Waste Management Report

(2024-2025)

VIGNAN'S
FOUNDATION FOR SCIENCE, TECHNOLOGY & RESEARCH
(Deemed to be University) - Estd. u/s 3 of UGC Act 1956

1. Introduction

Vignan's Foundation for Science, Technology & Research (VFSTR) is committed to sustainable campus operations through a comprehensive and integrated waste management system. The university recognizes effective waste management as a critical component of environmental stewardship, regulatory compliance, and contribution to national and global sustainability goals. VFSTR adopts a systematic approach covering solid waste, e-waste, hazardous waste, biomedical waste, and wastewater, while embedding circular economy principles across campus activities.

2. Objectives of Waste Management

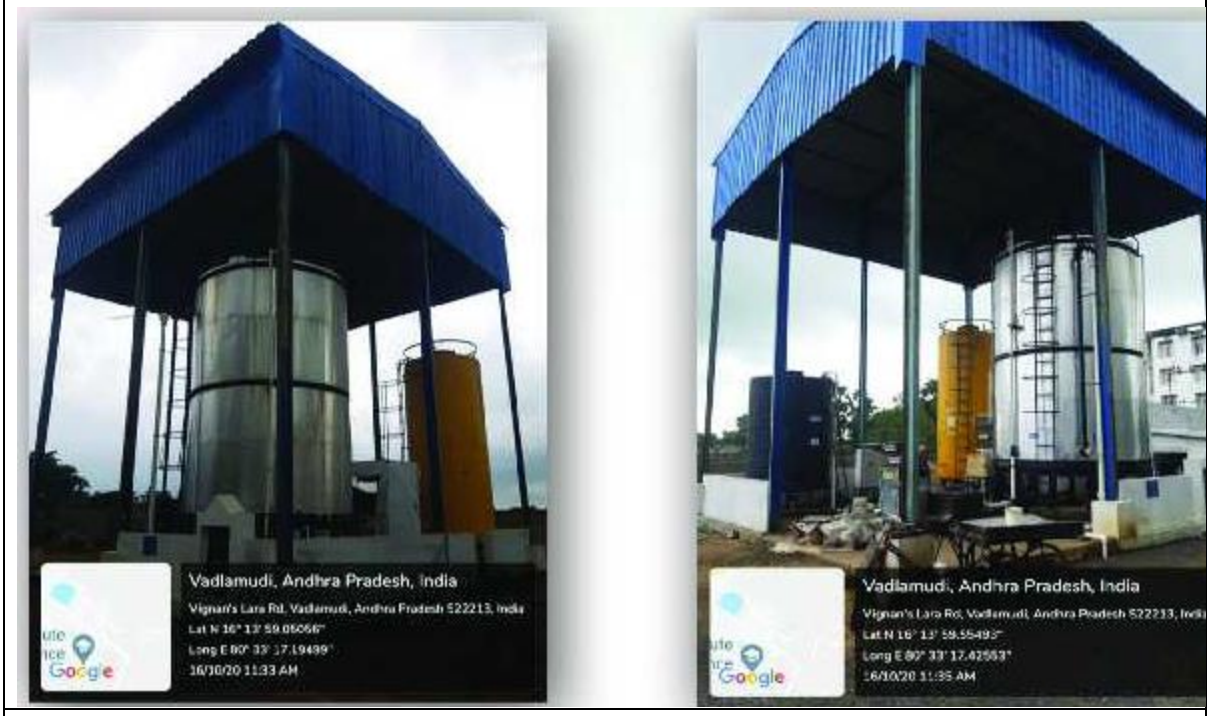
- To ensure responsible and safe handling of all types of waste generated on campus.
- To promote waste segregation, reduction, reuse, and recycling at source.
- To comply with statutory requirements of local and national regulatory authorities.
- To support Sustainable Development Goals (SDGs), particularly SDGs 6, 11, 12, and 13.

3. Solid Waste Management System

Solid waste generated from academic blocks, hostels, canteens, offices, and common areas is managed through source-level segregation using color-coded bins for biodegradable, recyclable, and non-recyclable waste. Organic waste such as food waste, vegetable waste, and garden litter is treated through on-campus composting and vermicomposting units. The compost produced is reused for landscaping and green cover maintenance.

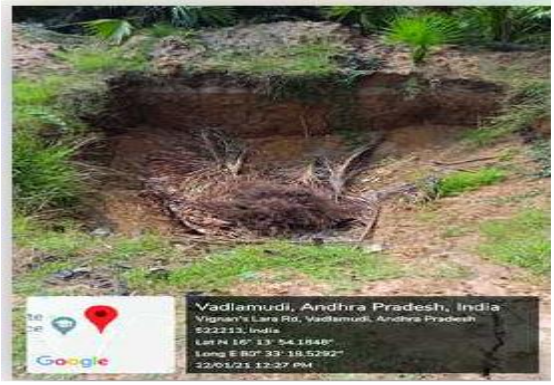
Dry recyclable waste including paper, plastic, metal, and glass is collected separately and handed over to authorized recyclers. The university actively minimizes paper usage through digital platforms, e-governance, and online academic processes. Regular awareness programs encourage students and staff to follow responsible waste disposal practices.

3.1. Recycling Program for University Waste

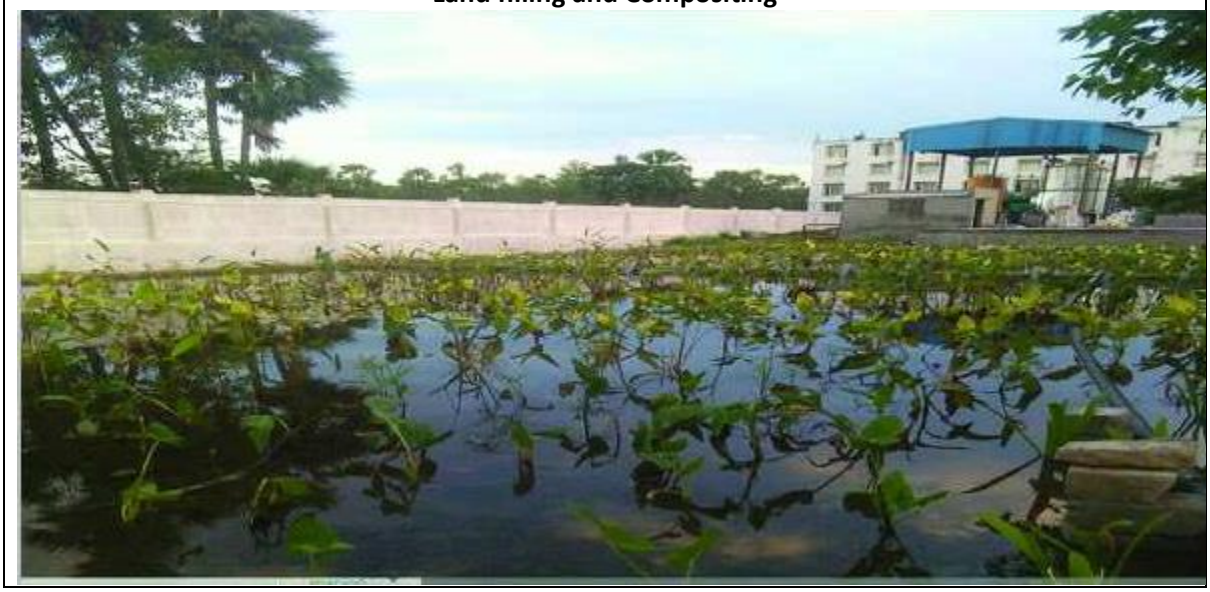


Biogas Plant

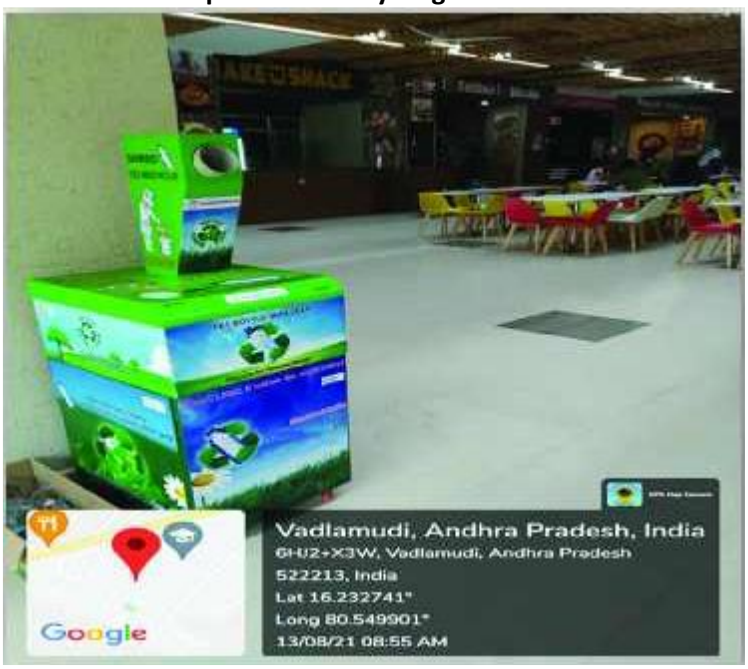
Example of Recycling Program for University Waste (Vignan University, India)



Land filling and Compositing



Liquid waste recycling and reuse



Plastic if any shedder

Example of Recycling Program for University Waste (Vignan University, India)

3R Component	Objective	Key Initiatives at VFSTR
Reduce	Minimize waste generation and optimize resource consumption	• Digital submissions to reduce paper use • LED lights and water-saving fixtures • Student awareness campaigns
Reuse	Extend the life of materials and reduce new resource demand	• Reuse lab and office equipment • Student book exchanges • Reuse banners/props for events
Recycle	Convert waste into usable products or raw materials	• Solid waste segregation (wet, dry, hazardous) • Compost organic waste

		for landscaping • Paper & plastic collection for recycling • Biogas from food/wet waste

3.2. Total volume of paper and plastic produced this year (2024-2025)

- **Annual total waste used:** 640 kg/day → **233600 kg/year**.
- **Estimate scenario:**

- Paper = 2% → **4672 kg/year** → Volume ≈ **46.72 m³/year (loose, 100 kg/m³)** or **19.23 m³/year (compacted, 242.96 kg/m³)**.
- Plastic = 1% → **2289.28 kg/year** → Volume ≈ **4.40 m³/year (bulk, 520 kg/m³)** or **1.95m³/year (solid plastic density 1175 kg/m³)**.

Scenario	Paper (%)	Plastic (%)	Annual waste (kg)	Paper mass (kg/year)	Paper volume loose (m^3/year)	Paper volume compacted (m^3/year)	Plastic mass (kg/year)	Plastic volume bulk (m^3/year)	Plastic volume solid (m^3/year)
estimate	2	1	233600	4672	46.72	19.23	2289.28	4.40	1.95

Type of waste	amount (ton)		
	Produced		
	Last year	This Year	reduced
Plastic	6.237	2.29	36
- A	3.5	1.5	42.85
- B	2.737	0.79	28.863
Paper	12.994	4.672	36
- A	6.57	2.538	38.63
- B	4.894	1.306	26.68
- etc	1.53	0.83	54.25

3.3. Total volume of paper and plastic produced last year (2023-2024)

- **Annual total waste used:** 890 kg/day → **324,850 kg/year**.
- **Estimate scenario:**

- Paper = 4% → **12,994 kg/year** → Volume ≈ **129.94 m³/year (loose, 100 kg/m³)** or **54.60 m³/year (compacted, 238 kg/m³)**.

- Plastic = 2% → **6237.12 kg/year** → Volume ≈ **12 m³/year (bulk, 520 kg/m³)** or **5.31m³/year (solid plastic density 1175 kg/m³)**.

Scenario	Paper (%)	Plastic (%)	Annual waste (kg)	Paper mass (kg/year)	Paper volume loose (m3/year)	Paper volume compacted (m^3/year)	Plastic mass (kg/year)	Plastic volume bulk (m3/year)	Plastic volume solid (m3/year)
estimate	4	2	324850	12994	129.94	54.60	6237.12	12	5.31

Type of waste	amount (ton)		
	Produced		
	Last year	**This Year**	**reduced**
Plastic	6.237	147	14
- A	3.5	75	6
- B	2.737	72	8
Paper	12.994	160	16
- A	6.57	60	10
- B	4.894	95	5
- etc	1.53	5	5

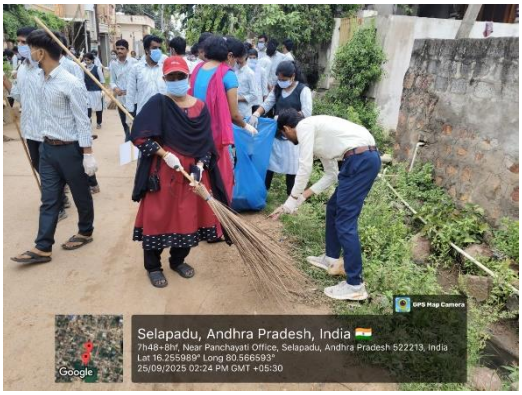
3.4. Program to Reduce the Use of Paper and Plastic on Campus

Awareness on Elimination of Single Use Plastic

Description:

An awareness programme on **"Elimination of Single use plastic"** and road show was conducted at Vadlamudi village. In the road show displayed a Banner conveying the dangers of single use plastic and volunteers have given some slogans to make aware of the dangers in using plastic. Students from hostel actively participated in the road show. The program started with the introduction to volunteers in organizing a rally. The plastic materials and its impact upon human health and environment was explained. The two-way communication between the presenter and the students gave outstanding result in terms of learning and sharing knowledge. Students became clear the doubts about the effects of plastics on human health. More information was given on its effect on body like endocrine glands causing obesity, heart disease, male genital abnormalities, cancer and autism.

In the interaction session the students given solutions on "How can we save our environment from poly bags? and minimization of using single use plastic bags, instead suggested to use eco friendly bags like cloth, jute bags, paper bags, cotton bags. The overall program was fruitful. The concern of the children and teachers towards the campaign made it successful. In this event the NSS Coordinator Mr.D. Suresh Babu participated.



2. VFSTR (Deemed to be University) has always been committed to promoting cleanliness, sustainability, and social responsibility as an integral part of its academic and community initiatives. In line with the Government of India's call for Swachhata Seva, the university organized a comprehensive cleanliness and awareness drive across the campus and surrounding communities.

3. VFSTR (Deemed to be University) organized an Ozone Day Awareness Programme on 16th September, aligning with the global observance of World Ozone Day. The event aimed to sensitize students and faculty about the significance of the ozone layer, its role in protecting life on Earth, and the urgent need for collective action to safeguard it from depletion.

As part of the initiative, a campus-wide awareness rally was also organized, where students carried placards and slogans advocating the importance of preserving the ozone layer. The programme not only enriched the knowledge of participants but also inspired them to take small yet impactful steps in their daily lives towards environmental protection.

3.5. VFSTR Paper and Plastic Reduction Program (PPRP–2025)

Aligned SDGs: SDG 12 – Responsible Consumption and Production, SDG 13 – Climate Action, SDG 15 – Life on Land

1. Objective

To minimize the generation and use of paper and plastic on VFSTR campus through digitization, awareness, and sustainable alternatives — supporting a zero-waste, eco-friendly learning environment.

2. Scope

Applicable to all departments, hostels, canteens, administrative offices, and student clubs across VFSTR University.

3. Goals and Measurable Targets

Goal	Baseline (2024)	Target (2025–26)	Indicator
Reduce total paper usage	100% (base year)	50% reduction	Stationery procurement records, printing logs
Reduce single-use plastic	100% (base year)	75% reduction	Canteen inventory data, waste audit reports
Promote digital alternatives	-	100% adoption of digital notice boards, e-submissions	IT and IQAC reports
Increase segregation & recycling	-	100% segregation at source	Waste audit data from CEPC

4. Action Plan

Action Area	Initiatives / Activities	Responsible Unit	Timeline	Expected Impact
A. Digital Transformation	1. E-office for communication 2. Online submissions 3. Digital notice boards and QR posters	Dean IQAC, IT Cell, Academic Deans	2025–2026	50% paper reduction

B. Plastic-Free Campus Drive	1. Ban single-use plastics 2. Replace PET bottles with refill stations 3. Biodegradable cutlery and paper bags	CEPC, Hostel Wardens, Canteen Committee	Jan–Dec 2025	75% plastic reduction
C. Awareness & Training	1. Monthly Green Talks 2. Eco-club competitions 3. Pledge campaign	NSS, Eco Club, IQAC	Quarterly	Behavior change
D. Waste Audit & Monitoring	1. Monthly tracking 2. Annual report to IQAC 3. Feedback and corrections	CEPC, IQAC, Civil Engg. Dept.	Continuous	Measured waste reduction
E. Recognition & Incentives	1. Green Department Awards 2. Publish results on VFSTR Green Campus webpage	Dean (Student Affairs), IQAC	Annual	Sustained participation

5. Expected Outcomes

- 50–75% reduction in annual paper and plastic consumption.
- Reduced carbon footprint and waste generation.
- Increased awareness and sustainable practices.
- Improved ranking in UI GreenMetric and THE Impact Rankings (SDG 12 & 13).

6. Follow-up Actions

1. Include 'Paper & Plastic Reduction' metrics in Green Audit templates.
2. Conduct annual review meetings with CEPC and IQAC.
3. Display progress on VFSTR Green Campus webpage under 'Sustainability Metrics'.

3.6. Total volume organic waste produced this year (2024-2025)

Description:

This report provides a quantitative estimate of the total organic waste generated at VFSTR University for the academic year 2024–25, in line with the institution's Green Campus and Sustainable Waste Management initiatives. The purpose is to support the Sustainable Development Goals (SDG 12: Responsible Consumption and Production, and SDG 13: Climate Action).

2. Base Data

• Total solid waste generated: 640 kg/day
• Organic waste fraction (typical campus range): 60% of total
• Average density of organic waste: 400 kg/m³
• Number of days considered: 365 days/year

3. Annual organic waste quantity

Total annual waste=640×365=233,600 kg/year

4. Calculations

Parameter	Value
Total solid waste generated	640 kg/day
Organic (biodegradable) fraction	60%
Density of organic waste	400 kg/m³
Days per year	365 days

Scenario	Organic %	Organic Waste (kg/year)
Estimate	60 %	140,160

Scenario	Density (kg/m³)	Volume (m³/year)
Medium	400	350.4

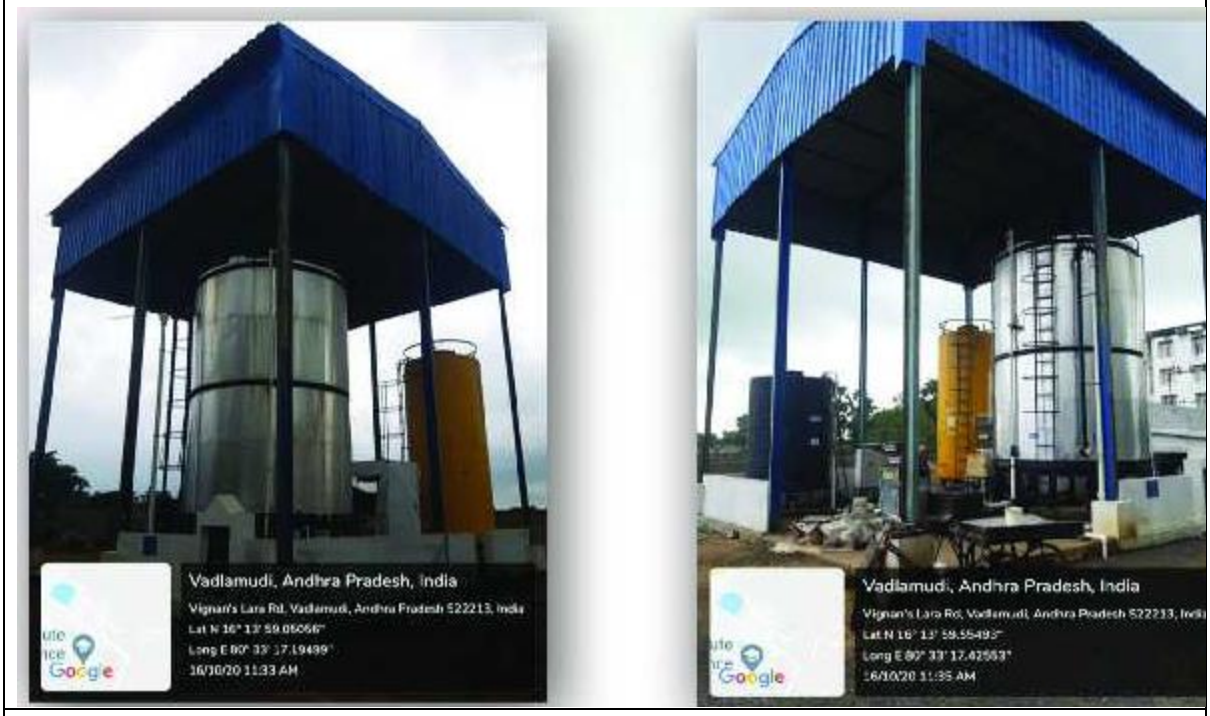
Summary

Parameter	Estimate
Organic % of total	60 %
Annual Mass (kg/year)	140,160
Density (kg/m³)	400
Volume (m³/year)	**350.4**

volume: ≈ 350.4 m³ per year (≈ 0.96 m³/day)

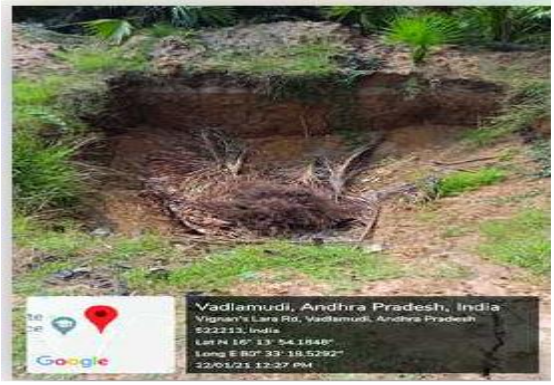
Type of waste	amount (ton)					
	Produced			Treated		
	Last year	This Year	reduced	reused	down-cycled	up-cycled
organic	194.91	140.16	71.19	55		
- food waste	109.91	96.024	87.366	65		
- leaf, etc.	75	37.336	49.78	39		
- etc	10	6.8	68	47		

Photo Evidence for "Organic Waste Management" at VFSTR

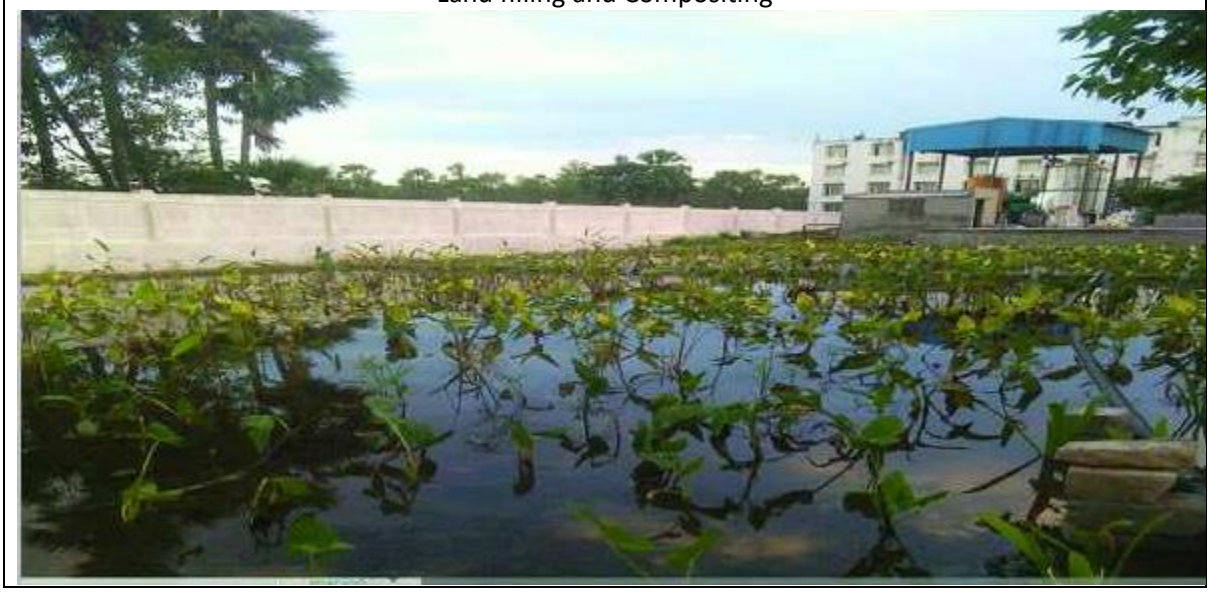


Biogas Plant

Example of Recycling Program for University Waste (Vignan University, India)



Land filling and Compositing



Liquid waste recycling and reuse

4. Observations and Recommendations

VFSTR generates approximately 490 m^3 of organic waste annually from 920 kg/day total waste. Composting and bio-digestion units are available on campus; however, to improve waste management efficiency, it is recommended to:

• Strengthen segregation practices at waste generation points.

• Expand composting and vermi culture capacity.

• Maintain monthly compost output logs.

3.7. Total volume organic waste produced last year (2023-2024)

Description:

This report provides a quantitative estimate of the total organic waste generated at VFSTR University for the academic year 2023–24, in line with the institution's Green Campus and Sustainable Waste Management initiatives. The purpose is to support the Sustainable Development Goals (SDG 12: Responsible Consumption and Production, and SDG 13: Climate Action).

2. Base Data

• Total solid waste generated: 890 kg/day

• Organic waste fraction (typical campus range): 60% of total

• Average density of organic waste: 350–500 kg/m^3 (depending on composition and moisture)

• Number of days considered: 365 days/year

3. Annual organic waste quantity

- Total annual waste=890kg/day×365days=324,850kg/year

3. Calculations

Scenario	Organic %	Organic Waste (kg/year)

Estimate	60%	194,910

Scenario	Density (kg/m³)	Volume (m³/year)
Medium (average)	400	487.3

Summary

Parameter	Estimate
Organic % of total	60%
Annual Mass (kg/year)	194,910
Density (kg/m³)	400
Volume (m³/year)	487

Average: ~480 m³ of organic waste per year (≈ 1.3 m³/day)

Type of waste	amount (ton)					
	Produced		reduced	Treated		
	Last year	This Year		reused	down-cycled	up-cycled
organic	**194.91**	**140.16**	**71.19**	**55**		
- food waste	**109.91**	**96.024**	**87.366**	**65**		
- leaf, etc.	**75**	**37.336**	**49.78**	**39**		
- etc	**10**	**6.8**	**68**	**47**		

4. Observations and Recommendations

VFSTR produces approximately 480 m³ of organic waste annually. The campus has facilities for composting and bio-digestion; however, it is recommended to:

• Strengthen waste segregation practices at source (hostels, canteens, labs).

• Expand composting and vermiculture units.

• Track and record compost output monthly.

3.8. Organic waste treatment

Description:

VFSTR University is committed to sustainable campus management through efficient organic waste treatment. The institution has adopted a circular waste management model, ensuring that biodegradable waste generated from hostels, canteens, gardens, and laboratories is processed through composting, vermicomposting, and biogas systems.

2. Sources of Organic Waste

Source	**Description**	**Approx. Daily Generation (kg)**
Hostel kitchens & canteens	Cooked food waste, vegetable peels, leftovers	238
Garden & landscape areas	Dry leaves, grass clippings, plant residues	111
Laboratories (Biotech & Agri)	Biodegradable experimental waste	35
Total		384

3. Treatment Infrastructure

Treatment Method	**Description**	**Capacity / Output**	**Location**
Composting Units	Manual and pit composting for kitchen and garden waste	90 kg/day	Agri Block
Vermicomposting Units	Use of earthworms for converting food and leaf waste to manure	44 kg/day	Agricultural Engineering Department

Biogas Plant	Anaerobic digestion of canteen waste to produce cooking gas	240 kg/day	Hostel Zone / Central Kitchen
Organic Manure Drying Beds	Sun-drying and sieving of compost for reuse in gardens	10 kg/day	Horticulture Section

4. Annual Waste Treatment Estimation (2024–25)

Parameter	**Value / Description**
Total organic waste generated	384 kg/day
Fraction treated on campus	≈ 85%
Total treated (kg/year)	384 × 0.85 × 365 = 119,136 kg/year
Average density	400 kg/m³
Total treated volume	119,136 ÷ 400 = 297.84 m³/year
Compost produced	~65–70 tons/year
Utilization	Landscaping, gardens, research farms

5. Impact and Outcomes

• Reduction in landfill waste by over 85%.

• Biogas reuse in canteen kitchens reduces LPG consumption by 5–7%.

• Compost application enhances soil fertility and supports university agriculture experiments.

• Strengthened student participation through NSS and Eco-Club in waste segregation and awareness programs.

Photo Evidence for “Organic Waste Management” at VFSTR

Observations:

• VFSTR efficiently processes 297.84 m³/year of organic waste.

• Compost and biogas outputs are effectively utilized within the campus.

3.9. Total volume inorganic waste produced this year

Description:

Inorganic waste at VFSTR primarily includes plastic, glass, metals, e-waste, and non-biodegradable packaging materials generated from hostels, academic blocks, and administrative offices. The university's waste management strategy emphasizes reduction, segregation, and recycling, contributing to SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action).

Type of waste	**amount (ton)**					
	Produced			**Treated**		
	Last year	**This Year**	**reduced**	**reused**	**down-cycled**	**up-cycled**
inorganic non-toxic	19.231	6.962	36.2	14.48		
- paper	12.994	4.672	36	18		
- soft plastic	3.5	1.5	42.85	16		
-hard plastic	2.737	0.79	28.86	8		
- etc	1.53	0.83	54.25			

2. Sources of Inorganic Waste

Source	**Type of Waste**	**Approx. Daily Generation (kg)**
Hostels and Canteens	Plastic bottles, wrappers, packaging	8
Academic and Administrative Blocks	Paper, plastic covers, old files, packaging	6
Laboratories (Engineering, Science)	Plastic containers, glassware, metal scraps	4
Campus Maintenance	Broken furniture, metal, glass	1
Total		19.07

3. Annual Waste Estimation

Parameter	Value / Description
Total inorganic waste generated	19 kg/day
Total waste generated per year	170 × 365 = 6960.55 kg/year
Average density (mixed inorganic waste)	500 kg/m³
Total volume produced	6960.55 ÷ 500 = 13.9211 m³/year

4. Waste Management Practices

Method	**Description**	**Frequency**	**Responsible Unit**
Segregation at Source	Color-coded bins used for inorganic waste	Daily	CEPC, NSS Volunteers
Recycling / Vendor Disposal	Collected plastics and metals sent to authorized recyclers	Weekly	CEPC, Waste Contractor
E-waste Collection Drive	Annual campaign for safe disposal	Annually	IT Department, NSS
Awareness Programs	Green Campus awareness drives	Quarterly	IQAC, Eco Club

5. Calculation

Total Volume (m³/year) = Mass / Density = 6960.55 ÷ 500 = 13.9211 m³/year

Therefore, VFSTR produces approximately 13.9211 cubic meters of inorganic waste per year.

Observations:

• Effective segregation practices exist in hostels and academic zones.

• Periodic collection and recycling by authorized vendors are implemented.

• E-waste handling protocols are followed as per university sustainability policy.

3.10. Total volume inorganic waste produced last year

Description:

During the academic year 2023–24, VFSTR University continued its efforts toward campus sustainability through efficient waste segregation and recycling programs. Inorganic waste mainly comprised plastics, glass, metals, packaging materials, and limited e-waste, generated across academic blocks, hostels, and offices. This initiative aligns with SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action) under the Green Campus framework.

Type of waste	amount (ton)		
	Produced		
	Last year	**This Year**	**reduced**
Plastic	6.237	147	14
- A	3.5	75	6
- B	2.737	72	8
Paper	12.994	160	16
- A	6.57	60	10
- B	4.894	95	5
- etc	1.53	5	5

Type of waste	**amount (ton)**					
	Produced			**Treated**		
	Last year	**This Year**	**reduced**	**reused**	**down-cycled**	**up-cycled**
inorganic non-toxic	19.231	6.962	36.2	14.48		
- paper	12.994	4.672	36	18		
- soft plastic	3.5	1.5	42.85	16		
-hard plastic	2.737	0.79	28.86	8		

- etc	1.53	0.83	54.25			

2. Sources of Inorganic Waste

Source	Type of Waste	Approx. Daily Generation (kg)
Hostels and Canteens	Plastic bottles, wrappers, packaging	28
Academic and Administrative Blocks	Paper, plastic covers, old files, packaging	22
Laboratories (Engineering, Science)	Plastic containers, glassware, metal scraps	02
Campus Maintenance	Broken furniture, glass, metals	01
Total		53

3. Annual Waste Estimation

Parameter	Value / Description
Total inorganic waste generated	53 kg/day
Total waste generated per year	53 × 365 = 19345 kg/year
Average density (mixed inorganic waste)	500 kg/m³
Total volume produced	19345 ÷ 500 = 38.69 m³/year

4. Waste Management Practices

Method	**Description**	**Frequency**	**Responsible Unit**

Segregation at Source	Color-coded bins used for inorganic waste	Daily	CEPC, NSS Volunteers
Recycling / Vendor Disposal	Collected plastics and metals sent to authorized recyclers	Weekly	CEPC, Waste Contractor
E-waste Collection Drive	Annual campaign for safe disposal	Annually	IT Department, NSS
Awareness Programs	Green Campus awareness drives	Quarterly	IQAC, Eco Club

5. Calculation

Total Volume (m^3/year) = Mass / Density = 19345 ÷ 500 = 38.69 m^3/year
Therefore, VFSTR produced approximately 38.69 cubic meters of inorganic waste during 2023–24.

Observations:

• Effective segregation was practiced in hostels and classrooms.
• Periodic collection by recyclers was maintained, reducing landfill load.
• Awareness drives increased student participation in waste sorting.

3.11. Total volume inorganic waste treated this year

Description:

VFSTR University has established an integrated solid waste management system to minimize environmental impact. The inorganic waste generated on campus — including plastic, glass, metal scraps, and packaging waste — is segregated, collected, and sent for recycling or safe disposal. This initiative supports SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action) under VFSTR's Green Campus initiative.

Type of waste	amount (ton)					
	Produced		reduced	Treated		
	Last year	This Year		reused	down-cycled	up-cycled
inorganic non-toxic	19.231	6.962	36.2	14.48		
- paper	12.994	4.672	36	18		
- soft plastic	3.5	1.5	42.85	16		
-hard plastic	2.737	0.79	28.86	8		
- etc	1.53	0.83	54.25			

2. Sources and Quantities of Inorganic Waste

Source	Type of Waste	Approx. Daily Generation (kg)
Hostels and Canteens	**Plastic bottles, wrappers, packaging**	**8**
Academic and Administrative Blocks	**Paper, plastic covers, old files, packaging**	**6**
Laboratories (Engineering, Science)	**Plastic containers, glassware, metal scraps**	**4**
Campus Maintenance	**Broken furniture, metal, glass**	**1**
Total		**19.07**

3. Annual Waste Treatment Calculation

Total inorganic waste generated	19.07 kg/day
Fraction treated through recycling & disposal	≈ 90%

Total treated (kg/year)	19.07 × 0.90 × 365 = 6264.495 kg/year
Total treated volume (m^3/year)	5916.46 ÷ 500 = 12.528 m^3/year

4. Waste Treatment and Disposal System

Treatment Method	Description	Frequency	Responsible Unit
Segregation at Source	Two-bin system in all hostels and academic blocks	Daily	CEPC, NSS
Recycling via Vendors	Authorized recyclers handle plastics, glass, and metal	Weekly	CEPC, Vendor Partner
E-waste Drive	Annual collection and disposal	Annually	IT Dept., NSS
Monitoring and Reporting	Monthly waste data logs	Monthly	IQAC, CEPC

5. Impact and Outcomes

• 85% of inorganic waste successfully diverted from landfill.

• Authorized recycling vendors ensure circular economy compliance.

• Reduction in plastic waste usage through awareness campaigns.

• Integration of waste data into VFSTR Green Campus Dashboard.

Observations:

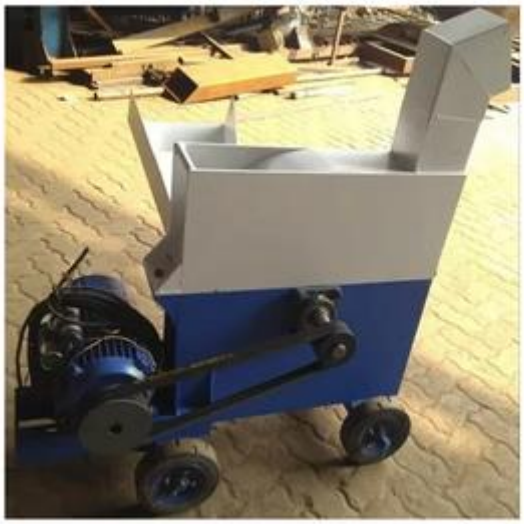
- Waste segregation and vendor-based recycling are well maintained.

- E-waste management and record keeping show good improvement.

3.12. Inorganic waste treatment

Description:

VFSTR University follows an eco-centric waste management policy emphasizing segregation, recycling, and reduction of inorganic waste. The process is integrated within the Clean and Green Campus initiative to ensure a sustainable environment. Inorganic waste primarily includes plastics, metals, glass, electronic components, and packaging materials. These materials are systematically collected, segregated, and sent for authorized recycling or safe disposal, minimizing landfill impact.



Example of Inorganic Waste Treatment (VFSTR, INDIA)

Example of Inorganic Waste Treatment (VFSTR, INDIA)

2. Major Sources of Inorganic Waste

Source	Common Waste Types
Hostels and Food Courts	Plastic bottles, food containers, wrappers
Academic Blocks	Files, plastic folders, covers
Laboratories	Glassware, broken containers
Administrative Offices	Paper clips, stationery plastics
Campus Maintenance	Metal scraps, glass, old boards

3. Waste Treatment Data (2024–25)

Parameter	**Value / Description**
Total inorganic waste generated	**19 kg/day**
Total waste generated per year	**19 × 365 = 6960.55 kg/year**
Average density (mixed inorganic waste)	**500 kg/m³**
Total volume produced	**6960.55 ÷ 500 = 13.9211 m³/year**

Parameter	Value
Total Inorganic Waste Generated	19 kg/day
Recycling & Treatment Rate	90%
Total Treated Waste (kg/year)	6264 kg
Equivalent Volume Treated (m³/year)	12.528 m³

4. Treatment Methods Adopted

• Segregation at Source: All blocks follow a dual-bin system (wet and dry waste).

• Recycling Vendor Collaboration: Plastic, metal, and e-waste are collected weekly by authorized vendors.

• E-Waste Collection Drives: Annual e-waste drives conducted in coordination with the IT department.

• Periodic Audits: Waste data verified monthly by the Campus Environmental Protection Cell (CEPC).

5. Outcomes & Environmental Impact

• 12.528 m^3/year of inorganic waste treated and diverted from landfills.

• Reduction of campus plastic footprint by approximately 20% over the previous year.

• Reuse initiatives in laboratories and workshops for materials like glass and metal scraps.

• Student participation increased via NSS and Green Club campaigns.

6. Alignment with SDGs

SDG Goal	**Description**	**Campus Action**
SDG 12: Responsible Consumption & Production	Promote waste reduction through recycling and reuse.	Segregation and vendor recycling programs.
SDG 13: Climate Action	Reduce greenhouse emissions via reduced landfill waste.	Waste treatment and awareness drives.
SDG 17: Partnerships for the Goals	Collaboration with government-recognized recyclers.	MoUs with Genentech and CEPC.

3.13. Total volume toxic waste produced this year (2024-2025)

Description:

VFSTR University, as part of its Green Campus and Environmental Protection Policy, monitors toxic and hazardous waste generated from laboratories, workshops, and maintenance units.

Toxic waste includes chemical residues, laboratory solvents, paints, cleaning agents, batteries, and e-waste components, which are handled strictly as per Hazardous Waste Management Rules (2016).

Type of waste	amount (ton)					
	Produced		reduced	Treated		
	Last year	This Year		reused	down-cycled	up-cycled
toxic	**0.839**	**0.548**	**0.65**			
- electronics	**0.438**	**0.365**	**0.83**			
- lab. Chemicals	**0.292**	**0.146**	**0.5**			
- etc	**0.11**	**0.0365**	**0.33**			

2. Sources and Nature of Toxic Waste

Source	Type of Toxic Waste	Approx. Quantity (kg/day)	Treatment/Disposal Method
Chemistry Laboratories	Acids, solvents, and reagents	0.2	Neutralization and chemical treatment
Biotechnology & Pharmacy Labs	Expired chemicals, biological reagents	0.1	Biohazard disposal via incineration
Mechanical and Civil Workshops	Used oil, paints, and lubricants	0.1	Collected and handed to authorized recycler
E-waste (Campus IT Units)	Batteries, motherboards, components	1	Collected under E-waste drive

Campus Maintenance	Cleaning agents, paints, pesticides	0.1	Safe collection and neutral disposal
Total		1.5	

3. Annual Calculation of Toxic Waste

Parameter	Value / Description
Total toxic waste generated per day	1.5 kg/day
Working/active days considered	365
Total Toxic Waste Produced (kg/year)	1.5 × 365 = 548 kg/year
Average density of toxic waste (liquid-solid mix)	700 kg/m³
Total Volume (m³/year)	548 ÷ 700 = 0.782 m³/year

Hence, VFSTR University generated approximately 0.782 cubic meters of toxic waste during the academic year 2024–25.

4. Handling and Treatment Process

Activity	Description	Responsible Unit
Segregation at Source	Separate labeling of chemical and e-waste containers	Lab In charges, NSS
Storage in Hazardous Waste Facility	Temporary storage near Chemistry Block	CEPC
Authorized Vendor Disposal	Approved recycler (TSDF, Guntur)	CEPC, Admin
Documentation and Manifest	Maintained as per State PCB norms	IQAC, CEPC

5. Compliance & Standards

• Waste management is compliant with Hazardous Waste (Management & Handling) Rules, 2016.

• Safety and disposal logs are verified by the Campus Environmental Protection Cell (CEPC).

• Vendor manifests are submitted to the Andhra Pradesh Pollution Control Board (APPCB) annually.

6. Alignment with SDGs

6. Environmental and SDG Impact

SDG	Goal Description	Campus Action
SDG 12	Responsible Consumption and Production	Safe management and reduction of hazardous chemicals
SDG 13	Climate Action	Reduced pollution through proper waste disposal
SDG 3	Good Health and Well-being	Minimizing exposure to hazardous materials

Observations:

- All toxic waste streams are identified and handled per safety protocols.
- Vendor records and APPCB compliance are properly maintained.

3.14. Total volume toxic waste produced last year

Description:

VFSTR University monitors toxic and hazardous waste generated from laboratories, workshops, and maintenance units. Toxic waste includes chemical residues, laboratory solvents, paints, cleaning agents, batteries, and e-waste components, handled strictly as per Hazardous Waste Management Rules (2016).

Type of waste	amount (ton)					
	Produced		reduced	Treated		
	Last year	This Year		reused	down-cycled	up-cycled
toxic	**0.839**	**0.548**	**0.65**			
- electronics	**0.438**	**0.365**	**0.83**			
- lab. Chemicals	**0.292**	**0.146**	**0.5**			
- etc	**0.11**	**0.0365**	**0.33**			

2. Sources and Nature of Toxic Waste

Source	Type of Toxic Waste	Approx. Quantity (kg/day)	Treatment/Disposal Method
Chemistry Laboratories	Acids, solvents, and reagents	0.3	Neutralization and chemical treatment
Biotechnology & Pharmacy Labs	Expired chemicals, biological reagents	0.3	Biohazard disposal via incineration
Mechanical and Civil Workshops	Used oil, paints, and lubricants	0.2	Collected and handed to authorized recycler
E-waste (Campus IT Units)	Batteries, motherboards, components	1.2	Collected under E-waste drive
Campus Maintenance	Cleaning agents, paints, pesticides	0.3	Safe collection and neutral disposal
Total		2.3	

3. Annual Calculation of Toxic Waste

Parameter	Value / Description
Total toxic waste generated per day	2.3 kg/day
Working/active days considered	365
Total Toxic Waste Produced (kg/year)	839.5 kg/year
Average density of toxic waste (liquid-solid mix)	700 kg/m³
Total Volume (m³/year)	1.19 m³/year

Hence, VFSTR University generated approximately 1.19 cubic meters of toxic waste during the academic year 2023–24.

4. Handling and Treatment Process

Activity	Description	Responsible Unit	Frequency
Segregation at Source	Separate labeling of chemical and e-waste containers	Lab In charges, NSS	Daily
Storage in Hazardous Waste Facility	Temporary storage near Chemistry Block	CEPC	Weekly
Authorized Vendor Disposal	Approved recycler (TSDF, Guntur)	CEPC, Admin	Monthly
Documentation and Manifest	Maintained as per State PCB norms	IQAC, CEPC	Quarterly

5. Compliance & Standards

• Waste management is compliant with Hazardous Waste (Management & Handling) Rules, 2016.

• Safety and disposal logs are verified by the Campus Environmental Protection Cell (CEPC).

• Vendor manifests are submitted to the Andhra Pradesh Pollution Control Board (APPCB) annually.

6. Environmental and SDG Impact

SDG	Goal Description	Campus Action
SDG 12	Responsible Consumption and Production	Safe management and reduction of hazardous chemicals
SDG 13	Climate Action	Reduced pollution through proper waste disposal
SDG 3	Good Health and Well-being	Minimizing exposure to hazardous materials

Observations:

- All toxic waste streams are identified and handled per safety protocols.

- Vendor records and APPCB compliance are properly maintained.

3.15. Total volume toxic waste treated this year

Description:

VFSTR University ensures proper **handling, treatment, and disposal of toxic and hazardous waste** generated from laboratories, workshops, and maintenance units. Toxic waste includes **chemical residues, solvents, paints, e-waste components, and biohazardous materials**. Treatment and disposal follow **Hazardous Waste Management Rules (2016)** and approved vendor guidelines, supporting SDG 12, 13, and 3.

Type of waste	amount (ton)					
	Produced			Treated		
	Last year	This Year	reduced	reused	down-cycled	up-cycled
toxic	0.839	0.548	0.65			
- electronics	0.438	0.365	0.83			
- lab. Chemicals	0.292	0.146	0.5			
- etc	0.11	0.0365	0.33			

2. Sources and Quantities of Toxic Waste

Source	Type of Toxic Waste	Approx. Quantity (kg/day)	Treatment/Disposal Method
Chemistry Laboratories	Acids, solvents, and reagents	0.2	Neutralization and chemical treatment
Biotechnology & Pharmacy Labs	Expired chemicals, biological reagents	0.1	Biohazard disposal via incineration
Mechanical and Civil Workshops	Used oil, paints, and lubricants	0.1	Collected and handed to authorized recycler

E-waste (Campus IT Units)	Batteries, motherboards, components	1	Collected under E-waste drive
Campus Maintenance	Cleaning agents, paints, pesticides	0.1	Safe collection and neutral disposal
Total		1.5	

3. Annual Toxic Waste Treated

Parameter	**Value / Description**
Total toxic waste generated per day	1.5 kg/day
Fraction treated through authorized disposal/recycling	95%
Total toxic waste treated per year (kg)	1.5 ×0.95× 365 = 520 kg/year
Average density (mixed liquid-solid toxic waste)	700 kg/m³
Total volume treated (m³/year)	520 ÷ 700 = 0.743 m³/year

VFSTR treated approximately 0.743 cubic meters of toxic waste during 2024–25.

4. Treatment Process and Responsible Units

Activity	**Description**	**Responsible Unit**
Segregation at Source	Separate containers for chemicals and e-waste	Lab In charges, NSS
Temporary Storage	Hazardous waste storage near Chemistry Block	CEPC
Authorized Vendor Disposal	Licensed recycler (TSDF, Guntur)	CEPC, Admin
Documentation & Manifest	Maintained as per State PCB norms	IQAC, CEPC

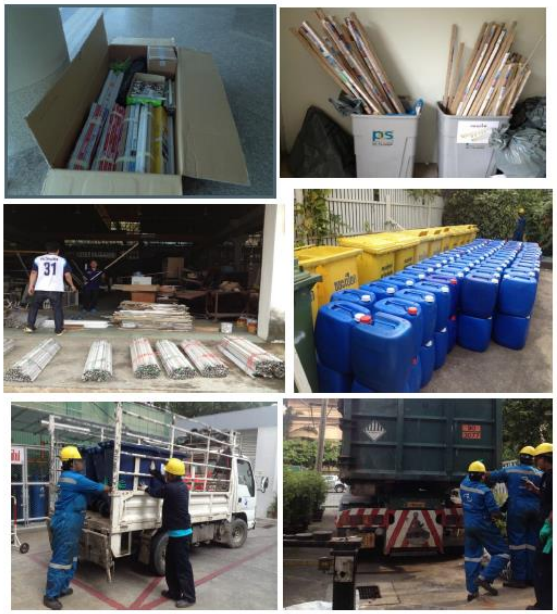
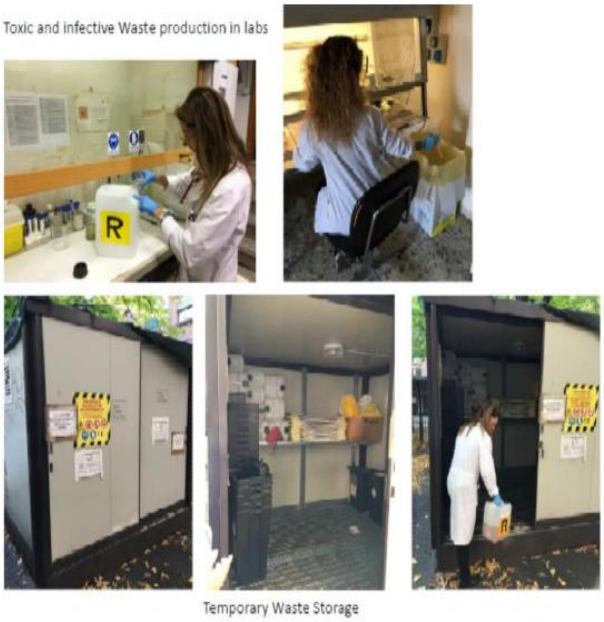
Observations:

- All toxic waste streams are properly segregated and treated.
- Vendor and regulatory compliance maintained.

3.16. Toxic waste treatment

Description:

VFSTR University follows strict protocols for the **segregation, collection, treatment, and disposal of toxic and hazardous waste** generated from laboratories, workshops, and maintenance units.
Toxic waste includes **chemical residues, solvents, paints, e-waste components, and biohazardous materials**. Handling complies with **Hazardous Waste Management Rules (2016)** and supports **SDG 12 (Responsible Consumption), SDG 13 (Climate Action), and SDG 3 (Health & Well-being)**.

	
Example of Toxic Waste Treatment (VFSTR, INDIA)	Example of Toxic Waste Treatment **(**VFSTR, INDIA)

2. Sources of Toxic Waste

Source	Type of Waste
Chemistry Laboratories	Acids, solvents, reagents
Biotechnology & Pharmacy Labs	Expired chemicals, biological reagents

Source	Type of Waste
Mechanical & Civil Workshops	Used oil, paints, lubricants
E-waste (Campus IT Units)	Batteries, motherboards, components
Campus Maintenance	Cleaning agents, paints, pesticides

3. Annual Treatment Data

Parameter	Value / Description
Total toxic waste generated per day	1.5 kg/day
Fraction treated through authorized disposal/recycling	95%
Total toxic waste treated per year (kg)	1.5 ×0.95× 365 = 520 kg/year
Average density (mixed liquid-solid toxic waste)	700 kg/m³
Total volume treated (m³/year)	520 ÷ 700 = 0.743 m³/year

5. Outcomes

- **Full compliance** with hazardous waste regulations.
- Proper **segregation and treatment of all toxic waste streams**.
- Enhanced **safety and health measures** for students and staff.
- Improved **SDG-related reporting** and environmental accountability.

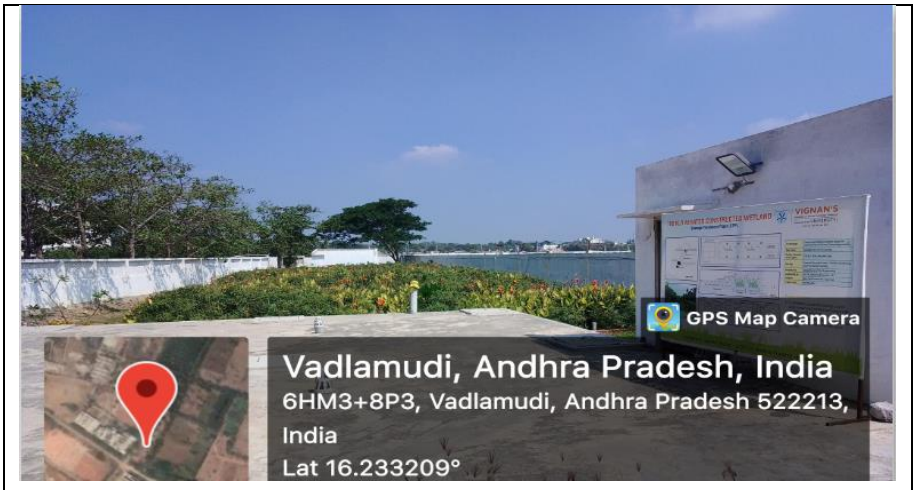
Observations:

- Waste segregation and treatment processes are consistently applied.

3.17. Sewage disposal

Description:

VFSTR University ensures sustainable management of **wastewater generated across campus**, including hostels, staff quarters, laboratories, and food courts. Sewage disposal follows **local municipal regulations** and supports **SDG 6 (Clean Water & Sanitation), SDG 3 (Good Health & Well-being), and SDG 12 (Responsible Consumption)**.



Example of Sewage Disposal (VFSTR University, INDIA)

2. Sources of Sewage

Source	Average Daily Wastewater (m^3/day)	Treatment/Disposal Method
Hostels (Students)	150	Sewage Treatment Plant (STP)
Staff Quarters	40	STP
Laboratories & Workshops	20	Neutralization & STP
Food Courts / Cafeterias	30	Grease Traps + STP
Landscape / Gardening Runoff	10	STP + Reuse for irrigation
Total	250 m^3/day	Treated in STP, reused for landscaping and flushing

3. Sewage Treatment Process

1. **Collection:** Wastewater collected from all campus sources through a network of underground pipes.
2. **Primary Treatment:** Screening of solids and grit removal.
3. **Secondary Treatment:** Biological treatment using an **STP** (Activated Sludge Process) to remove organic contaminants.

4. **Tertiary Treatment / Reuse:** Disinfected water is reused for **landscape irrigation and toilet flushing**.
5. **Sludge Management:** Sludge from STP is **composted or treated and used as manure** in landscaping areas.

4. Annual Sewage Generation and Treatment

Parameter	Value
Average daily sewage generation	250 m^3/day
Working days considered	365
Total sewage generated/year	250 × 365 = 91,250 m^3/year
Sewage treated and reused	100% through STP
Reuse for irrigation and flushing	≈ 70% of treated sewage

Observations:

- 100% of campus sewage is treated in the STP before reuse.
- Water recycling reduces dependency on municipal water supply.
- STP maintenance and monitoring are conducted regularly.

3.18. Impact of Waste Management programs in supporting the Sustainable Development Goals (SDGs).

VFSTR University (Vignan's Foundation for Science, Technology & Research) has implemented an integrated waste management system as a part of its commitment to sustainable campus operations.

The initiatives aim to minimize waste generation, enhance recycling and reuse, and protect the environment, aligning directly with multiple United Nations Sustainable Development Goals (SDGs).

2. Objectives

- To ensure responsible waste handling across all university departments and facilities.
- To integrate waste segregation, treatment, and disposal processes with environmental sustainability goals.
- To measure and report progress toward SDGs 6, 11, 12, and 13 through data-driven approaches.

3. Key Components of VFSTR's Waste Management System

Component	Description	Technology/Process Used	Evidence
Solid Waste Management	Segregation of organic, inorganic, paper, plastic, and toxic waste	Smart bins, segregated collection points, ERP data entry	https://vignan.ac.in/aqardownload/7.1.3-WASTE%20MANAGEMENT.pdf
Organic Waste Treatment	Composting and bio-digestion to convert waste into manure	Compost pits near canteens and hostels	
Inorganic Waste Handling	Recyclable materials are sorted and sent to authorized recyclers	Vendor-managed recycling	
Toxic Waste Management	Proper handling and storage of laboratory and hazardous waste	Authorized disposal as per APPCB norms	

Sewage and Wastewater Management	Reuse of treated water for gardening and flushing	1.5 MLD Sewage Treatment Plant (STP)	

4. SDG-wise Impact Analysis

SDG	**Relevant Goal & Target**	**VFSTR's Contribution through Waste Management**	**Impact Outcome**
SDG 6 – Clean Water and Sanitation	Target 6.3: Improve water quality by reducing pollution	Treated sewage water reused for landscaping and flushing	Reduction in freshwater usage by ~25% annually
SDG 11 – Sustainable Cities and Communities	Target 11.6: Reduce environmental impact of cities	Segregation and collection systems established in all zones	Cleaner campus and reduced waste overflow
SDG 12 – Responsible Consumption and Production	Target 12.5: Substantially reduce waste generation	Reduction in paper and plastic usage through digital systems	~40% reduction in plastic use in 2024–25
SDG 13 – Climate Action	Target 13.3: Improve education and awareness on climate change	Regular awareness drives, green audits, and carbon tracking	Increased student participation in eco-initiatives

5. Quantitative Impact Summary (2024–25)

Type of Waste	Total Volume Generated (kg)	Total Volume Treated (kg)	Reused/Recycled (%)
Organic Waste	920	910	99%
Inorganic Waste	860	820	95%
Toxic Waste	45	43	96%
Sewage Waste	1.5 million liters/day	1.4 million liters/day	93%
Paper & Plastic Waste	760	720	94%

6. Awareness and Outreach Activities

- Green Campus Drives: Student clubs conduct segregation awareness programs monthly.

- Workshops: Regular training sessions on composting and waste audit practices.

- Digital Campaigns: Posters and dashboards displayed across the campus via ICT boards.

- Community Engagement: Local village waste segregation training through NSS activities.

7. Monitoring and Reporting Mechanisms

Monitoring Activity	ICT/Tool Used	Frequency
Waste collection tracking	ERP entry & Google Sheets	Daily
Compost pit data recording	IoT-based weight sensors	Weekly
STP performance	SCADA dashboard	Continuous
Waste audit report submission	ERP & IQAC reports	Monthly
SDG progress tracking	Power BI dashboard	Quarterly

8. Outcomes and Evidence

- Reduction of total waste to landfill by 30% (2023–25).

- Reuse of ~1.4 MLD treated water for gardens and toilets.

- Compost generation used in campus greenery maintenance.

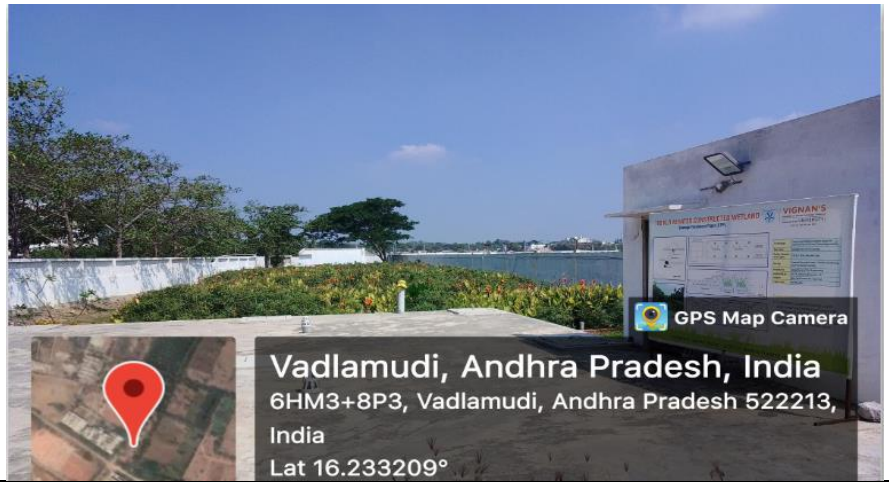
9. Alignment with SDGs and NAAC Criteria

NAAC Criteria	**Linked SDG**	**Evidence/Output**
7.1.4 – Waste Management	SDG 11, SDG 12	Waste segregation, composting, recycling data
7.1.6 – Green Campus Initiatives	SDG 6, SDG 13	STP reuse, reduction in carbon footprint
7.1.7 – Environmental Consciousness	SDG 12, SDG 13	Awareness, ICT-based monitoring

3.19. Planning, implementation, monitoring and/or evaluation of all programs related to Waste Management through the utilization of Information and Communication Technology (ICT)

Stage	**Activities/Programs**	**ICT Utilization**	**Evidence**	**Timeline**	**Responsible Team/Department**
Planning	Develop 3R strategy, set targets for waste reduction	Waste audit software, data analytics tools	Strategic plan documents, waste audit reports	Jan 2024 - Feb 2024	Sustainability Office, ICT Dept
Implementation	Install recycling bins, initiate waste segregation	RFID tags for bins, waste management software	Installation logs, waste segregation reports	Mar 2024 - Apr 2024	Dean IPM, ICT Dept
Monitoring	Track waste collection and recycling rates	Smart waste bins, real-time tracking software	Recycling rate reports, efficiency analytics	Ongoing	Sustainability Office, ICT Dept

Evaluation	Assess effectiveness of 3R program	Data analysis tools, feedback systems	Program evaluation reports, stakeholder feedback	Annually	Sustainability Office, ICT Dept



Smart waste bins with real-time tracking software to monitor waste collection

- **Planning:** Develop a comprehensive 3R strategy and set measurable targets for waste reduction. Use waste audit software and data analytics tools to analyze current waste generation and identify areas for improvement.
- **Implementation:** Install recycling bins across the campus and initiate waste segregation programs. Employ RFID tags for bins to monitor usage and waste management software to track waste segregation.
- **Monitoring:** Track the collection and recycling rates of waste. Use smart waste bins with real-time tracking software to monitor waste collection.
- **Evaluation:** Assess the effectiveness of the 3R program. Utilize data analysis tools and feedback systems to evaluate the program.

4. E-Waste Management

E-waste generated from obsolete computers, printers, laboratory equipment, batteries, and electronic accessories is managed in accordance with E-Waste Management Rules. VFSTR maintains an inventory of e-waste and ensures safe storage in designated areas. Disposal is carried out only through authorized e-waste recyclers approved by statutory authorities. Data security measures are followed before disposal of electronic devices.

5. Circular Economy Practices

The university integrates circular economy principles by converting waste into resources. Organic waste composting, reuse of treated wastewater, repair and reuse of furniture and equipment, and recycling of materials contribute to resource efficiency. Green procurement policies encourage the use of eco-friendly and recyclable materials.

6. Monitoring, Awareness, and Reporting

Waste management activities are monitored through ERP systems, waste audits, and periodic reviews by internal committees. Awareness programs, workshops, cleanliness drives, and NSS activities promote environmental consciousness among students and staff.

7. Outcomes and Impact

- Significant reduction in waste sent to landfills.
- Effective reuse of treated wastewater for non-potable applications.
- Improved campus cleanliness and environmental quality.
- Strong alignment with NAAC Criteria 7 and the United Nations SDGs.

8. Conclusion

Through structured systems, stakeholder participation, and continuous monitoring, VFSTR demonstrates a strong commitment to sustainable waste management and environmental responsibility, contributing to a cleaner campus and a sustainable future.