

The State of Decentralised Solid Waste Management in Kerala Report 2021



Local Self Government Department
Government of Kerala

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MESSAGE

Kerala has been a leading State in India in terms of social development indices. The State has made impressive achievements as a result of continued social movements and mass mobilisations for development action. After the 73rd and 74th Constitutional Amendments came into force, Kerala took the leadership in devolving a significant part of the State's Annual Plan Funds to the Local Self Government Institutions (LSGIs). All the 29 functions covered in the Constitutional Amendments were transferred to the LSGIs and a large pool of functionaries were deployed in them.

Since 2016, the Government of Kerala has been promoting a comprehensive development agenda under the Nava Kerala Action Plan. The Action Plan has been addressing some of the pertinent issues in Kerala's development and devising strategies for sustainable development. Hygienic handling and disposal of waste, essential for effective soil and water conservation, has been accepted as one of the central themes under it.

Haritha Kerala Mission was set up in 2016 as part of the Nava Kerala Action Plan, for leading the programme in hygienic waste management linked to organic farming. Suchitwa Mission, another arm of the State government, is the technical agency that advises and guides the programme. Grama Panchayats, Municipalities and Municipal Corporations have been leading the initiatives for solid waste management, as it is a function attached to the Local Self Governments.

I am happy that the Local Self Government Department is bringing out a report on the state of decentralised solid waste management in Kerala. I am sure the report will be helpful in further planning and strengthening the programme at the policy level and in practice.

Pinarayi Vijayan





Message from the Minister for Local Self Government Department

Solid waste management is a constitutional responsibility of the Local Self Government Institutions (LSGIs). The Solid Waste Management Rules 2015 of the Government of India while reiterating this constitutional role mandates the segregation of waste at source. The National Green Tribunal has laid down guidelines pertaining to waste management; the guidelines make it mandatory for the LSGIs to keep track of the waste generated and handled, and keep information on the status of segregated waste.

Effective waste management is critical in ensuring the protection of water resources and also for ensuring a healthy living environment. It is being increasingly considered an essential public service for sustainable development of resources and their optimal use. It is also part of several national and global policy frameworks including the Sustainable Development Goals (SDGs).

Kerala with strong LSGIs in rural as well as urban areas, has been focusing on creating sustainable institutional systems for it. Haritha Kerala Mission, the Suchitwa Mission, and the Clean Kerala Company are institutional mechanisms that have been created to support LSGIs for effective management of non biodegradable waste.

The State of Decentralised Solid Waste Management in Kerala Report 2021 is an attempt to consolidate the experiences so far and present it for policy level discussions and follow up.

M.V. Govindan Master
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This Report was envisioned in its current form by the Local Self Government Department. It was designed with the objective of evaluating the status of the programme and analysing the efficacy of policy level measures which guide the implementation in various districts.

This report has seen the contribution of a number of stakeholders who are to be acknowledged. This was a collaborative effort of various officials of the Local Self Government Department, Haritha Keralam Mission, Suchitwa Mission, Kudumbashree Mission, the Director Panchayats and Director Urban Affairs and a team from Kudumbashree National Resource Organisation (NRO).

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The contribution of all who have worked to get the State Decentralised Solid Waste Management in Kerala is gratefully acknowledged.

Sarada Muraleedharan IAS
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Chapter 1

Context

Kerala and Decentralized Solid Waste Management

Solid Waste management is a crucial and integral component of rural and urban socio-technical systems, necessary for the protection of public health and environment. As cities grow and villages urbanize, the waste generated inevitably increases. Thus, to cater to the needs of the growing population, effective waste management is increasingly being looked at as an essential public service for the sustainable development of spaces, communities and resources. This is also captured within several global policy frameworks, including the Sustainable Development Goals (SDG), with waste management prominently featuring in the targets and indicators of both SDG 11 and 12. Both the goals, notably include commitments to prevent, reduce, recycle and reuse - as well as to properly collect and discharge solid waste by 2030.

In this context, Kerala's geography, population density and terrain gradient pose unique challenges to and opportunities for the management of waste. With a population of about 34.8 million, densely packed settlements, and urban and rural areas interspersed across as a rural-urban continuum, Kerala generates more than 10,000 tonnes of waste per day (tpd). More than 70% of this waste is biodegradable with high moisture content, owing to the state's hot-humid climate, and can easily be treated at source. Since the composition of the place and type of waste generation varies with respect to level of urbanization and awareness, the challenge lies as much in being able to devise effective means of solid-waste management for the increasingly urbanized rural areas, as in enhancing the capacities of Local Self Governments (LSGs) to manage and treat effectively the growing quantities of solid waste generated daily.

This also falls in line with the constitutional and legal mandate governing Solid Waste Management in India. The provisions under Article 243 (G) and 243(W) as per the 73rd and 74th constitutional amendments empower the local self governments viz. Panchayats and Urban Local Bodies to

undertake the task of waste management. In addition, The Solid Waste Management Rules, 2015 of the Government of India state that it is the responsibility of the Local Self Governments (LSG) to provide waste management services in their jurisdiction and collect user fees from individual households and institutions for such services. The Rules also mandate the segregation of waste at source. Furthermore, there are the guidelines laid down by the National Green Tribunal (NGT) pertaining to the management of waste as per which the LSGs are supposed to keep a track of the waste generated as well as the quantities of waste handled and segregated to provide information to the NGT as and when needed.

Thus, keeping in mind the constitutional and legal framework governing waste management in India, as well as the contextual realities of the state, The Government of Kerala has adopted a policy for solid waste management with two strategies:

1. Decentralised waste management
2. Centralised waste management where necessary

The Decentralized Solid Waste Management (DSWM) as conceived in Kerala, is a system involving the segregation and processing of waste at source to the maximum extent possible and then at the community level. There are different methods for the treatment of biodegradable and non-biodegradable waste in such a system. While composting and biomethanation are common methods used for treatment of biodegradable waste, Non biodegradable wastes are collected and made available for recycling processes. These aspects substantially reduce the amount of waste reaching the landfill sites minimising associated issues.

The decentralized system has been credited for not only being sustainable and financially viable but also for helping improve the quality of life and working conditions of the waste collectors.

It is known to promote green growth, reduce GreenHouse Gas emissions and also reduce transportation of organic Solid Waste to the waste disposal site. To actualize the model of decentralized management, Material Collection Facilities (MCFs) need to be set up as the LSG level centres for waste storage and segregation and Mini MCFs need to be set up at the ward levels- primarily as local centres for the storage of waste and to reduce the workload of and drudgery on waste collectors. These Mini-MCFs and MCFs play an important role in secondary storage and segregation before sending the waste for recycling. As of date, more than 91% of the 941 Gram Panchayats in Kerala have either a functional MCF or a fully constructed MCF.

Mini-Material Collection Facility

Mini-MCFs have been introduced with the objective of reducing the drudgery of waste handling by waste collectors; and also for reducing the overall workload. These are interim waste storage spaces at the ward level. In order to ensure proper functioning of mini-MCFs, the following are to be in place:

1. Suitable location where the Community has control over it
2. Community education to ensure that the mini-MCF is used only for the purpose that it is meant for, and not for waste dumping by the public
3. Lock and key for safety and proper use

Material Collection Facility

MCFs have been established at the LSG level (Panchayats and Urban Local Bodies) for the purpose of storage and Segregation of non-biodegradable waste. The Local Self Government Department of the Government of Kerala had issued a circular for preparing a work calendar for its functioning. The work calendar specifies the dates of collection for different categories of waste, such as pet bottles, plastic, medicine wrappers, used sandals etc. The work calendar ensures segregation of waste at source and reduces the drudgery of workers at the MCF.

Ensuring the functioning of the MCFs and Calendar-based work is supposed to be the responsibility of the LSG

This apart, the adoption of a decentralized solid waste management system also necessitates the need to have an institutional framework with strong Local Self Governments directly responsible for waste management and an empowered and informed citizenry indulging in responsible waste management practices and behavior. Accordingly, the Government of Kerala has come up with the following institutional framework for solid waste management in the state with each stakeholder having a defined role:

1. The Local Self Government - Primary Agency and Stakeholder for service delivery and enforcement
2. Suchitwa Mission- Agency mandated to provide technical backstopping and financial support to the LSGs for effective and efficient waste management service provision
3. Clean Kerala Company - To undertake Commercial handling of non-biodegradable waste
4. Kudumbashree for Haritha Karma Sena (HKS)- A Trained team of women entrepreneurs from the Kudumbashree fold recruited to provide technical services and solutions on waste management projects, responsible for collection, transportation, storage, segregation processing, disposal, and management of waste in collaboration with the respective LSGs.
5. MGNREGS (Mahatma Gandhi National Rural Employment Guarantee Scheme) for infrastructure development (establishment of Mini-MCFs and MCFs) through convergence; Ayyankali Urban Employment Guarantee Scheme (AUEGS) in urban areas for the same purpose
6. Haritha Keralam Mission for techno-managerial support, campaigns, monitoring, and coordination.

The role of Local Self Governments in the upkeep of MCFs and provision of necessary services to the HKS Members

In 2017, the Government of Kerala announced the Suchitwa Keralam Campaign for system building. Roles envisaged for LSGs under it are as follows -

- 1) Facilities at MCF including toilets, restrooms
- 2) Ensuring personal security and the provision of safety equipment to the HKS members undertaking waste collection, storage and segregation
- 3) Ensuring income to the HKS members
- 4) Gap funding through additional projects where necessary

Notably, this transition to decentralized solid waste management (DSWM) with this kind of an institutional framework has not been merely a bureaucratic process, but has involved a concerted effort to change people's waste management habits behaviorally through Information-Education-Communication (IEC) Campaigns and to encourage the treatment of waste at source. Given the nature of the waste generated in the state - largely biodegradable, treatment at source also makes administrative and financial sense.

A large part of this change towards DSWM, can also be attributed to the people's effort and direct participation in demanding better and more sustainable frameworks of waste management - the mass movement in Vilappilsala Panchayat in Thiruvananthapuram and Sarvodayapuram Landfill in Alappuzha being two note-worthy examples. Indeed, the people of Vilappilsala and Sarvodayapuram have not been alone in highlighting the adverse impacts of centralized waste management systems on the living conditions and health of the communities living in close proximity. In fact, in the year 2012 itself, Kerala witnessed struggles against centralized waste management systems in at least 13 landfill sites. The struggles brought home the point that a centralised waste management system invariably shifts focus from the source of waste generation to waste disposal sites. It also involves a large economic investment.

Landfills in half of these sites were consequently closed and the Kerala administration gradually adopted DSWM, with an emphasis on building a "circular-economy." A circular economy follows the 3R approach - Reduce, Reuse and Recycle. Resource use is minimized (reduce). Reuse of products and parts is maximized (reuse). And last but not least, raw materials are reused (recycled) to a high standard. This stands in contrast to the idea of Linear Economy of "Take, Make, Use, Waste" step-by-step plan in which the raw materials are collected, then transformed into products that are

used until they are finally discarded as waste.

This shift of the administration towards decentralization and circular economy has also marked a significant change in the approach of the administration- that of looking at 'waste' as a 'resource'. Slowly, but steadily, waste has come to be viewed as part of a larger ecosystem, the management of which is considered to play a critical role in the idea of sustainability and livelihood generation. In order to turn waste into a valuable resource, the need for systematic ways to manage resources has been recognized and this management has to begin right at the household and institution level- where proper segregation of various kinds of waste i.e. food waste, plastic waste, bio-chemical waste is to take place. Two critical aspects of proper waste management adopted by Kerala can, thus, be summarized as follows:

1. Building of sustainable systems
2. Behavioural changes

A major component of building a sustainable system for waste management has been the formation of the Haritha Karma Sena (HKS) in 2016. The HKS, as mentioned above, is a women-led, women-owned network of micro-enterprises who undertake collection from houses, institutions and other sources and perform waste storage and segregation activities at Mini MCFs and MCFs respectively, so that the waste can finally be taken for treatment. These enterprising women, who mostly come from the neighbourhood groups (NHGs) fold of Kudumbashree in Kerala, undertake the arduous, labour-intensive task of door-to-door collection of non-biodegradable waste, segregating it at Material Collection Facilities and encouraging source level segregation at the houses and institutions they visit. The user-fees collected by these women from the houses and institutions acts as a source of remuneration for them and helps generate livelihood. The functions of the HKS, as envisaged by the Suchitwa Keralam Campaign, are as follows -

Haritha Karma Sena's Roles

1. Services at the door steps
2. Technical support to households
3. Service provider for community composting
4. Management of facilities such as mini-MCF, MCF, and Resource Recovery Facilities (RRF)

To develop the skills of the HKS members and provide them with support, Haritha Sahaya Sthapanams (Technical Support Agency), the accredited agencies of Suchitwa Mission, have been deployed. Haritha Keralam Mission (HKM) started in 2016 to act as an enabling entity to create synergies between water conservation, waste management, natural farming and environmental security- in line with bringing waste management to the fore of a circular economy. A key aspect of Haritha Keralam involves the promotion of material reuse and recycling through Resource Recovery Facilities or RRFs. There are other models where private players step into the role of management of door to door collection and disposal of waste, as outsourced service providers for the Local

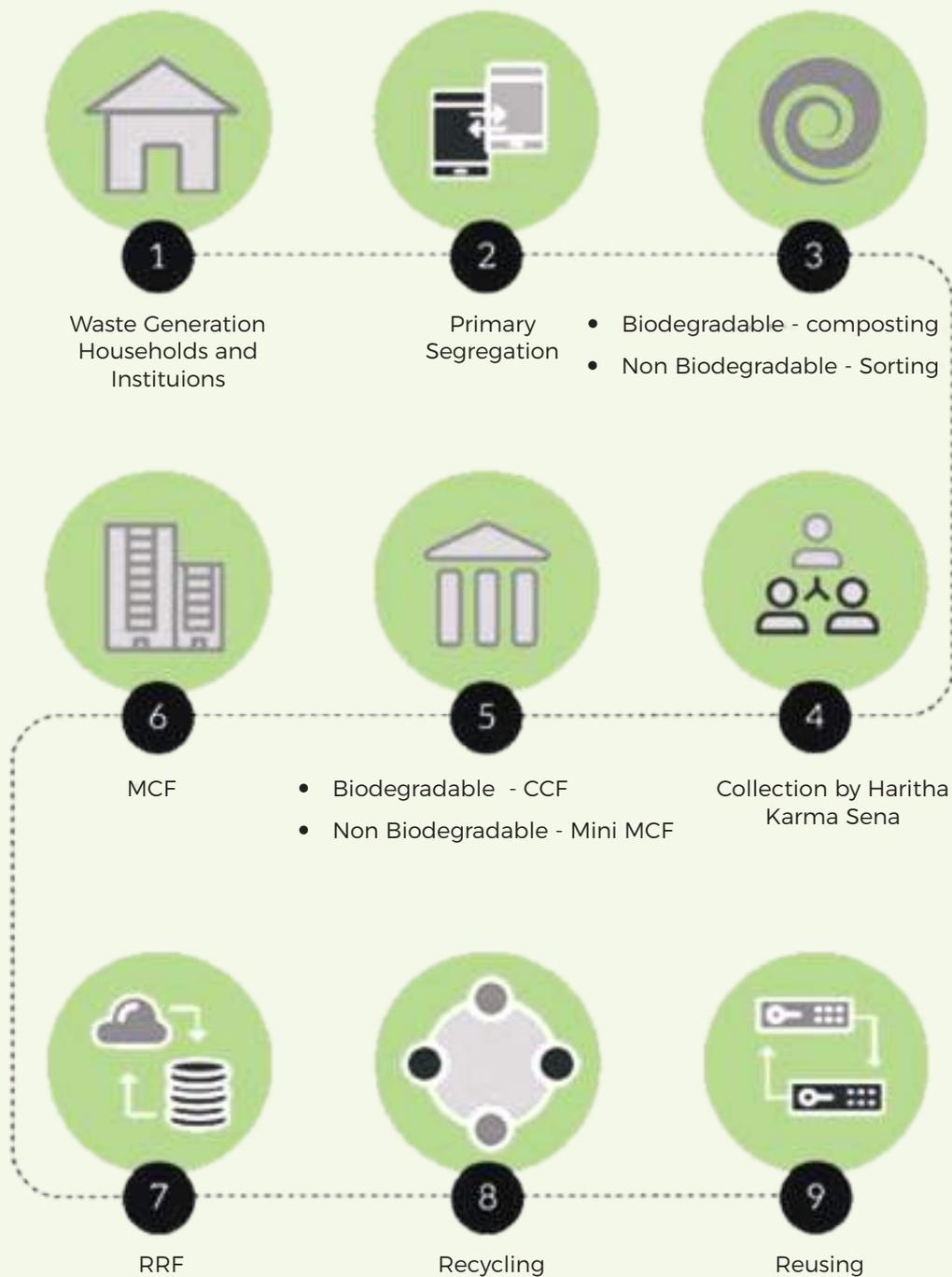
Government. In some municipalities, there is also a tendency to rely on contingent employees for coverage of institutions.

In sum, today, Kerala's waste management space has multiple stakeholders working in close coordination with each other, exchanging knowledge and resources to bring decentralized waste management and the circular economy idea to fruition. There are the local governments, who are the most significant stakeholders and the lynchpins of the waste management system, the Kudumbashree mission that empowers the Haritha Karma Sena MEs to find sustainable livelihoods in waste management, the Clean Kerala Company which has been tasked with removing non-biodegradable waste and with converting it into resource wherever possible and technical support agencies such as Haritha Keralam Mission and Suchitwa Mission who are responsible for providing support, hand holding and IEC to kindle behavioural changes pertaining to waste management. Monitoring and coordination are undertaken by the Directorate of Panchayats and the Directorate of Urban Affairs, soon to be amalgamated into a Principal Directorate of Local Governance.



WASTE MANAGEMENT IN KERALA

Process FLOW



Chapter 2

Suchitwa Padavi and After

The Evaluation

With an aim to incentivise and fast track the scientific treatment of waste in local self-government institutions in the state, Suchitwa Padavi Padanam had been carried out by the Local Self Government Department in collaboration with Haritha Kerala Mission and Suchitwa Mission. In August 2020, a state wide evaluation exercise was done of all LSGs, both rural and urban to assess the extent to which interventions in line with the SWM Rules 2016 and the State's own framework of decentralised Governance had been carried out. LSGs were graded according to the quality of intervention and impact and those who had managed a fair level of interventions were accorded "suchitwa padavi", a status of cleanliness. For the purpose of assessment of the LSGs, various criteria such as

- Haritha Karma Sena formation, services offered
- User fee for households and institutions
- Status of Material Collection Facilities (MCF), Mini-MCF, Resource Recovery Facilities (RRF) and linkages with Clean Kerala Company Ltd (CKCL)
- Status of source treatment of biodegradable waste
- Construction of toilets which are accessible to women, children and the elderly
- Status of water bodies and public spaces
- Status of interventions to comply with "green protocols"

There are a total of 941 Gram Panchayats, 87 Municipalities and 6 Corporations in Kerala.

After the evaluation, of the 1034 LSGs in the state, 793 obtained Suchitwa Padavi.

SUCHITWA PADAVI ACCORDED TO

718 Gram Panchayats

72 Municipalities

3 Corporations

It was intended that the front runners among these LSGs would be supported to attain sampurna suchitwa padavi (total sanitation status), but the restrictions which continued to be in force on account of the corona pandemic and back to back LSG and Assembly elections resulted in a falling back in standards of waste management, not improvement. Some of the gains that had been achieved by the suchitwa padavi drive were undone due to these developments. In the wake of the impending monsoons, it was feared that shortfall if any, in waste management systems could have a multiplier effect on pandemic management, if there was an outbreak of contagious diseases as well, and so it was important to do course correction wherever needed.

The Local Self Government Department therefore took upon itself the responsibility of doing an evaluation of the status of the compliance by all LSGs to the policy framework of the State with respect to solid waste management. The focus

of the assessment was to look at the existing mechanism of waste collection and management in each of the LSGIs, examine the gaps and challenges in the chain, and suggest ways for improved planning and effective implementation. It was also used as an opportunity to look into the pre-monsoon preparedness of each of the LSGIs to prevent and control the spread of communicable diseases.

The assessment brought together different stakeholders such as field officers of the Panchayat and Municipal Department (particularly the performance auditors), block level officers of the Commissionerate of Rural Development, Engineers of LSGD and the State Pollution Control Board, resource persons from the Haritha Kerala Mission, Suchitwa Mission, Clean Kerala Company, office of the Chief Town Planner, KILA, field facilitators etc. Mixed groups were formed for the field inspection. The inspection was done based on a pre-decided design with a defined template for data collection and compilation. The inspection team was given training on the same. Each block level team for rural areas was entrusted with the evaluation of 3 to 5 gram panchayats. The district level teams were entrusted 3-5 Municipalities. Separate district level teams were constituted for the City Corporations. Each team was expected to do one to one interactions and focus group discussions with key stakeholders such as the members of Haritha Karma Sena, besides the site inspections and perusal of records.

2.1 Formation of Field Inspection Teams

At the block level, a team of General Extension Officer, Women Welfare Officer, Performance Audit Officer and Resource person from Haritha Kerala Mission was formed to conduct the field inspection in the Gram Panchayats.

At the district level, the teams were formed comprising members from Haritha Kerala Mission, Suchitwa Mission, Office of the Deputy Director of Panchayats, Regional Joint Director Urban Affairs, District Town Planning Officer etc. In districts with a number of municipalities, Assistant Development Commissioner (General) or Assistant Development Commissioner (PAU), Executive Engineer (LSGD), Environment Engineer (Pollution Control Board) were also part of the team.

Keeping in mind the special circumstances due to COVID 19 Pandemic, two teams consisting of three members each were also kept as reserve in each district.

2.2 Training of the Teams

The team members were given online training by the Kerala Institute of Local Administration

(KILA) under the supervision of Haritha Kerala Mission and Suchitwa Mission. On the 8th of April 2021, a total of 456 members of the teams formed at Block level along with the respective district officials received their training. The online session was held from 10.30 am to 1 pm and was chaired by the Additional Chief Secretary, Local Self Government Department (LSGD). On the same day, similar training was held for 84 members from the team formed at the District Level from 2.00 pm to 4.00 pm. The reserve teams were trained at the respective districts on the 9th of April 2021. All the members were oriented on the pre-designed questionnaire (attached as annexure) for each local body and the template for district-level presentation to be made after the compilation of data. Required numbers of hard copies of the questionnaires were also distributed to each team.

2.3 Key points of Inspection

- Door to Door Collection of non-biodegradable Waste – Coverage
- Haritha Karma Sena and their Engagement
- User Fee Collection – Coverage
- Mini Material Collection Facility (MCF)
- Material Collection Facility (MCF)
- Resource Recovery Facility (RRF) – Linkage, Contract for handing over waste
- Treatment of Biodegradable waste
- Legacy waste and its treatment
- Unscientific and Improper Disposal of Waste – Penalty and Persecutions
- Evaluation and Monitoring of Waste Management and Sanitation
- Pre- Monsoon Preparations
- Analysis of the current situation at the Block Level
- Innovations in the Waste Management Sector

2.4 Field Inspection

The Inspection Teams undertook field visits from the 9th of April 2021 to the 13th of April 2021. The teams gathered data required to fill in the questionnaire at two levels. Firstly by collecting available data from each of the allotted local bodies and secondly through primary observation of waste disposal facilities, public spaces and water bodies and interactions with selected households within the local body. Interactions and Focus Group Discussions were also held with Haritha Karma Sena to understand their working conditions and challenges.

2.5 Compilation of data

Primary compilation of the data gathered by the Block Level and District Level teams were done on the 15th and 16th of April. This data was further put into the pre-designed template at the Block level on the 17th of April and the District Level on the 18th of April.

2.6 Analysis

From 19th of April 2021 to 24th of April 2021, intensive district level reviews were conducted by the Additional Chief Secretary of LSGD, in which all the LSGI Secretaries and the evaluation teams participated. The district coordinators of Haritha Kerala Mission and Suchitwa Mission presented the findings of the field inspections, replete with supporting pictures taken during inspections as well as information from records. On the basis of the district wise consolidation, the relative performance of each LSG against each performance indicator was reviewed, and the best and worst performers were identified. The Reviews were also attended by district officials, heads of various departments. The overall situation of waste management and sanitation of each district was assessed on the basis of these presentations and attendant discussions.

Chapter 3

Findings of the Evaluation

3.1 Haritha Karma Sena

Waste management is one of the mandated constitutional and statutory functions of the Local Self Governments. Because of the labour intensive nature of the process, Waste management has enormous potential to offer incomes and livelihoods to those who are associated with it in different capacities and at different steps (Collection, Storage, Segregation, Processing, Recycling etc.). To help the LSGs execute their responsibilities of waste management effectively as well as to help generate maximum sustainable livelihoods from the process, the Government of Kerala, through the Haritha Keralam Mission issued necessary directions for LSGs to constitute Haritha Karma Sena (HKS) in all the wards.

Haritha Karma Sena is a trained team of entrepreneurs recruited to provide technical services and solutions on waste management projects and are responsible for collection, transportation, processing, disposal, and

management of waste in collaboration with the respective LSGs. These women entrepreneurs come from the Kudumbashree Neighbourhood Group fold, form Micro Enterprises (ME) known as HKS (Haritha Karma Sena) ME Units and are assisted and trained by the LSGs in the waste collection drive. In addition to training people to undertake processing of biodegradable waste at source in houses, gated colonies, markets and institutions, the HKS members also undertake collection, segregation and storage of non-biodegradable waste.

Generally, a team of two Green Technicians (HKS Members) visits 250 households in a ward. In a ward, sufficient task force members are positioned with one Green Supervisor (a graduate able to operate computers and generate reports) for managing 5-6 teams covering 15 wards. Thus, in a Grama Panchayat having 15 Wards, the total manpower is supposed to be 31. HKS ME Units generally undertake the waste collection of non-biodegradable once in a month, as revealed by the survey.



Image: Haritha Karma Sena Members, Angamaly Municipality, Ernakulam Dist.

For the purpose of segregation and storage, Material Collection Facilities (MCF) have been established in the Grama Panchayats, Municipalities and Corporations in the State. Resource Recovery Facilities (RRF) with shredding and baling facilities have also been established in the blocks, big Municipalities and in all Corporations.

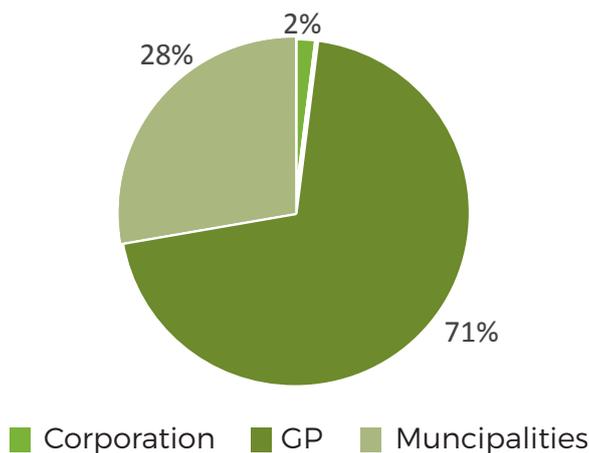
Primarily, the Haritha Karma Sena Micro Enterprises have the following sources of income-

1. User fee - Collected from Households
2. User fee - Collected from Institutions
3. Buy back of organic waste compost (for providing to farmers through farm projects at the LSG level)
4. Revenue from the sale of non-biodegradable waste

from where the waste is collected forms a major source of revenue for these HKS ME units. This User Fees is generally fixed by the LSGIs for the houses and institutions in that area. Another source of revenue for the HKS ME units is the money that accrues to them by way of sale of non-biodegradable waste. In the year 2020-21, a total of Rs 6,59,33,886 was credited to HKS from the revenue generated by the sale of non biodegradable waste as per the Assessment. Out of this, the share of Gram Panchayats in the total amount credited to Haritha Karma Sena was 71%, share of Municipalities was 28% and of Corporations was 2% as can be seen in the figure below.

The user-fee levied on the houses and institutions

Share of Each Local Body in the Amount Credited to HKS from revenue generated by the sale of Non Biodegradable Waste



Graph 3.1 - Share of Each Local Body in the Amount Credited to HKS from revenue generated by the sale of Non Biodegradable Waste

However, a major issue to be resolved in this regard is that pertaining to the frequency at which the amount is credited by the LSGIs. The Assessment reveals that more than 43% of the LSGIs do not credit the amount generated by way of sales to the HKS members' account regularly. GOs and notices reminding all the LSGIs to make a timely payment to the HKS members have been issued but were not followed up on in many cases. All defaulting cases were identified for corrective action.

As per the assessment, 97% of the LSGIs in Kerala have formed Haritha Karma Sena in their respective jurisdictions. In fact, the survey reveals that 100% of the LSGIs (Panchayats, Municipalities and Corporations) in the 5 districts of Kasargod, Kollam, Kottayam, Pathanamthitta and Palakkad have established HKS.

3.1.1 Household Waste Collection

The mandate of HKS is to primarily collect the non-biodegradable waste from households and institutions. The survey reveals that nearly half (47%) of the households in LSGIs across Kerala are giving their non-biodegradable waste to the HKS. While Kannur is the star performer with waste being collected by HKS from upto 70% of households, Thiruvananthapuram district lags behind with waste being collected by HKS from only 27% of households. Given below is a table showing the district wise collection of non-biodegradable waste by HKS members from households.

District	Total No. of households in the LSG	Total No. of Households from where Non Biodegradable waste is collected	Percentage of coverage
Alappuzha	6,42,082	2,85,478	44%
Ernakulam	10,31,547	3,96,238	38%
Idukki	3,47,860	1,78,262	51%
Kannur	7,17,866	5,00,068	70%
Kasargod	3,63,721	1,76,386	48%
Kollam	8,51,160	5,41,027	64%
Kottayam	5,89,718	2,51,228	43%
Kozhikode	8,56,188	5,16,694	60%
Malappuram	11,57,451	4,54,303	39%
Palakkad	8,38,302	4,64,724	55%
Pathanamthitta	4,15,507	2,63,725	63%
Thiruvananthapuram	11,62,404	3,11,749	27%
Thrissur	9,37,692	3,25,441	35%
Wayanad	2,40,584	1,29,179	54%
Grand Total	1,01,52,082	47,94,502	47%

Table 3.1 - Total No. of Households from where Non Biodegradable waste is collected- District Level

The higher percentage of waste collection from households in Kannur can largely be attributed to the performance of households and HKS members in the Panchayats. 77% of the households in Kannur Panchayats give their waste to HKS. Whereas only 52% and 46% of households in Kannur Corporation and Municipalities give their waste to HKS.

The survey also reveals that in the case of Thiruvananthapuram district, only 30 odd % of households in Panchayats give their waste to HKS. This is notwithstanding the fact that the fight between Thiruvananthapuram Corporation and Vilappilsala Panchayat in the same district was at the core of the protests demanding a new decentralized framework of waste management. Thus, more needs to be done in Thiruvananthapuram in terms of IEC campaigns to encourage households to give their waste to HKS.

Interestingly, out of all the three types of LSGIs- Panchayat, Municipality and Corporation- It is in the Gram Panchayats that the waste is being collected from a higher number of households by HKS (48%), as opposed to 45% in case of municipalities and 44% in case of corporations. This indicates that HKS ME Units are performing relatively better when it comes to household waste collection drives in GPs vis-a-vis more urbanized

areas.

Another important issue of concern is the frequency of collection. What generally happens is that a calendar is distributed to the households as per which HKS members undertake the collection of waste. This calendar is supposed to be distributed to all households and institutions as per circular no. DC1/282/2020 LSGD dtd. 29.07.2020. However, the survey indicates that only 24% of the households and institutions across LSGIs have been distributed a calendar. Furthermore, collection took place as per the calendar in only 20% of the households and institutions across LSGIs. This warrants the need to streamline the collection process to ensure it sticks to the timeline and calendar and to ensure the delivery of calendars.

3.1.2 Institutional Waste Collection

Institutional Waste is the waste generated by institutions such as hospitals, schools, restaurants, hotels etc. In the case of institutional non-biodegradable waste, corporations are at the top with more than 53% of the institutions across all the 6 corporations giving their waste to HKS. In fact, in Thiruvananthapuram Corporation, among the largest in the state, waste is collected from 92% of the institutions. Juxtapose this with the fact that only 7% of the households in the same

Thiruvananthapuram Corporation give their waste to HKS. Such a wide contrast between the behaviour of Households and Institutions in the same corporation suggests that a more targeted IEC campaign is needed for households in Thiruvananthapuram Corporation. The fact that the Corporation runs on outsourced service

providers who do not cover the entire corporation area, and whose quality of performance is not regularly assessed is a matter of concern. The Corporation was asked to come up with a clear strategy to make up for the uncovered areas.

Corporations	No. of institutions in the Corporation	No. of institutions from where Non-biodegradable waste is collected	Percentage of coverage
Kochi	18,706	10,191	54%
Kannur	6,100	736	12%
Kollam	9,824	6,877	70%
Kozhikode	31,000	6,212	20%
Thiruvananthapuram	18,882	17,382	92%
Thrissur	13,278	10,440	79%
Grand Total	97,790	51,838	53%

Table 3.2- No. of institutions from where non biodegradable waste is collected - Corporations

In addition to Thiruvananthapuram, the 2 other large corporations viz. Kochi and Kozhikode show a mixed response when it comes to waste collection by HKS. While Kochi Corporation hits a middle ground with around 54% of the institutions giving their waste to HKS, Kozhikode does not perform well with only 20% of institutions in the corporation giving their waste to HKS. Much of this has been caught up in the waste to energy projects that are coming up in these cities, with a commitment to provide specific minimum quantum of waste. It is expected that as soon as the projects take off, the waste collection systems will be streamlined in these places.

Compared to Corporations, the situation of institutional waste collection by HKS in Gram Panchayats and Municipalities is starkly different with both the kinds of LSGs lagging behind. The survey reveals that HKS members collect waste from only 26% of the institutions across all 87 municipalities and 31% of institutions across all 941 Gram Panchayats. Thus, efforts are to be taken to increase institutional waste collection in municipalities and Panchayats and to monitor the same.

3.1.3 User Fees

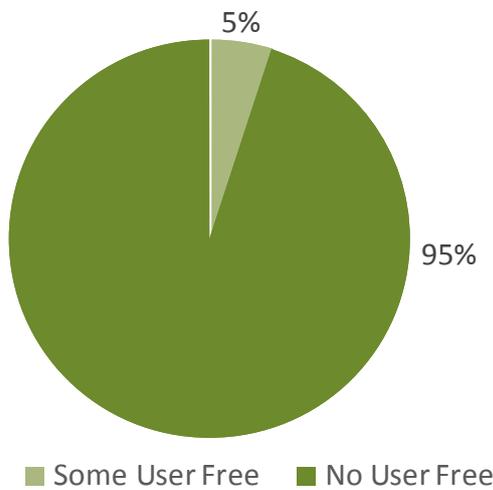
User Fees is one of the most critical components for the sustainability of the HKS Model. The

income of the Sena members and the profitability of the HKS micro enterprises depends on the user fee collection from houses and establishments within each local body based on the amount of non-biodegradable as well as degradable waste collected by the Sena every month from the doorsteps. The 2015 Rules allows the collection of user fees from individual households and institutions based on the rates fixed by LSGs.

(i) Biodegradable Waste - Household Level

In most LSGs management of the bio degradable waste is left to the generator to handle. In gram panchayats and smaller municipalities, the bio degradable waste generated is mostly processed at source through compost pits, or as feed to household animals and poultry. As per the survey, 896 out of the 941 (95%) of the Gram Panchayats have set no user fees for biodegradable waste collection. The situation is more or less similar for municipalities with 77% of the municipalities have not fixed any user fee for biodegradable waste collection. 3 out of the 6 corporations also have not fixed any fee for biodegradable waste collection.

Share of Panchayats with No User Fee at Household Level for Biodegradable Waste Collection



Graph 3.2 - Share of Panchayats with No User Fee at Household Level for Biodegradable Waste Collection



MCF in Palakkad Municipality

(ii) Biodegradable Waste - Institutional Level

Akin to the situation for households, 95% of the Gram Panchayats had not set any user fee for biodegradable waste collection in the case of institutions.

Similarly, 58% of the municipalities had not set any institutional user fee for biodegradable waste collection.

(iii) Non-Biodegradable Waste - Household Level

The situation differed considerably for non-biodegradable waste, the survey revealed.

While, 45% of the GPs fixed a user fee of Rs 30 per household in case of household non-biodegradable waste collection, 31% of the GPs fixed a user fee of Rs 50.

Likewise, 22% of the Municipalities had a user fee of Rs 30 for household Non-Biodegradable waste, while nearly 40% had a user fee of Rs 50 for the same. In case of corporations, three out of the six had a user fee of Rs 60 per household for the collection of non-biodegradable waste.

(iv) Non-Biodegradable Waste - Institutional Level

In case of institutions, the user fee was high across all LSGIs. 41% of GPs had set Rs 100 as user fee, while 34% of GPs had set Rs 50 as user fee. Similarly, 41 out of 86 (47% of) municipalities had set Rs 100 as user fee. In addition to that, three out of six corporations had set Rs 100 as user fee.

(v) Collection of User Fee from Households

Now, notwithstanding the different user fee rates set by the LSGIs, there exists a problem of households not paying the user fee to the HKS members who come to collect the waste. The survey reveals that a very Low percentage of households actually pay the user fees: Barely 1% of the households across all LSGIs pay the user fees for non-biodegradable waste. In the specific case of Corporations, the figures are even more dismal, with barely 0.1% of the households paying user fees for non-biodegradable waste collection.

However, the situation changes dramatically at an institutional level. 99% of the institutions in corporations pay the user fee for non-biodegradable waste, while 77% of the institutions in municipalities pay the user fee for non-biodegradable waste. Likewise, 67% of the institutions in GPs pay the user fee for non-biodegradable waste. In totality, 72% of the institutions across all LSGIs pay the user fee for the collection of non-biodegradable waste, as revealed by the survey. Thus, it can be fairly concluded that institutions have a much higher user fee payment rate across all LSGIs vis-a-vis households. Refer Annexure Table 5.1.

It is to be noted that the non-payment or irregular payment of user fee is a grave concern for the HKS members as the sustainability of the Micro Enterprise Model in waste collection depends on the regular payment of user fee. The non-payment has a direct impact on the remuneration of HKS members and consequently their morale as well as the sustainability of the project. Thus immediate steps are needed to encourage households to pay user fees through aggressive IEC (Information Education and Communication) Campaigns.

3.1.4 Remuneration

The average monthly income of HKS members



HKS workers collecting user fee from a household in Vadakkara GP

in Municipalities is the most - Rs 10,343 , as opposed to Rs 8,583 in Corporations and just Rs 3,766 in GPs. The average monthly income of HKS members working in Panchayats is barely sufficient, risking making the model unsustainable in these areas. There are, however, some outliers, with the average monthly income of HKS members in GPs of Kottayam and Kasargod being as high as Rs 12,575 and Rs 6,022 respectively. This can be attributed to a few GPs in Kottayam and Kasargod with outlier values pushing the average up.

Nature of LSGs	No. of LSGs	Monthly income of a HKS member on an average (Rs.)
Municipality	87	10,343
Corporations	6	8,583
Panchayat	941	3,766

Table 3.3 - Income of HKS Members

What is of concern is that in the Panchayats, the average monthly remuneration of an HKS member is less than Rs 4000. This means that on a daily basis, an average HKS member working in a Panchayat earns less than Rs 133.33 a day. This, in fact, is around 54% lower than the current prevailing MGNREGA wage rate in the state- Rs 294.59. Even considering it as part time employment, there is a case for much better and consistent remuneration in order to keep the model sustainable, as had been earlier done with the kudumbashree models in Kozhikode and Thiruvananthapuram cities.

Thus it is imperative to ensure the payment of user fee at the household and institutional level in Panchayats, as well as ensure that there is regular disbursement of the amount generated from the sale of non-biodegradable waste by the LSGs.

3.1.5 Protective Gear and Equipment

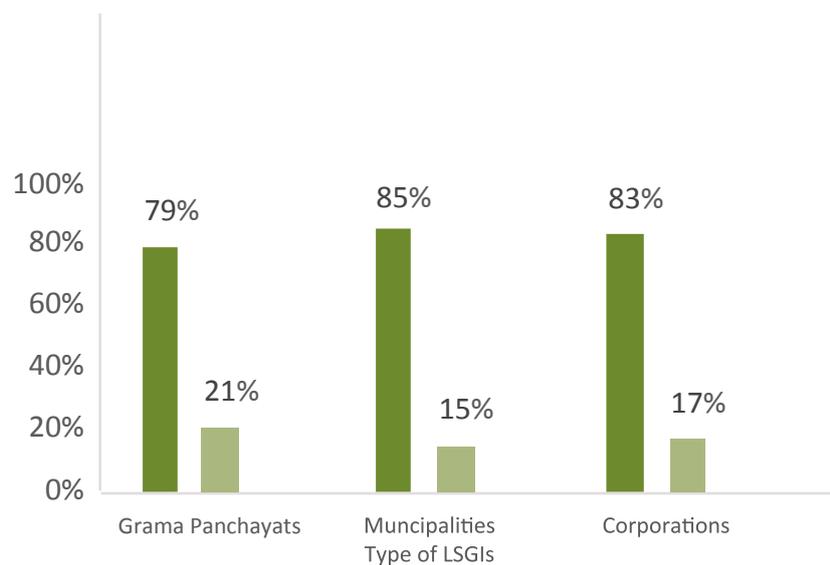
Waste Collectors keep communities and the environment safe and clean, at the cost of their own physical and mental health. Daily risks include accidental cuts, biological and medical waste contamination, poisoning by heavy metals, bites from animals and insects etc. In addition to this, often fatal accidents occur due to falls from collection trucks, stress due to workload etc. In addition, waste workers are also prone to violence by service users, with a special vulnerability for

women waste workers. HKS members are prone to similar sort of sufferings. They collect, sort, recycle, repurpose, and/or sell these materials to middlemen or the recycling industry.

The Government of Kerala has mandated that all HKS members be provided with personal safety equipment and gear while collecting, storing, handling and segregating waste by the concerned LSG as a matter of basic right. This assumes all the more significance during the pandemic and the challenges HKS members have to face owing to it.

Thus, with respect to the availability of Personal Protective Equipment (PPE) Kit and Protective Gear (such as gloves, safety glasses and shoes, earplugs or muffs, hard hats, respirators, or coveralls, vests and full body suits etc.) to the HKS Members, the Suchitwa Padhavi survey revealed the following information:

- 1) 79% of the GPs have provided HKS members with PPE Kit and protective gear (740 out of 941)
- 2) 85% of the Municipalities provided HKS members with PPE Kit and protective gear (74 out of 87)
- 3) 5 out of 6 Corporations (83%) provided HKS members with PPE Kit and protective gear



Graph 3.3- PPE Kit and Safety Equipment provided to HKS Members

It is a matter of grave concern that 201 GPs, 13 municipalities and 1 corporation (Kannur Corporation) have still not provided safety equipment and PPE Kits to all their HKS members.



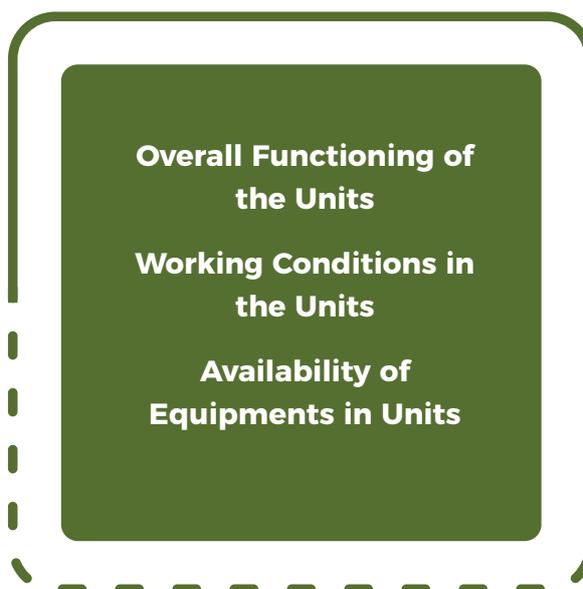
Material being collected from Mini-MCF Vadakara, Kozhikode dist

3.2 Status of MCF, Mini-MCF, RRF and their linkages

This section will focus on the various components of MCFs, Mini-MCFs and RRF which are the driving forces of the solid waste management process. The solid waste management process is based on establishing sustainable systems, led by LSGs to meet their constitutional responsibilities of proper planning, implementation and operation & maintenance management of waste management installations. (SWM Rules 2016). There are components in a system with facilities to ensure segregated collection of waste, transportation, treatment and disposal of solid waste under each LSC area.

The establishment and proper management of 3 main components in this system, such as Material Collection Facility, Mini-Material Collection Facility and Resource Recovery Facility is essential to ensure proper functioning of the system. If any component in the chain of systems becomes ineffective, the entire process is adversely affected. While the number of MCFs ensures a primary point for the system, proper availability of facilities in these units impacts the entire system. For example, an overloaded MCF would result in the overflow of waste collected by HKS, which needs to take place on a regular basis. Similarly, the absence of basic sanitation facilities or equipment also affects the overall efficiency of the workers in the unit. Therefore, not only the presence of forward and backward linkages, but proper functioning of these individual units is also critical in ensuring system performance.

The focus of the evaluation study has been categorised into three aspects of these system components



3.2.1 Overall Functioning of the Units

(i) Material Collection Facilities (MCFs)

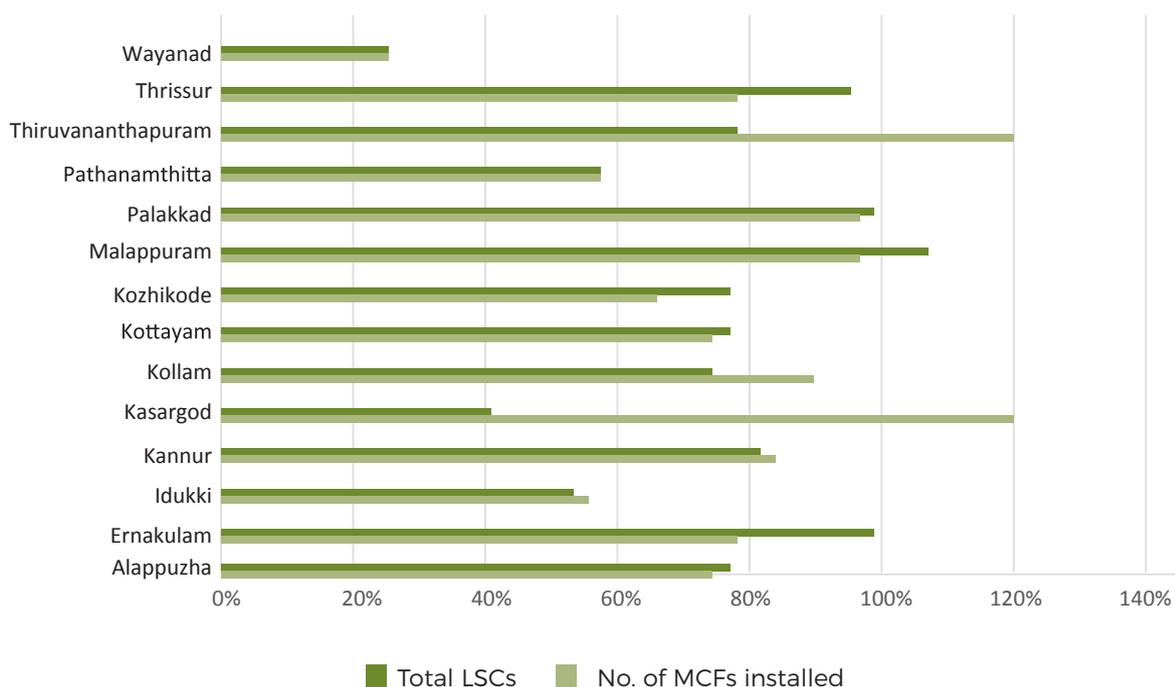
- Number of MCFs in the state

MCF stands as the site for first level collection of waste for any LSGI. These units are established for LSC level storage of segregated non-biodegradable waste. As per the Suchitwa Mission guidelines, at least 1 MCF should be established in each LSC.

LSGD issued a circular for preparing a work calendar

to facilitate proper functioning of the MCFs. The work calendar specifies the dates of collection for different categories of waste, such as pet bottles, plastic, medicine wrappers, used sandals etc. This work calendar ensures segregation of waste at source, systematic collection of waste as per categories and ultimately reduces the drudgery of HKS and other workers at the MCF. Ensuring that the door to door collection is calendar based is the governance role of the LSG.

Total no of MCFs installed across the state



Graph 3.4 - Total number of MCFs across LSGs in Kerala (includes Municipal Corporations, Municipalities, GPs)

**935 MCFs
across 941 GPs**

**935 MCFs across 87
Municipalities**

**78 MCFs across
6 Corporations**

A total of 1,110 Material Collection Facilities have been established across the state. The proportion of MCFs per total number of ULB is more compared to that of GP areas. However, there are districts such as Kasargod where the number of MCFs compared to the number of GPs is way higher.

- Gram Panchayats without MCFs

All the districts except Wayanad have at least one Panchayat without MCFs. Thiruvananthapuram, Ernakulam, Thrissur, and Kozhikode have at least 10 Panchayats each without MCFs. The state data tells us that about 90% of the MCFs are functional across GPs. Refer Annexure - Table 5.2 - Installation of MCF - Status for overall status.

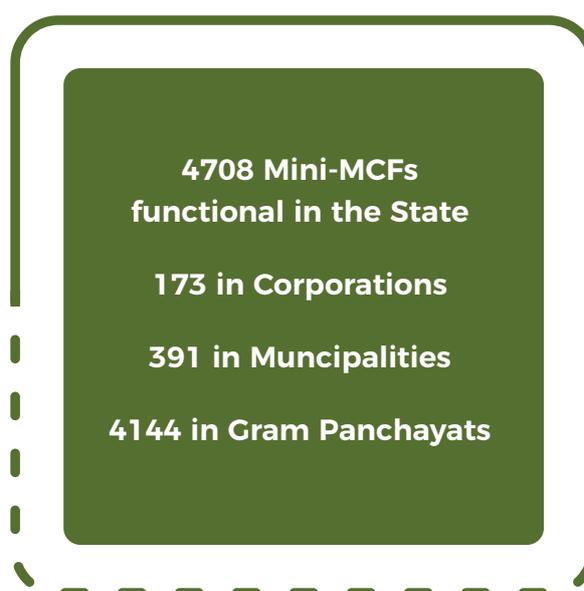
Districts	No. of Panchayats	Percentage of Panchayats without MCFs
Thiruvananthapuram	14	19%
Thrissur	24	27.9%
Alappuzha	5	6.9%
Kottayam	4	5.6%
Ernakulam	25	30.4%
Malappuram	11	11.7%
Kozhikode	16	22.8%
Total	99	10.5%

Table 3.4 - Panchayats without MCFs

(ii) Mini Material Collection Facilities (Mini MCF)

Mini-MCFs were introduced for reducing the drudgery of waste handled by women in the HKS units. In order to further manage the collection of waste from each ward and also for reducing the overall workload, Mini MCFs are established to facilitate the segregation process at the ward level. These are interim storage spaces set up ward wise while the MCF is set up at the LSG level. In order to ensure proper functioning of mini-MCFs, the following are to be in place -

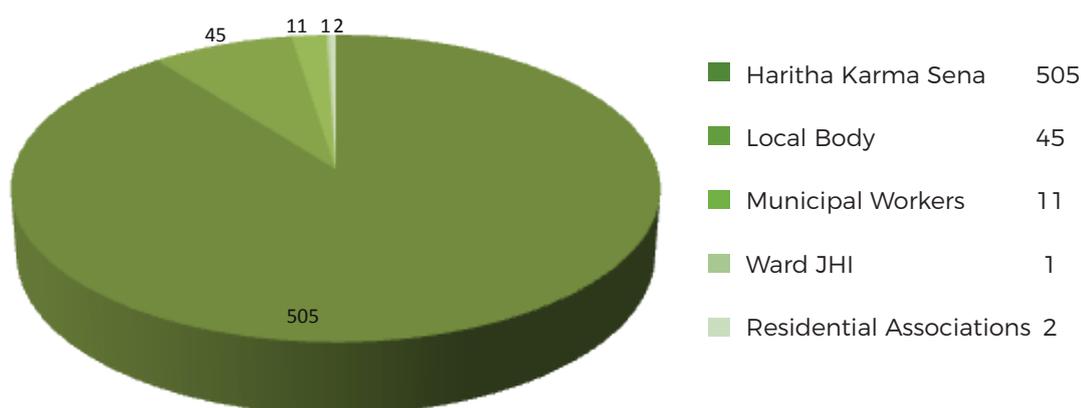
- Suitable location where the waste collector/supervisor has control over it
- Educating the community and awareness to ensure that mini-MCF is used only for the purpose of storing segregated waste by the HKS, and not as a dumping site by the public
- Ensuring the safety of the unit and proper use of lock and key



Kottayam with 1,216 units (26%) and Kollam with 930 units (20%) ranks the highest in this regard. The district wise break up of Mini-MCFs in Municipal Corporation areas shows a disproportionate figure, where Kollam alone has 166 units in the Corporation area, while other districts such as Thiruvananthapuram, Ernakulam and Kozhikode which have the largest corporation areas, do not have Mini-MCF units. Idukki and Wayanad have 0 Mini-MCFs in any of the ULB areas, followed by Kannur, Kasargod and Thrissur, which have less than 5 units in the entire district.

In order to ensure proper functioning of the Mini-MCFs, it is important to take note of the various stakeholders who are in operation and maintenance.

CARETAKING AND MAINTANCE OF MINI-MCF: MUNICIPALITIES AND MUNICIPAL CORPORATIONS



Graph 3.5 - Caretaking and Maintenance of Mini MCF in Municipalities and Municipal Corporations

Harithakarma Sena maintains and operates 89% of the Mini-MCFs across the state across ULB areas. This also gives them the autonomy to function smoothly and helps reduce the excess drudgery of transporting the waste to MCFs to a great extent. Followed by that, there are 7% of the Mini-MCFs which are taken care of by the Local Bodies and 1% by individual Municipal Workers.

In the case of GPs, 3882 Mini MCFs (94%) are managed by HKS. This covers a majority of the units across the state and it can be assumed that these units are being ideally used regularly by the groups and not lying idle, turning into dump sites. This would serve the objective of establishing such an intermediary unit at the ward level and significantly decrease the drudgery of the HKS. Some of the

other stakeholders involved in this process are LSGIs and their representatives such as ward members, counsellors, Residential associations, Ward level Health And Sanitation Committees, NHCs from the Kudumbashree network, School Principles and Municipal workers. There are collaborations between these institutions which is also seen, for example the joint management of the Mini-MCFs by the Residential Associations, LSGIs and HKS (11 such units found).

However, it is to be noted that 102 Mini- MCF units remain where the responsibility has not been given to any particular institution till now.



Image: Mini MCF, Erumeli GP, Kottayam Dist.

(iii) Resource Recovery Facility

Resource Recovery Facilities (RRF) are an important part of the modern waste management system where a paradigm shift has occurred from 'managing waste' to 'managing resources'. RRF operates as a space where non-biodegradable waste after a primary sorting is further sorted and made available for production and consumption activities with necessary infrastructure, tools and

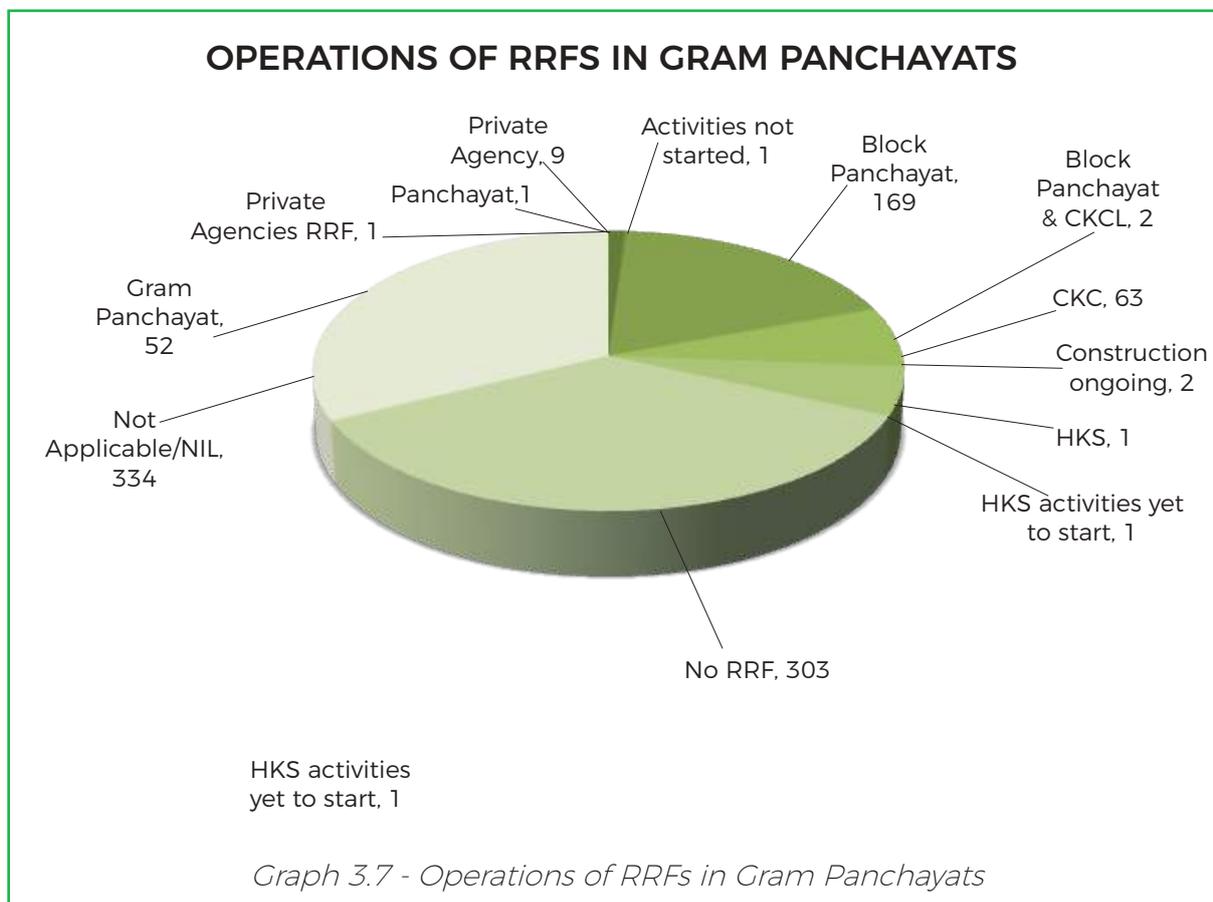
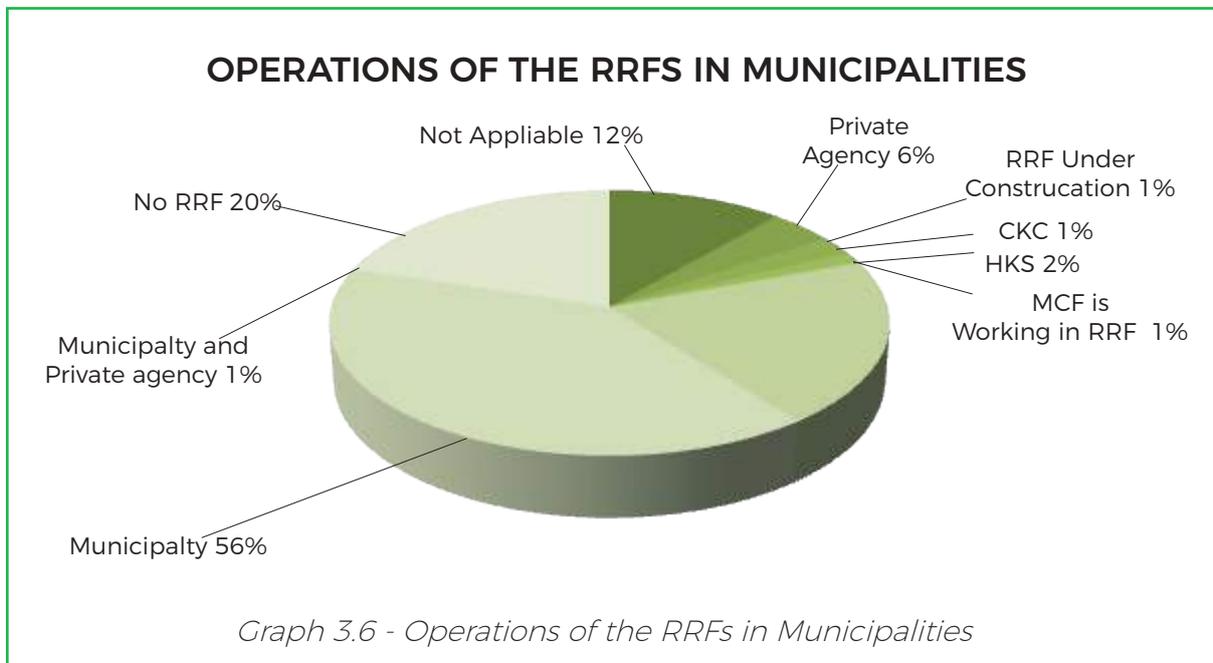
human power. The recyclable waste is channelised for recycling while the non-recyclable plastics are shredded and used for road tarring.

RRFs are supposed to be set up at cluster/block level. However, there was a lack of data regarding the number of RRFs in LSGIs across the districts. This limited the district wise analysis of the number of RRFs.



Equipments such as Bailing being used in RRF

RRFs are for higher level storage of segregated non-biodegradable waste including hazardous waste, which the Clean Kerala Company further treats. There are various entities which are operating the RRFs. This gives an understanding operations and management of the RRFs -



(iv) Waste Segregation

- MCFs with Waste Segregation facility



- MCFs with storage for the segregated waste

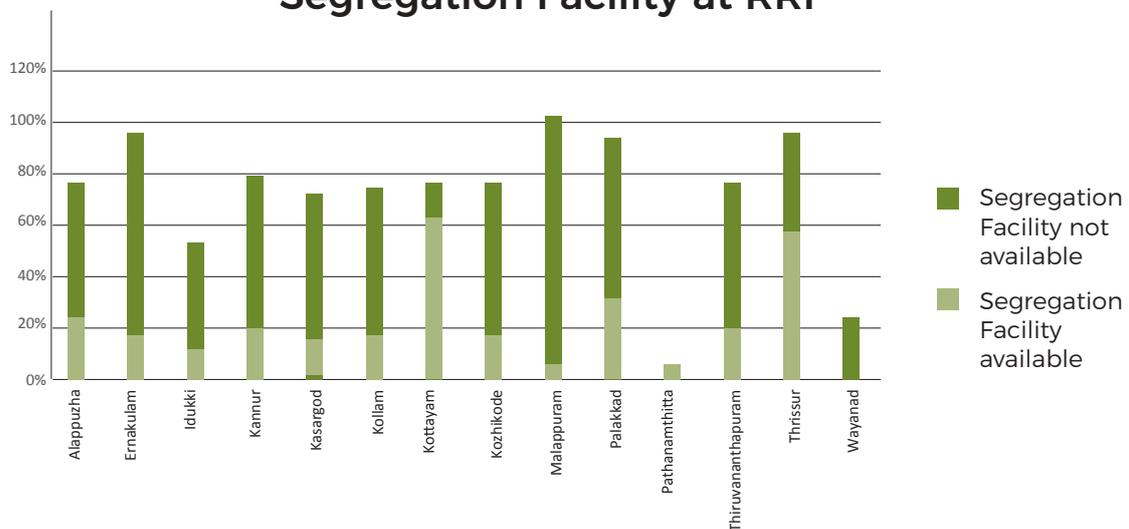


Segregation facility is available in 77% of the MCFs across the state. Malappuram (88%), Kasargod (88%), Thrissur (87%) and Thiruvananthapuram (84%) have notably high numbers of overall segregation facilities. The presence of such a facility enables further compartmentalisation of the waste collected before being sorted for the recovery process. The segregation of waste is the first step towards price realisation of the recovered materials, as without proper categorisation of waste, further enhancement of these into resources becomes more difficult. Refer Table Annexure Table 5.3.

With regard to the Storage facility of the segregated waste, 72% of the units have a Storage facility for the same before transportation to the RRFs. Thiruvananthapuram (89%) and Thrissur (83%) have the highest number of MCFs where segregated storage facilities are available.

Kottayam with 38 MCFs (52%), Kannur with 47 MCFs (56%) and Kollam with 52 MCFs (59%) MCFs rank lowest in this regard. The possible areas of concern arising from this can be those of overflow of the segregated waste before transfer to RRFs, hindering the backward linkages for segregated waste reaching the MCFs. The storage facility enables the MCFs to manage subsequent waste which is being brought in in case of a delay in transportation. Refer Table 5.4.

Segregation Facility at RRF

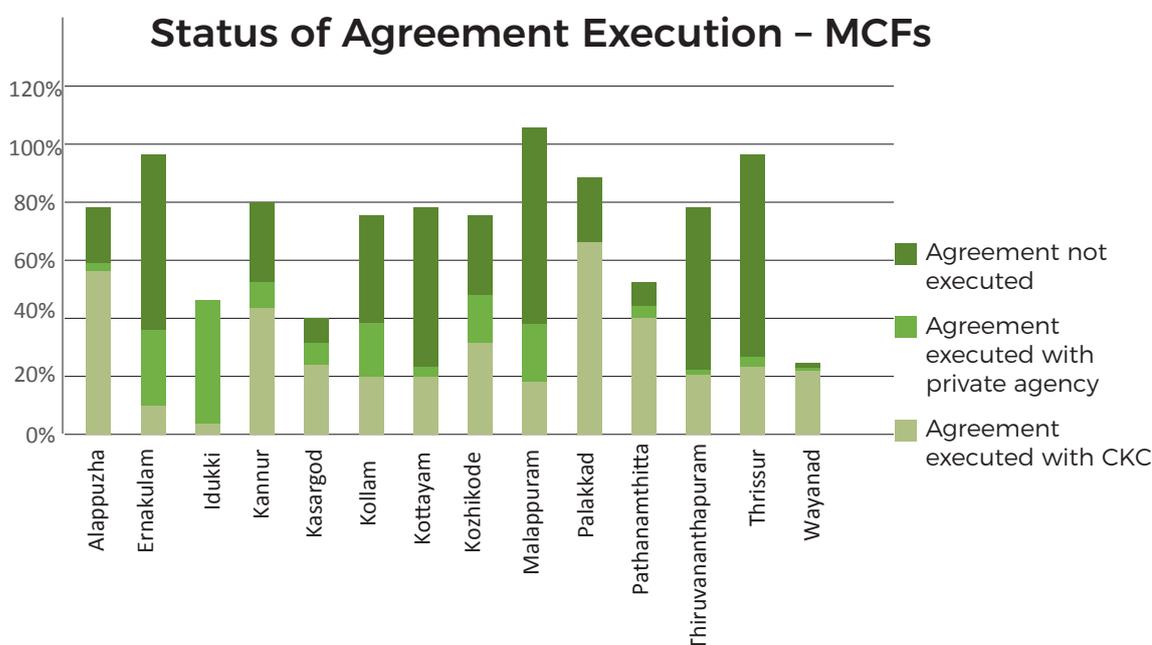


Graph 3.8 - Segregation Facility at RRF

(v) Status of Agreement Execution - MCFs

LSGIs enter into agreement with Clean Kerala Company to collect the materials from the RRFs. LSGIs are also allowed to get into partnership with private players provided the price paid by them is above the rate fixed by CKS. The graph below examines the status of agreement as on

March 31, 2021 with CKCL in LSGIs at District level across the state. It was seen that while waste collection from the MCFs was happening, in the places without formal agreement, the rates of the Government order were by and large followed, but the formalisation of systems and calendars were yet to happen.



Graph 3.9 - Status of Agreement Execution - MCFs

3.2.2 Working Conditions

The availability of basic facilities such as toilets/bathrooms, rest rooms and fans determine the working conditions in the MCF centres to a large extent. The LSGs should not only be able to ensure fair income to the members of Harita Karma Sena, but also ensure decent working conditions with proper sanitation facilities and hygienic environment. Waste management is an important factor in ensuring health and quality of life. There is a need to reflect on the capabilities of LSGs in delivering on their regulatory functions in this regard.

About 39.6% MCFs remain without Toilet/Washroom facilities. Thiruvananthapuram with only 37 MCFs (31%) ranks the lowest in this regard, followed by Kollam with 35 MCFs (40%) and Kottayam with 31 MCFs (42 %) are identified with absence of a toilet, ranking the lowest. This hinders the working conditions of the HKS members who are women and denies them of their basic rights. The state data tells us that 669 out of 1,110 functional MCFs have the facility, which is 60% of the total MCFs. (Refer Annexure Table 5.5)

Toilet / washroom facilities available in 60% of MCFs across the state

52% of the MCFs across the state have a Restroom facility

Collection and segregation of waste is a labour intensive task. Long hours of work at the MCF units necessitates the availability of Restrooms. These are mostly all women teams who work for more than 6 hours with continuous work. This necessitates a space which ensures basic needs of privacy and safety where one can unwind during breaks. The overall state scenario shows 52% of the MCFs having the facility. Kottayam with 20 MCFs (27%), Thiruvananthapuram with 33 MCFs (28%) and Kollam with 32 MCFs (36%) MCFs rank the lowest in this regard. The state data tells us that 578 out of 1110 MCFs have the facility, which is about 50% of the MCFs. (Refer Annexure Table 5.6)



Image: Baling Machine, Ettumanoor Municipality, Kottam Dist.



With regard to Fans available in the MCF units, Pathanamthitta with 6 MCFs (11%) and Kollam has 10 MCFs (11%), ranked the lowest in the state. The overall percentage for the state itself is low, with only 30% of the MCF having such a facility. The state data shows that 337 out of 1,110 MCFs have fans available, which comes upto only 30% of the MCFs. (Refer Annexure Table 5.7)

This majorly impacts the working condition in the MCFs as the hot and humid climate in the state leads to soaring temperatures for almost throughout the year and working in such heat can cause serious health issues to the HKS workers.

3.2.3 Availability of Equipments in Units

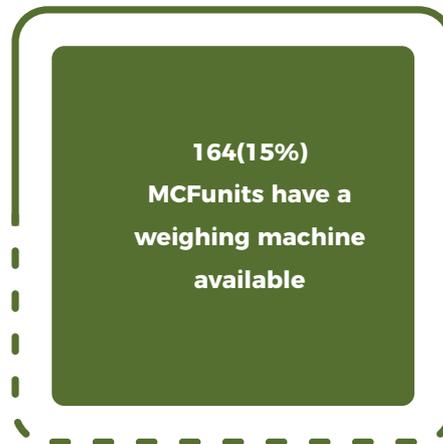
(i) Equipments in MCFs

- Baling Machines

Bailing machines are used to compress heavy scrap metal and plastic waste materials into large dense blocks by using a hydraulic baling press in order to increase the density of the scrap. This eases the transportation of heavy waste for further linkage and is the first step towards creating resources out of waste. Baling also significantly improves the price realisation; for example, milk covers bailed fetches ₹ 18-20 per kg; if not baled, the price goes down to ₹ 12 per kg.

Overall, only 20% of the MCFs have this equipment facility across the state. Kasargod stands out with 74% of the MCFs having the facility. 11 districts have less than 20% such facilities, which include Alappuzha, Idukki, Kollam, Kottayam, Kozhikode, Malappuram, Palakkad, Pathanamthitta, Thiruvananthapuram, Thrissur and Wayanad. Out of these, Kollam, Kozhikode, Thrissur and Thiruvananthapuram have one Corporation each, where the population ranges from 30 - 70 lakhs.

- Weighing Machines



The waste coming into the MCF units as well as that outgoing is supposed to be weighed and recorded each day. The amount of waste brought into the unit is further segregated into various categories and this leads to a difference between the incoming and outgoing waste. Weighing machines owned by MCF units makes this process a lot more convenient.

The overall percentage of MCFs having this equipment itself is low. Only 164 units have the facility out of 1110 MCFs. The number is alarming is Corporations where only 7 out of 78 MCFs (8.97%) have this facility available. Municipal Corporation

areas cater to a much larger population characterised by rapid urbanisation. Unavailability of such a facility might hamper the entire process flow of waste management.

The situation in the panchayat areas also remains the same, where only 111 out of 935 MCF units have the machine available. Except Alappuzha, where 22 (32%) of the units have this facility. Rest of the 13 districts have 16% or less in this regard. Kasargod ranks the lowest, with only 2 MCFs (1%) with such facilities.

All LSGs were instructed to procure weighing machines within 3 month's time as per requirement.

- Availability of Register for recording weightage of Waste



The percentage of MCFs with record keeping facilities for weight of incoming and outgoing waste is higher than the number of MCFs where a weighing machine is available. This indicates that there are alternative ways of weighing the waste at the collection point itself.

With regards to Municipal Corporations, the data tells us that 65 (83%) of the MCFs maintain such records. However, within this, Ernakulam and Kannur have zero MCFs with such a facility, Kollam and Kozhikode have only 1 such MCF each and Thrissur has 6 MCFs with the facility. Thiruvananthapuram is the only district with 57 (100%) of the MCFs which have record keeping registers.

With regards to municipalities, the status of record keeping registers in Municipalities is better than those in Corporations. 48 MCFs (49%) have this facility. Pathanamthitta, Kollam and Kasargod rank the highest with 100% coverage across all MCFs.

Across Gram Panchayats, 418 (44%) maintain such records in registers. Kasargod and Kozhikod rank high in this regard, with 90 (76%) and 33 (61%) of the MCFs with the facility.



Image: Garbage heaps at overburdened MCF - Mangalapuram GP, Thiruvananthapuram

- Availability of Vehicle for Transportation of Waste

The locations of MCF units are fixed taking into consideration a number of factors such as its safe distance from residential areas and water bodies (to avoid pollution), accessibility to HKS members and the access of vehicles to the units as well, among others. The vehicles available at MCFs ensure that the waste management process happens timely and in an efficient manner.



The state data shows us that 67% of the MCFs have a vehicle aiding in waste management. Kannur with 75 MCFs (89%) and Malappuram with 83 MCFs (86%) show a positive trend in this regard.

In case of Municipal Corporations, Thiruvananthapuram, Thrissur and Kannur have 100% MCFs with vehicles for transportation of waste available.

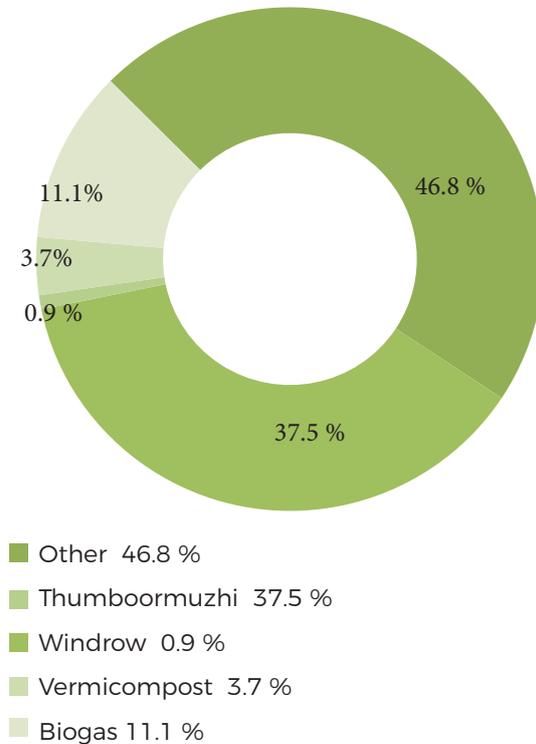
Kasargod occupies the lowest rung with a very low percentage of only 17% MCFs in having such a facility. Even in the GP areas in the district, only 14% of MCFs have vehicles.

3.3 Community Compost Facilities

Even as decentralised waste management is promoted, it is highly unrealistic to assume all of it is being treated at the source level. There are several varieties of composting facilities introduced at the household level to ensure maximum treatment of biodegradable waste at the source level. Some of them are Ring Composting, Pipe Composting, Kitchen Bin (Biobin) Composting, Pot Composting, Bio-gas plants etc. All composting facilities are eligible for a subsidy of 75% from Suchitwa Mission and 50% for biogas plants. For source level composting facilities and biogas plants, Local Self Government contributes a subsidy of 15% & 25% respectively. 11,83,892 households have composting facilities that directly contribute to the decentralised waste management efforts of the state. Kannur District with the highest total numbers at 2,92,828 units followed by Kozhikode and Kottayam with 1,83,990 units and 1,29,022 units respectively. Kasargod has the lowest total number of units with just 23,370 households with composting facilities and followed by Pathanamthitta with a total of 25,361 households with composting. It is notable that Kochi corporation has 0 households with composting units while all other corporations have covered over 1,000 households with the highest being Thiruvananthapuram Corporation with a total of 46,601 households with compost units.

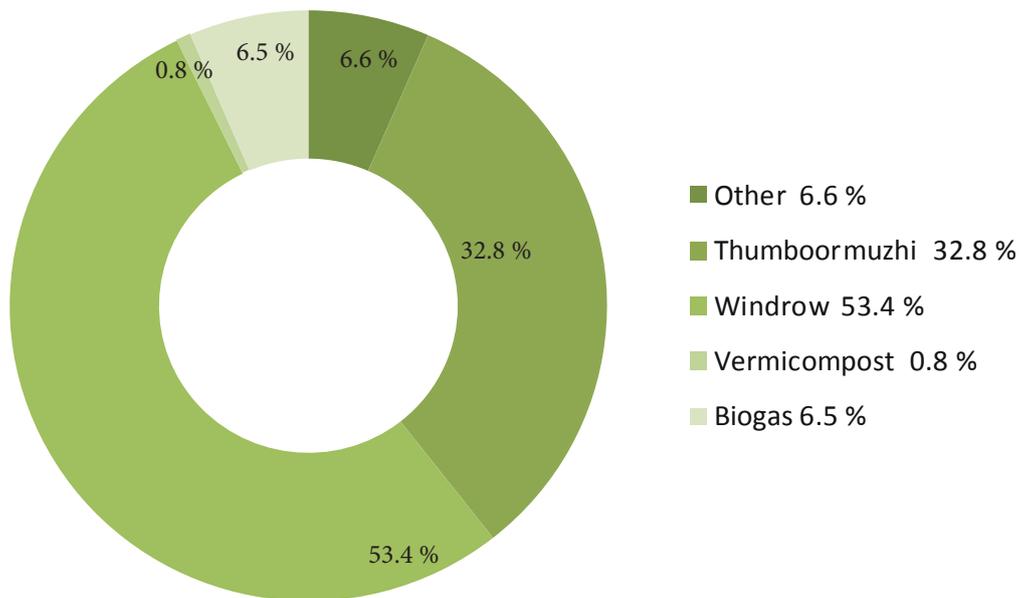
Furthermore, community composting facilities are also being promoted. This can be for several households in a neighbourhood, a housing or apartment complex or for an institution who do not have space or facilities to do source level management of biodegradable waste. These facilities are mainly focussed at hotels, restaurants, fast food joints, convention halls and auditoriums. Such institutions conventionally do not have the kind of space required to manage the volume of biodegradable waste generated in them. A large share of these CCFs are managed directly by the LSGs. The 4 most common community compost methods used across the state are Thumboormuzhi Model or the Aerobic Bins, Windrow composting facility, Vermicomposting and Biogas Plants. Other models of community composting facilities being used across the state include pit- composting, ferro cement tanks, masonry tank composting etc. some of which are a combination of traditional models.

Types of Community Compost Facilities



Graph 3.10 - Types of Community Compost Facilities across the State - Percentage share

There are a total of over 3,810 community composting facilities of various sizes and various capacities across the state. The total capacity composting at all these facilities combined is as high as 7,66,252 kgs per day. The total biodegradable waste received at these facilities stands at 5,34,493 kgs per day which points to an underutilisation of facilities at approximately 70 percent of the total capacity. If we take a quick look at the districts, Thrissur is highly overburdened with the community compost facilities receiving over 64,000 kgs above the total composting capacity. Ernakulam and Pathanamthitta have a good utilization at 93 and 82 percent capacity of the existing facilities respectively. Kollam and Kozhikode have utilised around 70 percent of the facilities available. Remaining all 9 districts have utilisation below 50 percent of their capacity. Wayanad has recorded that no biodegradable waste is received at any of these community facility centres. Lack of setting up of forward linkages has been identified as a reason for the same in Wayanad.



Graph 3.11 - Capacity of Different Composting Facilities - Percentage share

Some of the reasons that can be identified for the lower utilisation of these facilities are being discussed here -

- Lack of proper collection facilities - Biodegradable waste often requires a stable chain of movement from the source till the compost facilities. Any glitch in the collection chain such as lack of transportation etc. can cause a health and sanitation hazard for everyone involved and even in the surroundings. However, since convention centres and auditoriums etc., which are the major contributors to the CCFs, may not have a regular generation of waste. Keeping this chain of collection from source to composting facilities assembled can be a challenge for the LSGs in the absence of regular flow of waste. Further, the Haritha Karma Sena needs to be trained and equipped well in managing biodegradable waste. This is much more challenging and trickier than managing Non Biodegradable waste.
- Lack of proper planning - Since most of these CCFs are facilities with heavy capacity, it is extremely crucial that the users be identified prior and the capacity and location of the plants be matched as per the needs identified. However, the current practise is to find an empty plot to set up a facility and then mobilise the community in using these facilities.
- Lack of awareness - It is also possible that

the community may assume such facilities come with a huge user fee or is a hassle for the user to access and make use of or are mismanaged. A model facility that runs well without causing trouble to the users and the community nearby will act as a huge advertisement for such facilities.

- Lack of proper forward linkages in districts such as Wayanad has been pointed out as the reason for extremely low utilisation of CCFs.

The most commonly used models of Community Composting facilities are discussed below -

3.3.1 Thumboormuzhi Model - Aerobic Bins

Developed by Kerala Veterinary and Animal Sciences University, Thumboormuzhi Model or Aerobic bins composting units uses microbes isolated from cow dung to effectively manage biodegradable waste. The composting unit includes a box-like structure with a ferro-cement floor. Layers of cow dung, carbon source and waste materials are subjected to composting in the presence of oxygen. The temperature rises rapidly in the waste to almost 70°C, the peak temperature with pathogens. What makes this model a popular one is that an efficient aerobic compost bin does not emit a foul smell like ammonia. An aerobic compost bin reduces the biomass to usable compost quicker than its anaerobic counterpart. With the help of aerobic bins, biodegradable waste can be converted into compost, which can then be used for soil

conditioning for farming and gardening. In addition to converting the biodegradable waste to non toxic nutrients, aerobic bins don't pose any associated issues to local residents. Aerobic bins are constructed in such a way that it enables proper air circulation, proper draining of leachate and an easy way of collecting biodegradable waste in layers. Furthermore, no turning or mixing of the equipment is required.

The Thumboormuzhy model of composting is clearly the most popular model, forming over 37 percent of total community composting facilities in the state. Wayanad has 17 community compost centres all of which are in the Thumboormuzhy model. 84 percent of Kottayam's composting facilities are Thumboormuzhy models. However these form only 3 percent in Kasaragod, 17 percent each in Ernakulam and Thiruvananthapuram of the total composting facilities available within the district.

Looking into the actual numbers of facilities, there are a total of 1430 Thumboormuzhy community compost facilities across the state with a daily composting capacity of over 2,50,988 kilos. Kottayam has the largest number of Thumboormuzhi community compost units - 121 units in the 71 GPs and 203 units in 6 municipalities bringing a total 324 units for 77 LSGs. Wayanad has the lowest number of units with the total at 11 for 41 LSGs in the dist. Kannur has the second lowest average with 31 units for a total of 81 LSGs. Districts such as Ernakulam, Malappuram, Pathanamthitta, Palakkad and Wayanad have less than one Thumboormuzhi Community Compost Facility per LSG.



*Image: Aerobic Composting Facility
at Varkala, Thiruvananthapuram Dist.*

It is also to be noted that the units do not have uniform capacity. The minimum number of bins to be set up in each facility is two. LSGs may choose to set up multiple bins of varying capacity at the plants. The district average capacity with respect to the number of units vary from as high as 477 kg per unit in Alappuzha to as low as 11 kg per unit in Wayanad. Kannur ranks second with 452 kg per unit capacity and Pathanamthitta is the second lowest with capacity of 15 kg per unit. Idukki, Kasargod, Kollam, Kottayam, Malappuram and Thrissur have capacities below 100 kgs per unit.

3.3.2 Windrow Compost Units

Aerated or turned windrow composting is suited for large volumes such as that generated by entire communities and collected by local governments, and high volume food-processing businesses (e.g., restaurants, cafeterias, packing plants). It will yield significant amounts of compost, which might require assistance to market the end-product. Local governments may want to make the compost available to residents for a low or no cost. This type of composting involves forming organic waste into rows of long piles called "windrows" and aerating them periodically by either manually or mechanically turning the piles. The ideal pile height is between four and eight feet with a width of 14 to 16 feet. This size pile is large enough to generate enough heat and maintain temperatures. It is small enough to allow oxygen flow to the windrow's core. Large volumes of diverse wastes such as yard trimmings, grease, liquids, and animal byproducts (such as fish and poultry wastes) can be composted through this method.

Of the 4 popular models of composting discussed in the report, the total number of windrow composting units stands at the lowest with less than one percent of total composting facilities. However, since these are units with high capacities, even though the number of units are low, they still form a total of 53 percent of the total capacity of composting within the state.

It is to be noted that windrow composting often requires large tracts of land, sturdy equipment, a continual supply of labor to maintain and operate the facility, and patience to experiment with various materials mixtures and turning frequencies. Also, leachate, a liquid released during the composting process, can contaminate local groundwater and surface-water supplies. Special attention has to be taken to collect it and treat it properly.

There are a total of 33 windrow compost units in Kerala with a total capacity of composting 4,08,826 kgs per day in these plants. 9 of them are in Idukki and 7 in Thrissur. Alappuzha, Kollam, Kottayam, Kasargod and Wayanad do not have any windrow compost units. The average capacity of these units range from 67,285 kgs per plant in Ernakulam to the lowest being 250 kg in Kannur.

3.3.3 Vermicompost Units

Worm composting or vermicomposting, uses the digestive power of earthworms to consume and recycle kitchen waste and other organic matter to create a nutrient rich soil amendment called worm or vermicompost. Vermicomposting reduces the amount of garbage entering landfills and improves garden soils while providing a fun and rewarding hobby. Much like traditional composting, Vermicomposting works by creating an ideal environment for various organisms to break down organic matter. Microorganisms such as fungi, bacteria and protozoa, along with larger organisms such as insects, assist worms in the



Image: Vermicomposting Facility at Kongad GP, Palakkad Dist

There are a total of 142 community vermicompost units in Kerala with a total composting capacity of 6495 kgs daily. Idukki has the highest number of vermicompost units with over 71 units composting a total of 1500 kgs of biodegradable waste. Kannur and Thrissur have huge units with average capacity of 1000 kgs and 1250 kgs respectively. Alappuzha, Kasargod, Kollam, Pathanamthitta and Wayanad districts do not have any vermicompost units at all. It is seen that while the quality of fertiliser generated is very good, the managerial expertise and attention required has meant that there are very few takers.

3.3.4 Biogas Units

Biogas plants rely on anaerobic digestion, a fermentation process in which waste is digested by microbes to produce methane gas (biogas). The waste can be converted into biofertiliser and spread directly onto fields, or the biogas itself can be used interchangeably with natural gas as fuel. The substrate used for the production of this methane-containing gas usually consists of biodegradable waste materials such as manure or food waste. The fermentation residue left over from the substrates at the end of the process can be used as fertilizer. The biogas is produced by the

micro-bacterial decomposition of the substrate in an oxygen-free environment, i.e. under anaerobic conditions. To do this, the substrate is pumped into the fermenters. The substrate is stored here under anaerobic conditions and is periodically shifted by agitators to avoid the formation of surface scum and sinking layers. This also allows the biogas to rise more easily.

Unlike in the decomposition of biomass under aerobic conditions (for example, composting), under anaerobic conditions the micro-bacterial organisms can only use a small part of the energy contained. Before being fed into the gas grid, this crude biogas from the biogas plant still has to be processed in a processing plant to attain natural gas quality, which means that substances such as carbon dioxide, hydrogen, oxygen and sulfur are filtered out. In a final step the gas is dehumidified and can then be used to generate electricity and heat, which is why many biogas plants have combined heat and power units (CHP). The purified biogas can also be fed into the gas grid and transported to points of consumption. A meter measures how much "green gas" was fed in.



Image: Biogas Plant at Vadasserikara GP, Pathanamthitta Dist.

There are a total of 423 Biogas Plants across the state with a composting capacity of 49,693 kgs. These plants are heavily concentrated in the corporations with 44 plants in the 6 corporations and the highest being in Thiruvananthapuram Corporation with 23 plants and composting capacity of 13,500 kgs of waste. There are 355 biogas plants across the 941 GPs and 24 plants across 87 municipalities. Kasargod and Wayanad districts do not have any biogas plants at all.

3.3.5 Other composting facilities

Apart from the 4 types of compost units mentioned above, some of the LSGs have other types of compost units as well such as pit- composting, ferro cement tanks, masonry tank composting etc. There are a total of 1782 of them across the state with a total composting capacity of 50,251 kgs. However it has to be noted that the average capacity of most of these units is significantly lower than the other models. The average capacity is less than 100 kgs.

3.4 Community Outreach - Pre Monsoon Campaigns

The pre-monsoon campaigns are primarily aimed to prevent the spread of communicable diseases and focuses on ensuring effective waste management, cleanliness of the surroundings, source-level eradication of risk factors such as mosquitoes and rats, cleanliness of drains, canals, houses and public places. The campaigns are usually carried out in the time period between the end of April to the beginning of June with the help of the Departments of Health and Local Self-Governance.

A number of activities are organised with the assistance of health institutions, civil societies such as libraries, voluntary organisations, residents' associations, schools, National Service Scheme (NSS) volunteers, National Cadet Corps (NCC) and Kudumbashree. Sanitation committees are formed in each ward of the LSGs and the campaigns headed by them. Other government departments such as the Department of Education, Urban Affairs, Water Resources, Social Justice, Animal Husbandry, Agriculture, Public Works and Labour also cooperate with the campaign.

The ward-level Health, Sanitation and Nutrition committees review the activities in every ward weekly. The meeting of the review committee should be convened in every local body once every two weeks. Sanitation monitoring committees should also be formed. These will comprise social workers, trade unions and cultural organisations. The members of the committee visit the institutions once in a week and submit a report to the local body concerned.

The state has been successful in forming ward level squads for pre-monsoon campaigns in 73.5 percent of the total LSGs. As on the first week of April 2021, Five out of six Corporations, 684 out of 941 GPs and 71 out of 87 municipalities worked on ensuring that the ward level squads are formed. At District level Kollam has performed best with over 89 percent of LSGs having ward level squads and the districts with lowest number of squads are Wayanad with less than 54 percent and Alappuzha and Kasargod less than 59 percent coverage. Micro plan preparation activity was carried out in less than 50 percent of the LSGs in the state. Ernakulam performed fairly well

among the districts by carrying out this activity in over 73 percent of the total LSGs while Kasargod and Pathanamthitta barely managed to cover 26 percent of the local bodies within the district. The districts were also expected to carry out a mapping of areas that need to be cleaned and follow up the cleaning of the same as well. Less than 34 percent (342 out of 1064) of the LSGs in the state did the mapping and less than 24 percent (248 out of 1064) were able to clean the identified areas within the time of review. Pathanamthitta and Malappuram were not able to do both the activities in over 94 and 92 percent of their local bodies respectively while Ernakulam performed relatively well by covering over 55 percent of its LSG in both the mapping and then cleaning out those areas.

The State's pre monsoon campaign was disrupted by the Assembly elections in April, the continuing COVID pandemic and the unseasonal cyclonic storms that hit the State in May, necessitating two monsoon time mosquito eradication drives in June and July.

3.5 Monitoring and Evaluation

According to the State Policy on Solid Waste Management, 2016, appropriate monitoring and evaluation shall be ensured by different tiers of government to make sure continued improvement in the performance efficiency of the waste management sector. The satisfactory implementation of the rules and their compliance shall be monitored by the Kerala State Pollution Control Board. The state level Empowered Committee constituted for the sanitation sector and the state level Advisory Board for solid waste management shall also monitor the progress and performance of the waste management sector. The process, procedure, output and outcome of the waste management activities shall be evaluated by the Suchitwa Mission and advisories shall be issued to the state and local governments. In addition, the Haritha Keralam Mission formed for enabling the integrated activities of waste management, organic agriculture and water conservation, chaired by the Chief Minister shall also review and monitor the process of the sector.

The task force constituted under the Nava Keralam Sub Mission at the State, District, Block, City Corporation, Municipality and Grama Panchayat level chaired by the respective chief executives shall also monitor the performance of the solid waste management sector and ensure corrective measures, whenever and wherever required. LSGD created a system of regular review and follow up on SWM initiatives by roping in the following officers for convergent action and review:

- District Mission coordinator Suchitwa Mission
- District Mission coordinator Haritha Kerala

Mission (convenor)

- Deputy director Panchayats
- Regional JD Urban Affairs
- District Mission coordinator Kudumbashree
- JPC MGNREGS Mission
- Assistant Development Commissioner (General), Rural Development

The handholding of the Haritha karma senas and the action for setting up MCFs and mini MCFs as well as the initiative for evaluating LSGs for the suchitwa padavi was undertaken by these district level coordination committees and reviewed at the State level by the ACS LSGD.

The April assessment examined the regularity and frequency of monitoring and supervision that was currently undertaken at the LSG level. These were the findings:

In most cases, it was seen that monthly monitoring was undertaken.

Monthly monitoring by LSGs has been recorded in over 66 percent of the local bodies. Daily monitoring by LSGs has been recorded in less than 8 percent of the LSGs, and weekly at 8.22 percent. All the Corporations except Kannur have daily monitoring systems established. However, around 18 percent of the LSGs were seen not to have regular monitoring mechanism. Malappuram and Thrissur have 37 and 23 local bodies respectively without any monitoring mechanism.

The field Inspection team also made sure to keep an eye open for garbage heaps out in the public and in water sources within the local bodies. Areas where garbage has been burnt were also spotted and recorded during the field inspection. Dumping of garbage in the public could be due to multiple reasons including lack of proper facilities, inaccessibility and overburdening of existing facilities, lack of awareness about proper facilities available and the health hazards that can be caused by improper waste disposal.

Wayanad has done exceptionally well where the inspection team did not find garbage heaps in the public at all in the entire district. Apart from this being sheer chance, it could also be because the source level management of waste is working fairly well. The district also has very few Community Compost Facilities (CCFs) and almost no waste brought into such centres. Over 40,000 households have individual compost facilities installed. There were 8 spots where garbage was being burned in the district.

Kannur, Kollam and Thrissur Corporations have also done well with almost no garbage heaps in public (other than at designated sites). In all the city corporations and in some of the Municipalities and panchayats, legacy waste and mixed waste dump sites were noticed. Proposals for bio

remediation of these sites were either under preparation or process. In some areas, overflowing MCFs themselves contributed to the problem. Municipalities in Idukki, Kannur, Kasargod, Kottayam, Kozhikode, Trivandrum and Wayanad Districts have also done well with respect to not dumping waste in public. However in Trivandrum district garbage being burnt publicly has been identified at over 151 spots. Ernakulam, Kottayam and Palakkad are districts where heaps of garbage in public spaces were found in large quantities. Palakkad also has over 124 spots where garbage is being burnt. Apart from being an obvious health hazard, this practice can also lead to a fire hazard

and cause significant damage to life and property.

Except for Kozhikode Corporation, water sources being used as garbage dumps have been observed in all corporations. 41 out of 87 municipalities have also used water resources as garbage dumps. At the Gram Panchayat level, this was observed in only 233 panchayats of the total 941 panchayats. At the district level, except for Wayanad and Kozhikode that have less than 10 Local bodies where garbage in water bodies were spotted, all other districts have an average of 18-22 local bodies that have water bodies contaminated with garbage.



Image: Garbage dumped in water bodies - Amayizhanjan Thode - Thiruvananthapuram Dist.



Image: Waste being burnt in public, Elamkulam GP, Malappuram Dist.

Local bodies have to take up legal action against individuals and institutions for either disposing waste in public or for burning of waste in public. It was seen that fewer than 5% LSGs took up action to issue notices, impose fines and initiate prosecution. In the months of January, February & March 2021, around 6000 legal notices were served for the same in the state. Manikkal GP in Thiruvananthapuram alone served 2672 of them and Kozhikode Corporation served 1632. All the other LSGs together coughed up only 1696 notices. Penalties were imposed on over 54,636 individuals including households and institutions for improper disposal of waste. Ernakulam district

has over 40,000 cases, most of which were from a single Panchayat - Cheranallor. Kottarakara Municipality in Kollam District and Kolayad GP in Kannur Dist have also imposed over 7000 and 5000 cases of penalty respectively. A total of Rs. 52,14,634 was collected on account of these penalties. 26,27,140 was from the 6 Corporations in the state, Rs. 16,78,700 from the 8 Municipalities and remaining from the GPs.

It was seen that in the matter of regulatory interventions for enforcing SWM rules, the LSGs had much to do. The two Directorates need to be reviewing the action taken much more assiduously.

Chapter 4

Conclusion

In 2017, the Government of Kerala announced the Suchitwa Keralam Campaign for system building. The system building envisaged under the campaign was to help LSGs meet a constitutional responsibility without spending money, but by creating opportunities for employment generation and incomes at the local level. It was done with the acknowledgement of the fact that if any component in the chain of systems became ineffective, the entire process would be adversely affected. Ensuring forward and backward linkages becomes critical in ensuring the performance of the waste management system. This survey was conducted with the aim of assessing how effective this system is as a whole, as well as evaluating each component in the system so as to restructure and improve wherever needed.

It has clearly been established that the LSGs are the primary stakeholders in Kerala's waste management space and have an important regulatory and enforcement role to play- from ensuring the proper functioning of Mini MCFs and MCFs to monitoring, tracking and reviewing the processes involved in waste management. Some of the major questions LSGs should ideally be grappling with on a daily basis include but are not restricted to:

1. The functioning of the mini MCFs and the MCFs
2. The intervals and frequency at which waste is collected by Haritha Karma Sena Members
3. The number of LSGs with well functioning Haritha Karma Sena Units and the institutional and household waste collection rates
4. The supply of PPE Kits and safety gear to Haritha Karma Sena Members dealing with waste
5. The functioning of the systems for weighing, documentation, bailing, sales etc.
6. Compliance with the provisions under the SWM Rules 2015

7. Compliance with the work calendar
8. The rate of user fee payment across households and institutions- for all LSGs
9. The income levels of Haritha Karma Sena members
10. The review and tracking of the processes of waste management as well as the frequency of it- Daily, Weekly, Monthly
11. Innovative systems of Waste management that can be incorporated etc.

The April 2021 assessment looked into all these aspects and more, and has revealed important takeaways for each component.

4.1 Haritha Karma Sena

1. A targeted IEC campaign for households is the need of the hour to drill home the point that the payment of user-fee for services rendered is mandatory. This is also necessary for institutions (which have a much higher user fee payment rate of 72% across LSGs). Anything below 100% ideally, should not be acceptable since women servicing institutions without pay is not only unsustainable but also exploitative. The model of a few Private agencies which have ensured decent income to women can be looked into.
2. Provision of waste collection services to functions or events can be a remunerative option for HKS. In urban areas, there are models where composting has been linked to urban farming. Similar innovations for enhancing incomes have come up across the State in different LSGs.
3. Waste management is an important factor in ensuring health and quality of life. There is a need to reflect on the capabilities of LSGs in delivering on their regulatory functions. Compliances of waste management requirements by institutions and individuals is a pre

condition for building permits and licences. LSGs can also play a role in ensuring that compliance. Awards and other forms of encouragement for well-performing residents associations can also be considered.

4.2 Infrastructure and Facilities - MCFs and RRFs

1. Given that there are still 10% GPs without an MCF and certain districts where more than 20% GPs do not have MCFs at all, there is a need to have MCF as a prerequisite to start waste collection. Lack of required facilities and infrastructure may cause significant increase in the effort to be taken by everyone involved including the HKS members. Appropriate infrastructure will ease this pressure and reduce drudgery.
2. Data shows that working conditions of the MCFs and RRFs need improvement especially in the availability of fans and restrooms. This becomes especially important for a workforce that is primarily comprised of women. Having proper working conditions in place needs to be a prerequisite for functioning these waste management installations. Access and safety compliances in the MCFs is also a matter of priority intervention.

4.3 Community Compost Facility

While household level processing of biodegradable waste is the most preferred option, community compost facilities are used wherever necessary especially in cases where there is restriction in space to do source level composting. Different technology options are available for waste processing at household as well as community level. These include kitchen bins/ bio-bins, pipe compost, pot compost, ring compost, bio-digesters etc. Adequate technology options are available now.

At the community level, five critical aspects to ensure proper functioning of a CCF are the following -

1. Location
2. Timeliness in functioning
3. Selling of compost through HKS or directly to customers
4. Hygiene
5. Links with LSG (in promoting use of manure, maintenance of facility etc.)

With a little bit of attention in the following areas, the management of biodegradable waste can be

improved -

1. User Education - Educating users on proper use and maintenance of the system is important in all cases. Even though some effort has been put into the setup of compost facilities across the state to promote individual composting at household level and in institutions, it might be common to observe that a large share of them are rendered useless after a couple of months due to lack of proper management. Regular follow up of maintenance such as repair and supply of activators etc., and support in proper usage of the units will ensure longevity if use of individual compost units setup. Haritha Karma Sena members have been entrusted with this responsibility. It has to be ensured that Karitha Karma Sena is trained and is equipped to provide these services along with adequate supply of materials required.
2. Incentivise composting - A model where composts are purchased from the households and institutions that do source level composting can be thought of. At CCF level, a model to incentivise hotels and restaurants that bring in properly segregated biodegradable waste can also be considered.
3. It is suggested that all the community compost plants, especially the ones catering to convention centres should have an additional bin, over and above their normal capacity or planned utilization to ensure that in case of an unplanned event, such as a festivals, rallies or any event that attracts crowd from outside the local body, there should be mechanism to manage.

4.4 Way Forward

Based on the aforementioned data points and other significant findings, the steps identified to be taken to help improve the waste management system and processes are as follows:

1. All LSGs that have not started door to door collection for households to do so immediately by identifying and training HKS.
2. All LSGs to have an action plan for incremental improvement of coverage so that by 6 months there is a 50% to 100% improvement depending on the status of coverage so far.
3. All LSGs to review the monthly income of HKS and to take action to improve coverage, rate of user fee, user fee payment

- and regularity of payment by engaging with households and institutions on a war footing.
4. All LSGs to align at source segregated waste collection as per the calendar provided by the State so as to streamline movement of segregated waste from MCFs and RRFs.
 5. All LSGs where the functioning of the HKS was adjudged to be unsatisfactory or requiring improvement to organise capacity building initiatives with the support of Suchitwa Mission, HKM, KILA and Kudumbashree.
 6. LSGs where protective gear had not been provided to HKS to be rectified forthwith and action taken against the officials concerned for the lapse.
 7. LSGs in rural areas to focus on institutional bio degradable waste and augment capability in markets and commercial centres with significant generation of bio degradable waste.
 8. Capacity utilisation of thumboor muzhis to be increased. Defunct vermi composting units to be revived.
 9. Temporary MCFs to be set up in all LSGs where permanent structure was not available or was in the process of sanction/ construction.
 10. System of segregation, weighing, recording and disposing of collected waste to be streamlined in all MCFs.
 11. Improvement of road access to MCFs in areas identified as difficult to access to be undertaken.
 12. Quality of restroom and fans in the MCFs and RRFs to be ensured, as per the information available.
 13. Special interventions at the district and state level to intervene in the LSGs identified as laggard in waste management based on the assessment. The concerned councils to be specifically briefed about the status of waste management in their jurisdiction for urgent corrective action.
 14. Action to improve regulatory actions for enforcement of good waste management practices and against illegal dumping of waste to be taken by all LSGs and monitored regularly at HQ level.

15. Action to clear payment of legacy waste clearance dues to be undertaken
16. Agreement for removal of collected segregated waste to be entered into with CKCL or other agency as per Government directions immediately.
17. Action to provide appropriate weighing machines in the MCFs to be expedited and ensured.

4.5. Innovative Practices

Many LSGs have become role models in various aspects of waste management – it could be organised waste collection, it could be in enforcing green protocols, it could be with regard to branding fertiliser obtained from composting plants, it could be in ensuring that the LSG becomes zero waste. Some LSGs have undertaken specific innovations which are worthy of mention and appreciation. Some of the interesting innovations that came up in the course of assessment are listed below:

1. “Sanchikkoru Saree”- Sarees were collected from over 300 households in Edavaka GP, Wayanad Dist to upcycle them into cloth bags. This was done in order to promote the use of cloth bags and discourage the use of plastic shopping bags.
2. Pen Booths in all schools - Padiyoor GP in Kannur Dist. has installed pen booths in all the schools. Plastic pens that cannot be reused shall be collected from all schools for proper recycling. These pen booths might act as a reminder for students of the amount of plastic being generated each day. Along with proper awareness, these will motivate students to reduce their usage of single use plastic.
3. Green Protocol Followed at Kanichukulangara Temple Festival- Kanichukulangara Temple Festival which attracts a massive crowd from across the state was conducted as per Harita protocol. Mararikulam North GP, Alappuzha Dist has taken special efforts to ensure this was followed.
4. Green Check Post - Checkpoints where single use plastics are collected from vehicles, especially that of tourists who often end up littering scenic spots with plastic waste were set up in Vagamon, Idukki District.



Image: Green Check Post at Vagamon, Idukki Dist.

5. Upcycling Challenge - Ernakulam District held "Upcycling Challenge" in partnership with schools, colleges and Kudumbashree NHG units to incentivise and promote upcycling of materials that are often discarded as waste.

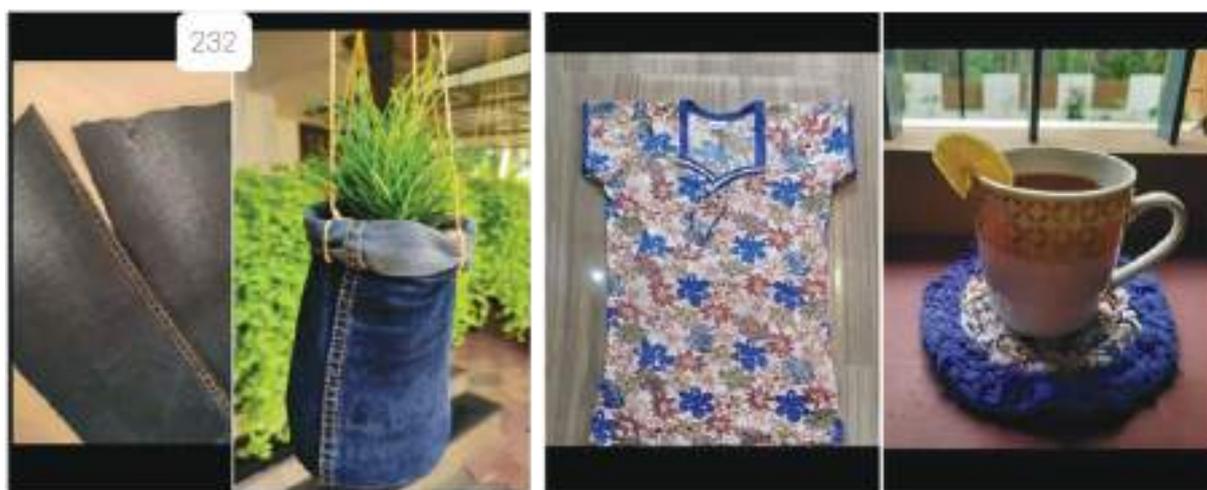


Image: Entries from the "Upcycling Challenge" held in Ernakulam Dist.

6. "Collectors @ School" Campaign - Ernakulam Dist is also running a "Collectors @ School" Campaign to promote segregation of waste and create awareness in students. Young students can often be an effective medium for

behavioral changes in their households about the need and necessity of segregation of waste.



Image: Bins placed in schools as part of "Collectors @ School" Campaign to collect segregated waste, Ernakulam Dist.

7. Junk- Le Park - Discarded objects are sorted, treated and transformed into beautiful works of art at Junk-le Park of Punalur Municipality, Kollam Dist. Apart from the obvious benefit of these junk not landing up in landfills, they also serve as awareness for the public for the need to reuse and recycle.





*Image: Art Installations made from discarded materials at Junk-Le Park,
Punalur Municipality, Kollam Dist.*

8. Disinfection Unit - An era appropriate intervention, a disinfection unit was set up by Thumpamon GP, Pathanamthitta Dist. The members were also provided with required protective gear and equipment to undertake disinfection of buildings and institutions



Image: Disinfection Unit, Thumpamon GP, Pathanamthitta Dist.

9. The concept 'Swap-Shop', based on the principle of 'Reuse' in waste management, aims at providing a public system for exchanging reusable goods that could be useful for others. Local self-governance bodies have the primary responsibility for arranging the functions of swap-shops, along with public participation. Drop facility centers to be set up to collect

and store the permissible items from the public have been at various places. The collected materials would then be segregated and displayed in stalls. Such swap shops break the myth that the people of Kerala are averse to the idea of using second hand items and there would be no takers for such items.



Image: Swap shop, Thrikkalangode GP, Malappuram Dist

Annexure

Questionnaire

ശുചിത്വ- മാലിന്യ സംസ്കരണം
 തദ്ദേശസ്വയംഭരണസ്ഥാപനങ്ങൾ സന്ദർശിക്കുന്ന ടീം
 വിലയിരുത്തേണ്ട ഘടകങ്ങൾ (2021 ഏപ്രിൽ 9 മുതൽ 13 വരെ)

ജില്ലയുടെ പേര് :		ബ്ലോക്ക്	
ഗ്രാമപഞ്ചായത്ത്/ നഗരസഭയുടെ പേര് :		ശുചിത്വ പദവി നേടിയുണ്ടോ ? ഉണ്ട്/ ഇല്ല (?)	
ക്രമ നം.	വിലയിരുത്തൽ ഘടകങ്ങൾ	റിമാർക്സ്	
വാതിൽപ്പടിശേഖരണം			
1	ഹരിതകർമ്മസേന രൂപീകരിച്ചിട്ടുണ്ടോ ?	ഉണ്ട്/ ഇല്ല	
2	വാതിൽപ്പടിസേവനം എത്ര വീടുകളിൽ ലഭ്യമാക്കുന്നു ?	എണ്ണം(%)
(1)	എത്ര ഇടവേളകളിൽസേവനം ലഭ്യമാക്കുന്നു ?	പ്രതിദിനം/ ആഴ്ചയിലൊരിക്കൽ, ഒരാഴ്ചയിലൊരിക്കൽ, മാസത്തിലൊരിക്കൽ,	
3	വാതിൽപ്പടിസേവനം എത്ര സ്ഥാപനങ്ങളിൽ ലഭ്യമാക്കുന്നു ? (അജൈവ മാലിന്യം)	എണ്ണം..... (%)
1	എത്ര ഇടവേളകളിൽസേവനം ലഭ്യമാക്കുന്നു ?	പ്രതിദിനം/ ആഴ്ചയിലൊരിക്കൽ, ഒരാഴ്ചയിലൊരിക്കൽ, മാസത്തിലൊരിക്കൽ,	
4	തദ്ദേശ സ്വയംഭരണ വകുപ്പ് പുറത്തിറക്കിയ ഡി.സി. 1/282/2020 തസഭവ 29.07.2020 നമ്പർ സർക്കുലർ പ്രകാരമുള്ള കലർ അച്ചടിച്ചു വീടുകൾക്കും സ്ഥാപനങ്ങൾക്കും ലഭ്യമാക്കിയിട്ടുണ്ടോ ?	ഉണ്ട്/ഇല്ല	
1	മേൽ കലണ്ടർ അനുസരിച്ചാണോ വാതിൽപ്പടി ശേഖരണം നടക്കുന്നത് ?	അതെ/അല്ല	എന്നു മുതൽ ആരംഭിച്ചു
5	എത്ര വീടുകളിൽ നിന്നും ജൈവ മാലിന്യം ശേഖരിക്കുന്നു?	എണ്ണം..... (%)
6	എത്ര സ്ഥാപനങ്ങളിൽ നിന്നും ജൈവ മാലിന്യം ശേഖരിക്കുന്നു ?	എണ്ണം..... (%)
7	യൂസർഫി നിരക്ക് എത്ര ? (വീട് സ്ഥാപനം)	ജൈവമാലിന്യം	ജൈവവും അജൈവവും
1	വീട് നിരക്ക്	രൂപ	രൂപ
	വീട് ലഭിക്കുന്നത്	രൂപ	രൂപ
2	സ്ഥാപനം നിരക്ക്	രൂപ	രൂപ

	സ്ഥാപനം ലഭിക്കുന്നത്	രൂപ	രൂപ
8	ഹരിതകർമ്മസേന		
1	ഹരിത കർമ്മ സേനയുടെ ഒരംഗത്തിന്റെ പ്രതിമാസവരുമാനമെത്രെ? കഴിഞ്ഞ മൂന്ന് മാസത്തെ വരുമാനത്തിന്റെ ആവരേജ് എഴുതുക		
9	ഹരിതകർമ്മസേനയുടെ അകൗണ്ട് ആരുടെയൊക്കെ പേരിലാണ്?		
10	പി.പി.ഇ (മാസ്ക്, ഗ്ലൗസ്, ഫെയ്സ്ഷീൽഡ്, സാനിട്ടൈസർ) നൽകിയിട്ടുണ്ടോ?	ഉണ്ട് / ഇല്ല	
	പി.പി.ഇ ശരിയായ രീതിയിൽ ഉപയോഗിക്കുന്നുണ്ടോ? നിരീക്ഷിച്ചും ഹരിത കർമ്മ സേന അംഗങ്ങളുമായി സംസാരിച്ചും നിരീക്ഷണം രേഖപ്പെടുത്തുക.		
	മിനി എം.സി.എഫ്		
1	പ്രവർത്തനക്ഷമതയുള്ള മിനി എം.സി.എഫുകളുടെ എണ്ണം.		
2	ഏത് പദ്ധതി പ്രകാരമാണ് മിനി എം.സി.എഫ് സ്ഥാപിച്ചിട്ടുള്ളത്.	1. തൊഴിലുറപ്പ്എണ്ണം 2. വികസന പദ്ധതി..... എണ്ണം 3. മറ്റുള്ളവഎണ്ണം	
13	മിനി എം.സി.എഫിന്റെ സൂക്ഷിപ്പും നിരീക്ഷണ ചുമതലയും ആർക്കാണ്?	റസിഡൻഷ്യൽ അസോസിയേഷൻ / അയൽക്കൂട്ടം/ ഹരിത കർമ്മസേന / മറ്റ് സംഘടനകൾ.....	
14	എത്ര മിനി എം.സി.എഫുകൾ നേരിട്ട് സന്ദർശിച്ചു?		
1	നിരീക്ഷണം എന്താണ്?		
	എം.സി.എഫ്.		
15	എം.സി.എഫ് സ്ഥാപിച്ചിട്ടുണ്ടോ?	ഉണ്ട്/ ഇല്ല..... എണ്ണം	
16	എം.സി.എഫിന്റെ വിസ്തീർണ്ണം എത്ര സ്വയർഫീറ്റ്?	ഒന്നിൽ കൂടുതൽ ഉണ്ടെങ്കിൽ ഒരാലും പ്രത്യേകമായി എഴുതുക.	
17	ചുവടെ സൂചിപ്പിച്ചിട്ടുള്ള സൗകര്യങ്ങൾ എം.സി.എഫിൽ ലഭ്യമാണോ?	എം.സി.എഫ്	എം.സി.എഫ് 2
1	തരംതിരിക്കുന്നതിനുള്ള സൗകര്യം ലഭ്യമാണോ?		
2	ഇനം തിരിച്ച് സംഭരിക്കുന്നതിനുള്ള സൗകര്യം ലഭ്യമാണോ?		
3	സി.കെ.സി നിർദ്ദേശപ്രകാരമുള്ള തരംതിരിവ് നടക്കുന്നുണ്ടോ?		
4	ടോയിലറ്റ് വാഷ്റൂം ലഭ്യമാണോ?		
5	വിശ്രമ സ്ഥലം ഉണ്ടോ?		
6	ഫാൻ ലഭ്യമാണോ?		
7	ബെയിലിംഗ് മെഷീൻ സ്ഥാപിച്ചിട്ടുണ്ടോ?		

	8	എം.സി എഫിലേക്ക്കൊണ്ടുവരുന്ന പാഴ്വസ്തുക്കളുടെയുംഎം.സി.എഫിൽ നിന്നുംകൊണ്ടു പോകുന്നവയുടെതുകാരേഖപ്പെടുത്തുന്നതിനുള്ളസംവിധാനം ഉണ്ടോ ? (വെയിറ്റിംഗ് മെഷീൻ&രജിസ്റ്റർ)	വെയിറ്റിംഗ് മെഷീൻ ഉണ്ട്/ ഇല്ല	രജിസ്റ്റർ ഉണ്ട്/ഇല്ല
	9	എം.സി.എഫ്വരൈവാഹനം എത്തിച്ചേരുമോ ?		
	10	വാഹന ചെലവ്വഹിക്കുന്നത് ആര്	സി.കെ.സി./ഏജൻസി/തദ്ദേശസ്വയംഭരണസ്ഥാപനം/മറ്റാരെങ്കിലും	
18	മാലിന്യംഎടുത്തുമാറ്റുന്നതിന്റെ ഇടവേള എത്രയാണ് ?			
	1	എം.സി.എഫിൽ നിന്നും അവസാനമായി പാഴ്വസ്തുക്കൾ നീക്കംചെയ്തത് എന്നാണ് ?		
19	എം.സി.എഫിൽ നിന്നും പാഴ്വസ്തു ആർ.ആർ എഫിലേക്ക്ഇപ്പോൾകൊണ്ടുപോകുന്ന ഇടവേള എത്രയാണ്. ?			
20	എം.സി.എഫ്ഇപ്പോൾ നിറഞ്ഞിരിപ്പുണ്ടോ ?			
21	എം.സി.എഫ്വരൈവാഹനം എത്തിച്ചേരുമോ			
22	ക്ലീൻ കേരള കമ്പനിയുമായികരാർവഹിച്ചിട്ടുണ്ടോ ? ഉണ്ടെങ്കിൽകരാർഉണ്ടാക്കിയതീയതിയുംമറ്റ്വിശദവിവരങ്ങളും?		ഉണ്ട്/ഇല്ല	
23	സ്വകാര്യ ഏജൻസിയുമായാണ് കരാറുകിൽ തീയതിയും ഏജൻസിയുടെ പേര്, വിലാസം, ഫോൺ നമ്പർ.			
24	ക്ലീൻ കേരള കമ്പനിയുടെ നിരക്കിനേക്കാൾ കുറവാനോ/ കൂടുതലാനോ പുനഃചംക്രമണ സാധ്യതയുള്ള പാഴ്വസ്തുക്കൾക്ക്സ്വകാര്യ ഏജൻസികൾ നൽകുന്നത് ?			
	ആർ.ആർ.എഫ്.			
25	ആർ.ആർ.എഫ്. നടത്തിപ്പ് ചുമതല ആർക്കാണ് ?		ഗ്രാമപഞ്ചായത്ത്/ നഗരസഭ/ബ്ലോക്ക് പഞ്ചായത്ത് /സി.കെ.സി സ്വകാര്യ ഏജൻസി	
	1	സ്വകാര്യവ്യക്തികൾക്കോസ്ഥാപനങ്ങൾക്കോആണെങ്കിൽ അവരുടെ പേര്/ വ്യവസ്ഥകൾ എന്നിവവ്യക്തമാക്കുക		
26	ചുവടെസൂചിപ്പിച്ചിട്ടുള്ളസൗകര്യങ്ങൾ ആർ ആർഎഫിൽലഭ്യമാണോ ?			
	1	തരംതിരിക്കുന്നതിനുള്ളസൗകര്യംലഭ്യമാണോ ?	ആണ്/ അല്ല	
	2	ഇനം തിരിച്ച് സംഭരിക്കുന്നതിനുള്ള സ്റ്റോറേജ്സൗകര്യംലഭ്യമാണോ ?	ആണ്/ അല്ല	
	3	സി.കെ.സി നിർദ്ദേശ പ്രകാരമുള്ള തരം തിരിവ് നടക്കുന്നുണ്ടോ ?	ആണ്/ അല്ല	
	4	ട്രെയിലറ്റ്&വാഷ്റൂംലഭ്യമാണോ ?	ആണ്/ അല്ല	
	5	വിശ്രമസ്ഥലംഉണ്ടോ?	ആണ്/ അല്ല	

6	ഫാൻ സൗകര്യം ലഭ്യമാണോ ?	ആണ്/ അല്ല	
7	പാഴവസ്തുക്കൾ നീക്കം നടത്തുന്നതിന് വാഹന സൗകര്യം ലഭ്യമാണോ?	ആണ്/ അല്ല	
8	ആർ ആർഎഫിൽ വാഹനം എത്തിച്ചേരാൻ സൗകര്യമുണ്ടോ ?	ആണ്/ അല്ല	
ജൈവമാലിന്യം			
27	എത്ര കമ്മ്യൂണിറ്റി കമ്പോസ്റ്റിംഗ് യൂണിറ്റ് ഉണ്ട് ?	എണ്ണം	പ്രതിദിന സംസ്കരണശേഷി
1	തുമ്പൂർമുഴി		
2	വിൻഡ്രോ		
3	മണ്ണിര കമ്പോസ്റ്റ്		
4	കമ്മ്യൂണിറ്റി ബയോഗ്യാസ്		
5	മറ്റുള്ളവ		
28	പ്രതിദിനം ആകെ എത്ര കിലോഗ്രാം ജൈവമാലിന്യം പൊതുസംവിധാനത്തിലൂടെ സംസ്കരിക്കുന്നു ?		
29	എത്ര കിലോവളം പ്രതിമാസം ഉത്പാദിപ്പിക്കുന്നു?		
30	എത്ര വീടുകളിൽ ഉറവിട ജൈവ മാലിന്യ സംസ്കരണ യൂണിറ്റുകൾ സ്ഥാപിച്ചിട്ടുണ്ട്?		
31	പൊതു നിരത്തുകളിൽ മാലിന്യം വലിച്ചെറിയുന്നതിന്റെ ഭാഗമായി ഉണ്ടാകുന്ന മാലിന്യ കുനകൾ കണ്ടിട്ടുണ്ടോ ?	ഉണ്ട്/ ഇല്ല	
	(1)	ഉണ്ടെങ്കിൽ എത്ര എണ്ണം ?	
	(2)	കഴിഞ്ഞ രണ്ട് മാസത്തിനുള്ളിൽ അവയിൽ എത്ര എണ്ണം നീക്കം ചെയ്തു ?	
32	മാലിന്യം പൊതുനിരത്തിൽ കത്തിക്കുന്നുണ്ടോ ? എത്ര സ്ഥലംകണ്ടു ?		
33	ജലസ്രോതസുകളിൽ മാലിന്യ നിക്ഷേപം കണ്ടോ ?		
34	ജനുവരി, ഫെബ്രുവരി, മാർച്ച് മാസങ്ങളിൽ പൊതുനിരത്തിലോ പൊതുസ്ഥലങ്ങളിലോ മാലിന്യം വലിച്ചെറിയുകയോ, കത്തിക്കുകയോ ചെയ്യുന്നതിന്		
	(1)	എത്രപേർക്ക് നോട്ടീസ് നൽകി	
	(2)	എത്രപേർക്ക് പിഴചുമത്തി, തുക എത്ര ?	
		പ്രോസിക്യൂഷൻ നടപടിയിലേക്ക് പോയത് എത്ര ?	
35	കൂട്ടിക്കലർത്തിയ പാഴ്വസ്തുക്കൾ (ലഗസിവേസ്റ്റ്) നീക്കം ചെയ്യുന്നതിന് 2020-2021-ൽ എന്തു കഴിഞ്ഞുവെന്ന് ?		

	(1)	ക്ലീൻകേരള കമ്പനി വഴി എത്ര ? രൂപ
	(2)	സ്വകാര്യ ഏജൻസി വഴി എത്ര ?	
36		2020-21-ൽ അജൈവ പാഴ്വസ്തുക്കൾ വിറ്റ്കിട്ടിയതുക എത്ര ?	
	1	തുക ഹരിതകർമ്മ സേനയ്ക്ക്കൈമാറുന്നുണ്ടോ	
	2	2020-2021-ൽ എന്ത് തുക ഹരിത കർമ്മ സേന അകൗണ്ടിൽ ക്രഡിറ്റ് ചെയ്തു	
37		പ്രീ-മൺസൂൺ ക്യാമ്പയിൻ	
	1	വാർഡുതല സ്കാഡ് രൂപീകരിച്ചിട്ടുണ്ടോ?	
	2	മൈക്രോ പ്ലാൻ തയ്യാറാക്കിയിട്ടുണ്ടോ	
	3	മാപ്പിംഗ് പൂർത്തീകരിച്ചിട്ടുണ്ടോ ?	
	4	മാപ്പിംഗ് കണ്ടെത്തിയ ഇടങ്ങളിൽശുചീകരണം നടത്തിയിട്ടുണ്ടോ ?	
	5	ശുചീകരണം നടത്തിയ എത്ര സ്ഥലങ്ങൾ നേരിട്ട് സന്ദർശിച്ച് ബോധ്യപ്പെട്ടു.	
38		ശുചിത്വമാലിന്യ സംസ്കരണരംഗത്തുടേതല്ലാത്ത സായംഭരണസ്ഥാപനത്തിൽ നടക്കുന്ന നിലവിലെവിലയിരുത്തൽ രീതി	1) പ്രതിദിന വിലയിരുത്തൽ- നിർവ്വഹണ ഉദ്യോഗസ്ഥൻ 2) പ്രതിവാരവിലയിരുത്തൽ- സ്റ്റാന്റിംഗ് കമ്മിറ്റി/സെക്രട്ടറി 3) മറ്റേതെങ്കിലുംരീതി

SI No	District	Corporation			Grama Panchayat			Municipality			Grand Total		
		No. of Institutions from where non biodegradable waste is collected	No. of Institutions paying user fee	%	No. of Institutions from where non biodegradable waste is collected	No. of Institutions paying user fee	%	No. of Institutions from where non biodegradable waste is collected	No. of Institutions paying user fee	%	No. of Institutions from where non biodegradable waste is collected	No. of Institutions paying user fee	%
1	Alappuzha				12,321	9,312	76%	1,140	646	57%	13,461	9,958	74%
2	Ernakulam	10,191	10,191	100%	11,581	9,358	81%	11,499	10,811	94%	33,271	30,360	91%
3	Idukki				14,243	9,565	67%	2,038	695	34%	16,281	10,260	63%
4	Kannur	736	150	20%	24,173	17,898	74%	4,180	4,370	105%	29,089	22,418	77%
5	Kasargod				11,575	9,830	85%	2,415	2,415	100%	13,990	12,245	88%
6	Kollam	6,877	6,800	99%	23,760	14,582	61%	3,557	2,806	79%	34,194	24,188	71%
7	Kottayam				25,344	9,405	37%	1,064	453	43%	26,408	9,858	37%
8	Kozhikode	6,212	6,212	100%	34,921	27,289	78%	9,089	8,982	99%	50,222	42,483	85%
9	Malappuram				28,113	17,487	62%	5,393	1,993	37%	33,506	19,480	58%
10	Palakkad				35,060	34,228	98%	5,304	3,494	66%	40,364	37,722	93%
11	Pathanamthitta				14,122	2,124	15%	2,021	682	34%	16,143	2,806	17%
12	Thiruvananthapuram	17,382	17,382	100%	26,158	20,785	79%	4,206	2,686	64%	47,746	40,853	86%
13	Thrissur	10,440	10,440	100%	22,859	8,513	37%	6,189	6,189	100%	39,488	25,142	64%
14	Wayanad				10,269	6,148	60%	2,825	914	32%	13,094	7,062	54%
	Grand Total	51,838	51,175	99%	294,499	196,524	67%	60,920	47,136	77%	407,257	294,835	72%

Table 5.1 - User Fee Payment - Overall Status

SI No	District	No. of Corporations	No. of MCFs installed	No. of Municipality	No. of MCFs installed	No. of Grama Panchayat	No. of MCFs installed	Total LSGs	No. of MCFs installed
1	Alappuzha			6	7	72	67	78	74
2	Ernakulam	1	4	13	18	82	57	96	79
3	Idukki			2	3	52	53	54	56
4	Kannur	1	2	9	11	71	71	81	84
5	Kasargod			3	3	38	117	41	120
6	Kollam	1	7	4	3	68	78	73	88
7	Kottayam			6	6	71	67	77	73
8	Kozhikode	1	2	7	8	70	54	78	64
9	Malappuram			12	14	94	83	106	97
10	Palakkad			7	6	88	88	95	94
11	Pathanamthitta			4	2	53	55	57	57
12	Thiruvananthapuram	1	57	4	4	73	59	78	120
13	Thrissur	1	6	7	10	86	62	94	78
14	Wayanad			3	2	23	24	26	26
	Total	6	78	87	97	941	935	1,034	1,110

Table 5.2 - Installation of MCF - Status

SI No	District	No. of Corporations	No. of MCFs where segregation facility is available	No. of Municipality	No. of MCFs where segregation facility is available	No. of Grama Panchayat	No. of MCFs where segregation facility is available	Total LSGs	No. of MCFs where segregation facility is available	% of MCF where segregation facility is available
1	Alappuzha			6	2	72	53	78	55	74%
2	Ernakulam	1	1	13	11	82	44	96	56	71%
3	Idukki			2	3	52	37	54	40	71%
4	Kannur	1	2	9	7	71	44	81	53	63%
5	Kasargod			3	3	38	102	41	105	88%
6	Kollam	1	1	4	2	68	53	73	56	64%
7	Kottayam			6	6	71	43	77	49	67%
8	Kozhikode	1	1	7	5	70	46	78	52	81%
9	Malappuram			12	13	94	72	106	85	88%
10	Palakkad			7	4	88	68	95	72	77%
11	Pathanamthitta			4	1	53	39	57	40	70%
12	Thiruvananthapuram	1	57	4	4	73	40	78	101	84%
13	Thrissur	1	6	7	8	86	54	94	68	87%
14	Wayanad			3	2	23	17	26	19	73%
	Total	6	68	87	71	941	712	1,034	851	77%

Table 5.3 - Segregation Facility at MCF- Overall Status

Sl No	District	No. of Corporations	No. of MCFs where segregated storage facility is available	No. of Municipality	No. of MCFs where segregated storage facility is available	No. of Grama Panchayat	No. of MCFs where segregated storage facility is available	Total LSGs	No. of MCFs where segregated storage facility is available	% of MCFs where segregated storage facility is available
1	Alappuzha			6	2	72	54	78	56	76%
2	Ernakulam	1	1	13	12	82	43	96	56	71%
3	Idukki			2	2	52	36	54	38	68%
4	Kannur	1	2	9	7	71	38	81	47	56%
5	Kasargod			3	3	38	94	41	97	81%
6	Kollam	1	1	4	2	68	49	73	52	59%
7	Kottayam			6	6	71	32	77	38	52%
8	Kozhikode	1	1	7	5	70	39	78	45	70%
9	Malappuram			12	9	94	68	106	77	79%
10	Palakkad			7	3	88	62	95	65	69%
11	Pathanamthitta			4	1	53	36	57	37	65%
12	Thiruvananthapuram	1	57	4	4	73	46	78	107	89%
13	Thrissur	1	6	7	9	86	50	94	65	83%
14	Wayanad			3	2	23	15	26	17	65%
	Total	6	68	87	67	941	662	1,034	797	72%

Table 5.4 - MCFs where segregated storage facility is available

SI No	District	No. of Corporations	No. of MCFs where toilet & washroom facility is available	No. of Municipality	No. of MCFs where toilet & washroom facility is available	No. of Grama Panchayat	No. of MCFs where toilet & washroom facility is available	Total LSGs	No. of MCFs where toilet & washroom facility is available	% of MCFs where toilet & washroom facility is available
1	Alappuzha			6	4	72	36	78	40	54%
2	Ernakulam	1	4	13	13	82	38	96	55	70%
3	Idukki			2	2	52	35	54	37	66%
4	Kannur	1	2	9	9	71	48	81	59	70%
5	Kasargod			3	2	38	101	41	103	86%
6	Kollam	1	-	4	1	68	34	73	35	40%
7	Kottayam			6	4	71	27	77	31	42%
8	Kozhikode	1	1	7	5	70	37	78	43	67%
9	Malappuram			12	11	94	54	106	65	67%
10	Palakkad			7	3	88	57	95	60	64%
11	Pathanamthitta			4	-	53	32	57	32	56%
12	Thiruvananthapuram	1	-	4	3	73	34	78	37	31%
13	Thrissur	1	4	7	6	86	49	94	59	76%
14	Wayanad			3	2	23	11	26	13	50%
	Total	6	11	87	65	941	593	1,034	669	60%

Table 5.5 - MCFs where toilet & washroom facility is available

SI No	District	No. of Corporations	No. of MCFs where restroom is available	No. of Municipality	No. of MCFs where restroom is available	No. of Grama Panchayat	No. of MCFs where restroom is available	Total LSGs	No. of MCFs where restroom is available	% of MCFs where restroom is available
1	Alappuzha			6	3	72	37	78	40	54%
2	Ernakulam	1	4	13	11	82	35	96	50	63%
3	Idukki			2	-	52	28	54	28	50%
4	Kannur	1	2	9	8	71	39	81	49	58%
5	Kasargod			3	2	38	97	41	99	83%
6	Kollam	1	-	4	1	68	31	73	32	36%
7	Kottayam			6	4	71	16	77	20	27%
8	Kozhikkod	1	1	7	4	70	24	78	29	45%
9	Malappuram			12	10	94	44	106	54	56%
10	Palakkad			7	2	88	51	95	53	56%
11	Pathanamthitta			4	-	53	22	57	22	39%
12	Thiruvananthapuram	1	-	4	3	73	30	78	33	28%
13	Thrissur	1	4	7	8	86	46	94	58	74%
14	Wayanad			3	2	23	9	26	11	42%
	Total	6	11	87	58	941	509	1,034	578	52%

Table 5.6 -MCFs where restroom is available

SI No	District	No. of Corporations	No. of MCFs where fan is available	No. of Municipality	No. of MCFs where fan is available	No. of Grama Panchayat	No. of MCFs where fan is available	Total LSGs	No. of MCFs where fan is available	% of MCFs where fan is available
1	Alappuzha			6	2	72	23	78	25	34%
2	Ernakulam	1	1	13	9	82	23	96	33	42%
3	Idukki			2	1	52	8	54	9	16%
4	Kannur	1	2	9	8	71	23	81	33	39%
5	Kasargod			3	1	38	90	41	91	76%
6	Kollam	1	-	4	-	68	10	73	10	11%
7	Kottayam			6	2	71	10	77	12	16%
8	Kozhikkod	1	1	7	3	70	10	78	14	22%
9	Malappuram			12	6	94	16	106	22	23%
10	Palakkad			7	-	88	22	95	22	23%
11	Pathanamthitta			4	-	53	6	57	6	11%
12	Thiruvananthapuram	1	-	4	3	73	21	78	24	20%
13	Thrissur	1	4	7	4	86	22	94	30	38%
14	Wayanad			3	-	23	3	26	3	12%
	Total	6	8	87	39	941	287	1,034	334	30%

Table 5.7 - MCFs where fan is available

Glossary

- **Solid Waste Management:** The term solid waste management is generally used to describe most of the non-hazardous solid waste from a city, town, or village that requires routine collection and transport to a processing or disposal site. Solid waste results from various sources, such as animal wastes, hazardous wastes, industrial and non-infectious medical wastes, food wastes, mineral wastes, and non-hazardous waste. Solid waste does not include wastes from industrial processes, construction, and demolition debris, sewage sludge, mining waste, or agricultural wastes.
- **Non-Biodegradable Waste - Non - Biodegradable Waste** is the kind of waste that cannot be decomposed by biological processes. Most of the inorganic, plastic and artificial waste are non-biodegradable.
- **Biodegradable waste - Biodegradable waste** includes any organic matter in waste which can be broken down into carbon dioxide, water, methane or simple organic molecules by microorganisms and other living things by composting, aerobic digestion, anaerobic digestion or similar processes.
- **Composting - Composting** is the process of recycling organic matter, such as food scraps and other biodegradable waste, into fertilizer or manure that can enrich soil. This is done by creating an ideal environment for bacteria, fungi, and other decomposing organisms (such as worms, sowbugs, and nematodes) to do their work. The resulting decomposed matter is called compost.
- **Community Compost Facilities (CCF) - Composting facilities** managed by govt or private agencies where biodegradable waste from several households in a neighbourhood, a housing or apartment complex or for an institution is collected and composted scientifically.
- **Thumboormuzhi Model or Aerobic bins - Thumboormuzhi Model or Aerobic bins** composting units use microbes isolated from cow dung to effectively manage biodegradable waste. The composting unit includes a box-like structure with a ferrocement floor. Layers of cow dung, carbon source and waste materials are subjected to composting in the presence of oxygen.
- **Windrow Composting - Windrow composting** is the process of composting by forming organic waste into rows of long piles called “windrows” and aerating them periodically by either manually or mechanically turning the piles.
- **Vermicomposting - Vermicomposting** is the process of composting biodegradable waste using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermicast.
- **Biogas Plant - A biogas plant** is the name often given to an anaerobic digester (air-tight tanks with different configurations) that treats biodegradable waste. These plants can be fed with biodegradable wastes including sewage sludge and food waste. During the process, the microorganisms transform biomass waste into biogas (mainly methane and carbon dioxide) and digestate.
- **Green Protocol - Green protocol** is essentially a set of measures which when implemented results in significant reduction of waste with primary focus on prevention of use of disposables and using reusable alternatives like glass/stainless/porcelain cutleries. When Green Protocol is implemented in any event, non biodegradable waste generation becomes close to zero.
- **Biomethanation- Biomethanation** is a process by which organic material is microbiologically converted under anaerobic conditions to biogas. Microorganisms degrade organic matter via cascades of biochemical conversions to methane and carbon dioxide.

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