University : KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES
Country : India
Web Address : www.karunya.edu

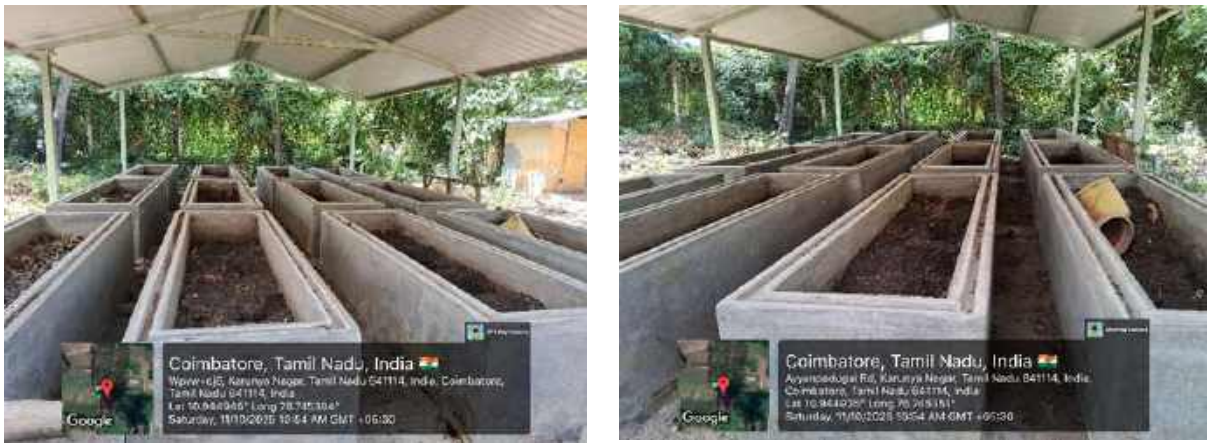
[3] Waste (WS)

[3.8] Organic Waste Treatment (WS.3)

Karunya Institute of Technology and Sciences is dedicated to promoting sustainable waste management practices as part of its commitment to environmental stewardship. Organic waste treatment plays a vital role in this initiative by converting biodegradable waste into valuable resources such as compost and bio-fertilizer. This document outlines the measures adopted for organic waste treatment within the campus, reflecting Karunya's ongoing efforts to reduce environmental impact, enhance resource recovery, and move towards a sustainable and zero-waste campus.

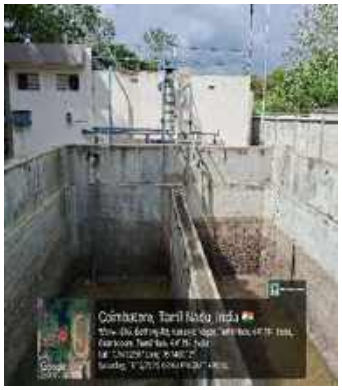
Type of organic waste	Total Waste in tons per year	Total Waste treated in tons per year	Percentage of Waste Treated per year
Food waste, vegetable cuttings etc.	180	170	
Leafy biomass	597	257.18	
Night soil	300	300	**68%**
Sludge	22	22	
Total	**1097 tons**	**749.18 tons**	

*** For details kindly refer 3.3 & 3.4**



Vermicompost Unit at North Farm, Karunya

Biogas plant in residential unit at KITS



STP in KITS campus

Food Waste Crusher

Food Waste Disposal

Vermicomposting

The crop residues, the dry leaves collected from hostels, garden, trees and other plants are recycled by Vermicomposting pits (4 Nos) in our Karunya farm. Nearly 4 tonnes of campus waste is recycled per year. Food waste generated in the campus is disposed-off through a private vendor for his piggery units.

BIO-GAS PROJECT

i) Bio-gas – An overview

- A *biogas plant* is a decentralized energy system, which can lead to self-sufficiency in heat and power needs, and at the same time reduces environmental pollution.
- Biogas is a gas mixture which is generated when organic compounds are fermented in the absence of air (anaerobic fermentation). This gas mixture is mainly made of carbon dioxide (CO2) and methane (CH4). Methane is a combustible gas, which means it can be burned. It can be used as a sustainable renewable fuel for cooking and lighting.
- Organic matter such as manure (human or animal) is used to feed the plant. The process of anaerobic fermentation will then take place here, to generate biological gas (biogas).

ii) Bio-gas plants in Karunya Campus

- Since being a residential campus, the night soil and food waste generated in the hostel zones (both ladies and gents) of Karunya Campus are treated by biogas plant installed in the following locations:

Sl. No.	Location	Capacity of the Bio-gas Plant	Year of Installation	Cost of the Plant (in Lakhs)	Savings in terms of LPG Cylinders (19Kg) /Day	Savings in terms of cost /Year (Rs.)
1	FDR Campus	100m3	2017	32.0	2 Nos.	6.60 Lakhs
2	JMR Campus	80m3 (Multi feed)	2010	26.0	2 Nos.	6.60 Lakhs
3	Ladies Hostel (PRG Campus)	100m3	2017	32.0	2 Nos.	6.60 Lakhs
4	Ladies Hostel (EVR Campus)	80m3	2017	26.0	1.5 Nos.	4.90 Lakhs

- The treated effluent from biogas plant is diverted to the STP for storage and utilized for irrigation/gardening. This will reduce the organic load coming to two STPs of capacity 6 and 4.5 lakh litres of sewage and their operational & maintenance cost.

- The biogas produced from the plant can be utilized for cooking, and the residual dung or the digested slurry left after generating *biogas* can be used as manure for agricultural purposes

iii) Sewage treatment plants in Karunya Campus

STP-Father Duraisamy Residence

Feed given to STP: Water from FDR, EGR & Hephzibah Hostels.

Capacity of the STP is : 4, 00,000 LPD
Number of beds available to remove the sludge : 12
Sludge removal from STP : Once in 4 days
Number of beds filled : 4

Bed dimensions
Length of the bed : 3.15m
Breadth of the bed : 1.89m
Height of the bed : 0.75m

Volume of 1 bed is given by = length*breadth*height
= 3.15*1.89*0.75
= 4.4651 Cubic meter

Volume of 4 beds = 4*4.4651
= 17.8605 Cubic meter

Water Treated daily
Water Recycled at Father Duraisamy Residence : 2, 40,000 LPD

Sludge Utilisation
Sludge is utilised in farming and gardening purposes and the details are given below

JMR & JVR – Backside (Fields)
SYNDICATE BANK, NEW AUDITORIUM- Garden
Hephzibah & Angelina Residence – Garden
Then fields extend up to SEMMEDU (outer).

STP-Students Meditation Centre

Capacity of the STP : 8,000 LPD
Purified water everyday : 4,000 LPD

This is only for water purification, so no sludge is produced from this.

STP- JMR

Capacity of the STP at JMR : 10, 00,000 LPD
Feed given to STP

1. Treated waste from a Biogas plant.

2. Some waste from Oil treatment plant.

Total no. of beds available to remove the sludge : 12
Sludge removal from STP : Once in 4 days
Number of beds filled : 4

Bed dimensions
Length of the bed : 2.70m
Breadth of the bed : 1.80m
Height of the bed : 0.60m

Volume of 1 bed is given by = length × breadth × height
= 2.70 × 1.80 × 0.60
= 2.916 Cubic meter

Total Volume in 4 beds = 4 × 2.916
= 11.664 Cubic meter

Water treated daily
Total water recycled at STP-JMR : 6, 00,000 LPD

STP-Ladies Hostels

Number of STPs in Ladies hostels are : 2

New Sewage Treatment Plant Capacity : 6, 00,000 LPD

Old Sewage Treatment Plant Capacity : 4, 50,000 LPD

Feed to STPs: Used water from all the ladies' hostel and staff quarters.

Water recycled Daily
Water recycled in both STP is around : 5, 40,000 LPD

Sludge Utilisation
Sludge from the STPs is supplied to Karunya University Gardens and Bethesda gardens.