



# 'Moving Towards Circular Economy'- Kerala perspective

## Launch of Communities of practice in Coimbatore

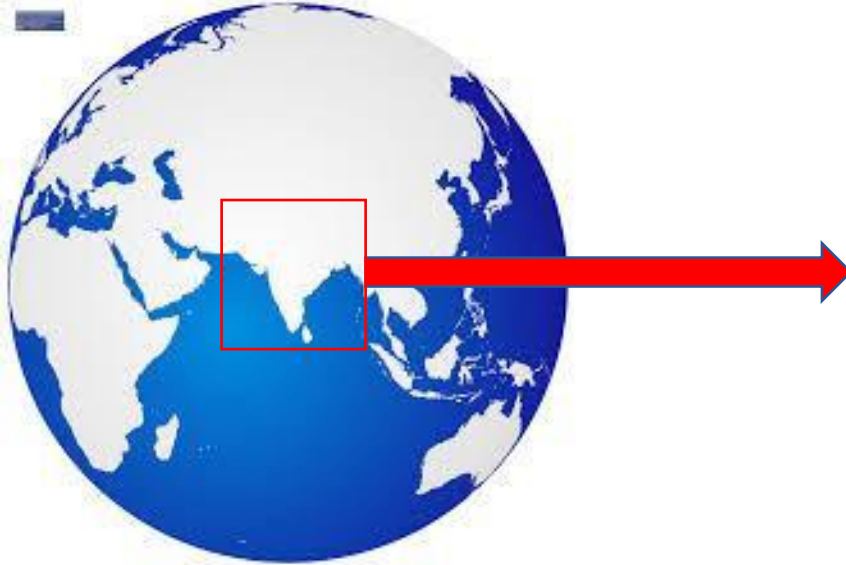
5th September 2023



Jyothish Chandran. G  
Director (SWM)  
Suchitwa Mission, Kerala

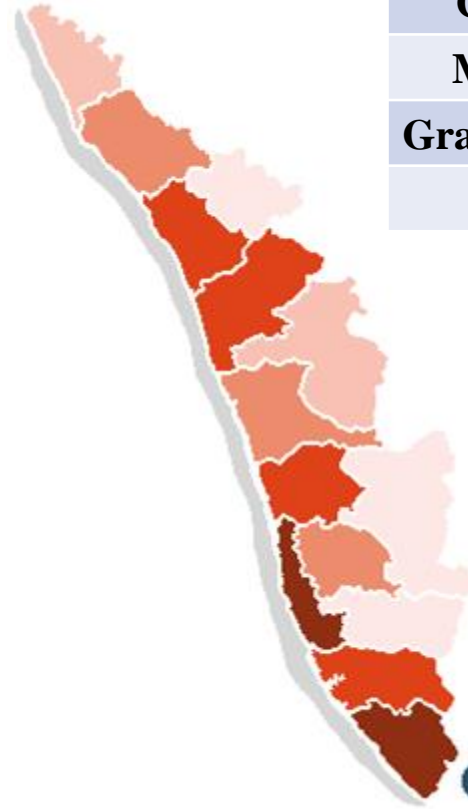


# Location



# About Kerala

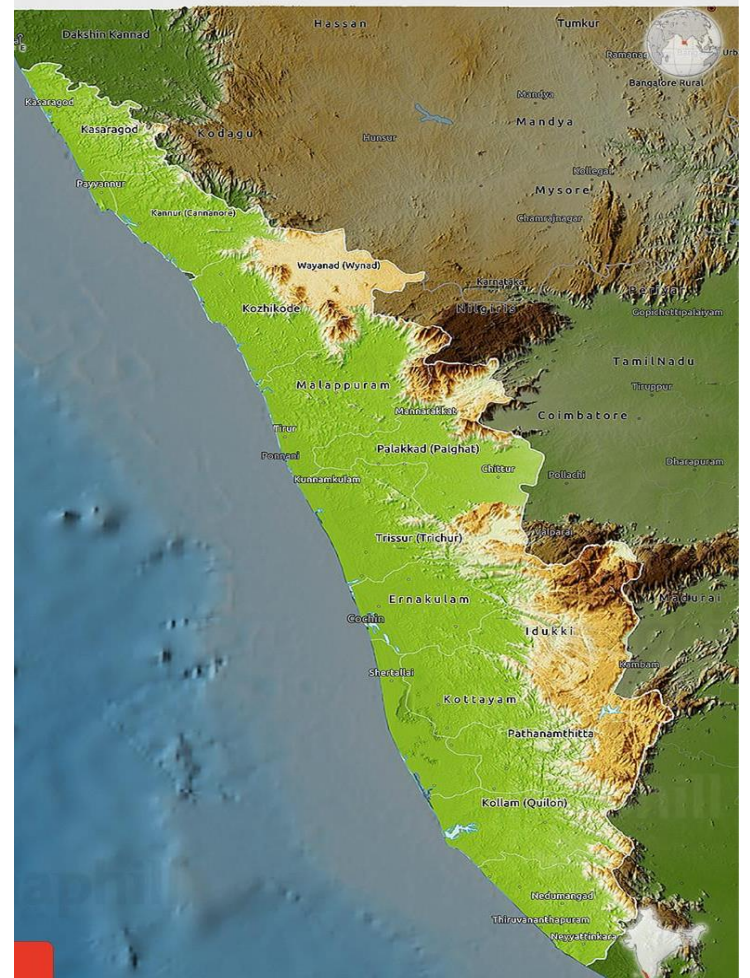
- **Population:** 34 million, 2.76% of India's population
- **Area:** 38,863 sq. km
- **Density:** 860 per sq. km  
India : 481 per sq. km



| Local Self Government Institution | Nos | Population (Cr) |
|-----------------------------------|-----|-----------------|
| Corporation                       | 6   | 0.31            |
| Municipality                      | 87  | 0.45            |
| Grama Panchayat                   | 941 | 2.58            |
| <b>Total</b>                      |     | <b>3.34</b>     |

# Climate

- Tropical land with generally pleasant climate, with temperatures ranging from  $20^{\circ}\text{C}$  –  $38^{\circ}\text{C}$  in the plains
- The high ranges are cool with temperatures falling to about  $20^{\circ}\text{C}$
- The Annual Monsoon lasts from June to November with an average rainfall of 3107 mm (All-India average - 1197 mm)



# Tourism

- 600 km of Arabian Sea shoreline: palm-lined beaches and backwaters, a network of canals
- Inland - The Western Ghats: mountains whose slopes support tea, coffee and spice plantations as well as wildlife.



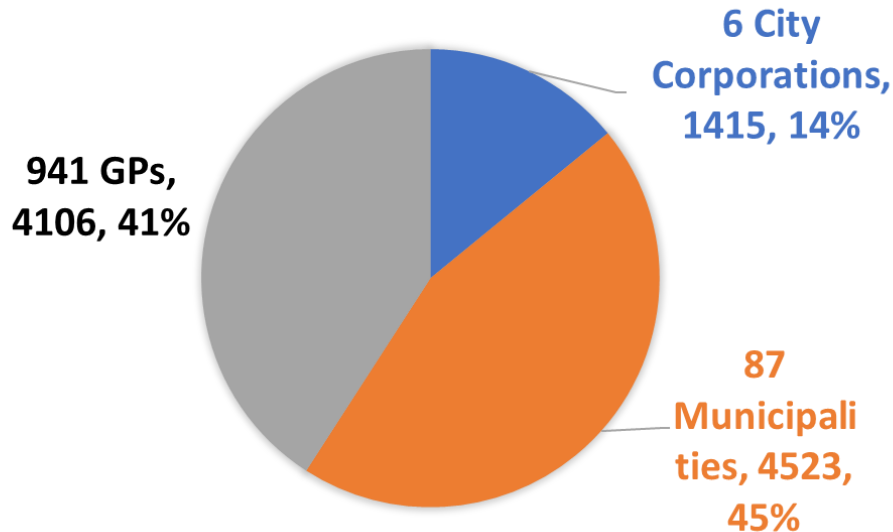
No. of tourists visiting Kerala annually: 10.1 million

Therefore, a clean and waste-free environment is an extremely high-priority subject for the Government

# Waste Generation in the State

**Total Municipal Solid Waste generation in Kerala is 3.7 Million Tons annually**

WASTE GENERATED IN TONS PER DAY



Per capita waste generation based on a comprehensive sectoral status study on solid waste management sponsored by the Water and Sanitation Project - South Asia (World Bank)



# Suchitwa Mission

## Nodal Agency for Sanitation and Waste Management

### Government of Kerala

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- SM is a Technical body of Government of Kerala, under the Local Self Government Department.
- It is responsible for evolving implementation strategy and providing policy in the sector of sanitation and providing technical support to LSGIs on various solid and liquid waste management issues.
- Functioning as the nodal agency for assisting Corporations, Municipalities and Panchayats in projects related to sanitation and waste management.
- Providing Technical Sanctions and Government share of funds for Solid & Liquid Waste Management projects.

# Suchitwa Mission – Major Roles – Technical support

| <b>Empanelment of Agencies</b>                                 |  |            |
|--|--|------------|
| <b>Area of Empanelment</b>                                     |  | <b>Nos</b> |
| <b>Solid Waste Management</b>                                  | Household level, Institutional Level and Community level SWM | 74         |
| <b>Liquid Waste Management</b>                                 | Consultants for LWM projects                                 | 21         |
| <b>Design and Installation of Crematorium Furnace/ Chimney</b> |  | 6          |
| <b>Design and construction of Modern Slaughter houses</b>      |  | 2          |
| <b>Total</b>   |  | <b>103</b> |



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# **SOLID WASTE MANAGEMENT IN KERALA STRATEGY & APPROACH**

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# Strategy on SWM

## Emphasis on Decentralised Waste Management based on 3 R Principle

- Segregation at source
- Source level processing of Biowaste
- Material Recovery through MRF
- Recycling

- Green Protocol (Reduce)
- Swap Shops & Repair shops (Reuse)
- Promotion of recycling

# Source level Management of Biodegradable Waste

## Home Composting Devices

Pipe



Tri-bin



Tri-pot



Kitchen bin



Pot



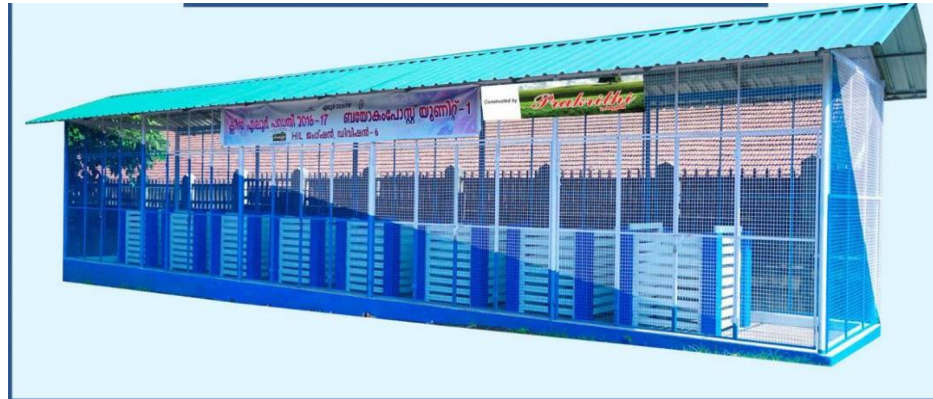
Ring



In-vessel



# Composting Devices for Institutions, Apartments & Community



# Bio-gas plants for Households & Institutions



# Advanced Waste to Energy Biogas Plants with Health monitoring System (Bioshakti-Biourjja Model)



# Managing Non-Biodegradable Waste



Waste are segregated at source and collected by Haritha Karma Sena

Waste collected by Haritha Karma Sena is temporarily stored here

Waste stored in Mini MCF is transferred to MCF for secondary segregation.

Waste from MCF is subjected to dust removal, shredding, bailing etc.  
Waste from here is also considered for reuse, recycle

Plastic shreds, rejects etc are transferred to Clean Kerala Company

# Source level Management of Non-Biodegradable Waste

- Dry discards to be kept neat & clean at households
- Hand over to rag pickers or collection agents of LSGIs (HKS)





# Haritha Karma Sena (HKS)

- Each ward will be having 2 HKS (Green task force) members
- Their training given by the local bodies with help from Haritha Keralam Mission and Haritha Sahaya Sthapanam.
- Haritha Keralam Mission has empanelled NGOs, companies, agencies etc who have expertise and experience in this field to help HKS and are called Haritha Sahaya Sthapanam
- The user fee collected depends upon the local bodies and is charged Rs.50 at households and Rs.100 at institutions(for about 2 sacks and the amount might increase if the quantity of waste is more).
- Stored at Mini-MCF at ward level



# Storage Facility

- The plastic waste collected from households and institutions after sorting are transported to Material Collection Facilities (MCF) by HKS.
- The collected plastics are temporarily stored at mini MCFs and MCFs. There are 1204 functional MCFs and 172 RRFs in Kerala.

# MCF & Mini-MCF in Aryad GP in Alappuzha District



# Segregation at MCF

Collected materials are segregated at MCF and valuable items are sold locally from MCF itself



Plastics will be sent to RRF

# Recycling of Non--Biodegradable Waste

- **172 Resource Recovery Facilities functional on a cluster basis**
- **Non biodegradables segregated for shredding and bailing for recycling**

**Plastic Shredding Unit**



**Plastic Bailing Unit**



**Material Collection Facility**



# Resource Recovery Facilities

- From MCFs, plastic is transported to Resource Recovery Facilities (RRFs).
- There are 172 functional RRFs in Kerala.
- At RRFs dust removal, shredding and baling of plastic waste are carried out to recover usable fractions. Recovered fractions from RRF are considered for reuse and recycling.
- Shredded plastic, rejects etc from MCFs are also transferred to CKCL.



**Resource Recovery Facility in Mundur BP  
in Palakkad**



**Resource Recovery Facility in Bharanikkavu BP  
in Kollam**

# Shredded Plastics used for Road Tarring



**3163 TMT of of shredded plastic has been used for tarring 5485 km of roads so far constructed (More than 11.7 Million Rupees cost recovery)**



# Shredded Plastics being used for Road Tarring



# Green Protocol for events, celebrations, institutions offices, HHs etc.



## Few events completed with green protocol

- National Games
- Swearing-in ceremony of state ministry
- State School youth Festival
- National School Athletic meet
- Temple festival (Attukal temple)

# Green Protocol in School Youth Fest



# Green Protocol in Events



**Reusable Cutleries**



**Water Dispensers**

# Eco Friendly Alternatives to Plastic carry bags

Ban on plastic carry bags are being imposed in a phased manner. Few local bodies and even few districts have already banned carry bags below 50 microns. SM has submitted proposals to Govt. for imposing a ban on all disposables



# Swap Shops to Promote Reuse of Resources

Swap Shops are being opened by local bodies where people can drop their old items which may be useful for others in the society. From there, people can select things they need on a very minimal cost or even free of cost



# Ban on Single Use Plastics (SUPs)

- State Government vide G.O. (MS) 06/2019/Envvt dated 27.11.2019 (further clarification vide G.O. (MS) 08/2019/Envvt dated 19.12.2019, G.O(Rt) No.04/2020/ENVVT dated 16.02.2020) imposed complete ban on the manufacture, storage, transport and sale of the single use items in the State of Kerala with effect from 1.1.2020
- As per the notification of Government of India on 12-8-2021, the additional Single-Use Plastics which need to be banned w.e.f. July 1, 2022 are:
  1. Candy sticks,
  2. Ear buds with plastic sticks,
  3. Ice-cream sticks,
  4. Plastic sticks for balloons,
  5. Wrapping or packing films around sweet boxes, invitation cards, and cigarette packets.

# Enforcement

- As per G.O(Rt)No. 673/2023/LSGD dated 21.03.2023, 23 numbers of squads have been formed Enforcement squads are effectively functioning on SUP ban, imposing fines to the violators, and seizing banned plastic items.
- Concurrent press releases were issued regarding the actions taken by the enforcement squad.



# Challenges

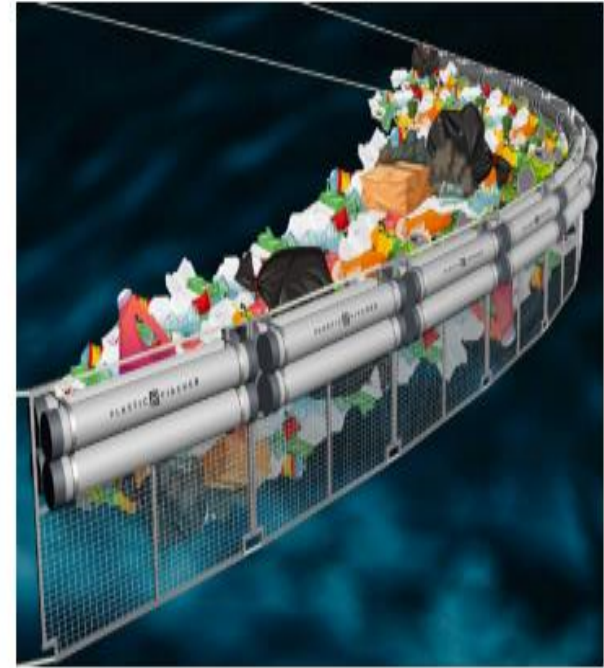
- *High density of population*
- *Constraints in land based activities due to lack of public land*
- *Mixed and legacy waste management in major urban local bodies*
- *Lack of facilities with modern technology for management of plastic, glass, e-waste, C&D waste and regional facilities*
- *Climatic conditions prevents continuous use of recycled plastic for polymerized road construction*
- *Lack of facilities for co-processing of non-recyclable waste*
- *Lack of facilities to manage flood waste*

# Recent Initiatives & Projects in the Coming Years

## 1. Pilot project - Preventing Marine Plastic Pollution (interventions at rivers) at Trivandrum

- Project to be done by Plastic FischerGmbh who provide end-to-end service from collection to processing of the waste.
- Plastic FischerGmbh has an objective of collecting the waste from the different water bodies and setting up MRFs (Material Recovery Facilities) to manage, sort, and process the collected material.
- They introduced a solution called trashbooms which will be deployed to prevent the plastic waste from flowing further downstream and the waste thus accumulated in the trashbooms will be collected on a regular basis. Then collected waste will be sorted and stored in MRFs and will be forwarded for recycling/co-processing.

*Trash Boom*



## Pattom Thodu (System #4)

**BEFORE**



**AFTER**



## Ulloor Thodu (System #3)

**BEFORE**



**AFTER**



## System #1 at Thampanoor Thodu (contd.)

- Status on 20th July, 2022



## **2. Black Soldier Fly (BSF) larvae based composting**

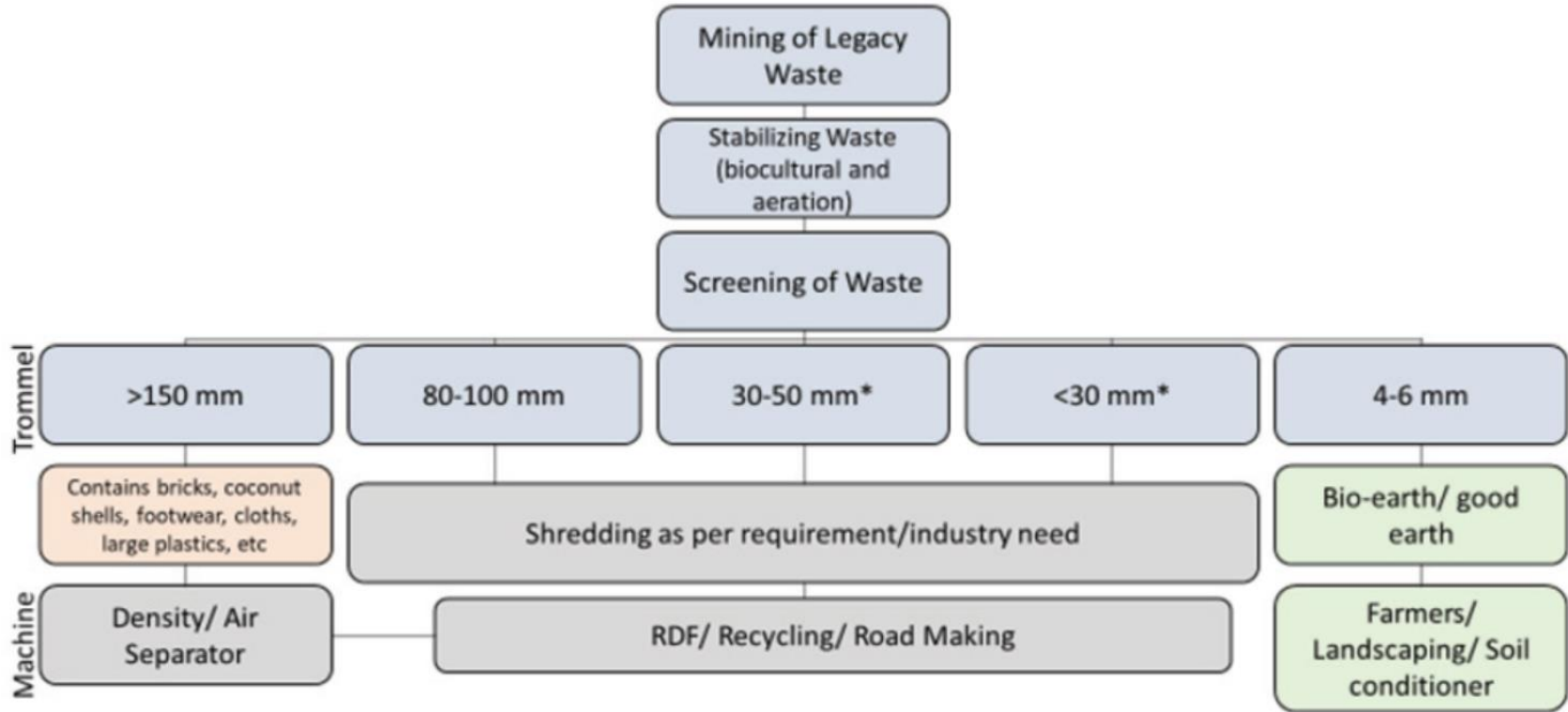
- BSF larvae composting is a new composting technology fast rising in most developing countries.
- Each larva can consume up to 200 mg of food waste per day
- Also which can accumulate and remove some toxic substances from compost.
- BSF larvae is a great source of protein for our pets and animals including fish
- Black soldier fly supports circular economy
- BSF larvae could eliminate organic waste almost completely and reduce the production of greenhouse gas without using non-renewable resources in its process
- In Kerala we recommend this composting system after getting clearance from entomology department of Kerala Agricultural University

# Remediation and Land Recovery of Legacy Dumpsites

- Scientific recovery of dumpsites through biomining/bioremediation
- Land remediated shall be used for waste management activities
- 18 sites out of 44 has been remediated.
- Remediation projects for remaining 26 sites are under progress.



# Overview of Dumpsite Remediation





# Legacy Waste Management

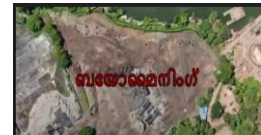
## Kureepuzha dumpsite (KOLLAM CORPORATION)



**Before**



**After**



# Stages of Biomining

## Pre-Stabilisation

**a) Inoculum Spraying**



**b) Windrowing**



**c) Loading for Processing**



**d) Weighing process**



# Various Stages of Segregation



## Other Outputs after Segregation



**Wood**



**Iron**



**HD Plastic**



**Coconut  
waste**

# Dumpsite Mapping

- Vide G.O.(Rt)No.2629/2022/LSGD dated 29/10/2022, Government has approved guidelines for Remediation of Legacy Waste Dumpsites through Bioremediation.
- 18 Urban Dumpsites cleared.
- Area recovered after clearing 18 dumpsites is 43.5 acres.
- Process ongoing at 8 sites and Remaining 18 LSGIs are at planning stage.
- 108 acres can be recovered by clearing 26 nos of dumpsites.

# Poultry Waste In Kerala

- Kerala state has more than 16,000 poultry stalls where around 18 lakh poultry are slaughtered and sold daily and it is estimated that about 1080 TPD of poultry waste is produced.
- Though there are a number of units in the state for rearing, processing and selling poultry meat, very few have the facility for scientific processing and sale of meat.
- Also the waste generated as a part of such unscientific processing is not being properly managed and this often ends up in polluting the environment and affecting human health.
- Poultry farms and some poultry meat processing units resorted to biogas plants to treat their poultry related wastes.

# Strides in poultry waste treatment with 40 rendering plants on stream

The plants function across 10 districts in public-private partnership mode; facility to be set up in the remaining four districts in a year. The government is now implementing a system to ensure that chicken waste reaches these plants



The chicken waste rendering plant at Kattur in Kattur is now implementing a system to ensure that chicken waste reaches these plants

S.R. Prasen  
THIRUVANANTHAPURAM

Early handling of poultry waste has for long been cited as the cause for problems ranging from pollution of waterbodies to increase in stray dog population in the state.

But now, major strides have been made by the Local Self-Government department and Suchitra Mission to tackle the issue. Mission in the past two years to chicken waste renders with 40 chicken waste rendering plants becoming functional across 10 districts in public-private partnership model. Plans are to be set up in the remaining four districts within a year.

The process of the chicken waste, is chilling the feather, is steamed and cooked to turn it into a powder form which is used as raw material for dog feed and animal feed. The government

is now implementing a system to ensure that chicken waste reaches these plants. The poultry shop owners should either have a facility to process the waste or shared or hand these over to those running the rendering plant in the area. The maximum fee for collecting the waste, is one per kilogram. All the plants across has been fixed at 17 per kilogram. The plants now become functional have a total capacity to

1080 tonnes of waste. According to the Suchitra Mission's estimates, 1080 tonnes per day of chicken waste is produced from the 16,000-odd poultry stores across the state.

40 plants that have be successful, the Local Self-Government department issued detailed poultry guidelines for increasing poultry try most stalls and poultry waste rendering plants in October 2021, after which

process as much as 75% of this waste. The first of the plants was set up on an experimental basis in Pappinisseri in Kattur in 2015.

more plants were set up in other districts. Currently, Ernakulam, Thrissur and Alappuzha are the districts to yet have a plant, while the work on a plant in Thiruvananthapuram is ongoing.

Monitoring panels District-level facilitation and monitoring committees, headed by collectors, have been set up to ensure the viability of the plants before sanctioning a sufficient supply of waste has to be provided. Already, the plan is in some places, the owners are lowering the collection fee so that they would get more waste. The collection fee is mostly play-acting the role of a facilitator; government is also providing some areas also providing with the local bodies in the PPP model. There is no land for the plant. Due to additional financial burden on the local bodies," says G. Jyothish Chandrahan, Director Solid Waste Management, Suchitra Mission.

ചെറിയ മത്സരമാണ്

കുറ്റസംഭവത്തെക്കുറിച്ച് വിവരം ഇനി കണ്ടാൽ വിമർശനം ഉണ്ടാകും. അതുകൊണ്ട്, ഇന്നിപ്പോൾ മാത്രമാണ് ചെറിയ മത്സരമാണ്. സർക്കാർ താല്പര്യം കൈയാളിച്ച്, സർക്കാർ അംഗീകാരം നേടിയെടുക്കണം.

മറ്റൊരു കാര്യമാണ്, മത്സരം കഴിഞ്ഞ് സർക്കാർ അംഗീകാരം നേടിയെടുക്കണം. ഇതിനായി സർക്കാർ അംഗീകാരം നേടിയെടുക്കണം. ഇതിനായി സർക്കാർ അംഗീകാരം നേടിയെടുക്കണം. ഇതിനായി സർക്കാർ അംഗീകാരം നേടിയെടുക്കണം.

DEEPA KUNHIL DATTA  
Special Correspondent, 'Kairat'

## മാലിന്യസംകരണത്തിന് റെന്ററിംഗ് പ്ലാന്റുകൾ കോഴിക്കടകൾ ഇനി ഹൈടെക്



### നിബന്ധനകൾ

- 1500 രൂപയ്ക്ക് മാത്രമായി ട്രെയിനിംഗ് പ്ലാന്റുകൾ തുറക്കാനാവില്ല.
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# Poultry Waste Management in Kerala

- The state has more than 16,000 poultry stalls where around 18 lakh poultry are slaughtered and sold daily. It is estimated that about 1,080 TPD of poultry waste alone is produced..
- Some of the local bodies have entrusted the work of collecting this waste, to private traders, who are not treating this waste in any manner except dumping it in isolated places of Kerala and Tamil Nadu.
- Suchitwa Mission was directed to prepare a policy framework on poultry and slaughter waste management . It was prepared and then redrafted as guidelines.
- Guidelines for Licensing Poultry Meat Stalls and Poultry Waste Rendering Plants has been issued in the State vide **GO (Ms.) No. 227/2021/LSGD Dated, 07.10.2021**. According to the orders, District Level Facilitation and Monitoring Committee under the chairmanship of District Collector has been formed for approving rendering plants and monitoring the same

## Current Status in Kerala

- Major strides are being made by the Local Self Government department and Suchitwa Mission in the past two years to tackle the issue, with 40 chicken waste rendering plants becoming functional across 10 districts under public-private-partnership model.
- The total capacity of the rendering plants across the state is approx. 853 TPD to address the waste from 10 districts across the state.
- The 40 plants with 853 TPD capacity is for handling about 1080 tonne per day of chicken waste produced from the 16,000 poultry stores across the State.
- By the combined efforts of Suchitwa Mission and Haritha Kerala Mission, Kannur district is the first district to be declared Poultry waste free district.

## Current Status in Kerala

- All the chicken waste, including the feather, is steamed and cooked to turn it into a powder form, which is used as raw material for dog feed and animal feed.
- The poultry shop owner should either have a facility to process the waste produced or hand these over to those running the rendering plant in the area.
- The maximum fee for collection has been fixed at ₹7 per kilogram.
- All the plants have refrigerated vehicles for collecting the waste.

## Current Status in Kerala

| Sr No. | Name of district   | Total number of rendering plants functioning in the district | Total capacity of rendering plants functioning in the district(TPD) |
|--------|--------------------|--|---|
| 1      | Thiruvananthapuram | 0  | 0   |
| 2      | Kollam             | 2  | 6.5   |
| 3      | Pathanamthitta     | 1  | 30  |
| 4      | Alappuzha          | 0  | 0   |
| 5      | Kottayam           | 0  | 0   |
| 6      | Idukki             | 0  | 0   |
| 7      | Ernakulam          | 4  | 135   |

# Current Status in Kerala

| Sr No. | Name of district | Total number of rendering plants functioning in the district | Total capacity of rendering plants functioning in the district(TPD) |
|--------|------------------|--|---|
| 8      | Thrissur         | 1  | 5   |
| 9      | Palakkad         | 7  | 103.25  |
| 10     | Malappuram       | 19   | 331.5   |
| 11     | Kozhikode        | 1  | 60  |
| 12     | Wayanad          | 1  | 20  |
| 13     | Kannur           | 2  | 51.5  |
| 14     | Kasargod         | 2  | 110   |
|        | <b>TOTAL</b>     | <b>40</b>  | <b>852.75</b>   |



**Rendering Plant in Mattanur , Kannur**





*Thank you...*