

**1653**

BEFORE THE NATIONAL GREEN TRIBUNAL

AT NEW DELHI.

ORIGINAL APPLICATION NO. 606 OF 2018

**IN THE MATTER OF:**

COMPLIANCE OF MUNICIPAL SOLID WASTE MANAGEMENT  
RULES, 2016 AND OTHER ENVIRONMENTAL ISSUES.

**REPORT FILED BY THE RESPONDENT STATE OF KERALA**

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## 1. INTRODUCTION

In response to NGT OA 606/2018, a pivotal case addressing the imperative implementation of Solid and Liquid Waste Management, the State of Kerala has taken significant steps to bridge the existing gaps in waste management infrastructure. Recognizing the urgency of the matter, the State has not only committed to ring-fenced financial allocations but has also embarked on comprehensive projects aimed at addressing the challenges outlined in the National Green Tribunal's directive. This collection of reports serves to detail the progress made by the State in waste management endeavors, providing a detailed overview of the initiatives undertaken and the status of implementation as of January 31, 2024.

## 2. SOLID WASTE MANAGEMENT

### 2.1 The ring-fenced amount and its utilization in ULBs

Table 2. Ring-fenced amount and its utilization in ULBs

Sl.No.	Component	Parameter	As per last report 16.08.2023			Progress as on 01.02.2024			Remarks
			No	Qty (in L MT)	Fund earmarked (Cr)	No	Qty (in L MT)	Fund expended (Cr)	
1	Legacy waste	Total identified legacy dumpsites	44	7.51	15.15	44	7.51	11.49	For clearing the existing legacy dumpsites, projects worth ₹120 cr have been taken up under KWSMP and projects worth ₹56.60 cr taken up under other funds. In 12 sites pending for remediation, process has been initiated after tying up of the funds..
		Remediation completed	18	2.46		18	2.46		
		Remediation started	6	2.38		12	3.42		
		To be remediated	20	2.67		14	1.63		

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2	SWM	Solid waste generated	(Qty in MT)	Fund earmarked (Cr)	(Qty in MT)	Fund expended (Cr)	Full earmarked fund of 2.67 Cr. expended. Additional Processing facility is being set up to cover future projections of waste generation
			3472	2.67	3472	2.67	
		Solid waste processing capacity	3205		3797		
GAP (TPD)	267	0					

As part of dumpsite identification, 44 legacy waste dump sites were identified. As part of a planned process, remediation by biomining has been completed on 18 sites. The quantity of waste processed at these sites is 2.46 lakh tonnes. The remediation work is ongoing in 12 sites. The quantity of waste processed on these sites is 3.42 lakh tonnes. The remediation process is initiated in 14 sites. The quantity of waste to be processed at these sites is 1.63 lakh tonnes. Total fund expended for legacy waste remediation is Rs 11.49 Cr. For clearing the existing legacy dumpsites, projects worth ₹120 Cr have been taken up under KSWMP and projects worth ₹56.60 Cr taken up under other funds. Total fund earmarked for legacy waste remediation is Rs 176.60 Cr.

With the available financial support from central and state, 2625 TPD capacity bio waste management facilities have already been installed at household, institutional and community levels in urban areas. In addition to that, from 401 TPD poultry slaughter waste is converted to various products such as pet feed, protein supplement, compost etc. For managing the dry waste including public and private sector there are 771 TPD capacity processing facilities have been established in the urban areas. As a whole 3797 TPD waste management facilities are in urban areas, to cater to the present waste generated.

## 2.2 Introduction

Kerala's densely populated settlements and the rural-urban continuum contribute to this substantial waste output. This waste consists of both organic and inorganic components. Approximately 77% of the waste generated is organic material and remaining 23% is inorganic waste including 5% reject material, which has a combustibility rate of 79.2%.

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3823 TPD of waste is produced in urban LSGIs based on the present population. Out of 3823 TPD waste generated, 2944 TPD is bio waste and 879 TPD is non bio waste including reject.

The Government of Kerala on 8th December 2023 passed Amendment Ordinances to the Kerala Municipality Act and the Kerala Panchayat Raj Act. They are both now before the ongoing session of the Kerala State Legislative Assembly. The Amendments have brought in some changes to the existing law. The main changes are as follows: Spot fine amount which was Rs 250 earlier has been increased to Rs. 5000 both in rural and urban areas. The fine amount for dumping has been increased to Rs. 50000 from Rs. 25000. This is keeping in line with the actual damage to the environment resulting from the crime. Under the revised law, all persons alike are now mandated to hand over waste to the local body or their authorized agency and are to maintain systems at home for this. This is keeping in line with the knowledge that all human beings are in today's consumeristic world waste generators and if at all they are not handing over at least non-biodegradable waste to the local body, they would be likely to dispose of it unscientifically elsewhere.

Penalties have also been introduced in the law for non-payment of user fee. Further, the Secretary of the local body is vested with the power to refuse any other services from the local body in case of non-payment of user fee for waste management services availed. In case of the local bodies defaulting on taking action in accordance with the instructions of the State government, fine can be imposed upon the local body as well. Further, considering the increasing number of celebrations and functions in the State, a provision has been introduced that whoever organises any event with more than 100 persons in attendance needs to inform the local body 3 days in advance and hand over the requisite user fee to the local body for waste handling. Shops and establishments have to now ensure that their premises are kept litter free and that customers visiting their establishments also do not litter.

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The state of Kerala adopts a decentralized waste management approach for handling wet waste. Various types of composting devices and smaller capacity biogas units are used for managing the wet waste at source. The compost produced by household waste treatment is utilised as manure for cultivation in the respective residences. 80% of the total bio waste generated at households is being managed at source. The remaining 20% and waste generated from community facilities are the responsibility of LSGIs. Based on the land availability, medium capacity decentralized composting facilities such as aerobic compost units, organic waste converters, windrow plants, biomethanation facilities etc are established at community level widely in Kerala. The compost generated from the treatment of waste at community facilities is branded and marketed as manure at Pattambi municipality, Wadakkanchery municipality, Perinthalmanna municipality and Munnar GP, and compost produced from many other facilities are being supplied to farmers groups free of cost.

Table 3. Details of Existing Waste Management Facilities (HH facilities not included)

Sl. No.	Waste management facility	Urban LBs		Rural LBs	
		No of units	Capacity (TPD)	No of units	Capacity (TPD)
<b>I.</b>	<b>Wet Waste Management</b>				
<b>A</b>	<b>Composting Facilities</b>				
	a. Household level composting devices	392750	907	1858310	2787
	b. Compost pits	495940	480	1845281	1845
	c. Institutional Composting Facilities	28420	83	694	2
	d. Community Level composting facilities	793	458	365	18
	e. Centralized composting facilities	24	228	103	52
	<b>Total capacity of composting facilities</b>		<b>2156</b>		<b>4704</b>
<b>B</b>	<b>Bio methanation Facilities</b>				
	a. Household level	77250	386	57406	57

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	Biomethanation facilities				
	b. Community Level Biomethanation facilities	117	58	310	78
	c. Centralized Biomethanation facilities	4	25	7	7
	<b>Total capacity of Biomethanation facilities</b>		<b>469</b>		<b>142</b>
<b>C</b>	Rendering plants	20	401	20	401
	<b>Total Bio waste processing facilities</b>		<b>3026</b>		<b>5247</b>
<b>II</b>	<b>Dry Waste Management</b>				
<b>A</b>	Dry waste processing facilities (Public Sector)	348	696	1800	1385
<b>B</b>	Dry waste processing facilities (Private Sector)	30	60	18	36
<b>C</b>	Sanitary waste disposal Facility (Community Level)	1	5	0	0
<b>D</b>	Sanitary waste disposal Facility (Institutional Level)	3272	10	17897	54
	<b>Total Dry waste processing facilities</b>		<b>771</b>		<b>1475</b>
	<b>Total Capacity of Existing facilities</b>		<b>3797</b>		<b>6722</b>

With the available financial support from central and state, 2625 TPD capacity bio waste management facilities have already been installed at household, institutional and community levels in urban areas. In addition to that, 401 TPD poultry slaughter waste is converted to various products such as pet feed, protein supplement, compost etc.. For managing the dry waste including public and private sector there are 771 TPD capacity processing facilities established in the urban areas. As a whole 3797 TPD waste management facilities are in urban areas, to cater to the present waste generated.

Local bodies, with the assistance of women's self-help groups known as Harita Karma Sena, manage the collection of dry waste from households and establishments. There are over 35000 Haritha karma sena engaged in the State by the LSGs. The collected waste

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undergoes segregation at Material Collection Facilities (MCFs) and Resource Recovery Facilities (RRFs). Recyclable waste is sent to recycling units, while non-recyclable waste is directed to co-processing facilities, such as cement plants for energy recovery. To address specific waste components like sanitary waste, e-waste, construction & demolition waste, and hair waste, private partnerships are encouraged, and a partnership framework is being developed to facilitate action at the LSG level. The reject waste generated statewide in households/shops are segregated at MCFs and are sent to cement factories for onward utilization for energy generation.

Table 4. Quantity of Reject Waste transferred to Cement Plants from January 2023 to December 2023

Quantity of Reject Waste transferred	Govt sector	29,826 Tonnes
	By Pvt Sector	18,205 Tonnes
	<b>Total</b>	<b>48,031 Tonnes</b>

Projects have been taken up by LSGIs in all districts for effectively addressing the gap in the processing capacity.

Table 5. Details of Projects Undertaken by LSGI's for solid waste management (Excluding World Bank)

Name of Districts	Biomethanation		Composting		MCF/RRF/ MRF/Mini MCF		Sanitary	
	No. of Projects	Fund Earmarked (in Rs)	No. of Projects	Fund Earmarked (in Rs)	No. of Projects	Fund Earmarked (in Rs)	No. of Projects	Fund Earmarked (in Rs)
Thiruvananthapuram	76	45676434	245	263512921	205	256914050	7	13970925
Kollam	12	28165206	52	76370924	156	127928818	13	32684045

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Pathanamthitta	3	2151062	7	27485623	20	19019521	2	5398091
Alappuzha	4	7865200	12	72602977	33	57928247	1	600000
Kottayam	2	700000	8	6006399	9	4324813	1	100000
Idukki	2	5000000	1	5583750	15	10100893	1	650000
Ernakulam	8	24713033	14	38229878	36	55856234	3	350000
Thrissur	8	18865944	24	101533565	68	102300901	4	2177774
Palakkad	-	-	7	21260294	24	28838153	3	15083344
Malappuram	2	463000	15	115701485	16	38340116	-	-
Kozhikode	6	848600	9	29458635	37	89730235	3	2735324
Wayanad	-	-	2	3742500	2	5000000	-	-
Kannur	3	2950000	17	84310090	29	51964428	3	9992350
Kasargod	2	185000	2	11456000	10	22091140	-	-
<b>Total</b>	<b>128</b>	<b>137583479</b>	<b>415</b>	<b>857255041</b>	<b>660</b>	<b>870337549</b>	<b>41</b>	<b>83741853</b>

Statewide 128 nos of biomethanation projects, 415 nos of composting projects, 660 nos of MCF/MRF and 41 nos sanitary waste treatment plants have been proposed by various LSGIs. In order to manage the waste generated including the future requirements, projects have been planned & proposed in local bodies. Projects worth ₹ 99.48 cr have been taken up in local bodies for wet waste management and ₹95.40 cr have been taken up in local bodies for dry waste management. A total outlay of 194.89 cr has been earmarked for these projects. Under KSWMP projects worth ₹2400 cr have been taken up for waste management.

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As part of the KSWMP funded by World Bank, a total outlay of 2400 cr has been earmarked for capacity building, procurement of SWM goods, dumpsite remediation and regional infrastructure.

### 2.3 Dumpsites Remediation

Legacy dump sites are remediated by biomining, in which microorganisms and natural processes are used to excavate, treat, segregate, and recover valuable materials from old, accumulated waste dumps (landfills). These legacy wastes contain organic matter, plastics, metals, and other materials that have been compacted and decomposed over decades.

As part of dumpsite identification, 44 legacy waste dump sites were identified. As part of a planned process, remediation by biomining has been completed on 18 sites. The quantity of waste processed at these sites is 2.46 lakh tonnes. The remediation work is ongoing in 12 sites. The quantity of waste processed on these sites is 3.42 lakh tonnes. The remediation process is initiated in 14 sites. The quantity of waste to be processed at these sites is 1.63 lakh tonnes. Total fund expended for legacy waste remediation is Rs 11.49 Cr. For clearing the existing legacy dumpsites, projects worth ₹120 Cr have been taken up under KWSMP and projects worth ₹56.60 Cr taken up under other funds. Total fund earmarked for legacy waste remediation is Rs 176.60 Cr.

The processed waste soil from bio mining is used for soil filling at various locations. Specific interventions have been done at Brahmapuram and remediation by biomining is in progress there. The biomining is successfully completed in Kureepuzha, Kollam and a total quantity of 92,874 T of legacy waste has been processed as part of this project. The total waste has been successfully segregated into soil, stones, RDF, glass aggregate, plastic aggregate, OBMS aggregate, S S aggregate, tyre aggregate, wood aggregate and footwear and a total of 74,093.00 T has been disposed of and remaining quantity is stocked.

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## 2.4 Other interventions taken by the State in Solid Waste Management

### 2.4.1 Door-to-Door Waste Collection

In the fiscal year 2023–2024, there has been a significant increase in door-to-door waste collection coverage across the State including in rural areas. Haritha Mithram app facilitated developing systematic and professional approach on customized strategies for increasing the D2D coverage, user fee collection, segregated material movement, and scheduled transportation of waste from door steps to disposal facilities. During this period, the volume of dry waste delivered to MCF/RRF facilities has correspondingly risen. To accommodate the increased amount of collected waste, an additional 41 godowns were established. Currently, there are 57 godowns with a combined area of 4,97,000 sqft to effectively manage the heightened volume of waste.

Table 7: Details of Solid Waste Management facilities in the state

Facility	Up to March 2023	Up to Jan 2024
RRF	93 Nos	167 Nos
MCF	1182 Nos	1981 Nos
Mini MCF	9357 Nos	20904 Nos
Godown facility	16 Nos	57 Nos
Godown Area	85,250 sqft	4,97,000 sqft

The state has made significant investments in infrastructure for the storage of dry waste. Currently, there are 167 Resource Recovery Facilities (RRF), 1981 Material Collection Facilities (MCF), 20904 Mini Material Collection Facilities (Mini MCF), and 57 storage godowns covering an area of 4,97,000 square feet.

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#### 2.4.2 Registration of Unauthorized Dealers

Scrap dealers are pivotal in the non-biodegradable waste management process in Kerala, contributing significantly to the collection and processing of waste. They engage in collecting, sorting, and processing diverse scrap materials, such as metals, paper, plastics, and electronics, contributing to the reduction of waste reaching the mainstream. Efforts are underway to register them officially and evaluate the volume of waste they manage.

#### 2.4.3 Lifting Plan and Forward Linkage

The transfer of waste from mini MCF to MCF and RRFs faced inefficiencies due to insufficient vehicle resources and a lack of professionalism. Through the assistance of Haritha Sahayasthapanams, a systematic plan for waste lifting has been devised and implemented. Additionally, a seamless disposal process for segregated waste has been established by identifying appropriate disposal facilities and recycling markets. To efficiently handle non-recyclable rejects, plans are underway to propose RDF plants at the district level.

Non-recyclable plastic waste is shredded in the MCF/RRFs and is used for the tarring of PWD and LSGD roads. During the period 2016-2023, Clean Kerala Company Limited (CKCL) has produced 34443.142 T of shredded plastics and given to various agencies (NHAI- 12-18 T, PWD-947.76 T, LSGI-1151.2 T). The total length of polymerized road constructed during this period using shredded plastic is 3838.04 km.

#### 2.4.4 MCF Modernization

Most of the MCF/RRF facilities faced a shortage of sufficient space and machinery to handle the increased volume of waste. Technical measures have been implemented to recognize these gaps and upgrade the existing facilities. New projects have been initiated to address and bridge these gaps. 660 projects are taken up for an amount 87,03,37,549/- of this year for the construction of new MCFs and improvement and maintenance of existing MCFs.

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#### 2.4.5 GPS Tracking Facility

To control the illegal dumping of waste, GPS tracking systems have been mandated for vehicles transporting waste. The Kerala State Pollution Control Board has created a web portal for real-time monitoring of waste-carrying vehicles, both interstate and intrastate. Additionally, vehicles involved in the transfer of non-bio waste have been equipped with security stickers embedded with holograms.

#### 2.4.6 IEC Interventions

IEC initiatives have been intensified to improve door-to-door waste collection and eliminate open littering.

- An incentive program has been instituted to encourage public engagement in identifying Garbage Vulnerable Points.
- Technical assistance has been provided to BWGs to strategize and establish waste management facilities independently.
- For effective waste management, private partnership has been ensured
- Ranking of LSGIs based on their performance on waste management
- Ranking of public and private sector institutions based on cleanliness index
- 100% User Fee challenge among LSGIs

#### 2.4.7 Enforcement Action

To enforce waste management regulations and prevent open dumping, 23 squads were established in March 2023 to undertake enforcement actions. Single-use items constitute a significant portion of the waste discarded on roadsides. The enforcement team has conducted 33,405 inspections to date, identifying 9,078 violations and punishment actions have been taken. A fine amounting to Rs. 1,04,55,622/- has been collected. Additionally, approximately 161,456 kgs of single-use plastic items have been seized as a result of these enforcement efforts.

Control rooms have been decided to be set up at the District and Local Self-Government levels to closely monitor the existing collection of waste and their proper disposal.

Control rooms are functioning effectively in 16 local self-government bodies, which are taken as pilot projects.

#### 2.4.8 Clearing and beautification of Garbage Vulnerable Points

With active public participation in a mass campaign in which the garbage points were uploaded onto a portal, 5512 garbage vulnerable points were pinpointed, of which 4993 were cleared. Another 2400 locations underwent clearing and beautification efforts, with students and environmentalists playing a crucial role, converting them into 'sneharaamams'. The once unsightly wayside waste heaps transformed into attractive gardens, conveying a significant message on cleanliness to the public. The operation and maintenance (O&M) of each of these parks are scheduled to be carried out with the support of LSGIs, Resident Welfare Associations, trade unions, NGOs, etc.

#### 2.4.9 Sanitary Waste Management

An incinerator plant for sanitary waste has been established in Palakkad district. Following satisfactory monitoring of its operation, new plants are now being proposed in all districts. The total number of planned projects for implementation in the state is 57. These plants will have a cumulative capacity of 44.80 TPD.

Table 8. Community Level Sanitary Waste Incinerator Projects taken in local bodies

SI No.	Name of District	Total Projects taken up in districts	Capacity (TPD)
1	Thiruvananthapuram	4	3.3
2	Kollam	8	5
3	Pathanamthitta	4	1.5
4	Alappuzha	5	3.5
5	Kottayam	4	4
6	Idukki	2	2

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7	Ernakulam	3	4
8	Thrissur	4	4
9	Palakkad	3	2
10	Malappuram	5	5
11	Kozhikode	8	6
12	Wayanad	1	1
13	Kannur	5	2.5
14	Kasargod	1	1
<b>TOTAL</b>		<b>57</b>	<b>44.80</b>

#### 2.4.10 Rendering plants

Meat rendering plants process animal by-product materials for the production of tallow, grease, and high-protein meat and bone meal. Plants operate in conjunction with animal slaughterhouses or poultry processing plants. The Government of Kerala developed guidelines for the operation of rendering plants which led to the standardization of facilities. The facilities use wastes as an input material to create valuable products as new outputs. The aim of resource-recovery is to reduce the amount of waste generated and optimize the values created from waste. Here, the newly functioning plants lead to the management of around 800 TPD of poultry waste which would have ended-up as waste and created a menace to the people.

Table 9. Details of Existing Rendering Plants

District	Plant Details	
	No.	Capacity
Thiruvananthapuram	0	0
Kollam	2	9
Pathanamthitta	1	30
Alappuzha	0	0

Kottayam	0	0
Idukki	0	0
Ernakulam	7	216
Thrissur	2	5
Palakkad	7	103
Malappuram	15	204
Kozhikode	1	60
Wayanad	1	12
Kannur	2	54
Kasargod	2	110
	40	802

Rendering plants are available in 10 districts and the waste from other 4 districts are also processed through these plants.

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## Annexures

## 1. Remediation Completed Sites

Sl. No.	District	Name of Local Body	Name of Location	Area Covered (in sq. meter)	Volume of Waste (in cubic meter)	Status of Remediation	Fund earmarked	Fund expended	Source of Fund
1	TVM	Thiruvananthapuram	Palayam market	405	9608	Completed	7500000	6600000	Smart city
2	TVM	Thiruvananthapuram	Erumakuzhi, near chala market	2429.56	1800	Completed	1000000	1100000	TMC (Own fund)
3	KLM	Kollam	Kureepuzha	22258.5	148106.88	Completed	73200000	0	SBM 2.0, Own fund, CFC fund
4	KKD	Kozhikode	Kalliyi, Ward-56, beside the river	40	20	Completed	10000	10000	Own fund
5	PTA	Pathanamthitta	Near Mini stadium	1000	500	Completed	0	0	0
6	PTA	Pandalam	Near RRF Unit	400	800	Completed	0	585000	Own fund
7	TSR	Guruvayoor	Choolpuram	13638	27276	Completed	0	1200000	Own fund
8	PLK	Pattambi	Shangaramangalam	2215	2082.3	Completed	576985	505590	CFC Tied Grant
9	MLP	Perinthalmanna	Kunnappalli	40480	400	Completed	2000000	2000000	Own fund
10	KKD	Koyilandi	Below Bridge	50	50	Completed	10000	10000	Own fund
11	ERKM	Kalamassery	Kalamassery	11209.79	70000	Completed	20000000	19600000	0
12	PTA	Adoor	Kaimalapara, Ward no. 2	100	1000	Completed	0	0	0
13	MLP	Manjeri	Vettekkode	20100	5000	Tendered	80000000	0	KSWMP
14	WYD	Kalpetta	Vellaramkunnu	12140.6	36422	Yet to Start	2,10,54,202	0	KSWMP
15	MLP	Tirur	Trenching Ground, Ottilathara	16187	60	Agency selected	4387513	0	SBM U 2.0,
16	MLP	Malappuram	Near Inkel City, Ward 38, Puliyettummal	13000	65	Tendered	40000000	0	KSWMP

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17	TSR	Kodungalloor	Pullut, Chappara	20000	60000	started	2160000	0	SBM (U) 2.0
18	KKD	Kozhikode	Njaliyanparabu	72843.4	130000	Completed	0	37422000	SBM fund, Plan fund

## 2. Remediation Work in Progress

Sl. No.	District	Name of Local Body	Name of Location	Area Covered (in sq. meter)	Volume of Waste (in cubic meter)	Status of Remediation	Fund earmarked	Fund expended	Source of Fund
1	PLK	Ottapalam	Panamanna	4047	3000	50% work completed in Phase-1 (CFC Tied grant). Remaining work started and is ongoing by MCK Kutty, Kozhikode.	16500000	7000000	SBM (U) 2.0, CFC Tied Grant
2	TVM	Attingal	Chudukad	1619	18500	50% land cleared in 1st phase completed for 7800 m3. Second phase work order given.	12500000	6874523	SBM (U)
3	TSR	Chavakkad	Chavakkad	872	4210	97%	5500000	1273675	Urban Agglomeration fund
4	ALP	Alappuzha	Sarvodayapuram	48500	22500	90% completed	74000000	9106000	SBM (U) 2.0. Suchitwa Keralam (U) -1 crore bill submitted

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5	TSR	Thrissur	Laloor	1014.2	39000	87%	50000000	12400000	SBM 2.0, Own fund
6	TSR	Kodungulloor	T.K.S. PURAM	6475	1214.055	87%	2160000	0	SBM (U) 2.0
7	KNR	Kannur	Chelora	97124	1,20,323	50% completed	91934590	9199895	CFC Tied Grant
8	KNR	Thalassery	Punnoolpetty palam	22500	56788	Started	64725936	0	SBM & UA
9	ERKM	Kothamangalam	Kumbalathumuri	10117.1	25000	Started	51700000	0	SBM, KSWMP
10	ERKM	Kochi	Brahmapuram	64749.7	413927	Restarted	450000000		SBM, Plan fund, CFC
11	KTM	Kottayam	Vadavathoor	20560	80000	Started (10% completed)	14500000	0	SBM
12	KSGD	Kanhangad	Trenching Ground Chemmattam vayal	2800	4285	Started (just started)	5600000	0	CFC Fund

### 3. Remediation Work about to start

Sl. No.	District	Name of Local Body	Name of Location	Area Covered (in sq. meter)	Volume of Waste (in cubic meter)	Status of Remediation	Fund earmarked	Fund expended	Source of Fund
1	ALP	Kayamkulam	Murukkummoodu	3237	7300	Mou signed. Work will start on 14.03.2024	25000000	0	KSWMP
2	IDK	Thodupuzha	Parakadavu	4856	28000	Agreement executed. Yet to start	28350000	0	SBM & CFC
3	KNR	Mattannur	Karithurparamba	4815	19600	Agency selected	16000000	0	Urban agglomeration
4	IDK	Muvattupuzha	Kurianmala	26304.6	36000	Tender will open on 12/02/2023	108600000	0	SBM, KSWMP
5	TSR	Irinjalakkuda	Mangadikunnu,	6201	1485	Retender	10956000	0	SBM 2.0

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6	KTM	Changanacherry	Fathimapuram	1600	7300	Retender	8663000	0	SBM & CFC
7	KTM	Erattupetta	Thevarrupara	1416	77058	Retender	7600000	0	SBM & CFC
8	IDK	Kattappana	Puliyannala	3600	9500	Need to retender	8317000	0	SBM, Own fund & CFC
9	KNR	Payyannur	Moorikkovval	4508	2625	Retender	8300000	0	CFC & UA
10	KNR	Iritty	Athithattu	265.95	3800	Tendered	5550000	0	KSWMP
11	KNR	Kuthuparambu	Palapparamba	14164	49000	Pre bidding completed	33300000	0	KSWMP
12	TSR	Kunnamkulam	Kunnamkulam	22257.7	16184	Yet to start	45000000	0	SBM & KSWMP
13	PLK	Palakkad	BPL Junction, Koottupatha, Kodumba	30505	57000	Yet to start	100000000	0	KSWMP
14	KSGD	Kasaragod	Kelugudde	6434	11226.368	DPR prepared	0	0	KSWMP

### 3. LIQUID WASTE MANAGEMENT

Of the Projected 3500 MLD of liquid waste generated in the State, to cater to the gap of 1011 MLD, the State has ring-fenced an amount of Rs 2343.18 in compliance with the NGT Order 01.12.2022 in OA No.606/2018(PZ). Accordingly, the existing gap of 1011 MLD will be fully covered by the year 2026. State has undertaken a synergetic effort to execute the committed targets and details are described below:

#### Ring Fenced Amount

The table below provides a summary of the ring-fenced amount of Rs 2343.18 in the State.

Ring fenced amount (Amount in Cr)	Expenditure (Amount in Cr)	Under construction (Amount in Cr)	Approved (Amount in Cr)	Total (Amount in Cr)
2343.18	288.33	501.14	1511.93	2301.40

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The funds of AMRUT, Swachh Bharat, Finance commission tied grants, LSG own funds and development grants, MGNREGS have been earmarked and utilised for this purpose.

Out of the total ring-fenced amount of Rs. 2343.18 Crore, projects worth Rs. 288.33 Crore (more than 12% of the ring fenced amount) for setting up treatment systems have either been completed and commissioned or part bills released. Projects worth Rs 501.14 Cr (more than 21% of the ring-fenced amount) are ongoing and progressing as per schedule. Rest of the projects worth Rs 1511.93 Cr (64.52%) have been approved by the competent authorities and implementation has just commenced or to commence soon.

### 3.1 Urban

93 ULBs generate 1058 MLD of liquid waste which is 224.01 MLD is being treated by the existing common STPs and individual STPs as per the MPR submitted by KSPCB for the month of November.

9 AMRUT cities are catered to by the Projects under AMRUT 1.0 & 2.0. ULBs have formulated Projects with different sources of funds such as SBM(urban), KIIFB, RKI, State Plan Funds, Local body funds, KMRL Funds. Details are described in the following sections.

#### 3.1.1. AMRUT 1.0 & 2.0

The amount under AMRUT - 1.0 comes to Rs 340.60 cr against the earmarked amount of Rs. 412.06 cr due to the shifting of slow-starting projects to AMRUT -2.0. The overall expenditure as of 31.01.2024 stood at Rs. 209.61 Cr, out of which Rs. 23.60 Cr was expended during the past 6 months. This allocation caters to 10 STPs with a collective capacity of 27.70 MLD and septage co-treatment capability of 0.15 MLD. Allocation under AMRUT-1.0 also caters to 5 Faecal Sludge Treatment Plants(FSTPs) with a capacity of 0.32 MLD and sewer network initiatives under the sewerage and septage sector. Major Projects which were completed recently are the following.

- 5 MLD plants installed at Thiruvananthapuram Medical College & Elamkulam
- 2 MLD plant at Kozhikode Medical College with 100 KLD co-treatment facility
- 1 MLD plant at Padannapalam, Kannur

A major project of 12 MLD capacity is being constructed at Kureepuzha, Kollam which is currently at 87% of completion. The other ongoing project details are listed below.

- 1 MLD plant at Kozhikode Medical College

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- 1.1 MLD plant at Ambedkar Colony, Kochi Ernakulam

Under AMRUT -2.0, as on 31.01.2024, approval has been received from the Ministry of Housing and Urban Affairs(MoUHA) for sewerage and septage sector projects worth Rs.527.90 cr and Administrative sanction has been issued for projects worth Rs. 348.62 cr. Proposals to be submitted to MoHUA for approval under AMRUT-2.0 come to Rs. 579.08 Cr. Currently, there are 6 STP projects with a capacity of 67.635 MLD, 3 STPs with co-treatment facilities with a capacity of 0.429 MLD, and 2 Mobile FSTPs (capacity of 0.02 MLD). The expenditure incurred as on 31.01.2024 stood at Rs. 3.58 cr. Major projects are the following

- 3 projects in Kozhikode district having a capacity of 6,7,27 MLD for sewage treatment and 220 KLD of septage treatment
- 5 MLD plant at Maithanappally, Kannur with a Co-treatment capacity of 130 KLD
- 5 MLD plants at Elamkulam Ernakulam, Kottapuram & Guruvayoor , Thrissur, and Alissery Alappuzha.

### 3.1.2 Various Funds used in ULBs

#### 3.1.2.1 Institutional STPs

For the hassle free execution of institutional STPs, Suchitwa Mission has empaneled agencies for establishing packaged/ containerized sewage/wastewater treatment plants in establishments vested under LSGIs. As per the proceedings of the Executive Director Suchitwa Mission 4215/G/2022/SM dated 24.05.2023 and the GO (Rt) No. 1727/2023/LSGD packaged treatment plants can be implemented in the local body. Treatment plants with a total capacity of 0.582 MLD capacity are proposed by various ULBs. The cost of these projects comes up to Rs 8.489 Cr.

#### 3.1.2.2 SBM(Urban)

Proposals of 16 ULBs to establish STPs with a total capacity of 50.6 MLD have been approved in the SLTC held on 18.10.2023. Total project cost for these STPs as per SBM guidelines is Rs. 146.64 Cr. The estimate prepared by Kerala Water Authority (KWA) being on the higher side, SLTC intimated KWA to rework the STP technology and the cost to limit it within the SBM capping of Rs.2 Cr/MLD. Accordingly, KWA is reworking the estimates. Septage receiving facility for co-treatment at STP for 14 ULBs of total capacity 165 KLD has

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also been approved by the SLTC. The above proposals after SLTC approval were forwarded to MoHUA for fund release.

For the associated sewer network component, the average cost of laying sewer including the road restoration charges as per the estimate of KWA comes to Rs. 3.43 Cr per km. Since there is no SBM funding available for setting up the sewer network, the balance fund besides the available CFC fund will have to be pooled in by the State/ ULB. KWA is reworking the cost of the sewer network.

FSTP Proposals of 9 ULBs with a total capacity of 105 KLD have been approved by the SLTC and forwarded to MoHUA for fund release. The above proposals were considered in the National Advisory and Review Committee (NARC) of MoHUA held on 04.01.2024 and the formal approval is awaited from the Ministry as the minutes are yet to be shared with the States.

### **3.1.2.3 KMRL**

Under the purview of ULBs, a major project of 17.5 MLD capacity is being planned by Kochi Metro Rail Limited under the Integrated Urban Regeneration and Water Transport System (IURWTS) with the help of KIIFB funding. Collection system, laying of sewer lines, construction of manholes, sewage networks, sewerage connections etc. will also be set up as part of this project.

This project enhances the sewage treatment facility in the Kochi Corporation and is expected to bring out a permanent solution for preventing water pollution in major canals of Kochi Corporation that includes, Perandoor Canal and Edappally Canal. The overall project cost is Rs. 288.22 Cr

### **3.1.2.4 O&M for Treatment Plants**

The maintenance of the treatment plant is essential for the effective working of the plant. A total of 22.79 Cr has been utilized for the operation and maintenance of two plants - Muttathara Thiruvananthapuram and Wellington septage treatment plant.

### **3.1.2.5 RKI & KIIFB funding through Impact Kerala**

Impact Kerala is a special purpose vehicle (SPV) that deals with waste management activities and other infrastructure projects in the state. This uses the fund allocated from KIIFB and RKI for their work. In the field of waste management, Impact Kerala is involved in the

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construction of treatment plants. This agency has taken both STP projects and FSTP projects. A total of 7 projects worth Rs 66.54 Cr has been taken up including an ongoing FSTP project in Cherthala with a capacity 250 KLD. The total capacity catered by this agency is 5.37 MLD for sewage and 300 KLD for septage. 1.5 MLD plant at Ottapalam, Palakkad is one among the projects taken up by the agency.

### 3.1.2.6 Smart City

Smart City Mission has deposited Rs.7.17 cr to Kerala Water Authority for revamping of old sewer lines and laying new lines along the smart city roads in Thiruvananthapuram.

### 3.1.2.7. KWA Plan Fund

Government of Kerala had provided budget allocation to Kerala Water Authority for the improvement of the sewerage schemes and for the works for the prevention of river pollution and creating awareness for the compliance of NGT direction. This head is utilised for increasing the capacity of sewage pipe lines, extension of sewerage and reconstructing RCC manholes etc. Administrative sanction for an amount of Rs. 69.166 Cr has been accorded under the above heads during 2022-23 and 2023-24.

### 3.1.2.8 Biodigestors

Biodigester is a wastewater treatment system that uses microorganisms to break down organic matter, particularly faecal waste, in an anaerobic (oxygen-free) environment. This technology was developed by DRDO and is effectively implemented in the Indian Railway. Projects worth Rs. 87.00 lakhs have been taken up by the Kollam Municipal Corporation. Rupees Thirty-seven lakhs have been earmarked by Kollam Municipal Corporation for providing biodigester toilets to BPL houses near Ashtamudi Lake through Finance Commission Tied Grant. Rs. 50,00,000/- (Fifty Lakhs) has been allocated through Development Fund of Kollam Municipal Corporation (Finance Commission Tied Grant) for the works of installing septic tank /biodigester replacing leach pit of individual wards.

Panayam GP has proposed 105 number of biodigester costing Rs 1.05 Cr.

Coastal Panchayat of Karimkulam has installed 50 Nos of Biodigesters and is taking up project costing Rs. 1.00 Cr during 2024-25 for installing 200 Nos of biodigesters.

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### 3.1.2.9 Mobile Treatment Units(MTU)

In the prevailing scenario, certain regions face the critical challenge of inadequate access to centralized wastewater treatment facilities, including Fecal Sludge Treatment Plants (FSTPs) and Sewage Treatment Plants (STPs). Recognizing the urgency of addressing this infrastructure deficit, strategic plans are actively in progress to implement Mobile Treatment Units (MTUs) in these underserved areas. The Local Self Government Institutions (LSGIs) have spearheaded this initiative by proposing the deployment of 16 MTUs, reflecting a concerted effort to bridge the existing gap in wastewater treatment infrastructure.

- A substantial budget of Rs. 6.16 crore has been allocated to facilitate the deployment of sanitation solutions, emphasising a commitment to effective sanitation in the targeted regions.
- Work orders for the project have already been issued by two Local Self-Government Institutions (LSGIs), demonstrating a proactive approach to the imminent deployment of Mobile Treatment Units (MTUs).
- These MTUs collectively aim to treat the volume of 288 kiloliters of fecal sludge per day, showcasing the potential impact of this initiative on public health, environmental sustainability, and overall community well-being.

### 3.1.2.10 Lake Rejuvenation Projects by ULBs

For cleaning and upgrading the section from Manichithod to Ashtamudi Lake, a budget of Rs.1 Cr has been allotted. In addition to cleaning the canal, the project includes the installation of barricades at various places to prevent plastic waste from flowing in and the installation of nets on the side of the canal to prevent dumping of garbage. This work is in progress.

Rs. 50,00,000/- (Fifty Lakhs) has been allocated through Development Fund of Kollam Municipal Corporation (Finance Commission Tied Grant) for the construction of toilets and septic tank in the banks of Ashtamudi Lake and other coastal areas.

Kollam Corporation along with 12 neighbouring Panchayats have earmarked Rs.4.20 Crores for Ashtamudi lake cleaning. This project includes cleaning, restoration and protection of various places of the Kollam Corporation and nearby Panchayats on the banks of Ashtamudi

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Lake. This project is in progress. 48 jetties in the banks of Ashtamudi Lake have been cleaned under this project so far and 500 tonnes of garbage and 60 loads of plastic have been removed. Reconstruction of modern jetties is in progress. This project will enable Ashtamudi Lake and its surroundings to regain its glory.

### **3.2 Rural**

In the rural areas also several liquid waste management activities are taken up. The components monitoring the rural area include SBM Gramin, Panchayat Raj Institutes (i.e, Local Bodies), and MGNREGS. The total fund allocated in the rural region sums up to 646.57 Crores. As per the current status, projects worth 157.85 Cr are approved in SBM G and 24.78 Cr are approved in rural local bodies.

#### **3.2.1 SBM(Grameen)**

SBM Grameen fund is a centrally sponsored fund under Swachh Bharath Mission focusing the sanitation and hygiene in the rural areas. The prime focus of this fund is to be utilised in the implementation of Faecal Sludge Treatment plants across the state. Under this 25 projects are approved and 20 other projects are in consideration. With this, a total of 2638 KLD of septage can be treated.

#### **3.2.2 Panchayat Raj Institutions(PRIs)**

These are the local self-government bodies (LSGs) which ensure the public health and basic needs of the people come under their jurisdiction. Under these several institutions like Family health centre, Auditoriums, Hospitals, Schools etc exist. The waste management activities in these bodies come under the purview of local body and projects were taken up.

#### **3.2.3 Institutional STPs**

A total of 1.859 MLD is being proposed to be treated in various local bodies. Additionally

#### **3.2.4 Mobile Treatment Units**

2 mobile treatment units are approved in the 2 rural local bodies worth 0.9 Crores.

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### 3.2.5 Biodigestors

A biodigester is a waste treatment system that uses microorganisms to break down organic matter, particularly human waste, in an anaerobic (oxygen-free) environment.

Rupees Thirty-seven lakhs have been earmarked by Kollam Municipal Corporation for providing biodigester toilets to BPL houses near Ashtamudi Lake through Finance Commission Tied Grant. Panayam GP has proposed 105 number of biodigester costing Rs 1.05 Cr. Rs. 50,00,000/- (Fifty Lakhs) has been allocated through Development Fund of Kollam Municipal Corporation (Finance Commission Tied Grant) for the works of installing septic tank /biodigester replacing leach pit of individual wards. Coastal Panchayat of Karimkulam has installed 50 Nos of Biodigesters.

### 3.2.6 RKI (Rebuild Kerala Initiative)

Impact Kerala has also approved an STP of worth 11.55 Crores for treating the sewage of 590 KLD.

### 3.2.7 MGNREGS

In regions earmarked for the establishment of Fecal Sludge Treatment Plants (FSTPs), it is imperative to implement a comprehensive strategy for the effective management of greywater. To address this crucial aspect of decentralized wastewater management, a total of 53,662 household-level soak pits, with an investment of Rs. 48.295 crore, have been strategically constructed. Simultaneously, 3,392 community-level Grey Water Management (GWM) systems have been implemented at a cost of Rs. 10.17 crore under MGNREGS & SBM G. These endeavors signify a significant financial commitment to ensuring the separate and efficient treatment of greywater in areas where FSTPs are anticipated. The construction of household-level soak pits and community-level GWM systems not only aligns with environmental sustainability goals but also contributes to the overall improvement of decentralized wastewater infrastructure, reinforcing the state's commitment to holistic and efficient sanitation practices.

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## Other Interventions by State

### Water Quality Improvement

In the year 2018, there were 21 polluted river stretches in the state in different priority levels. Action plans were formulated for these polluted river stretches and being implemented by Stakeholder departments. As a result of continuous efforts in control of pollution of water bodies the water quality has improved. As per CPCB report on Polluted River Stretches for restoration of water quality 2022, 11 river stretches were delisted from the list of polluted river stretches. 8 new river stretches were newly added, but at the lowest priority level. Total number of polluted river stretches is reduced to 18. Karamana river stretch (Priority I to III), Kadambayar (Priority IV to V), and Manimala (Priority IV to V) are shifted to lower priority, 2 rivers are added in priority IV and 6 rivers in priority V. As per the new list there is no river in Priority 1 and 2.

On comparing the water quality data published by Kerala State Pollution Control Board for 169 stations in rivers for the months of August 2023 and November 2023, drastic reduction in faecal coliform in 111 stations have been observed; i.e., about 65.68% reduction.

### Information Education Communication (IEC) Programs and Capacity Building (CB) Programs

The State has executed over 165 Information, Education, and Communication (IEC) and capacity-building (CB) programs throughout its regions, showcasing a concerted effort towards enhancing Liquid Waste Management (LWM) initiatives. Notably, districts in Kerala have adopted a comprehensive and diverse strategy to elevate LWM through the implementation of IEC programs and capacity-building initiatives.

697 elected representatives and officials visited operational Faecal Sludge Treatment Plants (FSTPs) and LWM facilities both within and outside the State in an attempt to reduce local resistance to such projects.

A rigorous campaign titled "Malam Bhootham" was launched to underscore the perils of faecal contamination and emphasize the imperative for immediate intervention.

The Liquid Waste Management Campaign, named "Thelineer Ozhukum Nava Keralam." conducted a community based analysis of water quality in various bodies, enabling the identification of pollution sources.

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### **Prevention of Marine Littering**

Govt. of Kerala along with German Company Plastic Fischer, initiated the Trivandrum Project in 2022, aiming to combat marine plastic pollution. By deploying TrashBoom systems in the identified locations, Plastic Fischer successfully collected and managed a total of 257 tons of plastic material from rivers, riverbanks, and beach cleanups until the end of 2023. Plastic Fischer obtained the required Govt. permits and deployed 18 TrashBoom systems. Out of the total collected plastic material, 12 tons of plastic were recycled while 245 tons of non-recyclable material were sent to co-processing at cement plants.

On 1 June 2023, “No More Beach Cleanups” was officially launched along the coastal line of city of Thiruvananthapuram in participation with GIZ to demonstrate behavioural change focused on awareness and action, beach clean-ups, youth mobilization, community engagement and promotion of plastic alternatives in selected locations. In participation with GIZ, at 8 beach locations 44 beach cleanup drives were conducted in Trivandrum involving 2831 volunteers and 11.15 tonnes of waste were removed.

Under the GIZ project, NCSCM joined hands in G20 beach clean-up. The clean-up drive was conducted at three beaches in Kerala -Trivandrum, Alappuzha, and Fort Kochi in Kerala (More than 500 volunteers across three beaches collected litter weighing around 1710 kg).

The compliance efforts undertaken by the State of Kerala towards addressing liquid waste management as mandated by the Hon. National Green Tribunal (NGT) Order 01.12.2022 in OA No.606/2018(PZ) is concluding as follows:

### **Ring-Fenced Amount and Spending:**

- The State has ring-fenced Rs. 2343.18 Crore to fulfil the gap of 1011 MLD in liquid waste treatment capacity by 2026. Currently Project worth of Rs. 2301.40 Crore has been taken up in the state.
- More than 12% of the allocated funds have been used to complete or partially establish treatment systems.
- Projects worth over 21% are ongoing and progressing as planned.
- Remaining projects (over 64%) have been approved and implementation has commenced or will soon begin.
- AMRUT 1.0 & 2.0: Projects worth Rs. 1106.87 Crore are underway to establish STPs, FSTPs, and sewer networks.

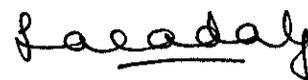
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- Various Funds Used in ULBs: Institutional STPs, SBM (Urban), KMRL projects, O&M for treatment plants, and biodigesters are being implemented with various funding sources.
- Smart City Mission and KWA Plan Fund are also contributing to infrastructure upgrades.
- Over 53,000 soak pits and 3,392 GWM systems have been constructed under MGNREGS & SBM G.

Overall, the State of Kerala has demonstrated significant progress in fulfilling its NGT-mandated obligations for liquid waste management. With ongoing and planned projects, the targeted gap in treatment capacity is expected to be bridged by 2026. Continued efforts to address challenges like land acquisition are crucial for ensuring the success of this initiative. The consolidated details of projects taken up for LWM so far out of the Ring fenced allocations are as below:

1. AMRUT 1.0 - Rs. 340.60 Cr
2. AMRUT 2.0- Rs.1106.87 Cr
3. ULB- Rs. 622.73 Cr
4. SBM Grameen - Rs. 157.858 Cr
5. PRI- Rs. 25.06 Cr
6. MGNREGS- Rs. 48.29 Cr

This report presents the actions undertaken by the State of Kerala to address solid as well as liquid waste management, as directed by the Hon. National Green Tribunal (NGT) Order dated 01.12.2022 in Original Application No. 606/2018(PZ). It outlines the progress made in bridging gaps in the mandated capacity, specific initiatives implemented in urban and rural areas, and other interventions aiming to improve solid and liquid waste management in the State.



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FOR STATE OF KERALA