Chapter VI

Segregation, Collection and Transportation of waste

6.1 Segregation

Segregation refers to the process of separation of municipal solid waste into four groups *i.e.,* organic, inorganic, recyclables and hazardous wastes. It is a critical requirement since it enables recycling, reuse, treatment and scientific disposal of different components of waste. Chapter 8 of Manual on MSWM, 2000 deals with the importance of sorting[19] waste.

Sorting/segregation shall take place at different levels such as source/household level; transfer station or centralised sorting facility; waste processing site and landfill site to segregate waste into different streams such as dry recyclables, biodegradable waste, C&D waste, hazardous waste, *etc.*, to minimise waste and ensure reduction in landfill space for final disposal besides ensuring appropriate processing.

6.1.1 Segregation of waste at source/household level

MSWM Manuals, 2000 (Section 8.10.1(a)) and 2016 (Section 2.2.1) stipulate that ULBs must accord highest priority for segregation of waste at source. DMA stated (June 2017) that only 105 out of 270 ULBs in the State started segregation at source (partially in few selected wards).

The test-checked ULBs also declared having achieved service level benchmarks between zero and 55 *per cent* for segregation. As per SLB declarations by the ULBs themselves, segregation was totally absent in seven ULBs and averaged 31 *per cent* in 28 ULBs during 2016-17, indicating poor segregation of waste. Based on JPVs, we found that segregation at source was not followed in 32 out of 35 test-checked ULBs and it was partially carried out in three test-checked ULBs (CC, Tumakuru, CMC, Dandeli and TMC, Kumta).

6.1.1.1 Issue of bins

Scrutiny of records revealed that 11[20] test-checked ULBs procured bins at a total cost of ₹3.45 crore during the review period and issued them to 35 *per cent* of households to encourage segregation of waste at source. We observed during JPV conducted along with the officials of ULBs that segregation of waste was not adopted despite the issue of bins (**Exhibit 6.1**).

The JPV also showed that mixed waste was handed over to waste collectors by households despite audio announcements regarding the importance of

[19] The word 'sorting' is used synonymously with 'separation' and 'segregation' in this Chapter.

[20] CCs - HDMC, Mangaluru and Tumakuru; CMCs - Bagalkote, Hosapete, Sira and Udupi; TMCs - Hiriyur and Manvi; TPs - Koppa and Kudligi.

segregation into wet and dry waste in 26 test-checked ULBs. In six[21] other ULBs, there was no segregation as the mechanism of door-to-door collection was totally absent resulting in dumping of waste on roadsides, streets, *etc*.

In CC, Tumakuru, though segregated waste was handed over to the waste collector (observed during JPV in one ward), the segregated waste was getting mixed in the secondary collection vehicle (Compactor). In CMC, Dandeli, segregation of waste at source was followed in 4 out of 31 wards that were managed voluntarily by West Coast Paper Mills (a company located at Dandeli). In TMC, Kumta, wet waste was being processed through pipe/pit composting at source level and therefore, only dry waste was being collected.

The good practices in segregated collection of MSW in CMCs, Dandeli and Kolar are detailed in **Appendix 11.4**.

6.1.1.2 Non-segregation of domestic hazardous waste

Domestic hazardous waste requires special handling and disposal because of its harmful physical and chemical characteristics, or biological properties. Hence, there is a greater need for proper segregation of such waste. Manual on MSWM, 2000 and SWM Rules, 2016 specify the roles and responsibilities of ULBs in this regard.

As stated in Paragraph 5.2 of IEC, the concerned authorities both at the State/district level and in all the 35 test-checked ULBs did not notify and publicise the list of items classified as domestic hazardous waste to be segregated at source. Consequently, people were not aware of the effect of non-segregation of domestic hazardous waste and contaminated mixed waste was reaching the landfills.

6.1.1.3 Non-segregation of sanitary waste

Sanitary waste generated by households was to be wrapped in old newspaper/pouches provided by the manufacturers and handed over to the waste collectors separately as per the guidelines of KSPCB and clause 4 under Section 2.2.1 of SWM Manual, 2016.

We observed that none of the test-checked ULBs emphasised segregation and disposal of sanitary waste as required (except ULBs in Uttara Kannada District and TP, Kudligi).

6.1.1.4 Absence of incentive mechanism and enforcement

MSWM Manuals, 2000 (Sections 18.3 and 18.4) and 2016 (Section 2.1.4) specify the various activities and methodologies required to be adopted by ULBs to ensure proper segregation of waste at source. One such methodology is providing incentives in the form of rewards/grants/subsidies.

Similarly, Section 18.5 of MSWM Manual, 2000 provides for enforcement. While all efforts should be made to educate people to effectively participate in

[21] CMC, Shidlaghatta; TMCs - Kakkera, Mugalkhod and T. Narasipura; TPs - Ainapura and Chinchali.

the management of waste through IEC, they also need to be made aware of penalties if they fail to discharge their civic duties. The provision for penalties should be made known to the people and details of those punished should be publicised widely to deter others.

Audit did not notice any instances of incentive/disincentive mechanism to promote segregation of waste in any of the test-checked ULBs. We also noticed that penalty provisions under Schedule XIII to Section 431A of KMC Act, 1976 were not enforced.

The above observations indicate that the test-checked ULBs made very little effort to emphasise the importance of segregation of waste at source. DMA attributed (July 2017) this to lack of (i) micro-level planning, (ii) citizen's co-operation and awareness, (iii) stringent laws, bye-laws, *etc.*, (iv) infrastructure such as bins, partitioned vehicles, storage facilities, *etc.* and (v) incentivisation for effective segregation at source and further stated (July 2017) that segregation of waste at source was prioritised and presently 105 ULBs started segregation at source (partially in few selected wards) and continuous efforts were being made to accomplish 100 *per cent* segregation at source.

The State Government stated (May 2018) that 100 *per cent* source segregation cannot be achieved in a single stretch. It further stated that efforts were being continuously taken to achieve source segregation in a progressive manner with the help of IEC tools and introducing penal clauses for non-compliance in the draft bye-laws. Top priority needs to be accorded to the operation of these two strategies for achieving higher levels of segregation.

6.1.2 Segregation of waste at transfer station/central sorting facility

Section 8.10.3(a) of the Manual on MSWM, 2000 states that sorting at the waste storage depot/transfer station is not desirable. However, if source level sorting is not developed, then such sorting may be allowed till a household-level sorting and collection system is established. Since source level segregation was absent/deficient in the ULBs as stated above, there was a need for ensuring segregation of waste at least before it reaches the processing/landfill site. Further, as per Clause 15 (h) of SWM Rules, 2016, the local authorities shall set up material recovery facilities or secondary storage facilities for sorting of recyclable materials.

We observed that:

- In all the test-checked ULBs, waste was transferred in mixed form from primary transportation vehicles to secondary transportation vehicles (mechanically-without manual intervention) near roadsides or vacant lands. In CC, Ballari, the primary transportation vehicles were transferring mixed waste to secondary transportation vehicles at a centralised point (transfer station); and
- Out of the 35 test-checked ULBs, dry waste collection centres were functioning only in three ULBs (CC, Tumakuru, CC, Mangaluru and TMC, Kumta). The dry waste collection centres constructed at CC, Ballari (July 2016 at a cost of ₹21.52 lakh); CMC, Chintamani (March 2017 at a cost of ₹15 lakh) and TMC, Humnabad (April 2015 at a cost of ₹1.75 lakh) were yet to be made functional (May 2017).

Failure to segregate resulted in failure to recover the recyclables, thereby leading to dumping these resources in landfills. It also led to sub-optimal use of precious landfill space.

The State Government accepted (May 2018) the audit observation.

6.1.3 Segregation of waste at processing site

Segregation of waste at processing site is desirable to ensure that the processed output (such as compost) meets the regulatory standards (Section 8.10.5 of Manual on MSWM, 2000).

We observed that five[22] out of 35 test-checked ULBs had compost processing facilities within the landfill site and TMC, Maddur had a decentralised processing facility. Hence, partial segregation was being practised in these ULBs.

Failure to segregate waste at different stages resulted in dumping of mixed waste on windrow platforms/landfill **(Exhibit 6.2)** leading to ineffective waste management. Dumping of mixed waste on windrow platforms also results in reduction in quality and quantity of compost.

The State Government accepted (May 2018) the audit observation and stated that efforts were being taken at all levels to increase the percentage of source segregation.

Recommendation 11: Segregation should be given greater emphasis by means of publicity and awareness campaigns and holding regular meetings with housing associations and NGOs. The State Government should encourage segregation of waste at source by devising a system for incentivising waste generators and collectors for segregation of waste, and should prevent mixing of segregated waste during various stages of SWM.

6.2 Collection

Collection of segregated waste is the second step of SWM process. Waste collection system is necessary to ensure that waste stored at source is collected regularly and it is not disposed of on the streets, drains, water bodies, *etc*. Inefficient waste collection has an impact on public health and aesthetics of urban areas. Waste collection service is divided into primary and secondary collection.

Sections 10.3 and 10.4 of Manual on MSWM, 2000, state that ULBs shall arrange for the collection of domestic, trade and institutional, food/biodegradable waste, recyclable waste material/non-biodegradable waste besides domestic hazardous/toxic waste from doorstep or community bins or waste deposition centres specially established for the purposes. The collection service provided by ULBs should be regular and reliable.

6.2.1 Inadequate collection of waste generated

The quantum of waste generated and collected during the period 2012-13 to 2016-17 in the State (other than BBMP) and in the test-checked ULBs is shown in **Table 6.1**.

[22] CCs - Mangaluru and Tumakuru; CMCs - Bagalkote and Sira; TP, Koppa.

Table 6.1: Statement showing the status of quantum of waste generated and collected in the State and the test-checked ULBs

(in tons)

Period	State			Test-checked ULBs		
	Generated	Collected	Uncollected	Generated	Collected	Uncollected
2012-13	Not Available			4,90,305	4,45,782	44,523
2013-14	19,28,660	16,79,730	2,48,930	4,99,868	4,55,600	44,268
2014-15	18,96,905	15,10,370	3,86,535	5,21,074	4,77,829	43,245
2015-16	19,55,172	16,71,156	2,84,016	5,59,523	5,14,914	44,609
2016-17	20,09,690	15,71,690	4,38,000	5,67,652	5,24,881	42,771
Total	**77,90,427**	**64,32,946**	**13,57,481**	**26,38,422**	**24,19,006**	**2,19,416**

Source: Information furnished by KSPCB and test-checked ULBs

On an average, 13-22 *per cent* of waste generated was not collected in the State and 8-9 *per cent* in the test-checked ULBs.

Section 6.9.4.1 of MSWM Manual, 2000 stipulated that every landfill must have a weighbridge for assessing the quantum of waste. The availability and status of weighbridge in landfill sites is detailed in Paragraph 7.3.1. Only four test-checked ULBs had working weighbridge facility. Other ULBs did not maintain any documents to assess the actual extent of the collection. This led to poor oversight and monitoring as ULBs had no means to quantify SWM in order to address it suitably.

Audit attempted to verify[23] the correctness of data furnished by two ULBs (CC, Tumakuru and CMC, Sira) for the year 2016-17 with reference to the records made available. We found that the data was inconsistent in respect of both these ULBs as detailed in **Table 6.2**.

Table 6.2: Comparison of data furnished by ULBs with the records

(Quantity in TPD)

Sl. No.	Name of ULB	As per information furnished by ULB			As per records (weighbridge data)			As per DPR		
		G	C	CE	G	C	CE	G	C	CE
1	CMC, Sira	22	20	91	22	13	59	29	26	90
2	CC, Tumakuru	120	110	92	120	84	70	130	77	59

G – Generation; C – Collection and CE – Collection efficiency in percentage

The State Government cited (May 2018) inadequate number of vehicles and manpower with ULBs and non-existence of micro-level planning for inadequate collection of waste. The reply was silent on the inconsistency in data pointed out by audit.

6.2.2 Ward-wise collection of waste

The status of ward-wise collection of waste in the State and test-checked ULBs is indicated in **Table 6.3**.

[23] In CC, Mangaluru and CMC, Udupi, the landfills were provided with weighbridge facility and were also used by other ULBs. Hence, data of these ULBs was not compared.

Table 6.3: Status of ward-wise collection

Sl. No.	Position in	Number of ULBs		
		Complete coverage of wards	Partial coverage of wards	No coverage
1	State	128	76	66
2	Test-checked ULBs	20	9	6

Source: Information furnished by KSPCB and test-checked ULBs

Four[24] of the ULBs where there was no door-to-door collection were upgraded from Gram Panchayats in the year 2015. Two[25] ULBs where door-to-door collection was absent and nine[26] ULBs where the collection was partial, cited shortage of manpower and vehicles as the main reasons. Twenty test-checked ULBs with complete coverage of wards claimed household coverage between 70 to 100 *per cent*. We observed that the claims of 16 of these ULBs were inconsistent with their own SLB declaration on household coverage.

The State Government stated (May 2018) that replies would be obtained from concerned ULBs and furnished.

6.2.2.1 Use of community bins for collection

DMA issued directions (October 2014) prohibiting purchase of community bins. In contravention of these directions, TMC, Humnabad purchased (July 2017) containers (community bins) at a cost of ₹9.00 lakh. Chief Officer, TMC, Humnabad cited (August 2017) lack of awareness among citizens and non-implementation of 100 *per cent* door-to-door collection as the reasons for purchase of containers. The justification offered by Chief Officer, Humnabad, was not convincing. It was observed during JPV that the purchase of bins did not bring in improvement in waste collection (**Exhibit 6.3**).

6.2.2.2 Non-involvement of Self Help Groups and waste pickers in door-to-door waste collection

Manual on MSWM, 2000 and SWM Rules, 2016 stipulate that ULBs must establish a system for formation of SHGs and recognise organisation of waste pickers and integrate them into the waste management system including door-to-door collection. We observed that only five[27] test-checked ULBs involved SHGs in door-to-door collection of waste. In CMC, Shidlaghatta, SHGs were involved in street sweeping.

Thus, failure to enforce efficient and effective door-to-door collection resulted in littering/dumping of MSW/food waste on roadsides and encouraged the movement of stray animals towards the waste leading to serious consequences as illustrated in Paragraph 8.1.2.1.

The State Government stated (May 2018) that suitable action would be taken to involve SHGs and waste pickers.

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[24] TMCs - Kakkera and Mugalkhod; TPs - Ainapura and Chinchali.

[25] CMC, Shidlaghatta and TMC, T. Narasipura.

[26] CMC, Bidar (63 *per cent*), CMC, Hosapete (40 *per cent*), CMC, Nanjangud (33 *per cent*), TMC, Hiriyur (93 *per cent*), TMC, Humnabad (22 *per cent*), TMC, Maddur (87 *per cent*), TMC, Manvi (78 *per* cent), TMC, Ugar Khurd (22 *per cent*) and TP, Kudligi (40 *per cent*).

[27] CMCs -Dandeli (only during 2012-13 and 2013-14), Nanjangud and Udupi; TMC, Bhatkal and TP, Gudibande.

6.2.3 Street sweeping/street cleaning

Street cleaning is one of the primary services rendered by municipal authorities to ensure clean and hygienic urban conditions. Section 11.3.1 of Manual on MSWM, 2000 and Section 2.4.2 of Manual, 2016 stipulate that it is necessary to have a well-planned, time-bound daily system for street sweeping including adequate staffing and equipment. Further, the Supreme Court, keeping in view Articles 48A and 51A(g) of the Constitution, directed (1996) in one case that the streets, public premises, parks, *etc*., should be surface cleaned on daily basis, including on holidays (B.L. Wadhera vs. Union of India and others case).

We observed that the 35 test-checked ULBs did not carry out street sweeping of 6,935 (83 *per cent*) out of 8,324 km of roads on daily basis.

The State Government stated (May 2018) that ULBs based on the activities and population density decided the frequency of street sweeping and it varied from city to city. The reply is not consistent with the spirit of the Constitution enshrined in Articles 48A and 51A(g), which talk about protection and improvement of the environment. It is also in violation of the Supreme Court directives and does not address the fact of keeping the streets clean and hygienic at all times.

6.2.4 Mixing of occupational waste with Municipal Solid Waste

The provisions of Manual on MSWM, 2000 and SWM Rules, 2016 prohibit mixing of other wastes with MSW. We, however, observed mixing of occupational waste with MSW as detailed below:

6.2.4.1 Collection of cut *beedi* leaves

The activity of *beedi* rolling was prevalent in five[28] test-checked ULBs. The door-to-door collection of MSW in these ULBs involved sizeable quantity of 'cut *beedi* leaves', the residual product of the activity.

CC, Tumakuru and CMC, Sira, generated two TPD of cut *beedi* leaves each. Similarly, in CMC, Nanjangud (10 kg) and TMC, Maddur (300 kg), cut *beedi* leaves were generated each day on an average. A *Beedi Karmikara Nagara*, an exclusive colony of 200 houses established in Ward 66 in HDMC generated 150 kg of cut *beedi* leaf waste per day, which was found dumped openly in the colony as well as in the empty water sump (**Exhibit 6.4**). As cut *beedi* leaves waste is organic in nature and biodegradable, the collection of such waste along with MSW and transporting the mixed waste to the landfill contravenes the provisions of SWM Rules and may result in poor quality of compost.

The ULBs should have made separate arrangements for collection of this waste on collection of user charges or directed the concerned to arrange for collection and disposal of the waste either under 'Polluter pays principle' or 'Extended Producer Responsibility'.

6.2.4.2 Collection of ash waste generated from silk reeling units

CMC, Shidlaghatta houses approximately 1,450 to 1,650 silk reeling units, wherein, ash waste is generated by conventional method of burning wood to

[28] CCs - HDMC and Tumakuru; CMCs - Nanjangud and Sira; TMC, Maddur.

boil water for reeling silk (2 TPD which constitutes about 10 *per cent* of total waste generated). Similarly, TP, Sringeri generates ash waste (0.42 TPD – 12 *per cent* of total waste) from hotel industry (burning of rice husk). These two ULBs failed to make special arrangements to collect the ash waste from the generators and the ash waste was being mixed with MSW, ultimately, reaching the landfill site, without segregation **(Exhibit 6.5**).

Though DPR of CMC, Shidlaghatta suggested an economical way of disposal by channelising the ash waste to cement/brick industry, no steps were taken to implement the same. The DPR of TP, Sringeri did not suggest effective and economical way of ash disposal. Thus, failure to enforce segregation resulted in letting the ash waste mix with MSW. The ash waste generated, collected and dumped in landfill site in the two ULBs was 4,052 tonnes during the period 2012-17.

The State Government stated (May 2018) that steps were being taken in SWM DPRs to ensure that different types of waste including cut *beedi* leaves would not mix up with other wastes.

6.2.5 Personal protection equipment

MSWM Manuals, 2000 and 2016 prohibit manual handling of waste. If manual handling is unavoidable due to constraints, it should be carried out under proper precaution with due care for safety of workers. As per clause 15 (zd) of SWM Rules, 2016, local bodies shall ensure that the operator of a facility provides personal protection equipment including uniform, fluorescent jacket, hand gloves, raincoats, appropriate foot wear and masks to all workers handling solid waste and the same are used by workforce.

We observed during JPV in 30 test-checked ULBs (other than new upgraded ULBs) that majority of the work force involved in manual handling of waste were not using protective equipment particularly gloves and boots though they were provided with such equipment by the ULBs/contractors **(Exhibit 6.6)**. Non-utilisation of protective equipment is risky and may lead to serious health hazards especially in view of non-segregation of waste. ULBs need to analyse the reasons for non-utilisation of protective equipment by the work force and take steps to ensure utilisation.

The State Government stated (May 2018) that steps to educate the workers regarding significance of protection equipment would be taken up continuously.

Recommendation 12: ULBs should ensure that the informal system co-exists and supplements the formal system of waste collection, treatment and disposal and larger percentage of MSW generated is collected. ULBs should also ensure that workers involved in handling waste follow occupational health and safety protocols by wearing safety gear and other protective equipment.

Recommendation 13: The State Government may issue suitable instructions to enable ULBs to manage occupational waste such as beedi leaves, wood ash, etc., effectively and efficiently.

Exhibit 6.1: Unsegregated waste being handed over (Paragraph 6.1.1.1)

HDMC (28.4.2017)

CMC, Bagalkote (29.8.2017)

TMC, Humnabad (4.8.2017)

Exhibit 6.2: Dumping of mixed waste on windrow platform
(Paragraph 6.1.3)

CC, Tumakuru (21.3.2017)

Exhibit 6.3: Status of waste collection (Paragraph 6.2.2.1)

TMC, Humnabad (3.8.2017)

Exhibit 6.4: Cut *beedi* leaf waste (Paragraph 6.2.4.1)

HDMC (5.5.2017)

CMC, Sira (17.6.2017)

Exhibit 6.5: Ash waste (Paragraph 6.2.4.2)

CMC, Shidlaghatta (8.6.2017)

TP, Sringeri (5.7.2017)

Exhibit 6.6: Handling of waste without protective equipment (Paragraph 6.2.5)

TMC, Maddur (5.6.2017)

CC, Ballari (4.8.2017)

CMC, Shidlaghatta (7.6.2017)

6.3 Transportation

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

6.3.1 Shortage of vehicles for door-to-door collection

The State policy, 2004 envisaged use of auto tippers for door-to-door collection of MSW. In accordance with the normative standards prescribed under the policy for use of auto tippers for door-to-door waste collection, one auto tipper is required for 1,000 households. The status of availability of auto tippers in the test-checked ULBs as of March 2017 is indicated in **Table 6.4**.

Table 6.4: Statement showing the status of auto tippers

Category of ULB[29]	No. of auto tippers required as per normative standards	No. of auto tippers available	Shortage	Percentage of shortage
CMC	249	94	155	62
TMC	86	51	35	41
TP	29	11	18	62
Total	**364**	**156**	**208**	**57**

Source: Information furnished by test-checked ULBs

It is seen from the table that there was acute shortage of auto tippers despite availability of funds. The impact of shortage of collection vehicles in few test-checked ULBs is detailed below:

- In CMC, Hosapete, only 14 out of 35 wards were covered due to non-availability of sufficient number of vehicles;
- TMC, Ugar Khurd had one mini truck that was used for collection of waste in five wards on alternate days; and
- TP, Kudligi had only one tipper that was used to cover 8 out of 20 wards.

Therefore, shortage of vehicles up to 62 *per cent* led to serious inefficiency and irregularity in collection and transportation of MSW.

The State Government stated (May 2018) that integrated SWM plan was being prepared to include/procure vehicles required to achieve 100 *per cent* door-to-door collection. The reply indicates lack of commitment towards this activity of SWM despite Rules being in force for last 17 years. Further, in the absence of 100 *per cent* door-to-door collection, unscientific dumping of waste is bound to continue.

6.3.2 Use of vehicles without partition/open vehicles for transportation of Municipal Solid Waste

Source segregation is successful only when the segregated streams are not mixed at any stage of transportation while being taken to the respective processing or disposal facility directly or through a transfer station. Hence, segregated transportation of solid waste from source to destination is essential. Further, Section 7.7.4 of Manual on MSWM, 2000 and Section 2.3.2 of

[29] In all the test-checked CCs, the door-to-door collection activity was outsourced.

Manual, 2016 stipulate that vehicles used for transportation of waste should be covered so that waste is not visible to public and that they should have the facility for preventing spillage of waste. For this purpose, MSW vehicles need to be covered and provided with two separate containers or a single container with an effective partition.

We observed during JPV that majority of the vehicles used for door-to-door collection did not have partition to collect the segregated waste, if any. In four[30] ULBs, though the new vehicles procured had partitions for collection of wet and dry waste, the waste collectors were depositing both wet and dry waste in both the sections thereby defeating the purpose of segregation of waste (**Exhibit 6.7)**. The JPV also revealed that the test-checked ULBs were using open vehicles for transportation (**Exhibit 6.8)**, leading to scattering of waste, which caused littering and could also be a health hazard. KSPCB confirmed (December 2017) that open vehicles were used by ULBs for transportation of MSW.

HDMC, CMC, Bidar and TP, Kudligi purchased new vehicles with a provision of slider opening for depositing waste (**Exhibit 6.9)**. These vehicles were more appropriate as they prevented visibility of waste during transportation.

Thus, even after 18 years of MSW Rules, 2000 coming into force, ULBs have failed to comply with minimal requirements of hygiene such as covered vehicles and vehicles with partition. This also indicates failure of IEC/enforcement of training given to waste collectors.

The State Government stated (May 2018) that ULBs would procure vehicles with partition to ensure non-mixing of wet and dry waste and that ULBs have been instructed to use covered vehicles for transportation of waste.

6.3.3 Use of transportation vehicles without authorisation

Government of Karnataka directed (January 2004) that transportation vehicles used for MSW should have to be registered with KSPCB within 30 days and the same has been reiterated by KSPCB. Further, as per Motor Vehicle Act, all public transport vehicles are required to obtain fitness certificate for use of the vehicle besides possession of a valid insurance for the vehicle.

Scrutiny of records in 35 ULBs showed that the vehicles used for transportation of MSW were deficient in:

(i) authorisation from KSPCB - all 463 vehicles (100 *per cent*). Thus, the vehicles were being used by ULBs unauthorisedly for SWM activities;

(ii) fitness certificate from Regional Transport Office - 255 out of 463 vehicles (55 *per cent*); and

(iii) valid insurance for the vehicles - 101 out of 463 vehicles (22 *per cent*). This indicates a general lapse of internal control on part of ULBs.

We further observed that 14 vehicles (13 vehicles in 2016 and one rapid action vehicle in 2013) purchased by CC, Ballari were not registered with RTO.

[30] HDMC; CMCs – Bagalkote and Hosapete; TP, Kudligi.

Similarly, in TMC, Humnabad, six vehicles purchased during the period 2009 to 2016 were not registered (August 2017) and in TP, Raibag, four auto tippers were not registered. Thus, ULBs were using the vehicles for SWM purposes without necessary registration for periods ranging up to nine years.

The above deficiencies highlight the absence of internal control mechanism within the department.

6.3.4 Monitoring of transportation vehicles

Transportation of MSW from source of generation to the authorised destination is important to ensure its proper disposal. MSWM Manual, 2016 stipulates that communication technologies such as global positioning system (GPS) are to be integrated as part of monitoring of SWM system. This also helps in improving the collection and transportation efficiency of the vehicles.

Out of 463 transportation vehicles, 139 vehicles were affixed with GPS devices in 10[31] test-checked ULBs. In 56 vehicles, in five ULBs (CC, Mangaluru, CMC, Bidar, CMC, Hosapete, CMC, Udupi and TMC, Maddur), the devices were functional and in the other five ULBs, GPS devices were not functional due to issues such as software problems, damages due to short circuit (CMC, Chintamani). In the absence of GPS, ULBs were deprived of an effective tracking mechanism.

Further, the test-checked ULBs, other than CC, Mangaluru, CC, Tumakuru and CMC, Sira did not have the facility of weighbridge and CC TV cameras resulting in absence of effective monitoring of transportation activity.

Illustration - Unauthorised dumping of waste in CMC, Nanjangud

The authorised landfill site was located at a distance of eight kilometres from Nanjangud city and the ULB stated that waste collected was being dumped in the authorised site. ULB neither fixed GPS in MSW transportation vehicles nor installed closed circuit television (CCTV) camera and weighbridge in the landfill site.

We observed that huge quantity of mixed waste including plastics, food waste, chicken waste, clothes, cut-hair was dumped in a vast area of 6 acres close to the bank of River Kabini (50 metres), which passes through Nanjangud city. This unauthorised dumpsite was located at a distance of one kilometre from the city. The above area, which was enroute to the landfill site, was found to be grazed by pigs and stray dogs and unbearable foul smell was emanating from the area (**Exhibit 6.10**).

The quantum of waste seen in the area only indicate dumping of waste in an unauthorised area. Regional Office, KSPCB, Mysuru (Rural) also communicated (2015) this observation to CMC, Nanjangud. The CMC, however, failed to take preventive measures by way of either installing GPS to each MSW transporting vehicle or installing CCTV camera in the landfill site, which could have prevented dumping of waste at unauthorised site besides ensuring proper monitoring of movement of MSW vehicles by ULB.

The State Government agreed (May 2018) to look into the matter.

[31] CCs - Mangaluru and Tumakuru; CMCs - Bagalkote, Bidar, Chintamani, Hosapete, Karwar, Sira and Udupi; TMC, Maddur.

6.3.5 Usage of compactor trucks for transportation of Municipal Solid Waste against State policy

The State policy, 2004 stipulates that compactors have a separate system for secondary collection and these vehicles are not recommended for towns with population of less than 20 lakh. The population of all ULBs in the State other than BBMP is less than 20 lakh and hence use of compactors for transportation was not permitted.

We observed that nine[32] test-checked ULBs were using 47 compactors for secondary collection and transportation of MSW to landfill. In six ULBs, the DC/DMA, responsible for monitoring the functioning of ULBs, approved the action plans for purchase of compactors. In CC, Mangaluru, the agency entrusted with the work of secondary transportation was using compactors. Thus, the approval, purchase and usage of compactors was against the State policy.

As the unsegregated MSW which include domestic hazardous waste is compressed in the compactors, chances of contamination of MSW by toxic wastes such as batteries, glass pieces, *etc.*, is significant. Therefore, handling of such waste would not only be risky but quality of by-products would be adversely affected. The usage of compactors also goes against the principle of facilitating aerobic composting in windrow platforms as it compresses waste, whereas windrows are meant to aerate waste to enhance the speed of aerobic decomposition.

The State Government stated (May 2018) that the State Policy would be suitably amended.

Recommendation 14: The ULBs, in addition to increasing the number of vehicles, should also ensure that the vehicles already procured comply with the statutory requirements of registration, obtaining authorisation, insurance, fitness certificate, etc. The vehicles procured should be suitably designed to collect and transport segregated waste efficiently.

[32] CCs – Ballari, HDMC, Mangaluru and Tumakuru; CMCs - Bidar, Hosapete and Udupi; TMCs – Hiriyur and Maddur.

Exhibit 6.7: Transportation of unsegregated waste (Paragraph 6.3.2)

CMC, Bagalkote (29.8.2017)

HDMC (28.4.2017)

CMC, Hosapete (11.5.2017)

Exhibit 6.8: Open vehicles used for transportation (Paragraph 6.3.2)

CMC, Shidlaghatta (8.6.2017)

CMC, Sira (17.6.2017)

TMC, Bhatkal (11.5.2017)

Exhibit 6.9: Vehicles with slider used for transportation (Paragraph 6.3.2)

HDMC (28.4.2017)

CMC, Bidar (8.8.2017)

Exhibit 6.10: Unauthorised dumping of waste (Paragraph 6.3.4)

CMC, Nanjangud (11.5.2017)