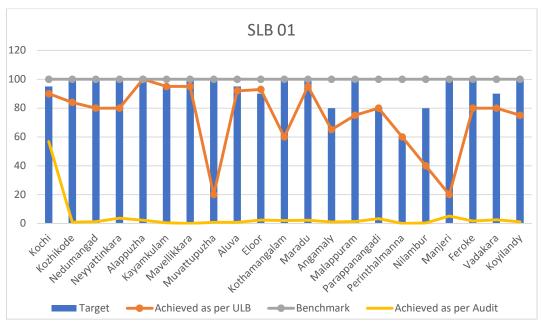
Appendix 1 Service Level Benchmarking performance indicators and benchmarks pertaining to Solid Waste Management (Reference: Paragraph 2.1.3.2, Page 12)

Sl. No.	Performance indicator	Unit as percentage of	Benchmark (in <i>per cent</i>)
1	Household level coverage of Solid Waste Management (SWM) services	Households and establishments covered by daily doorstep collection system	100
2	Efficiency of collection of municipal solid waste	Total waste collected against waste generated within the project area	100
3	Extent of segregation of municipal solid waste	Households and establishments that segregate their waste	100
4	Extent of municipal solid waste recovered	Quantum of waste collected, which is either recycled or processed	80
5	Extent of scientific disposal of municipal solid waste	1	100
6	Efficiency in redressal of customer complaints	Total number of SWM related complaints resolved against total number of such complaints received within 24 hours	80
7	Extent of cost recovery in SWM services	Recovery of all operating expenses related to SWM services that the ULB is able to meet from the operating revenues of sources related exclusively to SWM	100
8	Efficiency in collection of SWM user charges	Current year revenue collected against total operating revenues for the corresponding period	90

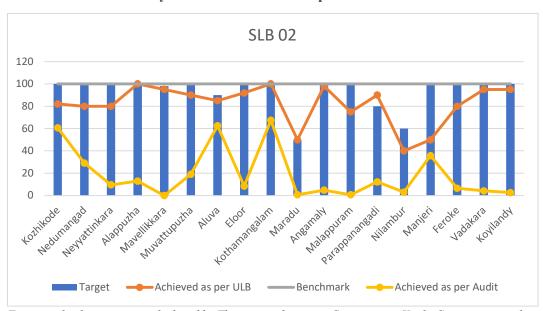
(Source: MoUD website)

I. Household level coverage of SWM services through door-todoor collection of waste



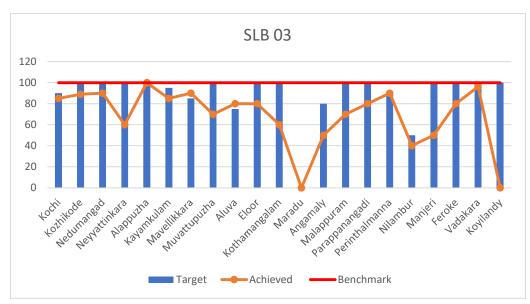
Target and achievement not declared by Thiruvananthapuram Corporation

II. Efficiency of collection of municipal solid waste



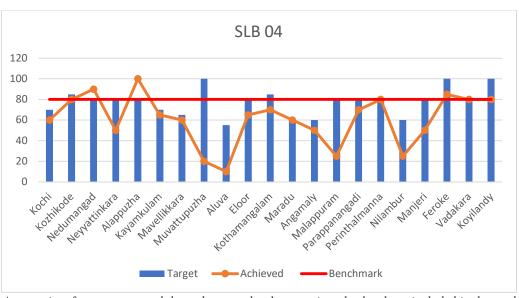
Target and achievement not declared by Thiruvananthapuram Corporation. Kochi Corporation and Kayamkulam and Perinthalmanna Municipalities did not furnish quantity of waste generated/collected.

III. Extent of segregation of waste



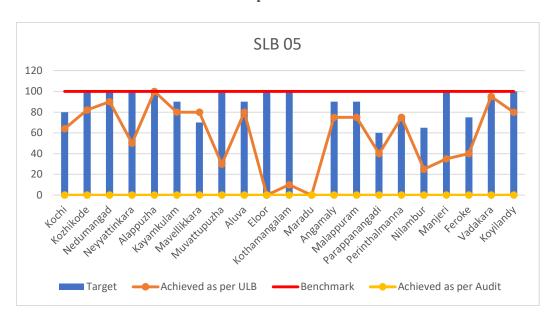
Test-checked ULBs did not record the quantity of waste segregated

IV. Extent of recovery of waste collected



As quantity of waste processed through source level processing also has been included in the total quantity of waste processed by test-checked ULBs, Audit could not work out the extent of waste processed, out of actual waste collected by ULBs.

V. Extent of scientific disposal of waste at landfill sites

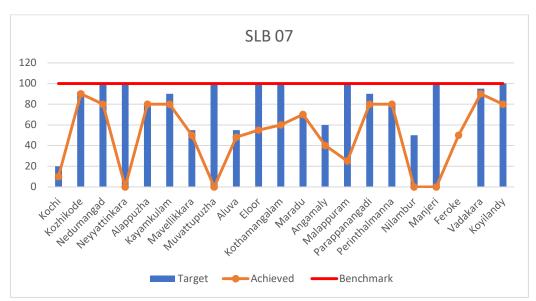


VI. Efficiency of redressal of customer complaints



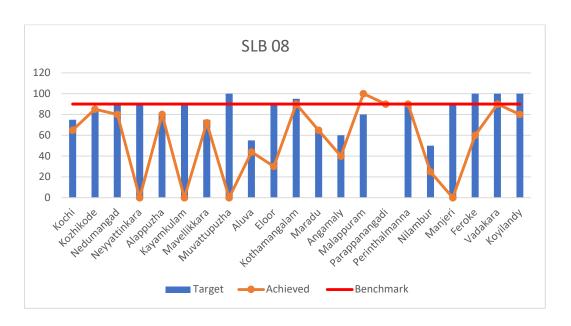
Only one test-checked ULB, Thiruvananthapuram Corporation had an online system in place to receive complaints. The remaining ULBs did not maintain separate registers to record the complaints relating to waste management.

VII. Extent of cost recovery for the ULB in SWM services



As the test-checked ULBs did not account the details of operating revenue received separately, Audit could not verify the extend of cost recovery declared by the ULBs.

VIII. Efficiency in collection of SWM user charges



Appendix 2
Allocation and Expenditure of various funds for waste management in test-checked ULBs
(Reference: Paragraph 2.2.1, Page 16)

(₹ in lakh)

		,	State fu	nd			Central fund			Own fund				
	Receipt						Receipt							Percentage of
Year	Develo pment Fund (Gener al)	Suchit wa Keral am (Urba n)	Oth ers*	Total	Total Expend iture (A)	CFC Grant	SBM (Urban) fund	Total	Total Expend iture (B)	Allocated for SWM	Expen diture for SWM	Total receipt	Total expendit ure (C)	dependency on Government grants ((A+B)/C)
2016-17	1630.26	69.80	10	1710.06	205.04	2956.79	0	2956.79	241.32	64.84	0.98	4731.69	447.34	99.78
2017-18	1560.30	3.17	0	1563.47	502	4936.62	0	4936.62	1841.59	23.41	0	6523.50	2343.59	100
2018-19	1351.07	0.80	0	1351.87	326.08	3734.93	1108.36	4843.29	1381.18	335.31	1.38	6530.47	1708.64	99.92
2019-20	568.87	0	70	638.87	146.65	5791.28	186.24	5977.52	1262.42	1884.08	86.88	8500.47	1495.95	94.19
2020-21	1353.67	137	150	1640.67	1105.06	7048.09	1601.98	8650.07	3553.79	1622.98	95.93	11913.72	4754.78	97.98
Total	6464.17	210.77	230	6904.94	2284.83	24467.71	2896.58	27364.29	8280.30	3930.62	185.17	38199.85	10750.30	

^{*}Maintenance fund (non-road) and receipts from other ULBs

Appendix 3 Statement showing potential revenue out of User fee (Reference: Paragraph 2.2.3.5, Page 20)

Name of ULB	No. of househol ds	Mont hly user fee rate (in ₹)	Potential monthly revenue from households (in ₹)	No of establis hments	Potential monthly revenue from establish ments(cal culated @ ₹ 100 from an establish ment per month)	Total potential user fee from households and establishme nts (in ₹)	Average monthly expenditu re of ULB on waste managem ent (in ₹)	Percenta ge of expendit ure on waste manage ment on total potential user fee
Corporations								
Thiruvananthapuram	336452	100	33645200	22305	2230500	35875700	7150282	19.93
Kochi	265288	100	26528800	66884	6688400	33217200	1996340	6.01
Kozhikode	157753	60	9465180	32145	3214500	12679680	2662771	21
Municipalities								
Nedumangad	22715	60	1362900	2878	287800	1650700	808627	48.99
Neyyattinkara	23045	40	921800	2775	277500	1199300	201273	16.78
Alappuzha	49545	40	1981800	7456	745600	2727400	853974	31.31
Kayamkulam	16392	40	655680	2630	263000	918680	215690	23.48
Mavelikkara	9676	60	580560	1460	146000	726560	104895	14.44
Muvattupuzha	7414	50	370700	2003	200300	571000	135501	23.73
Aluva	5828	100	582800	2566	256600	839400	505807	60.26
Eloor	10995	50	549750	900	90000	639750	384983	60.18
Kothamangalam	10389	50	519450	2239	223900	743350	283301	38.11
Maradu	20328	60	1219680	1262	126200	1345880	146766	10.90
Angamaly	8968	50	448400	2183	218300	666700	147983	22.20
Malappuram	18977	30	569310	8026	802600	1371910	341101	24.86
Parappanangadi	15413	30	462390	6127	612700	1075090	78829	7.33
Perinthalamanna	17489	50	874450	10089	1008900	1883350	624385	33.15
Nilambur	14652	60	879120	1650	165000	1044120	76520	7.33
Manjeri	27668	50	1383400	4806	480600	1864000	231899	12.44
Feroke	13284	30	398520	1750	175000	573520	135914	23.7
Vadakara	20774	50	1038700	5200	520000	1558700	433917	27.84
Koyilandy	20264	50	1013200	2885	288500	1301700	396386	30.45

Appendix 4
Segregation of waste at source by Households, Government Institutions and Commercial establishments
(Reference: Paragraph 3.1.1, Page 22)

CI.			Households		G	overnment Inst	itutions	Con	nmercial establis	hments		Grand Total	
SI No	ULB	Total	Providing segregated Waste	Percen tage	Total	Providing segregated Waste	Percen tage	Total	Providing segregated Waste	Percen tage	Total	Providing segregated Waste	Percen tage
	Corporations												
1	Thiruvananthapuram	336452	92100	27.37	475	475	100.00	22305	18225	81.71	359232	110800	30.84
2	Kochi	265288	150673	56.80	125	125	100.00	66884	12771	19.09	332297	163569	49.22
3	Kozhikode	157753	99515	63.08	168	42	25.00	32145	9144	28.45	190066	108701	57.19
	Municipalities												
4	Nedumangad	22715	7999	35.21	36	2	5.56	2878	1758	61.08	25629	9759	38.08
5	Neyyattinkara	23045	16592	72.00	33	16	48.48	2775	1149	41.41	25853	17757	68.68
6	Alappuzha	49545	45000	90.83	602	550	91.36	7456	6714	90.05	57603	52264	90.73
7	Kayamkulam	16392	2229	13.60	35	0	-	2630	357	13.57	19057	2586	13.57
8	Mavelikkara	9676	0	-	30	0	-	1460	46	3.15	11166	46	0.41
9	Aluva	5828	1344	23.06	123	0	-	2566	0	-	8517	1344	15.78
10	Angamaly	8968	4820	53.75	19	0	-	2183	1520	69.63	11170	6340	56.76
11	Eloor	10995	7785	70.80	13	0	-	900	875	97.22	11908	8660	72.72
12	Kothamangalam	10389	6440	61.99	35	23	65.71	2239	458	20.46	12663	6921	54.66
13	Maradu	20328	13475	66.29	13	13	100.00	1262	1262	100.00	21603	14750	68.28
14	Moovattupuzha	7414	1640	22.12	78	0	-	2003	0	-	9495	1640	17.27
15	Malappuram	18977	7200	37.94	250	80	32.00	8026	420	5.23	27253	7700	28.25
16	Parappanangadi	15413	11391	73.91	109	15	13.76	6127	802	13.09	21649	12208	56.39
17	Nilambur	14652	1300	8.87	85	1	1.18	1650	0	-	16387	1301	7.94
18	Manjeri	27668	7553	27.30	80	50	62.50	4806	2021	42.05	32554	9624	29.56
19	Feroke	13284	5469	41.17	16	16	100.00	1750	590	33.71	15050	6075	40.37
20	Vadakara	20774	12945	62.31	76	60	78.95	5200	3380	65.00	26050	16385	62.90
21	Koyilandy	20264	12000	59.22	25	0	-	2885	115	3.99	23174	12115	52.28
	Total	1075820	507470		2426	1468		180130	61607		1258376	570545	

(Source: Details furnished by test-checked ULBs; Details in respect of Perinthalmanna Municipality were not furnished to Audit)

Appendix 5
Inadequate infrastructure for managing household biodegradable waste (Reference: Paragraph 4.1.1.1, Page 36)

SI No.	Name of ULB	No. of househo lds	No. of Pipe compost units installed	No. of Pipe compost units work ing	No. of househo ld bio- gas plants installed	No. of household bio-gas plants work ing	No. of Kitchen Bin / biocomp oster bins installed	No. of Kitchen Bin / biocompo ster bins working	Other items installed	Other items work ing	Total items insta lled	Total items working	Percentag e of items work Ing	Per centage of househo lds where items installed	Percent age of househ old process ing waste at source	Gap in coverage
1	2	3	4	5	6	7	8	9	10	11	12 (4+6+8+ 10)	13 (5+7+9+ 11)	14 (13/12 %)	15 (12/3 %)	16 (13/3 %)	17 (100-16)
	Corporations															
1.	Thiruvananthapuram	336452	87000	4641	3982	778	46492	14505	109	109	137583	20033	14.56	40.89	5.95	94.05
2.	Kochi	265288	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.	Kozhikode	157753	20867	16214	586	586	0	0	260	0	21713	16800	77.37	13.76	10.65	89.35
	Municipalities			1						1		1				
4.	Nedumangad	22715	0	0	250	250	2500	2500	0	0	2750	2750	100	12.11	12.11	87.89
5.	Neyyattinkara	23045	0	0	131	131	0	0	0	0	131	131	100	0.57	0.57	99.43
6.	Alappuzha	49545	0	0	1197	1197	0	0	5091	5091	6288	6288	100	12.69	12.69	87.31
7.	Kayamkulam	16392	0	0	12	12	0	0	0	0	12	12	100	0.07	0.07	99.93
8.	Mavelikkara	9676	0	0	12	12	0	0	190	190	202	202	100	2.09	2.09	97.91
9.	Muvattupuzha	7414	154	125	17	0	425	350	0	0	596	475	79.7	8.04	6.41	93.59
10.	Aluva	5828	0	0	65	15	805	85	0	0	870	100	11.49	14.93	1.72	98.28
11.	Eloor	10995	0	0	29	29	2323	2323	0	0	2352	2352	100	21.39	21.39	78.61
12.	Kothamangalam	10389	0	0	0	0	2400	2400	0	0	2400	2400	100	23.1	23.10	76.90
13.	Maradu	20328	940	310	216	216	600	600	0	0	1756	1126	64.12	8.64	5.54	94.46
14.	Angamaly	8968	0	0	38	38	354	354	0	0	392	392	100	4.37	4.37	95.63
15.	Malappuram	18977	0	0	175	175	981	981	1621	1621	2777	2777	100	14.63	14.63	85.37
16.	Parappanangadi	15413	0	0	13	13	73	73	2050	2050	2136	2136	100	13.86	13.86	86.14
17.	Perinthalamanna	17489	0	0	0	0	420	420	0	0	420	420	100	2.40	2.40	97.60
18.	Nilambur	14652	0	0	0	0	69	69	35	35	104	104	100	0.71	0.71	99.29
19.	Manjeri	27668	0	0	0	0	10000	10000	0	0	10000	10000	100	36.14	36.14	63.86
20.	Feroke	13284	0	0	50	50	527	527	133	133	710	710	100	5.34	5.34	94.66
21.	Vadakara	20774	3211	2730	160	120	973	828	742	640	5086	4318	84.9	24.48	20.79	79.21
22.	Koyilandy	20264	279	279	0	0	3852	3852	4017	4017	8148	8148	100	40.21	40.21	59.79
	Total	1107006	112451	24299	6933	3622	72794	39867	14248	13886	206535	81674				

Appendix 6 Details of Thumboormuzhi units installed in test-checked ULBs (Reference: Paragraph 4.1.1.3, Page 38)

Sl. No.	Name of ULB	No. of units installed	Number of locations	Number of units damaged	Percentage of units in working condition	Reason for damage	
1.	Thiruvananthapuram Corporation	474 (Fixed)	52	136	71.31	Non-maintenance, non-supply of inoculum	
		214 (Portable)	47	49	77.10	Seepage of rain water, Non maintenance	
2.	Nedumangad Municipality	47	4	20	57.45	Non-utilisation	
3.	Neyyattinkara Municipality	20	8	0	100	-	
4.	Alappuzha Municipality	349	35	43	87.68	Rodent menace and lack of maintenance	
5.	Eloor Municipality	6	6	0	100	-	
6.	Angamaly Municipality	3	3	3	0	Not functioning since its installation, due to litigation	
7.	Nilambur Municipality	1	1	0	100	-	
8.	Kozhikode Corporation	10	4	4	60	Used for dumping plastic waste	
9.	Feroke Municipality	3	1	0	100	-	
10.	Koyilandy Municipality	23	3	23	0	Used for dumping plastic waste	
11.	Vadakara Municipality	14	5	7	50	Used for dumping plastic waste	
	Total	1164	169	285	75.52		

Appendix 7
Details of community level biogas plants installed in test-checked ULBs
(Reference: Paragraph 4.1.1.3, Page 40)

Sl. No.	ULB	Number of units	Number of units not working	Reasons for non-functioning
1.	Thiruvananthapuram	10	8	Improper maintenance
	Corporation			
2.	Nedumangad	1	1	Absence of proper
	Municipality			maintenance and upkeep
3.	Neyyattinkara	1	1	Absence of proper
	Municipality			maintenance and upkeep
4.	Nilambur	1	1	Absence of proper
	Municipality			maintenance and upkeep
5.	Parappanangadi	1	1	Absence of proper
	Municipality			maintenance and upkeep
6.	Manjeri Municipality	1	1	Technical reasons
7.	Kozhikode	1	1	Absence of proper
	Corporation			maintenance and upkeep
	Total	16	14	

Appendix 8 Details of dumpsites in selected ULBs (Reference: Paragraph 4.2.1, Page 47)

Sl. No.	Name of Local Body	Name of Location	Status of remediation work undertaken
1.		Vilappilsala	No action taken
2.	Thiruvananthapuram Corporation	Palayam market	Clearing of legacy waste completed
3.		Erumakkuzhy	Clearing of legacy waste completed
4.	Kochi Corporation	Brahmapuram	Biomining work awarded
5.	Kozhikode Corporation	Njaliyanparamba	Biomining in progress
6.	Vadakara	Puthiyapp	No action taken
7.	Alappuzha	Sarvodayapuram	No action taken
8.	Kayamkulam	Murukkummoodu	No action taken
9.	Mavelikkara	Puthiyakavu	No action taken
10.	Muvattupuzha	Valakkuzhi	No action taken
11.	Kothamangalam	Kumbalathumuri	No action taken
12.	Malappuram	Near Inkel City, Puliyettummal	No action taken
13.	Perinthalmanna	Kunnappalli	No action taken
14.	Manjeri	Vettekode	No action taken

Appendix 9 Status of compliance of ULBs to Rules relating to Plastic Waste Management

(Reference: Paragraph 5.1.1, Page 52)

Sl. No.	Requirement	Provisions	Status of compliance
1	Door-to-door collection of non-biodegradable waste from all households, institutions and commercial establishments.	Rule 6 (2) of PWM Rules, State policy	 Of the test checked ULBs, 21 ULBs generated 185.70 tonnes/day of plastic waste, of which 149.21 tonnes/day (80.35 per cent) were collected daily by 18 ULBs. The percentage of coverage of households ranged from 0¹¹⁴ to 76 per cent 115. Plastic waste was collected monthly by 14 ULBs, fortnightly by three ULBs, weekly by one ULB, daily by one ULB and yearly by one ULB from households. 116 Except eight ULBs 117 other test-checked ULBs did not collect plastic waste from institutions and the percentage of collection ranged from 12.50 to 100 per cent. Seven ULBs 118 did not collect waste from Commercial establishments and percentage of collection of plastic waste in respect of other ULBs ranged from 0.96 per cent 119 to 89.99 per cent 120. Absence of a proper system for collection of plastic waste from households, institutions and commercial establishments resulted in burning of plastic

¹¹⁴ Mavelikkara Municipality

¹¹⁵ Vadakara Municipality

Plastic waste is not collected in Mavelikkara Municipality; Date not available for Perinthalmanna Municipality, where plastic waste is being collected by a private agency.

¹¹⁷ Neyyattinkara, Kothamangalam, Malappuram, Parappanangadi, Feroke, Vadakara Municipalities and Kochi, Kozhikode Corporations.

Mavelikkara, Maradu, Nilambur, Alappuzha, Kayamkulam, Perinthalmanna Municipalities and Thiruvananthapuram Corporation.

¹¹⁹ Parappanangadi Municipality

¹²⁰ Kochi Corporation

Sl. No.	Requirement	Provisions	Status of compliance
			waste ¹²¹ and dumping of waste on road sides ¹²² , drains, private properties, ¹²³ water bodies ¹²⁴ , etc. as noticed during JPV.
2	Ensuring segregation of recyclables by setting up Material Recovery Facilities or secondary storage facilities with sufficient space	Rule 15(h) of SWM Rules, 2016	Though GoK had directed ULBs to setup MCF in all wards, the MCF to ward ratio in the test-checked ULBs ranged from 1:2 to 1:50.
3	Establish Resource Recovery Facilities (RRF) in each urban region of 20 km² for sorting and facilitating, reuse and recycling of waste materials	Rule 6(2)(c) and (d) of SWM Rules, 2016, State Policy	 Of the 93 ULBs in the State, only 43 Municipalities and four Corporations have RRF facilities. Of the 22 test-checked ULBs, 16 ULBs have installed 16 shredding machines and 18 bailing machines in the RRF, during the period from 2017-18 to 2020-21. Eight shredding machines and four bailing machines were nonfunctional, resulting in infructuous expenditure to the tune of ₹ 39.02 lakh.
4	Plastic waste which can be recycled, shall be channelised to registered plastic waste recycler	Rule 5(1)(a) of PWM Rules, 2016	• The ULBs did not ensure effective segregation of recyclable waste out of the non-biodegradable waste collected, resulting in disposal of 25 to 100 per cent of plastic waste as rejects.
5	Ensuring that no damage is caused to the environment during the process from segregation to disposal	Rule 6(2)(b) of PWM Rules, 2016	• Improper management of plastic waste led to recurring instances of fire outbreaks at Brahmapuram dumpsite in Kochi Corporation and once in Perinthalmanna Municipality.
6	Ensuring that open burning of plastic waste does not take place	Rule 6(2)(g) of PWM Rules, 2016	• Instances of open burning of plastic waste noticed in six ¹²⁵ test-checked ULBs.

¹²¹ Kayamkulam, Mavelikkara, Alappuzha, Koyilandy Municipalities
122 Kozhikode, Kochi Corporations and Kayamkulam Municipality
123 Kochi Corporation
124 Kozhikode, Kochi, Thiruvananthapuram Corporations, Kayamkulam, Mavelikkara Municipalities

¹²⁵ Thiruvananthapuram Corporation, Nedumangad, Muvattupuzha, Angamaly, Mavelikkara and Alappuzha Municipalities

Sl. No.	Requirement	Provisions	Status of compliance
7	For setting up of system for plastic waste management, the local body shall seek assistance of producers in line with the principle of Extended Producer Responsibility (EPR)	PWM	No test-checked ULB established an EPR based plastic waste management system.

(Source: GoI Rules and State Policy on Waste Management)

Appendix 10
Table showing details of disposal of plastic waste as rejects
(Reference: Paragraph 5.1.2, Page 52)

Sl No.	Name of ULB	Quantity of plastic waste generated (tonnes)	Quantity of Plastic waste processed/ sent to recyclers (tonnes)	Quantity of plastic disposed as rejects (tonnes)	Percentage of Plastic waste recycled/ processed	Percentage of plastic waste disposed as rejects
	Corporations					
1	Thiruvananthapuram	7665	4307	3358	56.19	43.81
2	Kochi	41009	541	40468	1.32	98.68
3	Kozhikode	5110	367	4743	7.18	92.82
	Municipalities					
4	Nedumangad	1423.5	620.5	803	43.59	56.41
5	Neyyattinkara	365	16.06	348.94	4.40	95.6
6	Alappuzha	2920	730	2190	25.00	75.0
7	Kayamkulam	383.25	4.02	379.23	1.05	98.95
8	Mavelikkara	153.3	1.72	151.58	1.12	98.88
9	Muvattupuzha	1277.5	273.75	1003.75	21.43	78.57
10	Eloor	193.45	98.55	94.9	50.94	49.06
11	Kothamangalam	1971	1095	876	55.56	44.44
12	Maradu	289.08	30.58	258.5	10.58	89.42
13	Angamaly	474.5	146	328.5	30.77	69.23
14	Malappuram	730	547.5	182.5	75.00	25.0
15	Parappanangadi	417	50	367	11.99	88.01
16	Nilambur	277.4	164.25	113.15	59.21	40.79
17	Manjeri	912.5	438	474.5	48.00	52.0
18	Feroke	1152	16.5	1135.5	1.43	98.57
19	Vadakara	470	69.37	400.63	14.76	85.24
20	Koyilandy	400	0	400	0.00	100

(Source: Details furnished by test-checked ULBs; details in respect of Aluva and Perinthalmanna Municipalities were not furnished to Audit)

Appendix 11 Details of inspections conducted and penalty imposed by test-checked ULBs during the period 2016-2021

(Reference: Paragraph 6.3.2, Page 74)

SI No	Name of ULB	Number of inspections conducted	Average annual inspection	Penalty realised from annual inspections	Number of spot fines imposed	Average number of spot fines	Penalty realised as spot fines	Total penalty (C+F)	Average monthly penalty (Total Penalty /60 months)
	Comment	A	В	С	D	E	F	G	Н
1	Corporations	2066	572	1.41270	1150	222	2000022	2040402	40157
1	Thiruvananthapuram	2866	573	141370	1159	232	2808033	2949403	49157
2	Kochi	1588	318	649960	737	147	1171610	1821570	30360
3	Kozhikode	456	91	350000	321	64	438920	788920	13149
4	Municipalities	250	50	110770	0	0	0	110770	1000
4	Nedumangad	250	50	118770		0		118770	1980
5	Neyyattinkara	68	14	5000	136	27	54000	59000	983
7	Alappuzha	456	91	239430	238	48 19	400680	640110	10669
	Kayamkulam	10		36450	95		236430	272880	4548
8	Mavelikkara	18	4	50571	0	0	12000	50571	843
9	Angamaly	26	5	34550	3	1	12000	46550	776
10	Aluva	111	22	67220	185	37	345870	413090	6885
11	Muvattupuzha	45	9	23450	161	32	181765	205215	3420
12	Kothamangalam	189	38	214760	0	0	0	214760	3579
13	Eloor	6	1	14500	89	18	192180	206680	3445
14	Maradu	11	2	5000	6	1	10500	15500	258
15	Malappuram	42	8	64290	0	0	417750	482040	8034
16	Perinthalmanna	8	2	40000	937	187	2139635	2179635	36327
17	Nilambur	69	14	113330	0	0	0	113330	1889
18	Parappanangadi	441	88	82200	14	3	69500	151700	2528
19	Manjeri	26	5	34900	6	1	24050	58950	983
20	Feroke	9	2	12500	63	13	145000	157500	2625
21	Koyilandy	123	25	85100	42	8	21000	106100	1768
22	Vadakara	46	9	58950	266	53	307430	366380	6106