



*Thumboormuzhi unit,
Nedumangad Municipality
September 2021*

CHAPTER IV

PROCESSING AND DISPOSAL OF WASTE



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There was gap in coverage among the households provided with biodegradable waste management facilities, which ranged from 59.79 *per cent* to 99.94 *per cent*. Waste processing units supplied to households were not utilised effectively in many places. Infructuous expenditure on purchase and distribution of bio-composter bins due to inadequate utilisation by beneficiaries resulted in unfruitful expenditure of ₹3.35 crore. Source level treatment facilities were not provided in all apartments visited. Incinerators/ burners were installed in apartments without authorisation of Pollution Control Board.

The bio-methanation units installed in markets were defective and Liquid waste treatment facility was not installed in any of the markets visited. Thumboormuzhi units and bio-gas plants installed were not functional due to improper maintenance.

We noticed that 3.86 lakh tonnes of waste reached the centralised processing plant at Brahmapuram in Kochi Corporation during 2016-2021. As the plant had a capacity to process only 250 tonnes/day of biodegradable waste, around 2.85 lakh tonnes became rejects. Leachate treatment plant was not installed which led to oozing leachate polluting nearby water bodies. An unjustifiable clause in the agreement between the local body and contractor, linking payment of tipping fee to the total quantum of waste brought into the treatment plant resulted in excess payment of ₹11.72 crore by the Corporation. In Kozhikode Corporation, the work of Leachate treatment plant at Njaliyanparamba was not yet completed, resulting in mixing of leachate with rain water, which flowed into drains.

Of the 14 dumpsites in the test-checked ULBs, unsegregated mixed waste was still being dumped in five sites and remediation work had commenced only in three Corporations. Sanitary landfill for disposal of rejects/residual waste was not set up in the State till date.

The source level processing units installed in households were not functioning effectively, leading to unscientific methods of processing of waste. We observed deficiencies in the functioning of processing plants at Kochi and Kozhikode Corporations. Scientific remediation of dumpsites was not undertaken by ULBs on priority.

4.1 Processing and Treatment

According to Rule 15 (v) of the Solid Waste Management Rules, 2016, ULBs shall facilitate construction, operation and maintenance of solid waste processing facilities and associated infrastructure for optimum utilisation of various components of solid waste. The ULBs were to adopt suitable technology such as bio-methanation⁶⁵, microbial composting, vermin-composting, anaerobic digestion or any other appropriate processing technology for bio-stabilisation of biodegradable waste.

⁶⁵ Process entailing enzymatic decomposition of organic matter by microbial action to produce methane rich biogas

4.1.1 Status of processing of biodegradable waste

The biodegradable waste shall be processed, treated and disposed of through composting or bio-methanation within the premises as far as possible by resident welfare and market associations, apartments, hotels and restaurants. As part of promoting decentralised system of waste management, the State policy issued in September 2018 prescribed source level processing of biodegradable waste. Details of biodegradable waste generated, collected and processed in the State during the audit period are shown in **Table 4.1**:

Table 4.1: Details of biodegradable waste generated, collected and processed by test-checked ULBs during 2016-2021

	2016-17	2017-18	2018-19	2019-20	2020-21
Generated (tonne/day)	2,97,615.28	3,04,634.17	3,12,051.82	3,17,848.10	3,03,507.05
Collected (tonne/day)	1,20,297.58	1,24,696.97	1,30,114.37	1,31,906.35	1,16,097.30
Processed	1,18,710.20	1,29,748.10	1,39,808.40	1,53,879.50	1,50,329.30
Percentage of processing	39.89	42.59	44.80	48.41	49.53

(Source: Data from test-checked ULBs)

As biodegradable waste processed through source level processing facilities were also considered, the total quantity of processing outweighed that of collection.

In test-checked ULBs, the percentage of biodegradable waste processed ranged from 39.89 to 49.53 only. Audit observed that inadequate infrastructure, low utilization of available infrastructure, etc. led to non-processing/inadequate processing of waste collected, as detailed in subsequent paragraphs:

4.1.1.1 Inadequate infrastructure for managing household biodegradable waste

With the exception of Kochi Corporation where household biodegradable waste was collected and transported to disposal site, the test-checked ULBs provided various systems like pipe composting, bio bins, biogas, kitchen compost, etc. to ensure source level processing of waste by households.

Audit observed inadequate infrastructure contributing to significant gap in coverage ranging from 59.79 per cent to 99.94 per cent among the households provided with biodegradable waste management technologies in the 21 test-checked ULBs⁶⁶ (**Appendix 5**). Joint physical verification was conducted at five⁶⁷ randomly selected households supplied with decentralised processing technologies in each test-checked ULB. Of the 107 households visited, only 54.24 per cent of waste processing units were being utilised effectively. Reasons for poor utilisation included improper technology (in the case of pipe compost), lack of awareness regarding usage of processing facilities, inadequate service by agencies of biogas plants, irregular/lack of supply of inoculum⁶⁸ for treatment of waste in kitchen bin, irregular service by HKS, etc. It was seen that no other ULB except Thiruvananthapuram Corporation supplied inoculum to households. However, the extent of supply of inoculum in this ULB ranged from 3.69 to 17.33 per cent only, which is suggestive of the

⁶⁶Except Kochi Corporation which transported biodegradable waste to Brahmapuram

⁶⁷The covid restrictions then prevailing in the State did not permit extensive coverage of households by audit team

⁶⁸ Population of micro-organisms introduced into a suitable medium

probability of non-functioning of 82 to 96 *per cent* household waste processing facilities. Despite GoK designating HKS to visit each household and impart awareness in using waste processing facilities, the percentage of facilities supplied and put to use by households was observed to be low, as presented in **Table 4.2**.

Table 4.2: Status of utilisation of waste processing facilities supplied in test-checked ULBs

Total number of households	Number of households provided with facilities	Percentage of households provided with facilities	Number of facilities actually in use	Percentage of facilities in use	Percentage of households processing waste at source
1107006	206535	18.66	81674	39.54	7.38

(Source: Data from test-checked ULBs)

Low source level treatment clubbed with low door-to-door collection of biodegradable waste resulted in littering of waste in public places, water bodies, etc. Further, instance of private agencies collecting waste from households which were already provided with facilities was also noticed.

Infructuous expenditure on purchase and distribution of bio-composter bins in Thiruvananthapuram Corporation

As part of decentralised waste management, Thiruvananthapuram Corporation purchased and distributed 46,492 bio-composter kitchen bin units at ₹1800/unit in two phases (15,833 bins in the first phase and 30,659 bins in the second phase) during the period from 2016-17 to 2020-21. The expenditure incurred (until December 2022) by the ULB amounted to ₹5.96 crore, with a committed liability of ₹8.37 crore. As per Corporation records furnished to Audit, 14,505 beneficiaries (31.2 *per cent*) were using bio-composter bins for processing of waste (October 2021).

The status of utilization furnished by the ULB could not be regarded as true to facts, as Audit observed that only an average of 3627 bags of inoculum were supplied to the households per month in 2020-21. Further, private agencies entrusted with the collection of non-biodegradable waste collected biodegradable waste unauthorisedly even from households supplied with bio-composter bins. This resulted in non-utilisation of bio-composter bins supplied to the beneficiaries. Thus unauthorised collection of biodegradable waste by service providers, absence of regular supply of inoculum and lack of monitoring by the Corporation contributed to idling of 70 *per cent* of bins distributed. This would tantamount to unfruitful expenditure of atleast ₹ 3.35 crore.

Accepting the observation, Government stated in the exit conference (May 2022) that shortage of inoculum and improper management had led to non-usage of source level composting facilities. As regards non-usage of bio-composter bins leading to infructuous expenditure by Thiruvananthapuram Corporation, it was stated that the ULB had relied on service providers and monitoring and supervision had been an issue. Government assured that steps have been taken to assess the functioning of existing household waste processing systems through site verification by HKS.

4.1.1.2 Source level treatment of waste in Apartments

Apartments and houses having floor area 400 m² or above should establish necessary facilities for treatment and disposal of waste at source. It was mandatory to include waste processing facilities in buildings at the time of construction itself and within one year, for existing buildings. The Secretary of the ULB was to cancel the licence of buildings which did not have such facilities and those who violated the Rule were to be penalised by levying fine not below ₹ 10,000 or imprisonment upto six months, or both. It was observed that only 286 (52.19 *per cent*) of 548 apartments in test-checked ULBs had source level treatment facilities. During JPV in 21 apartments in five⁶⁹ test-checked ULBs, it was seen that source level treatment facilities were not provided in 11 apartments. In 14 apartments, incinerators/burners were installed without authorisation of PCB.

4.1.1.3 Inadequate Source level treatment of waste in markets and other places

According to SWM Rules, 2016, the local bodies were to set up decentralised compost plant or bio-methanation plant in markets and other suitable locations for processing the waste generated, ensuring hygienic conditions. As per data furnished by ULBs, of the 118 markets in 20⁷⁰ test-checked ULBs, 33 markets (28 *per cent*) had source level waste treatment facilities. Joint Physical Verification conducted by Audit in 23 of these markets revealed that composting/ bio-methanation units to treat market waste were installed only in 19 markets, of which 11 were functioning. Liquid waste treatment facility was not installed in any of the markets visited by Audit.

Audit observed that the source level treatment facility installed in the markets and other locations in test-checked ULBs had deficiencies as detailed below:

▪ Aerobic Bin (thumboormuzhi) units

Thumboormuzhi is a type of Aerobic Bin Composting unit for converting biodegradable waste into compost using inoculum. Usage of inoculum is essential for providing bacterial consortium for aerobic composting. Equal layers of biodegradable waste and dry leaves are placed with the help of wooden frame and inoculum is sprayed on top. Composting takes place in a period of 90 days. Details of thumboormuzhi units installed in test-checked ULBs are given in **Appendix 6**. The following deficiencies were noticed:

- Thiruvananthapuram Corporation employed 350-396 workers (with two persons per location for fixed units and one person per location for portable units) for managing thumboormuzhi units at 99⁷¹ locations. This resulted in employing an additional 252-298 workers against the actual requirement of 98 workers⁷², which led to extra expenditure of ₹41.28 lakh per month. Interestingly, despite employing excess personnel, only 73 *per cent* of units installed remained functional. Fifty three workers were engaged in two circles and Main office where no thumboormuzhi units were installed. In

⁶⁹ Thiruvananthapuram, Kochi Corporations and Mavelikkara, Aluva, Maradu Municipalities

⁷⁰ No markets function in Eloor and Mavelikkara Municipalities

⁷¹ 52 (fixed units) and 47 (portable units)

⁷² Manpower required in 99 locations (151) – Manpower allotted to non-functional units and Main office (53) = 98

13 locations though the units were defunct the workers continued to be engaged.

- Two hundred and seventy three thumboormuzhi units in six ULBs⁷³ were not functional due to improper maintenance and short supply of inoculum. The non-functional units were used for storing plastic waste in some places. Audit also observed the units in poorly maintained and unhygienic conditions converting the area into breeding ground for black soldier larvae and rodents. The manure produced from the units was not regularly sold/disposed which resulted in accumulation of manure and non-use of the units.
- No leachate treatment facilities were provided in the units which led to untreated slurry contaminating the soil. During JPV in 10 locations at Alappuzha Municipality, Audit noticed that leachate collection tanks were not provided, causing leachate generated to seep into the ground.



Thumboormuzhi unit stacked with plastic and other waste in Thiruvananthapuram Corporation (July 2021)



Koyilandy Municipality: Thumboormuzhi units not functional and filled with plastic waste (July 2021)



Thumboormuzhi aerobic compost unit at Civil station Koyilandy Municipality (July 2021)

The Chairman, KSPCB stated (June 2022) that periodic inspections were not possible due to shortage of technical staff and that inspections were conducted on receipt of complaints and necessary action taken. Government informed (May 2022) that Thiruvananthapuram Corporation has approved an estimate to revive all thumboormuzhi units.

⁷³ Thiruvananthapuram, Kozhikode Corporations and Nedumangad, Alappuzha, Koyilandy, Vadakara Municipalities

▪ **Non-functioning of Community Level Biogas plants**

Seven test-checked ULBs⁷⁴ installed biogas plants for treatment of waste in markets and of the 16 plants installed, 14 were found non-functional due to improper maintenance, technical reasons, etc. (**Appendix 7**). Audit observed that community level biogas plants require dedicated manpower for their proper management and Annual Maintenance Contracts (AMC) so that non-degradable waste do not get fed into the plants.

Unfruitful expenditure on a biogas plant

Manjeri Municipality formulated (2010-11) a project for installation of a 1000 kg capacity biogas plant at market premises. The Municipality entrusted (March 2010) the works relating to design, supply, erection and commissioning of the plant to M/s Integrated Rural Technology Centre (IRTC) Palakkad at a cost of ₹19.88 lakh with the stipulation to complete the work within six months. However, the agency completed the work only in December 2016, after a prolonged interval of six years, reportedly due to public protest. Though the Municipality took over the plant from IRTC in February 2018, it did not ensure fruitful utilisation of gas generated in the market premises. Moreover, the slurry accumulated in the plant could not be removed which led to the closing down of the plant within days after taking over of the plant. This led to inability to dispose of market wastes at source level, thereby defeating the purpose of installation of the biogas plant, in addition to unfruitful expenditure of ₹19.88 lakh.

Government informed (May 2022) that Manjeri Municipality has given strict directions to IRTC to carry out the maintenance works without delay. However, JPV conducted by Audit in August 2022 revealed that the biogas plant remained dysfunctional and removal of biodegradable waste was entrusted to a private agency.

Infructuous expenditure on Annual Maintenance Contracts

Thiruvananthapuram Corporation installed 10 community level biogas plants having capacity of one or two tonnes per day in public markets during the period from 2011-12 to 2015-16. Audit observed that though the ULB spent ₹19.50 lakh for the maintenance of five⁷⁵ community level biogas plants and ₹11.31 lakh towards AMC for five plants⁷⁶ during 2019-20 and 2020-21, eight out of the 10 biogas plants were not functioning (October 2021). In Manacaud market, which was a dedicated market for sale of bananas, the biogas plant installed remained underutilised as little bio-waste was produced and fed to the plant. Audit observed that non-engagement of dedicated personnel/absence of regular awarding of AMC for management of the biogas plants resulted in closing down of the plants. In Vallakkadavu market, plastic waste was fed into the plant leading to its closing down. The Health and Engineering wings awarded AMC without assessing the requirements to make a plant functional,

⁷⁴Thiruvananthapuram, Kozhikode Corporations, Nedumangad, Neyyattinkara, Nilambur, Parappanangadi and Manjeri Municipalities

⁷⁵ In markets at Palayam, Manacaud, Kalladimughom, Perunelli and Sreekandeswaram

⁷⁶ In markets at Vattiyoorkavu, Vallakkadavu, Perunelli, Women and Child Hospital, Thycaud and Main office of Thiruvananthapuram Corporation

which resulted in failure in operationalising the plant within the AMC period. This led to infructuous expenditure and resultant loss to the exchequer.

In the exit conference (May 2022), Government assured to take corrective action with respect to the absence of source level treatment facilities in apartments and markets and non-functioning of biogas plants.

4.1.2 Functioning of Centralised processing plants

Of the 22 test-checked ULBs, Kochi and Kozhikode Corporations and Perinthalmanna Municipality had centralized processing facilities. Audit analysed the functioning of these plants and noted deficiencies in the working of the plants at Kochi and Kozhikode Corporations as detailed below:

4.1.2.1 Faulty operation of Brahmapuram centralised processing facility

Kochi Corporation executed agreement (January 2012) with M/s. Environ Green for O&M of solid waste disposal facility at Brahmapuram. As per the agreement, the contractor had to procure all materials and equipment required for composting and also meet the requisite charges for supply of electricity, water, etc. The following shortcomings were noticed in the operation of Brahmapuram plant:

- The agreement between the Corporation and contractor stipulated that both the parties should jointly fix the permissible amount of rejects in the collected waste, every three months. However, no such fixing of quantity was done during the audit period. Of the 3,85,555 tonnes of waste which reached the Brahmapuram processing site during 2016-17 to 2020-21, only 1,00,138 tonnes were processed. Unprocessed quantity of 2,85,417 tonnes turned into rejects.

The agreement executed by Kochi Corporation with the neighbouring local bodies specified that only biodegradable waste were to be transported to Brahmapuram. However, the local bodies transported 79,996 tonnes of unsegregated mixed waste to the facility. Had the local bodies effectively segregated waste at source point itself, there would have been considerable drop in the quantum of rejects which reached the centralised facility.

- Audit observed that leachate oozed underground from the waste heaped in plant premises, polluting nearby water bodies like Kadambayar and Chitrapuzha. The failure of the Corporation to install leachate treatment plant for treatment of leachate generated, led to KSPCB assessing the Environmental compensation amounting to ₹1.12 crore on the Corporation from 22 November 2018 to 30 November 2019. The leachate treatment plant has not been made functional yet.
- As per clause in the agreement executed, the Corporation had to pay tipping fee to the contractor @ ₹550 per tonne of solid waste (biodegradable and RDF⁷⁷) except plastic waste received in the plant. Though the plant claimed to have capacity to process 250 tonnes of waste per day and received 211 tonnes/day, the contractor processed only around 69 tonnes/day. The dilapidated windrow composting plant was the root cause of



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⁷⁷ Refuse Derived Fuel

malfunctioning of the waste management facility. Inadequate spot treatment of fresh biodegradable waste brought into the plant led to its accumulation over and above the deposited legacy waste. Though the contractor processed only 33 *per cent* of the waste, Corporation made payment for the entire quantity of waste reaching the plant. Despite the agency having no role in transportation of waste from the ULBs to the treatment plant, payment of tipping fee was linked in the contract to the total quantum of waste brought into the treatment plant and not to the waste processed by agency. Excess payment attributable to this unjustifiable clause amounted to ₹11.72 crore.

- Government directed (November 2015) all departments and local bodies to adhere to e-tender procedure while awarding works with estimated cost of ₹ five lakh and above. In violation of the above, Kochi Corporation selected the same contractor from 2012 till 2021, by extending the period of contract and not uploading e-tenders. Audit observed that e-tender was conducted only thrice during the period from 2015 to 2021. The action of the Corporation in awarding work to the same contractor who failed to work in the best interest of the Corporation was objectionable.
- The National Institute of Technology, Kozhikode (June 2021) estimated the quantity of legacy waste at Brahmapuram as 325816 cu.m above ground level and 226087 cu.m below ground level. The Corporation had a committed liability of ₹55 crore to remove the huge volume of legacy waste in the plant premises.
- The Brahmapuram plant has been functioning without authorisation of State PCB since 2010. Though PCB issued notice to Kochi Corporation (July 2021), the plant continues to function without authorisation.

In reply, Government stated (May 2022) that issues related to dilapidated condition of the existing windrow compost plant have resulted in reducing the processing of bio waste into compost at Brahmapuram. Chairman, KSPCB replied to Audit (June 2022) that the Technical Committee meeting for finalising the implementation of Bio-mining held in January 2022 had observed that the contractors were unable to dig and carry out clearing of deposited waste due to water interference and that the total quantum of legacy waste assessed did not include the waste deposited in the dilapidated windrow sheds. In the exit conference (May 2022), Government assured to look into specific issues such as faulty agreement conditions, non-functioning of leachate treatment plant, etc.

4.1.2.2 Shortfalls in processing of biodegradable waste at Njaliyanparamba Treatment plant in Kozhikode Corporation

Biodegradable waste generated in Kozhikode Corporation was collected by sanitary workers/Kudumbashree members and transported to the treatment plant at Njaliyanparamba. As per agreement executed (June 2008) for O&M service of the plant with M/s. IL&FS Environmental Infrastructure and Services Ltd., the firm had to meet the running cost of the plant and remit royalty amount of ₹ 48,400 to the Corporation. The agreement also stipulated that the agency shall ensure an overall compost recovery rate of 20-25 *per cent*. Citing low level of achievement in production of compost and non-payment of royalty, the

Corporation terminated the agreement with the Company (July 2019) and took over the management of the plant. As of March 2022, the firm was obliged to pay ₹ 17 lakh to the Corporation.

The following shortcomings were noticed in the functioning of the plant during the audit period:

- During 2017-2021, against the total quantity of 84317.70 MT waste reaching the plant, the total compost production was 5233.17 MT (6.2 per cent). The MSWM Manual, 2016 stipulates typical efficiency of 18-20 per cent for organic solid waste input and 10-15 per cent for mixed waste input for a windrow compost plant. Reckoning compost production at 15 per cent, total biodegradable waste processed would be 34887.73 MT. As such, only 41 per cent of waste brought to the plant was being processed.



Kozhikode Corporation - Mixed waste processed at treatment plant, Njaliyanparamba

- Reduced processing resulted in accumulation 3000 MT of backlog waste at the plant site. Low processing of waste also resulted in approximate revenue loss to the tune of ₹48.69 lakh, which would have accrued from sale of compost during 2019-20 and 2020-21.
- The Audit Report of Comptroller and Auditor General of India for the year ended March 2010 had pointed out the need for installing leachate treatment plant at Njaliyanparamba. Even after passage of 12 years, the situation has not changed. The Project Manager, KSUDP entered into an agreement (January 2016) with Ionex Envirotech Pvt. Limited for the construction of leachate treatment plant of capacity 75 cu.m per day in Kozhikode Corporation. The Chief Environmental Engineer, KSPCB Regional Office, Kozhikode inspected the treatment plant (October 2016) and reported that the majestic flow meter for the measurement of flow was not installed, anaerobic reactor was found open with aeration and sludge drying beds were not constructed. Though the ULB incurred an expenditure of ₹54.96 lakh on the plant, the plant has not been commissioned yet.
- Due to failure in completion of all items of work specified in the agreement, KSPCB did not grant Consent To Operate to the plant.
- During JPV (March 2022), Audit noticed that leachate generated in the compost plant got mixed with rainwater and was discharged into nearby drains. The KSPCB conducted site verification and reported (November

2019 and June 2022) that untreated leachate mixed with rain water flowed into the nearby stormwater drainage and farmlands.

- The KSPCB collected and tested (October 2021) well water samples in the area and found that the leachate content reduced the potability of well water.

Government replied (May 2022) that due to inefficiency and non-functional machinery, processing of biodegradable waste dumped in the windrow compost has been reduced and compost production decreased to seven tonnes per day. Regarding non-functioning of Leachate treatment plant, it was stated that Corporation has initiated legal action against the contractor. It was also informed that the Corporation has entered into an agreement to establish a Waste to Energy Plant at Njaliyanparamba, on completion of which all the problems related to leachate flow, water quality in the region, etc. would be permanently solved.

4.1.3 Street sweeping/street cleaning

As per SWM Rules, 2016, it is the responsibility of local authorities to collect sweeping waste separately on alternate days or twice a week depending on the density of population, commercial activity and local situation. The MSWM Manual prescribed that in small towns and medium cities, one sweeper per 300-350 running meters of road length was required for sweeping high density roads. Likewise, in the case of medium density roads, one person per 500 running meters of road length and in low density roads, one person per 750-1000 meters of road length was mandated for street sweeping. An analysis of the length of road required to be swept daily as against the manpower available for street sweeping in the test-checked ULBs revealed that the existing staff could cover only 888 km out of 7692 km length of road per day. The distance to be swept daily by a sweeper ranged from one km to 23 km in test-checked ULBs, due to which cleaning and sweeping of streets could not be undertaken effectively. There was an urgent need to increase the strength of the sweeping staff in ULBs to attend to the collection and processing of sweeping waste.

4.1.3.1 Processing of sweeping waste

Street sweeping waste predominantly comprises horticulture type waste (leaves, twigs), inert materials (sand and grit), and biodegradable and non-biodegradable waste from littering. As per SWM Rules, 2016, it is the duty of local authorities to direct street sweepers not to burn tree leaves collected from streets and to set up covered secondary storage facility for temporary storage of street sweepings and silt removed from surface drains, wherever direct collection of such waste into transport vehicles is not convenient. However, 21 of 22 test-checked ULBs have not provided temporary storage facility for street sweepings. Thiruvananthapuram Corporation which generated 71 tonnes of sweeping waste daily, had temporary storage facility for one tonne of waste only, whereas in the absence of storage facility, Kochi and Kozhikode Corporations and Aluva and Angamaly Municipalities transported the sweeping waste to Brahmapuram.

As per the MSWM Manual, street sweeping waste and silt derived from drains are to be separated from household waste streams, since street sweeping and drain silt could be infiltrated with significant amount of toxic substances and may contaminate waste streams envisaged for composting and recycling.

Therefore, street sweepings and silt from the drains are to be landfilled. However, in the absence of landfills, 12 of the test-checked ULBs deposited sweeping/drain waste in dumping yards. Burning of sweeping waste was noticed in Thiruvananthapuram and Kochi Corporations. Three ULBs⁷⁸ utilised the sweeping waste for processing of food/biodegradable waste in thumboormuzhi units, violating Rules.

Government replied (May 2022) that there was shortage of workers to cover the entire urban area on daily basis and that proposal for engaging Self help groups/ Non-Governmental Organisations/agencies for street sweeping was under consideration. As regards disposal of sweeping waste, it was stated that the collected waste would be categorized and only dry leaves would go to thumboormuzhi.

4.1.3.2 Infructuous expenditure on purchase of Mechanised Road Sweeping machine⁷⁹

Thiruvananthapuram Corporation purchased a road sweeping machine in 2010 from M/s Roots Multi Clean Company Limited, Coimbatore (Company), incurring ₹ 73.50 lakh. As the Corporation lacked technical expertise to operate the machine, its O&M was entrusted to the same company for three years, for which an additional ₹ 99.69 lakh was paid. Though the Company submitted proposal for renewal of O&M in September 2013, O&M was not renewed by the Corporation. The machine was left idling since the expiry of O&M agreement (June 2013), at the garage of the Corporation.

In August 2021, the Corporation requested the Company to inspect the machine and prepare an estimate for necessary repairs to make it functional. However, the Company, after inspecting the machine, reported (November 2021) that as the machine was kept idle for over eight years, its parts had got rusted and damaged and technology turned obsolete. The repair of the machine would not be economical as its parts were to be imported from abroad. Further, RTO norms have been changed and currently, public vehicles were to adhere to BS-VI standards.

Audit observed that the laxity on the part of Thiruvananthapuram Corporation to renew O&M or impart technical expertise to personnel during the three operational years, led to the idling and consequent damage of the machine since 2013, not to mention the infructuous expenditure of ₹ 73.50 lakh, for which responsibility needs to be fixed.

Government stated that the Corporation has requested (January 2022) the Mechanical wing of Public Works Department to ascertain the feasibility of utilising the chassis of the vehicle after removing sweeping kit. The reply does not provide any assurance regarding the scope of utilisation of the machine for the purpose envisaged.

4.1.4 Authorisation of Urban Local Bodies

As per Rule 15 of SWM Rules, local bodies shall make an application to the KSPCB or the Pollution Control Committee for grant of authorisation for

⁷⁸ Thiruvananthapuram Corporation, Alappuzha and Eloor Municipalities

⁷⁹ The irregularity was pointed out in the Audit Report 2013-14 of Kerala State Audit Department. Audit has updated the present status of utilisation of the machine in this report

setting up waste processing, treatment or disposal facility, if the volume of waste exceeds five metric tonnes per day, including sanitary landfills. The KSPCB was to examine the proposal received from local bodies, make necessary inquiries and issue authorisation within a period of sixty days.

On scrutiny of records at KSPCB to check extent of compliance of the above, it was seen that of the 22 test-checked ULBs, only one Corporation (Kozhikode Corporation) and five Municipalities⁸⁰ have received authorisation of KSPCB. Five ULBs⁸¹ had submitted applications for receipt of authorisation, which were under scrutiny. The KSPCB had issued show cause notices to five ULBs⁸² for not complying with the provisions of SWM Rules, 2016. Though directions were issued to six ULBs⁸³ to apply for authorisation, the ULBs have not responded favourably. Audit noticed that the instructions of KSPCB were not complied with and no pro-active action initiated by the ULBs to secure authorisation.

Audit also observed that KSPCB issued notices on the basis of Environment Protection Act, 1986 and directions of National Green Tribunal and worked out Environmental Compensation for non-compliance with the provisions of the Act to Thiruvananthapuram Corporation (₹14.59 crore), Aluva Municipality (₹2.13 crore) and Kochi Corporation (₹14.92 crore). Thiruvananthapuram and Kochi Corporations obtained stay from Hon'ble High Court against the levy of Environmental Compensation whereas Aluva Municipality has not initiated any action so far.

The KSPCB, in the process of issuing authorisation to local bodies, ensures that the waste management mechanism adopted by local bodies is in compliance with accepted health and environmental standards. Therefore, local bodies need to assign priority to secure authorisation from KSPCB.

Government accepted the observations and replied (May 2022) that necessary directions have been issued to local bodies to obtain authorisation from KSPCB.

4.2 Disposal

4.2.1 Status of Dumping Yards

A Dumpsite is a land utilised by the local body for disposal of solid waste without following the principles of sanitary land filling. The SWM Rules, 2016 stipulate that bio-remediation or capping of old and abandoned dump sites is to be done within five years from the date of notification of the Rules. Remediation work on all other dumpsites was to be commenced from 01 November 2019 and completed preferably within six months and in no case beyond one year.

As per records in KSPCB/ULBs, there are 43 dumpsites in the ULBs in the State, of which eight are in Municipal Corporations and 35 in Municipalities. Status of dumpsites in selected ULBs is given in **Appendix 8**. It was seen that of the 14 dumpsites in the test-checked ULBs, unsegregated mixed waste was

⁸⁰ Neyyattinkara, Alappuzha, Mavelikkara, Kayamkulam, Vadakara

⁸¹ Malappuram, Manjeri, Parappanangadi, Perinthalmanna, Feroke Municipalities

⁸² Thiruvananthapuram and Kochi Corporations, Aluva, Angamali, Maradu Municipalities

⁸³ Kothamangalam, Muvattupuzha, Eloor, Nedumangad, Nilambur, Koyilandy Municipalities

still being dumped in five sites⁸⁴ and remediation work has commenced only in Thiruvananthapuram, Kochi and Kozhikode Corporations. It was evident that the test-checked local bodies were yet to investigate and analyse all old open dumpsites and existing operational dumpsites for their potential of biomining and bio-remediation, and to undertake necessary action wherever feasible.

It is perturbing to note that despite the passage of five years since the notification of SWM Rules and National Green Tribunal's ultimatum for completion of remediation work within a year, the test-checked ULBs had not bestowed attention on the closing/rehabilitation of existent dumpsites to evade potential risks of environmental hazards.

Government replied (May 2022) that remediation of 34 dumpsites would be undertaken through KSWMP.



Legacy waste dumped at Njaliyanparamba dumping site (October 2021)



Brahmapuram dumpsite at Kochi Corporation (November 2021)

4.2.2 Status of Landfills

Sanitary landfilling is the final and safe disposal of residual solid waste and inert waste in a facility designed with protective measures against pollution of ground water, surface water and fugitive air dust, fire hazard, animal menace, greenhouse gas emissions, etc. The SWM Rules, 2016 mandated that only the non-usable, non-recyclable, non-biodegradable, non-combustible and non-

⁸⁴ Kozhikode, Kochi Corporations, Kayamkulam, Mavelikkara, Muvattupuzha Municipalities

reactive inert waste and pre-processing rejects and residues from waste processing facilities, were to be sent to sanitary landfill.

Audit observed that sanitary landfill for disposal of rejects/residual waste has not been set up in the State so far. In the absence of sanitary landfill, test-checked ULBs dumped rejects and street sweepings at the dumpsites and centralised/community level processing facilities. Instances of dumping inert sweeping waste and drain silt in private lands and land owned by the ULB were noticed in Thiruvananthapuram and Kozhikode Corporations. Mixed waste including plastic bottles, e-waste, etc. were sent by local bodies to the landfill facility of KEIL. Imprudent utilisation of the only hazardous landfill facility in the State for disposing unsegregated and non-hazardous waste would lead to dearth of space for hazardous waste disposal in future.

Government informed in the exit conference (May 2022) that efforts of the State to purchase land to set up landfill facility have not yet succeeded, due to the difficulty in identifying suitable land for the purpose, on account of the density and spread of population in the State. The reply is not acceptable as the delay in identification of land to establish scientific landfills atleast at regional levels, would contribute to unscientific and non-sustainable disposal of waste as observed by Audit.

Unsegregated waste dumped at processing centre



Brahmapuram (November 2021)



Erumakuzhy, Thiruvananthapuram (July 2021)

Recommendation 8: Government/ULBs must ensure to provide adequate resources to implement source level treatment facilities for processing of biodegradable waste and handhold households/institutions for effective utilisation of the facilities provided. Government must also set up adequate

number of community level facilities for processing spill over waste from all sources.

Recommendation 9: Government must ensure that mixed waste generated gets segregated at source points itself and biodegradable waste alone reach the Centralised processing plants at Brahmapuram and Njaliyanparamba. Government must also urge the Corporations to set up Leachate treatment plants to treat the leachate generated, thereby preventing pollution of nearby water bodies and farmlands.