### **1. Operation and Maintenance**

- a. The operation and maintenance of wealth centre is done as per SOP issued by this Department.
- b. Dry and wet waste is collected, segregated and processed properly.
- c. Weighing of dry and wet waste is done separately every day and record in a register and update in Ama Sahar Mobile App
- d. In case of breakdown of Equipments, waste collection vehicles, s/he will Coordinate with the supplier/AMC for quick repair and inform immediately to ULB.
- e. In case of infrastructural damage like building, compost tubs, plumbing fittings and fixtures, S/he will coordinate with Nodal officer and repair.
- f. Ensure the availability of consumables such as water, jaggery and curd for preparation of EM Solution.
- g. Facilitate marketing of compost (Mo Khata) and recyclables to the different bulk buyers/department/recyclers.
- h. All the Equipment and waste collection vehicles are ready for next day.

##### **2. Manage Human Resources.**

- i. Record attendance of all the Swachha Karmis in the morning.

- i. Ensure that all the Swachh karmis are working for 8 hours a daily.
  - i. Ensure that all the Swachha karmis are well-trained and delivering as per acceptable standards.
  - i. Assess and allow leave to Swachha karmis in a way that work is not affected.
  - i. Ensure that all the Swachha karmis are provided with two pair uniforms, foot wear, PPE and ID-Card
- 3. Ensure Safety Measures are in place and functional**
- o. Ensure that the Swachha karmis are using PPE while working at the wealth centre.
  - o. All the safety Equipments like fire extinguisher is properly placed and accessible in the wealth centre.
  - o. The first aid kit is available and used in the wealth centre.
  - o. Lounge is cleaned daily and used by women Swachha karmis.
- 4. Monitor Record Keeping and Reporting**
- The Wealth Centre In-Charge/ Manager will maintain the following registers -
- s. Vehicle Deployment and Waste Collection Register
  - s. Dry and Wet waste collection register
  - s. Mo Khata sales register
  - s. Recyclable sales register
  - s. Attendance Register for Swachh Karmis

**5. Maintenance of Accounts and Records:**

In Charge of the “Wealth Centre” shall maintain the Records and Accounts on day to day basis. Separate Account opened in the Nationalized Bank should be updated in each month and discrepancy if any be sorted out.

ULB should designate an official of the ULB for periodical verification (Monthly or in lesser suitable duration as deemed suitable) of the Accounts, Records etc. maintained in the “Wealth Centre”. Remedial measures, required, if any, may be resorted to forthwith.

**6. Reporting on Ama Sahara App**

Wealth Centre In-Charge/ Manager is responsible for maintaining records of different types of data as per the frequency mentioned in Table-21.

*Table 21: Frequency of Reporting in Ama Sahara App*

Sl. No	Type of data to be reported through Ama Sahar App	Frequency of data filling in the App
1	Wet Waste Received	Daily
2	Mo Khata Ready-to-sale	Daily
3	Mo Khata Sold	On the date of sale
4	Dry Waste Received	Daily
5	Segregated Waste	Daily
6	Recyclable Sold	On the date of sale
7	Non-recyclable Disposed	On the date of disposal
8	Sanitary waste Disposed	Daily
9	Domestic Hazardous waste disposed	On the date of disposal
10	E-waste disposed	On the date of disposal
11	Disbursal of incentive	Monthly
12	Attendance	Daily

## 12. Engaging Self Help Groups for Operations at Wealth Centre

Government of Odisha is pioneering the Community Partnership Model for effective solid waste management in the cities. The state has mandated for partnering with formation of women self-help groups formed under Mission Shakti called as Mission Shakti Groups (MSGs) or groups of sanitation workers, waste pickers and transgender in the cities for operation and maintenance of MCC and MRFs. The MSG/ Waste Pickers groups/ Transgender groups provide Swachh Karmis.

### 12.1. Selection of SHGs

Selection of MSG/ waste picker/ transgender groups involves of the following steps:

- The ULBs will invite Expression of Interest (EOI) from the Mission Shakti SHGs and SHGs of waste pickers and transgenders for the operation and maintenance of MCC/MRF.
- The SHG will engage their members or others from their community as workers, who are called Swachh Karmis.
- The number of Swachh Karmis are to be decided by ULB based on the MCC/MRF's actual utilisation capacity at the rate of 1 Swachh Karmi per TPD utilisation capacity of MCC and 2-3 Swachh Karmis per TPD utilisation capacity of MRF.

### 12.2. MOU with SHG

Memorandum of Understanding (MoU) should be signed between the ULB and the Mission Shakti Group/transgender groups/ waste pickers specifying period of engagement, assignments, operational modalities, payment of incentives, etc., which must be executed prior to their engagements.

#### 12.2.1. Incentives to Swachh Karmis

#### 12.2.2. Criteria for incentives:

The criteria of incentives shall be paid as per the H & UD Department's instruction vide Letter No. 16040/HUD, Dated 26/09/2022, which is mentioned below -

- a. A consolidated sum of Rs. 9780/- [Rupees nine thousand seven hundred eighty only] per person per month is to be paid to Swachh Karmis.
- b. **An additional performance-based incentive will be paid @ Rs. 40/- [Rupees forty only] per day per person is to be paid.**

Note: The additional performance-based incentive will be paid after analysis has been done in relation to the quantitative and qualitative aspects of the work performed on quarterly basis subject to meeting the qualifying performance criteria.

A detailed analysis of the incentive structure for Swachh Karmis, as well as their incentive indicators, are provided in Annexure-A.

#### 12.2.3. Modalities for Payment:

- ULBs to issue a one-time Standing Instruction to the Banks concerned for remittance of the fixed monthly incentive to the Aadhaar linked Savings Bank Account of the Swachh Karmi concerned associated with solid waste processing in Wealth Centres on 5<sup>th</sup> of each month, unless a contrary advice to "Stop payment" is issued by the ULB before that date, whenever situation warrants.
- Performance Incentive as stipulated in preceding paragraphs may be remitted to the Aadhaar linked Savings Bank Account of the Swachh Karmi concerned on quarterly basis.
- A standard format is developed and attached for issuing to the Bank Authority as STANDING INSTRUCTIONS is annexed herewith at ANNEXURE-B (along with Format "SCHEDULE OF MONTHLY INCENTIVE" as Annexure-B-1)
- If it is found that, amount payable is to be withheld for lack of delivery of services or absent or for any other valid reason(s) on administrative grounds; an instruction to that effect may

be issued to the Bank concerned before 5<sup>th</sup> and subsequently upon rectification / compliance, the amount payable may be released.

- Any amount that needs to be deducted or recovered from the payable or already paid may be effected in subsequent months also. Hence for want of verification of absentee statement or on account of services delivered no undue delay should happen in monthly payment to Swachh Karmis.
- The concerned E.O. and Accountant will be held personally liable for any delay in releasing payment to the Community Partners.
- It is the responsibility of the E.O to ensure necessary coordination with the relevant Banks so as to achieve the objective of timely payment to Community Partners.

#### 12.2.4. Gap funding

In the initial stage, till the system has not stabilised or the earning has not reached the expected level or otherwise, the ULB may remit the amount of incentive as agreed upon, from its own fund, if required.

#### 12.2.5. Capacity Building of SHG members

To build, strengthen or upgrade the skills and capacities of the human resources engaged in the MRF for its effective and efficient operation and maintenance, the department has laid out a comprehensive capacity building plan. As a part of the plan, the department has designed and rolled out the training modules, self-learning training guidebooks and information ready reckoners for different stakeholders. The ULBs shall be responsible for ensuring that the training programmes are organised with support from the resource organisations and agencies authorised by the H & UD Department.

#### 12.2.6. Entitlements of SHG members

The ULBs will ensure that in addition to the monthly incentives, the Swachha Karmi engaged from SHGs avail their basic entitlements listed in the Table -22 below.

Table 22: Entitlements of Swachh Karmis

Sl No	Entitlements	
1.	Monthly Incentive	7 <sup>th</sup> of subsequent month
2.	Weekly one-day paid leave	The Wealth Centre In-Charge/ Manager must ensure that the daily waste management activities are not affected due multiple Swachh Karmis absence on a particular day. Hence, all leaves are to be granted after careful assessment.
3.	Group Personal Accidental Insurance	The H & UD Department has covered all the Swachh Karmis of MCC and MRF under the Group Personal Accident Insurance of Rs. 2 lakh per person w.e.f. 01/08/2022, which is subjected to renewal every year.
4.	Health check-up	Quarterly by Urban PHC
5.	Personal Protective Equipment (discussed with details under the "Safety Measures" in this document)	To be provided by ULB for use by the Swachh Karmis all the time while handling waste
6.	Lounge with individual locker facility and First Aid box	Common Lounge to be provided at each wealth centre for use by Swachh Karmis for dining and storing belongings

7.	Four sets of uniform, gloves head scarf etc.	
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### 13. Maintenance of equipment at Wealth Centre

Maintenance of wealth centres includes repair and replacement of infrastructure, machineries, equipment, fixtures (plumbing, sanitary and electrical) and any other repairs wherever. Maintenance can be categorised into two types:

- a. **Preventive maintenance** is to check or inspect regularly to lessen the likelihood of sudden break down. This includes checking or inspecting of equipment, machinery, electrical fixtures such as switchboard, electric motor, pump, etc. and sanitary fixtures such as taps and drainpipes.
- b. **Responsive maintenance** takes care of remedial action to resolve any breakdown. ULB shall engage appropriate agencies/ITIs for annual maintenance of infrastructure, machinery, and vehicles through a contract.

Table 23: List of required maintenance tasks for the Wealth Centre

List of required annual maintenance in Wealth Centre		
Task (in-charge)	Category	Frequency
<b>Equipment/Machineries</b>		
Washing and cleaning of waste collection vehicles (BoV) by Swachha Karmis/ Driver	Preventive	At least twice a week
Inspect all machineries (Weigh Bridge/ Weighing Scale, Baling Machine, Incinerator, Conveyor belts and sieving machine) and hire agency for repair/ replacement through annual maintenance contract (AMC). Periodic inspection by agency under AMC	Preventive	Once a month
Coordinate with agency under AMC when there is damaged or dis-function of machineries and equipment	Responsive	As and when required
<b>Electrical Fixtures</b>		
Inspect all bulbs, tube lights, fans, hand dryers, switches, plugs, miniature circuit breaker (MCB) switch and any other electrical fittings in the wealth centre and repair/ replace as needed	Preventive	Once a month
Repair and replace electrical fixtures when these are damaged or not functioning	Responsive	As and when required
<b>Plumbing Fixtures</b>		
Inspect all the toilet seats, urinals, wash basins, flush knobs, taps, faucets, showers, pipes, and any other plumbing fixtures within the wealth centre including leachate channel to identify any leakage/ damage/ malfunction that may need repair/ replace	Preventive	Once a month
<b>Other elements</b>		
Inspect sanitary pad vending machines and restock as needed. Inspect sanitary pad incinerators and clear out the ash as needed as per the instructions of the manufacturer.	Preventive	Once a month
<b>General Infrastructure</b>		
Report any visible damage in the internal/external walls/ceiling of wealth centre building, large cracks and breakages, damage in leachate tank/soak pits/septic tanks and damage in the drains	Responsive	As and when required
Inspect all the doors, windows, ventilators, latches, hooks, and any other elements within the wealth centre for any damage/ breakage that may need repair/replace	Preventive	Once a month

Maintain a barrier free access to the wealth centre by not allowing any other activities at or close to the entrance of the wealth centre	Preventive/ Responsive	As and when required
Inspect to identify any damage in painted walls and signage, and inform the ULB in case of requirement of renovation/replacement	Preventive	As and when required

The Wealth Centre In-Charge/ Manager will maintain a maintenance register to capture details of breakdown and maintenance activities at the Wealth Centres

## 14. ISO Certification

Third Party assessment may be made for ascertaining the qualitative maintenance of the infrastructures for which ISO Certification for each MCC and MRF be made, Funds from the Corpus Fund / sale proceeds available from sale of “Mo Khata” or Recyclables may be utilised for the purpose.

## 15. Information Education and Communication (IEC)

### 15.1. Display boards

All wealth centres shall have standardised display of information (prototype is provided in Annexure-C). The following display boards are mandatory for every MRF:

- a. Board 1: DOs and DON'Ts at Wealth Centre
- b. Board -2: Daily Update on Waste
- c. Board -3: Process flow of MRF

### 15.2. Awareness campaign

The ‘Source Segregation’ being the most important parameter across the solid waste management value chain, it is necessary to communicate the message at household level through IEC and BCC campaign. For this there is a need to develop inter-personal communication to generate awareness on source segregation and its importance in managing the solid waste.

The Swachha Sathis plays a very important role to sensitize all the households assigned to them.

- Sensitize public and educational institutions through practical demonstration on waste segregation at source.
- Take up vigorous actions to orient the waste generators in practicing source segregation in day-to-day life.
- Aware waste generators on the rate of user fees to be paid by them and the rebate available for payment of the User Fee in one go for a year by the Swachha Sathis.
- Identify houses who provides segregated waste and tag them as Swachh Gruh
- Identify houses who does not provides segregated waste and tag them as Aswachh Gruh

The ULBs shall also take appropriate awareness campaigns based on the following key messages as provided on Table- 24 below:

Table-24: Key messages for IEC campaign

	Key Messages
1	Behaviour change of waste generators for keeping dustbins and handing over segregated waste to collection vehicles of ULB
2	My waste my responsibility – Green bin for wet waste and blue bin for dry waste
3	Refuse, reduce, reuse, recycle, recovery of waste – everyone’s responsibility
4	Pay a nominal user fee through Ama Sahara App by waste generator for collection of waste from door step by ULB

5	Use ULB's door-to-door waste collection facility and be a part of the state's mission of waste management
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Apart from educating the waste generators, IEC and BCC for Swachha Karmis is also required for various activities at the wealth centre.

- Dissemination of educational messages for awareness generation of various stakeholders engaged should be done.
- Displaying the educational messages about their responsibilities at their respective work areas.
- For example, the responsibilities of a Swachha Karmi at MCC for processing the wet waste can be displayed by painting it on the outer walls of composting tubs, etc.
- Colorful wall paintings related to sanitation and solid waste management may be displayed suitably on the walls of the Wealth Centres to disseminate messages on environmental impact of scientific processing of solid waste and other related matters.

The responsibility of generating awareness for the staff at the wealth centre is of ULB.

Following activities can be taken up:

- The farmers and other stakeholders of surrounding area should also be educated upon the long-term benefits of soil conditioning properties of compost.
- The benefits in use of compost should be informed to farmers, who should be encouraged to partially substitute inorganic fertilizers with organic compost, as appropriate for their crop and specific soil.

The officials in the line departments such as the Agriculture & Farmers' Empowerment Department, Forest & Environment Department may be oriented for the use of "Mo Khata" and salient features, nutrient values etc. for promoting use of the same by the Department, its Nurseries, beneficiaries associated.


## 16. Safety Measures at Wealth Centre




The collection, segregation, transportation, and processing activities at Wealth Centre (WC) involves exposure to contaminants and hazardous waste. To ensure healthy and safe environment at WC, the human resource engaged in activities of wealth centre are required to adopt certain safety practices at work.

### 16.1. Personal Protective Equipment

The provision of Personal Protective Equipment (PPE) should be guaranteed for all sanitation workers associated in the process to ensure safety at wealth centres. While the ULB shall ensure provision of PPE, the Wealth Centre In-Charge/ Manager shall ensure its usage by all Sachh Karmis all the time while they are handling waste. The Table-25 below shows the types of hazards and PPE to be used as a precaution.

Table 25: Type of hazards and appropriate PPEs to be used at Wealth Centre

Sr. No.	Hazards	Precaution	PPE
1.	Cuts and injuries due to presence of broken glass, sharps, needles which may lead to septic wounds and tetanus or bacterial infections by contaminated	Use of safety gloves	

2.	Exposure to fumes/ gases causing irritation of nose, throat, and lungs.	Use of particulate mask	
3.	Bacterial infection due to contaminated waste and Cuts and injuries due to presence of broken glass, sharps, needles which may lead to septic wounds and tetanus	Use of Safety shoes	
4.	Exposure of head to waste, flies and sharp objects, which may lead to infection or injury	Cap	

### 16.2. Fire Safety

The wet waste sometimes due to methane emissions, can get fire, when there is very high temperature during summer. Also, the dry waste received at the wealth centre generally consists materials such as: wood, paper, cloth, rubber, and some plastics. The presence of these materials involves the risk of fire hazards at wealth centres. As a precaution, fire safety measures should be taken at Wealth Centres as prescribed by local fire authorities to tackle fire emergencies. The wealth centers must be equipped with a suitable fire extinguisher to be used in emergency. The human resources engaged at the Wealth Centre should be trained for such situations.

The emergency contact number for fire emergency '101' should also be known by the workers at the WC.

### 17. Uniform for Swachha karmis

The H & UD Department has prescribed standardised uniform for the SHG members engaged as Swachh Karmis as mentioned in Table-26 below –

Table-26: Specification for Uniforms

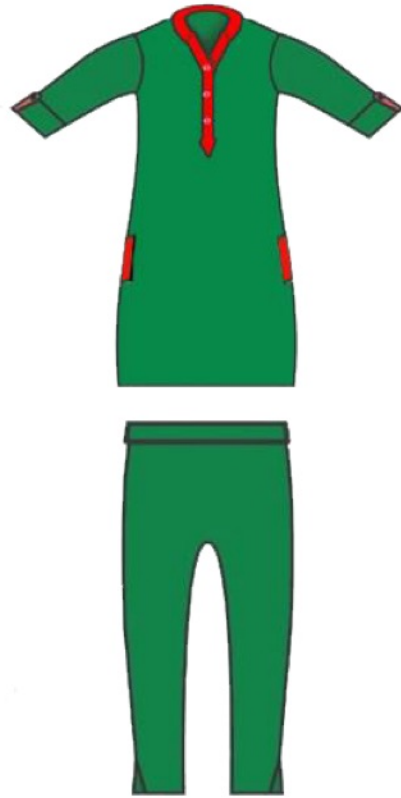
<b>Specification for Uniforms</b>
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**Top**

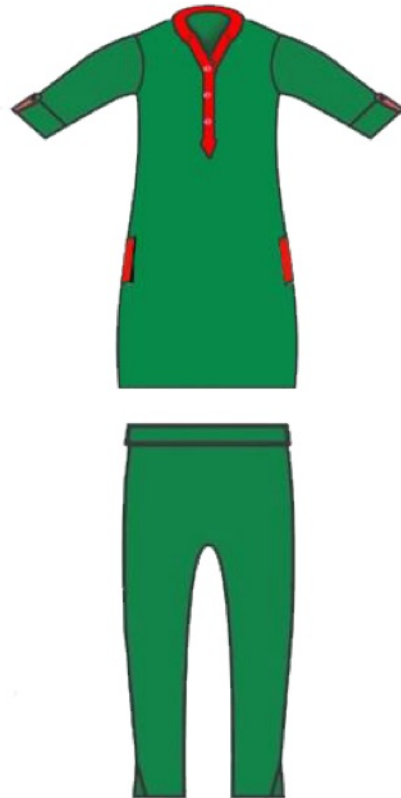
- Short kurta
- 3/4<sup>th</sup> sleeve with red piping (Roll up with bottom up)
- Mandarin neck design with buttons
- Two side kurta pocket (with red strip) attached to side slit
- Poly Cotton Material

Size – M

Kurta length – 32 inch

**Pant**

- Straight cut
- Bottom side slit
- 
- Size – M
- Pant Length – 35 inch
- Waist round – 32 inch
- Hip round – 38 inch



## 18. Performance Indicators for MRF

The performance level of the MRF may be assessed by examining / evaluating on the basis of the following criteria:

- a. Quantity of waste sent for co-processing
- b. Quantity of rejects in percentage
- c. Quantity of recyclables sold
- d. Revenue generated from the selling of recyclable waste
- e. Expenditure on the operations
- f. Expenditure on maintenance
- g. Baling machine downtime (in days) in percentage
- h. Napkin incinerator downtime (in days) in percentage
- i. Percentage of absenteeism of manpower
- j. Monthly testing of compost from laboratory
- k. Percentage of days the MRF was not operational
- l. Quantity of waste received
- m. Quantity of waste recycled

Periodic assessment of performance may be made to resort to curative measures and improve quality of service. The State Level Monitoring Cell may be intimated of the outcome of the review.

The Cell suo-motu shall also assess with the help of the Mobile App AMA SAHARA and constant monitoring the smooth functioning of the Wealth Centres.

The provisions should be scrupulously followed for implementation for enhancing efficacy of the Wealth Centre and strengthening the Sanitation Value Chain.

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## Annexure-A

## INCENTIVE INDICATORS FOR SWACHH KARMIS

Sl. No.	Partnering Swachh Karmis	Work components	Quantum monthly Incentive (in Rupees)	Base Indicators	Quantum of Performance Incentive	Indicators for Performance based Incentive	Means of Verification	Remarks
1	2	3	4	5	6	7	8	9
1	Swachh Karmis associated with MRF	1. Weighing of incoming waste on weigh bridge 2. Unloading of incoming waste 3. Sorting of waste 4. Bundling and storage of waste 5. Weighing of waste after segregation 6. Baling of non-recyclable wastes 7. Use of Personal Protective	Rs 9780/- [Rupees nine thousand seven hundred eighty only]	1. Must work for 8 (eight) hours per day. 2. Quantity of dry waste segregated per day 3. 100% use of Uniform & Prescribed PPE during work hours 4. Maintain cleanliness of the MRF 5. Record should be properly maintained	Rs 40 [Rupees forty only] per day	1. 100 % segregation of dry waste received on a particular day 2. 100% attendance in the month (excluding the paid holidays) 5. Performance report of work by Nodal Officer of the Wealth Centre concerned	1. Attendance Register 2. Daily stock Register 3. Random Quality Check by Nodal Officer or persons authorised.	It is being a collective effort, quantifying individual performance is difficult. Therefore, collective quantitative & qualitative performance need to be assessed.

		8. Equipment Record Keeping 9. Regular cleaning of waste sorting area		6. and updated Any one day in a week shall be paid holiday. The MSG concerned shall allow Swachh Karmis to avail the paid holiday in a staggered manner to ensure that the MRF continue to function seamlessly without disruption throughout the year.				
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**ANNEXURE – B****FORMAT FOR STANDING INSTRUCTIONS TO BE ISSUED TO BANKS**

Office of the .....Corporation / Council

**(Name of the ULB)**

From

Commissioner/ Additional Commissioner/ Joint Commissioner/ Deputy Commissioner/ DDO/  
Executive Officer

----- (Name of the ULB)

To

The Bank Manager,

----- (Name of the Bank)

----- (Name of the Branch)

----- (Address)

Sub: Issue of Standing Instruction for release of Honorarium of Swachh Karmis associated in processing of Solid waste in the Wealth Centres

Madam/ Sir,

I am to intimate that monthly incentives of Swachh Karmis associated with Operation and Management of MCCs and MRFs established within the jurisdiction of this Urban Local Body are being paid through your Bank.

I authorise you to debit a sum of Rs. \_\_\_\_\_ (Amount in Rupees in words) on **5<sup>th</sup> of each month** from the Bank Account No. .... of this ULB maintained in your Bank as per the list attached herewith as ANNEXURE-B-1, unless "STOP PAYMENT" instruction in writing by the undersigned or the authorised officer is issued in this regard.

Yours faithfully,

Commissioner/ Additional Commissioner/ Joint  
Commissioner/ Deputy Commissioner/ DDO/ Executive Officer  
----- (Name of the ULB)

**ANNEXURE – B-1****"SCHEDULE OF MONTHLY INCENTIVE"**

Sl. No.	Name of the Swachh Karmi	Name and Code of the Wealth Centre	Amount of monthly Honorarium	Name of the Bank of the Beneficiary	Bank Account Number of the Beneficiary	IFS Code of the Bank
1	2	3	4	5	6	7

**N:B:** Changes in the aforesaid List required, if any, will be communicated from time to time.

Commissioner/ Additional Commissioner/ Joint  
Commissioner/ Deputy Commissioner/ DDO/ Executive Officer  
----- (Name of the ULB)

**Annexure C**  
**Display boards at MRF**

**Board -1: DOs and DON'Ts at Wealth Centre**

  
 ଗୃହ ଓ ନଗର ଉନ୍ନୟନ ବିଭାଗ

  
 ଓଡ଼ିଶା ପୁଲିସ୍

  
 ଫିରୋ

  
 ଓଡ଼ିଶା ରାଜ୍ୟ ବିପତ୍ତି ସମ୍ବନ୍ଧୀୟ କର୍ମାଳୟ

ସମ୍ପଦ କେନ୍ଦ୍ରରେ କର୍ମ କରିବା ଏବଂ କର୍ମ କରିବା ନାହିଁ

 <b>କର୍ମ କରନ୍ତୁ</b> ଏବଂ  <b>କର୍ମ କରନ୍ତୁ ନାହିଁ</b>	 ବ୍ୟକ୍ତିଗତ ପ୍ରତିରକ୍ଷା ଉପକରଣ (PPE) ର ବ୍ୟବହାର କରନ୍ତୁ	 ଯବପାଟିର ମାସିକ ଯାଞ୍ଚ ଏବଂ ରକ୍ଷଣାବେକ୍ଷଣ କରନ୍ତୁ	 ବ୍ୟବହାର ପରେ ସମସ୍ତ ଯନ୍ତ୍ରପାତି ସଫା କରନ୍ତୁ
 ଶୌଚାଳୟର ସ୍ୱଚ୍ଛତା ସୁନିଶ୍ଚିତ କରନ୍ତୁ	 ଆଲୋକ ଏବଂ ମୃତ୍ତ ବାୟୁ ଚଳାଚଳ ସୁନିଶ୍ଚିତ କରନ୍ତୁ	 ଜରୁରୀକାଳୀନ ପରିସ୍ଥିତି ପାଇଁ ପ୍ରାଥମିକ ଚିକିତ୍ସା କିଟ୍ ରଖନ୍ତୁ	 ଅଗ୍ନି ନିର୍ବାପକ ଯନ୍ତ୍ର ବ୍ୟବହାର ପାଇଁ ପୁରୁଣା ସ୍ଥାନରେ ରଖନ୍ତୁ
 କାମ କଲାବେଳେ ଯନ୍ତ୍ରପାତି ପାଖକୁ କିଲା ପୋଷାକ ପିନ୍ଧି ଯାଆନ୍ତୁ ନାହିଁ	 ଯନ୍ତ୍ରପାତି ଚାଲିବା ଅବସ୍ଥାରେ ଚାଁ ନିକଟରେ ହାତ ରଖନ୍ତୁ ନାହିଁ	 ଗର୍ଭଚର୍ଚ୍ଚା ମହିଳାମାନଙ୍କୁ ପରିସର ଭିତରକୁ ଅନୁମତି ଦିଅନ୍ତୁ ନାହିଁ	 ପିଲାମାନଙ୍କୁ ପରିସର ଭିତରକୁ ପଶିବାକୁ ଦିଅନ୍ତୁ ନାହିଁ
 ପୁରୁଷ ଏବଂ ମହିଳା ଭିତରେ ଭେଦଭାବ କରନ୍ତୁ ନାହିଁ	 ପରିସର ଭିତରେ ପଶୁଙ୍କୁ ଅନୁମତି ଦିଅନ୍ତୁ ନାହିଁ	 ଜଳ ଏବଂ ବିଦ୍ୟୁତ୍ ନଷ୍ଟ କରନ୍ତୁ ନାହିଁ	 ଯାହା ଡାହାଣ ନିଆଁ ଲାଗିବାର ସମ୍ଭାବନା ଥାଏ ସେ ସବୁ ପରିସର ଭିତରେ ବ୍ୟବହାର କରନ୍ତୁ ନାହିଁ

## Board -2: Daily Update on Waste



## ସମ୍ପଦ କେନ୍ଦ୍ର (Wealth Centre)

### ସାମଗ୍ରୀ ପୁନର୍ଲାଭ କେନ୍ଦ୍ର, ପୋଖରୀପୁଟ

### Material Recovery Facility (M.R.F), Pokhariput

ତାରିଖ Date	
ଏମ.ଆର.ଏଫକୁ ଆସିଥିବା ଗାଡ଼ି ଗୁଡ଼ିକର ମୋଟ ତ୍ରୈପ ସଂଖ୍ୟା Total no of collection vehicles trip to MRF today:	
ମୋଟ ସଂଗୃହିତ ଶୁଖିଲା ଅଳିଆର ପରିମାଣ Total dry waste received today	କି.ଗ୍ରା kg
ମୋଟ ଅଲଗା କରାଯାଇଥିବା ଶୁଖିଲା ଅଳିଆର ପରିମାଣ Total dry waste sorted today:	କି.ଗ୍ରା kg
ମୋଟ ପୁନଃବ୍ୟବହାରଯୋଗ୍ୟ ଅଳିଆ ବିକ୍ରି ପରିମାଣ Total recyclables sold today:	କି.ଗ୍ରା      ଟଙ୍କା kg              INR





## ସମ୍ପଦ କେନ୍ଦ୍ର, (Wealth Centre)

ଅଣୁ ଜୈବଖତ ପ୍ରକ୍ରିୟାକରଣ କେନ୍ଦ୍ର, ପୋଖରୀପୁଟ

**Micro Composting Centre (M.C.C), Pokhariput**

ତାରିଖ <b>Date</b>	
ଆଜି ଏମ.ସି.ସିକୁ ଆସିଥିବା ଗାଡ଼ିଗୁଡ଼ିକର ମୋଟ ତ୍ରିପ ସଂଖ୍ୟା <b>Total no of collection vehicles trip to M.C.C today:</b>	
ମୋଟ ସଂଗୃହୀତ ଓଦା ଅଳିଆର ପରିମାଣ <b>Total wet waste received today</b>	କି.ଗ୍ରା <b>kg</b>
ଆଜି ଉତ୍ପାଦିତ ହୋଇଥିବା "ମୋ ଖତ" ର ପରିମାଣ <b>Total compost generated today :</b>	କି.ଗ୍ରା <b>kg</b>
ଆଜି ବିକ୍ରି ହୋଇଥିବା "ମୋ ଖତ" ର ପରିମାଣ <b>Total compost sold today:</b>	କି.ଗ୍ରା      ଟଙ୍କା <b>kg              INR</b>







# Sanitation is more important than Independence

*mk Gandhi*

Housing & Urban Development Department  
Government of Odisha



## Annexure-B

### **Standard Operating Procedure with Operational Control Measures in MCCs situated near Residential Areas:**

Bhubaneswar Municipal Corporation has established 36 nos. Micro Composting Centre (MCCs) adopting decentralized approach for scientific management of segregated wet waste. The MCCs are designed for an intake waste capacity of 5 ton per day. Since, the capacity of MCCs are 5 TPD with required shed facilities it is coming under the purview of White category (Non-polluting industries) industry by State. The Operational Control Measures practiced in MCCs situated near Residential areas are as follows:

- 1- Less than 5 TPD of segregated wet waste is received and the additional quantity is directly diverted to TTS without unloading it in Micro Composting Centre (MCCs) to avoid leachates formation.
- 2- Area is earmarked in the MCCs for unloading of waste from LCVs. The floors where wet waste is received is impervious with proper drainage arrangement for channelizing the flow of leachates to the collection pits.
- 3- The Non-veg waste are collected separately and not allowed to mix with the wet waste received at MCCs situated near the Residential Area to avoid pungent odour.
- 4- The intake capacity of MCCs situated near the Residential areas are reduced to 60% during monsoon period to accommodate the waste in the compost pits and to ensure free turning of waste for reducing the odour.
- 5- The leachates collected in the pits are removed by using cesspool vehicles on regular basis.
- 6- For providing good aeration, maintaining the temperature and moisture content frequent turning of waste is being carried out by engaging dedicated male workers particularly in MCCs situated near Residential Areas.
- 7- For accelerating the decomposition process and to reduce odour Effective Microorganism (EM) solution prepared by adopting conventional methods is used with well ventilated space and turbo arrangement in sheds.
- 8- Spraying of bio-culture and organic odour control powder in every alternate days to minimize the odour.
- 9- For managing insects & flies sufficient number of insect killer/fly catchers are installed in the MCCs.
- 10- The compost generated in the MCCs situated near the Residential areas are directly transferred through covered vehicles to central drying yard for sun dry and inhouse drying of compost in the said facility is not recommended to completely stop release of any bad odour.
- 11- For maintaining hygienic conditions and to ensure odour management two times washing and floor cleaning is being carried out with application of disinfectant/neem Oil/lemon Grass Oil.
- 12- Regular plantation is being carried out wherever space is available to develop greenbelt in and around the facility.

  
**Dy. Commissioner (Sanitation)**  
**Bhubaneswar Municipal Corporation**