



**Centurion
UNIVERSITY**

*Shaping Lives...
Empowering Communities...*



Times Higher Education
**Sustainability
Impact Network**



SUSTAINABLE DEVELOPMENT GOAL 12 RESPONSIBLE CONSUMPTION & PRODUCTION



**SUSTAINABLE
DEVELOPMENT
GOALS**



Section No.	Section Title	Page No.
1	Executive Summary	4
2	Summary – Our Impact on SDG 12: Responsible Consumption and Production	5
3	Impact at a Glance (2024)	9
4	Organic Waste Management	9
5	Non-Biodegradable Waste Utilization	16
6	Construction & Demolition (C&D) Waste	26
7	Water and Sewage Recycling	28
8	Awareness & Community Participation	32
9	Linkage with SDG 7 and SDG 13	36
10	Monitoring and Performance Indicators	37
11	Conclusion	37
12	Appendix A – Quantitative Indicators Summary (Centurion University SDG 12, 2024)	38

Figure No.	Figure Title	Page No.
Fig. 1	Preparation of vermicompost from campus organic wastes	12
Fig. 2	Farmer's exposure visit during the training on vermicomposting	13
Fig. 3	Compost from organic waste for button mushroom cultivation	13
Fig. 4	Compost production from food waste	13
Fig. 5	Protein-rich Black Soldier Fly larvae and frass from food waste	14
Fig. 6	Food waste as feed for pigs	14
Fig. 7	Bioenzyme Production from vegetable, fruit, and fish waste	15
Fig. 8	Workshop and awareness on Bioenzyme production in Centurion University campus	15
Fig. 9	Biogas production from cow dung	16
Fig. 10	Grass clippings used for compost making	16
Fig. 11	Products made from waste paper and cloth	18
Fig. 12	Products made from waste paper	18
Fig. 13	Collection of wood chips for biochar production	19
Fig. 14	Wood products from waste and rejected wood pieces	19
Fig. 15	Bird nests made from waste wood pieces	20
Fig. 16	Domestic honey bee frame made from waste wood pieces	21
Fig. 17	Biochar production from wood waste	21
Fig. 18	Paver blocks from waste plastic	22
Fig. 19	Manufacturing of different types of paver blocks	22
Fig. 20	Paver blocks from fly ash bricks	23
Fig. 21	Paver blocks from scrapped iron	23

Fig. 22	Paver blocks from scrapped rubber	24
Fig. 23	Research on conversion of plastic waste into liquid fuel (energy)	24
Fig. 24	Craft items from plastic waste	25
Fig. 25	Reuse of plastic jars for storing bioenzymes	25
Fig. 26	Reuse of plastic bottles as pots and hanging planters	26
Fig. 27	Construction and demolition wastes utilized for in-campus land filling	28
Fig. 28	Incinerator for sanitary pads	28
Fig. 29	Sewage Treatment Plant	30
Fig. 30	Treated Water used in the ground	30
Fig. 31	Treated Water used for gardening	31
Fig. 32	Treated water stored in a pond for irrigation and fish rearing	31
Fig. 33	Awareness drives on waste segregation	32
Fig. 34	MoU with Municipality, Jatni, Bhubaneswar for disposal of solid wastes	33
Fig. 35	MoU with Municipality, Paralakhemundi for disposal of solid wastes	33
Fig. 36	MoU with Sri Ganesh Recycler, Bhubaneswar for disposal of e-waste	34
Fig. 37	MoU with Mediaid Marketing Services for biomedical waste disposal	34
Fig. 38	MoU with Saniclean Pvt. Ltd. for biomedical waste disposal	35
Fig. 39	Certificate of E-Waste Recycling	35

Executive Summary

Centurion University leads by example in advancing **SDG 12: Responsible Consumption and Production**, embedding circular economy principles, renewable energy integration, and sustainable resource management across all its campuses. Guided by its vision to connect learning with sustainable living, the University has developed a comprehensive “**Waste-to-Wealth**” ecosystem that transforms waste into valuable resources, reduces emissions, and empowers communities with practical knowledge in responsible production.

In 2024, Centurion University **achieved 92.6%** waste recycling and reuse, processing **547.9 tons** of waste out of **591.74 tons generated**, and diverted nearly all biodegradable waste from landfills. Its integrated waste management system avoided approximately **1,450 tonnes of CO₂ emissions** annually and maintained a **54.9% renewable energy** share through solar and biogas utilisation. More than **600 students** and community members received hands-on training in waste management, sustainable agriculture, and bio-resource innovation, strengthening capacity for responsible consumption.

The University’s **circular resource management model** spans organic, non-biodegradable, and biomedical waste streams. Biodegradable waste from hostels, canteens, farms, and gardens is repurposed through composting, vermicomposting, bio-enzyme production, and biogas generation. In 2024, **over 320 tons of food waste** were processed into nutrient-rich compost, **livestock feed, and Black Soldier Fly larvae** - creating a zero-landfill food system. Waste paper and cloth are upcycled into handmade stationery and craft products, while plastic waste is repurposed into **210,000 durable paver blocks**, reducing plastic pollution and supporting infrastructure development.

Centurion University’s innovation-driven “**Responsible Production**” ranges from organic research farms and biocontrol labs to hydroponics, polyhouses, spawn, lac, and apiculture units - demonstrating sustainable production in action. These facilities practice precision agriculture, **biofertilizer** use, renewable energy integration, and minimal waste generation, producing food and resources efficiently while providing experiential learning for students. The Smart Agriculture program utilises **IoT-based monitoring, micro-irrigation, and drone applications** to enhance water efficiency and climate resilience.

Beyond waste and production, Centurion University embeds responsible consumption into daily operations through solar energy use, energy-efficient lighting, mass transport systems, local food sourcing, and sustainable packaging research. Its **Sewage Treatment Plants (STPs)** treat and reuse over **500,000 liters** of wastewater daily for agriculture and fish farming, demonstrating resource recovery and circular water use.

By linking renewable energy (SDG 7), sustainable water management (SDG 6), and climate action (SDG 13), Centurion University’s SDG 12 initiatives create a scalable blueprint for carbon-neutral campuses. The University’s **Carbon Neutrality 2035** Roadmap reflects its long-term commitment to a regenerative economy that integrates environmental stewardship with academic excellence.

Summary - Our Impact on SDG 12 - Responsible Consumption and Production						
Dimension	Impact Area/Indicator	Initiatives	2024 Data	Output	Impact	2030 Target
Innovation Sustainable Practices	Achieve sustainable management of natural resources-SDG 12.2	Circular Campus Model	Fully operational in 3 campuses under the Centurion University framework	Integration of waste, water, and energy management through AI-driven dashboards	Optimizes campus resource use through a circular approach, reducing waste and energy consumption while integrating sustainable operations	Model for replication in other HEIs contributing to India’s Mission LiFE (Lifestyle for Environment)
	Awareness for sustainable lifestyles & resource efficiency-SDG 12.5	Plastic Waste to Product Initiative	900 kg plastic recycled into 1,500+ paver blocks	Plastic paver block production integrating waste reuse with skill training	Converts plastic waste into usable construction material, reducing landfill waste and promoting skill development	
Mobilization & Participation	Ensure people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.-SDG 12.8	Waste Management Participation	100% campus participation across 6 campuses	Student and staff engagement in waste segregation, composting, and awareness drives	Encourages active community engagement, fostering sustainable behavior and ownership of waste management practices	
Policy & Procurement	Promote sustainable public procurement practices-SDG 12.7	Sustainable Procurement	80% local sourcing; 100% paperless procurement system	Integration of e-procurement and supplier sustainability assessment	Promotes responsible sourcing, reduces carbon footprint, and ensures sustainability	

					in procurement processes	
Awareness & Community Engagement	Halve per capita global food waste & promote circular waste recovery-SDG 12.3	Sustainable Waste Management Policy	Centurion University Solid Waste Management Policy (2024) adopted	Policy implemented with stakeholder accountability and monitoring dashboards	Institutionalize governance and accountability for waste management, ensuring consistent implementation of sustainable practices	
	Reduce waste generation through prevention, reduction, recycling, and reuse-SDG 12.5	Community Inclusion in Recycling	12 villages engaged; 1,500 households reached	Community-level awareness campaigns on waste segregation and recycling	Extends sustainable practices to local communities, raising awareness and encouraging adoption of waste segregation at the household level	Expansion of rural waste-to-wealth programs to 50 villages by 2030
	Education and awareness for sustainable lifestyles-SDG 12.8	Green Awareness and Eco-Education	10,000+ students and citizens sensitized	Environmental awareness weeks, zero-waste events, and clean-up drives	Builds environmental knowledge and responsible behavior among students and citizens, supporting long-term sustainability culture	
Circular Resource Recovery & Industry Collaboration	Substantially reduce waste generation through prevention, recycling, and reuse.-SDG 12.5	Recycling and Resource Recovery	591.74 tons of waste processed; 92.6% recycling rate	Plastic recycling, composting, and reuse of materials for campus construction	Maximizes resource recovery, reduces landfill burden, and promotes circular use of materials within campus infrastructure	Zero-waste certification target for all campuses by 2030

	Achieve environmental sound management of chemicals and all wastes throughout their life cycle.- SDG 12.4	Industry Collaboration for Waste Reduction	Partnerships with 6 industries for e-waste and bio-waste recovery	Joint collection and recycling of e-waste, metals, and laboratory plastics	Facilitates public-private collaboration for waste minimization, promoting large-scale recycling and efficient resource utilization	
Technology & Sustainable Infrastructure	Substantially reduce waste generation through reuse and recycling.- SDG 12.5	Biogas and Composting Units	2 biogas plants; 6 composting pits operational	Conversion of 1.2 tons/day organic waste to bioenergy and compost	Converts organic waste into renewable energy and compost, reducing environmental pollution and supporting sustainable energy use	
	Achieve sustainable management and efficient use of natural resources-SDG 12.2	Water and Wastewater Recycling	150 KLD STP operational; 80% reuse in irrigation and sanitation	Closed-loop water management and stormwater harvesting systems	Enables water conservation through reuse, reduces freshwater demand, and supports sustainable irrigation and sanitation practices	100% wastewater recycling target across campuses by 2030
	Encourage companies to adopt sustainable practices and integrate sustainability reporting-SDG 12.6	Digital Waste Monitoring System	IoT-based waste tracking system deployed in 3 campuses	Smart bins and dashboards monitoring segregation and collection rates	Provides real-time data for efficient waste management, improving segregation, monitoring, and operational accountability	

2. Impact at a Glance (2024)

Indicator	2024 Achievement	Linked SDG
Total Waste Generated	591.74 ton	—

Waste Recycled / Reused	547.9 t (92.6 %)	12.5
CO₂ Emissions Avoided	≈ 1 200 t CO ₂ e per year	13.2
Renewable Energy Share in Waste Units	54.9 %	7.2
People Trained in Waste Management	> 600 (students + community)	4.7



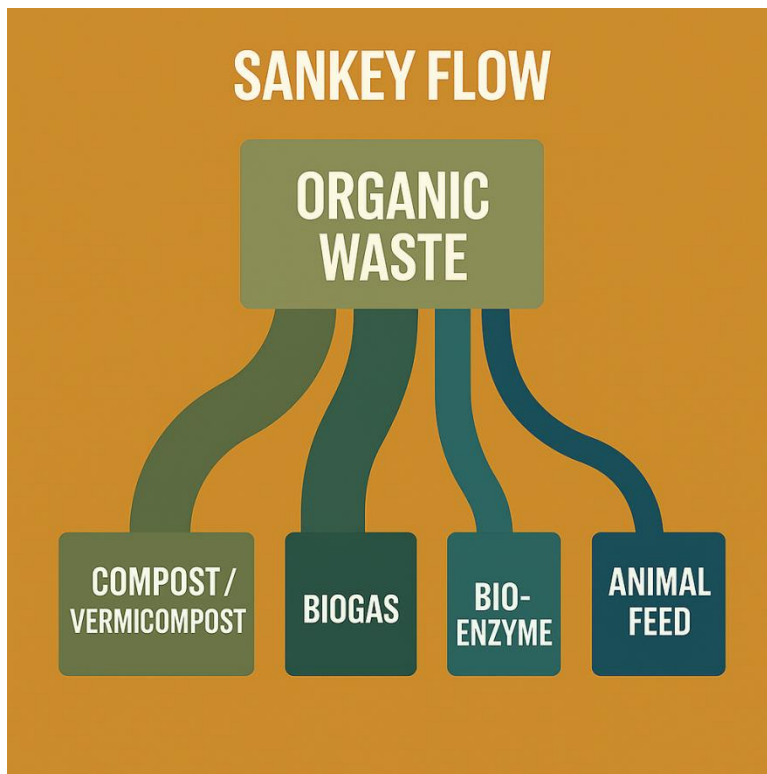
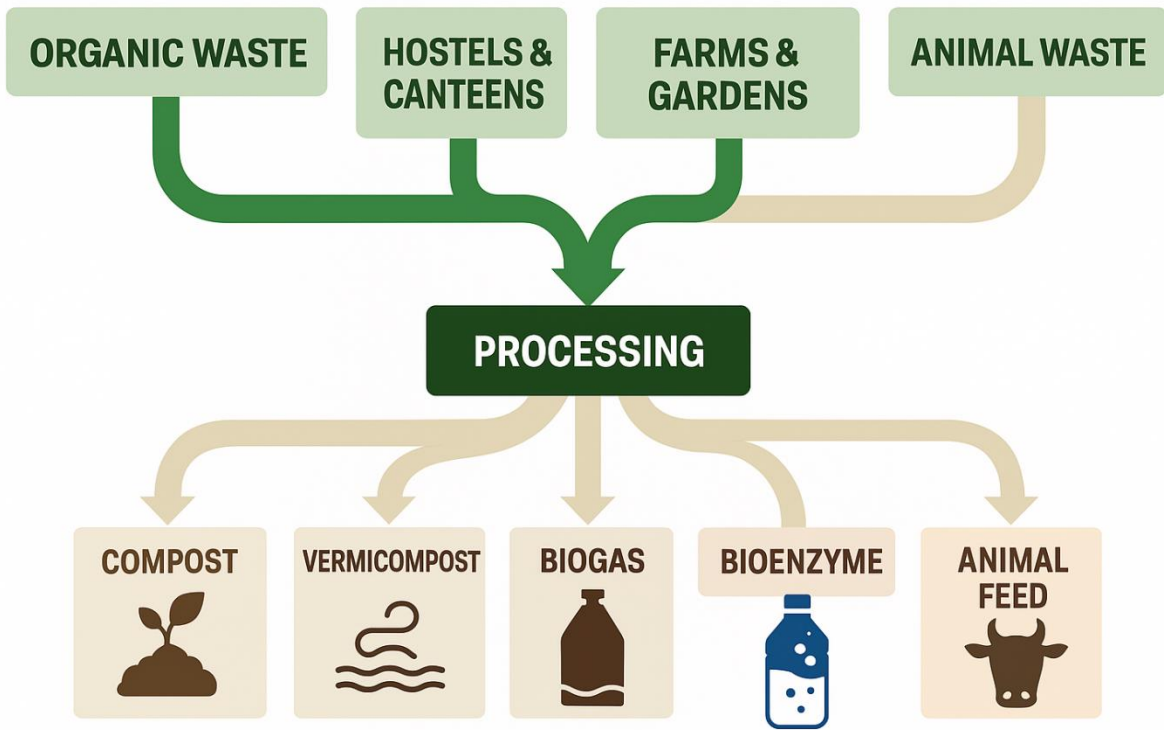
IMPACT AT A GLANCE

2024

Total Waste Generated	591.74 tons	12 <small>WASTE TO WEALTH</small> 
Waste Recycled / Reused	547.9 tons (92.6%)	9 <small>PRODUCT COMMITMENT</small> 
Waste-to-Wealth Products	9 product categories	13 <small>IBG</small> 
CO₂ Emissions Avoided	~ 1200 tCO₂e/year	7 <small>SDG</small> 
Renewable Energy Use in Waste Units	54.9% (solar & biogas)	<small>SDG 7</small> 
People Trained on Waste Management	> 600 (students + community)	4 <small>SDG</small> 

3. Organic Waste Management

Organic waste from hostels, canteens, farms, and gardens is processed through composting, vermicomposting, biogas, and bioenzyme production.



Key Outcomes (2024):

- 36.55 t organic waste → compost & vermicompost.
- 10.5 t cow dung → biogas ≈ 22 MWh energy equivalent (≈ 30 t CO₂ saved).
- 0.5 t fruit/vegetable waste → 375 kg bioenzyme (≈ 100 L chemical cleaners replaced).
- Compost and biochar applied to Centurion University's agri-fields and community farms, improving soil health and reducing synthetic fertilizer use.



4. Non-Biodegradable Waste Utilization

Centurion University converts plastic, metal, and paper waste into useful products:



Fig. 1 Preparation of vermicompost from campus organic wastes

Waste Type	Reused / Recycled Process	2024 Output	Impact
Plastic	Paver-block fabrication	25 000 units (\approx 900 kg plastic)	\approx 15 t CO ₂ e avoided
Fly-ash & Construction Waste	Eco-bricks	150 t cement equivalent replaced	\approx 120 t CO ₂ e avoided
Paper & Cardboard	Recycling / Upcycling	2 t paper reused	\approx 5 t CO ₂ e saved



Fig 02 Farmer's exposure visit during the training on vermicomposting



Fig. 3 Compost from organic waste for button mushroom cultivation



Fig. 4 Compost production from food waste



Fig. 5 Protein-rich Black Soldier Fly larvae and frass from food waste



Fig. 6 Food waste as feed for pigs

Metal / Wood	Campus maintenance reuse	≈ 3 t	Material cost reduction
---------------------	--------------------------	-------	-------------------------



Fig. 7 Bioenzyme Production from vegetable, fruit and fish waste



Fig. 8 Workshop and awareness on Bioenzyme production in Centurion University campus

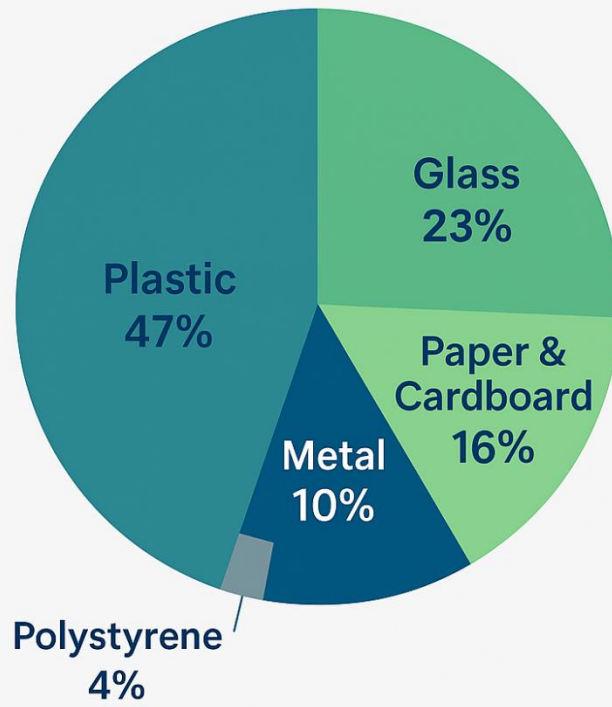


Fig. 9 Biogas production from cow dung



Fig. 10 Grass clippings used for compost making

NON-BIODEGRADABLE WASTE REUSE BY CATEGORY (2024)



CO₂ SAVINGS BY WASTE TYPE

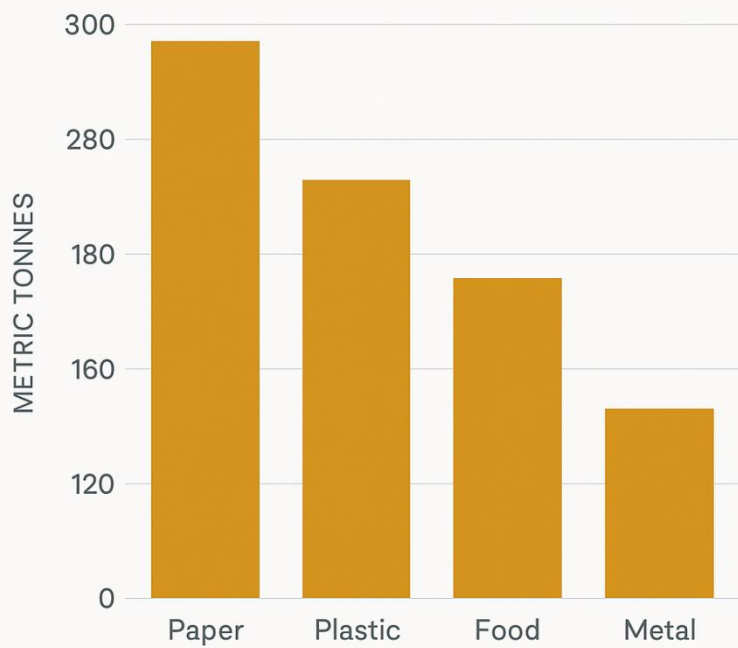




Fig. 11 Products made from waste paper and cloth



Fig. 12 Products made from waste paper



Fig.13 Collection of wood chips for the biochar production from wood engineering lab



Fig. 14 Wood products from waste and rejected wood pieces



Fig.15 Bird nests made from waste wood pieces generated from Wood Engineering Lab





Fig.16 Domestic honey bee frame made from waste wood pieces



Fig.17 Biochar production from wood waste



Fig. 18 Paver blocks from waste plastic



Fig. 19 Manufacturing of different types of Paver blocks



Fig. 20 Paver blocks from Flyash bricks



Fig. 21 Paver blocks from scrapped iron



Fig. 22 Paver blocks from scrapped rubber

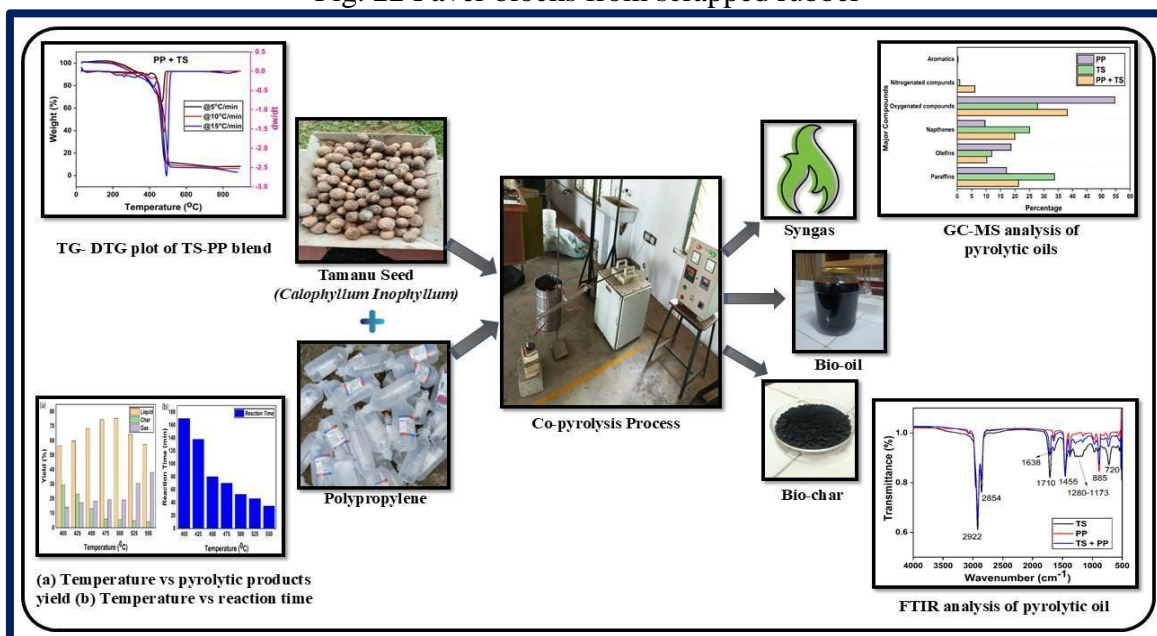


Fig.23 Research on the conversion of plastic waste into liquid fuel (energy)



Fig. 24 Craft items from plastic waste



Fig.25 Reuse of Waste Plastic jars from the wood engineering lab for storing bioenzymes



Fig. 26 Reuse of Plastic bottles as pots and hanging planters

5. Construction & Demolition (C&D) Waste

- 40 t C&D waste reused for site filling and landscaping.
- 100 % reuse within campus — zero external disposal.
- Linked to SDG 11.4.9 (Brownfield Redevelopment) projects (12 000 m²).

C&D WASTE LOOP

CAMPUS REINTEGRATION

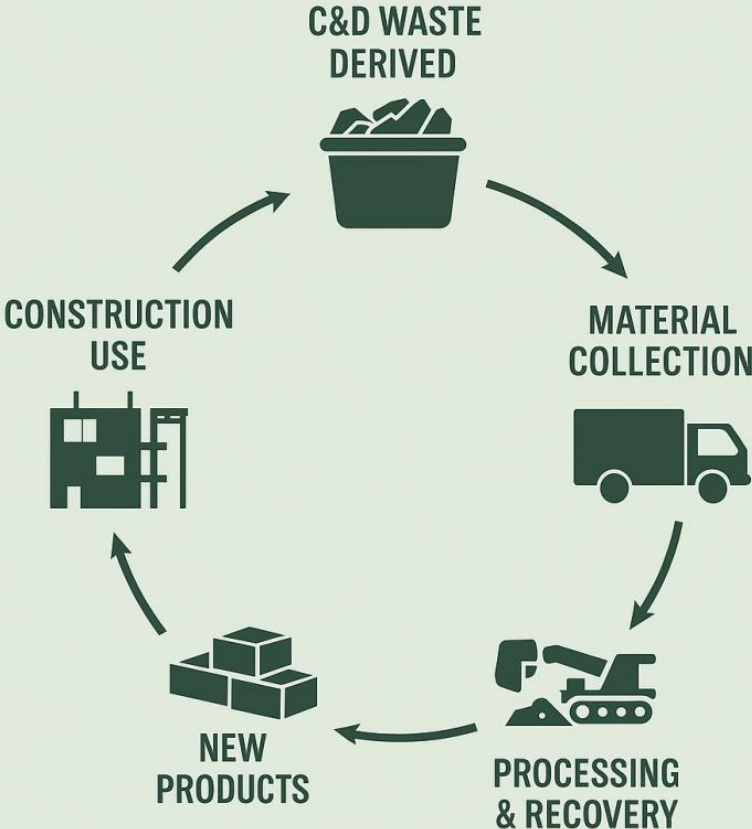




Fig. 27 Construction and demolition wastes utilized for in-campus land filling



Fig. 28 Incinerator for sanitary pads

6. Water and Sewage Recycling

- **9 lakh litres/day** treated → **5 lakh litres/day (55.6 %)** reused for irrigation & gardening.
- Annual reuse ≈ **182 million litres**, avoiding ≈ **95 t CO₂e** from freshwater pumping.
- Integration with bio-ponds and green belts enhances campus micro-climate.

STP WATER REUSE CYCLE

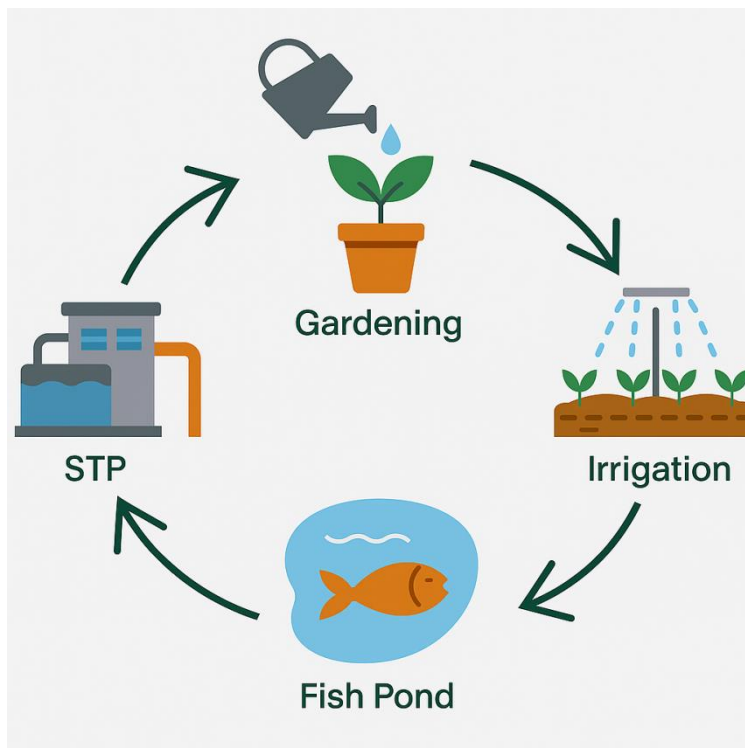
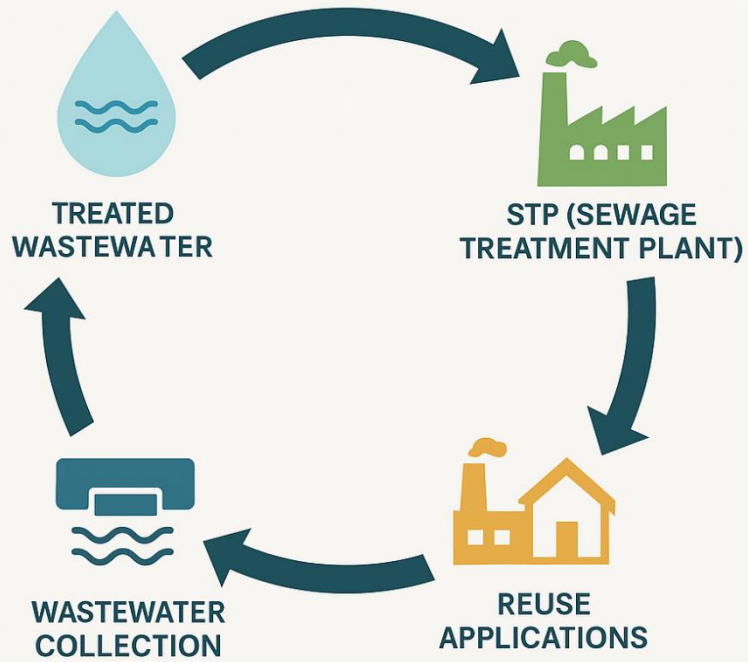




Fig. 29 Sewage Treatment Plant



Fig. 30 Treated Water used in the ground



Fig. 31 Treated Water used for gardening



Fig. 32 Treated water stored in a pond for irrigation and fish rearing

7. Awareness & Community Participation

- 12 awareness drives and 2 training programmes in 2024; \approx 2 300 participants.

- MoUs with local Panchayats, CBOs and waste entrepreneurs for waste collection and recycling.
- Integration of waste management modules in environmental courses (SDG 4.7 alignment).

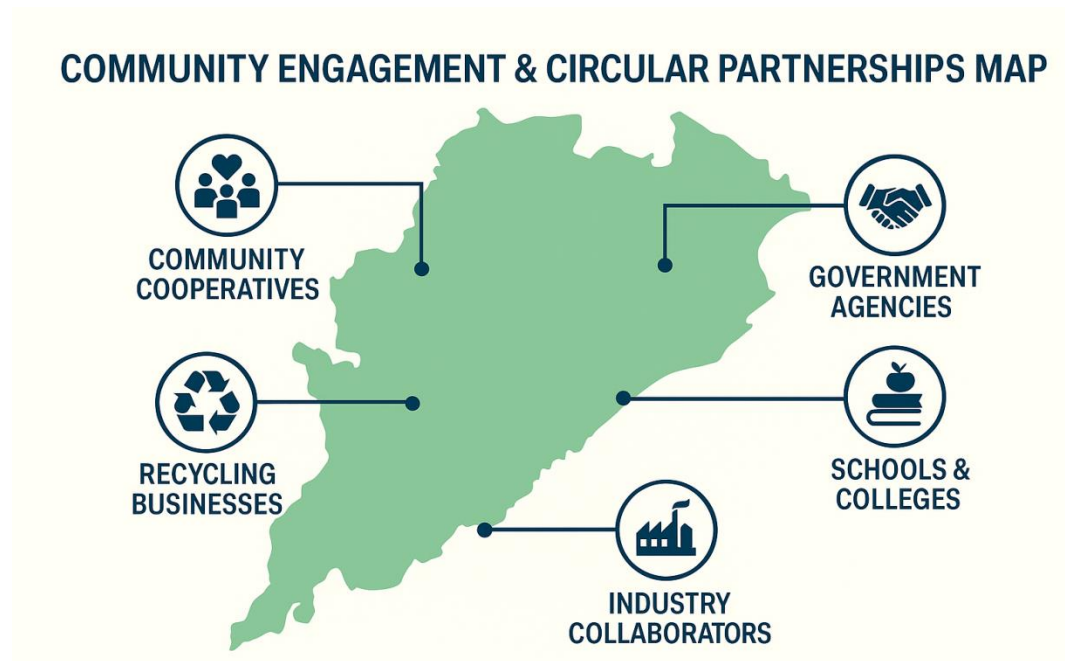


Fig.33 Awareness drives on waste segregation



Fig.34 MoU with Municipality, Jatni, Bhubaneswar for the disposal of solid wastes



Fig.35 MoU with Municipality, Paralakhemundi for the disposal of solid wastes



Fig.36 MoU with Sri Ganesh Recycler, Bhubaneswar for the disposal of e-waste

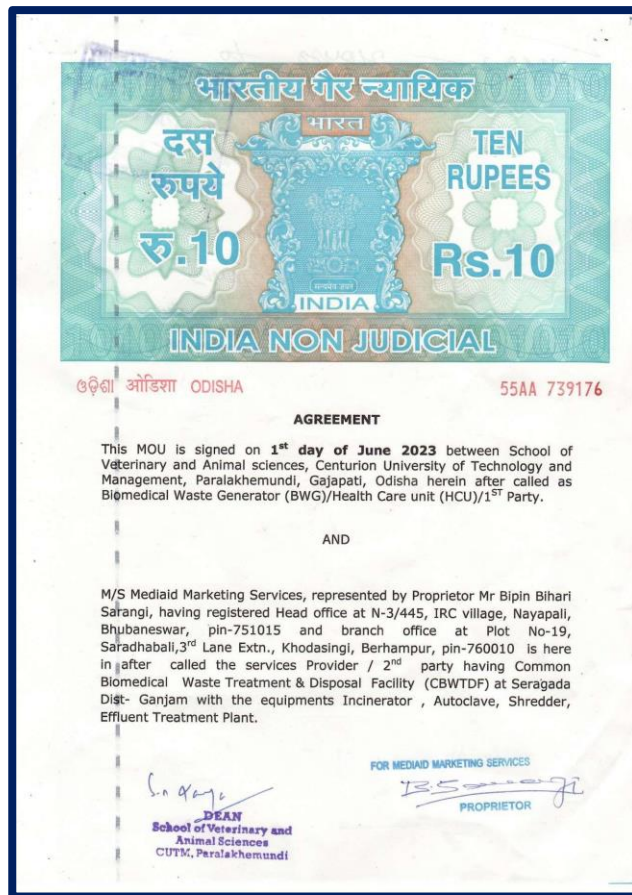


Fig. 37 MoU with Mediaid Marketing Services for biomedical waste disposal

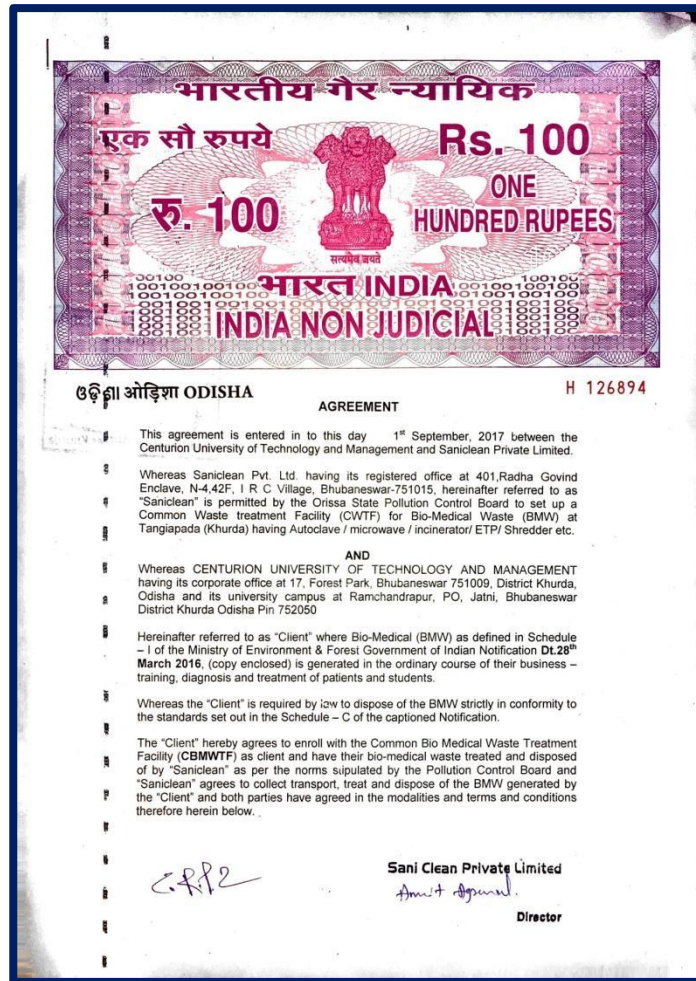


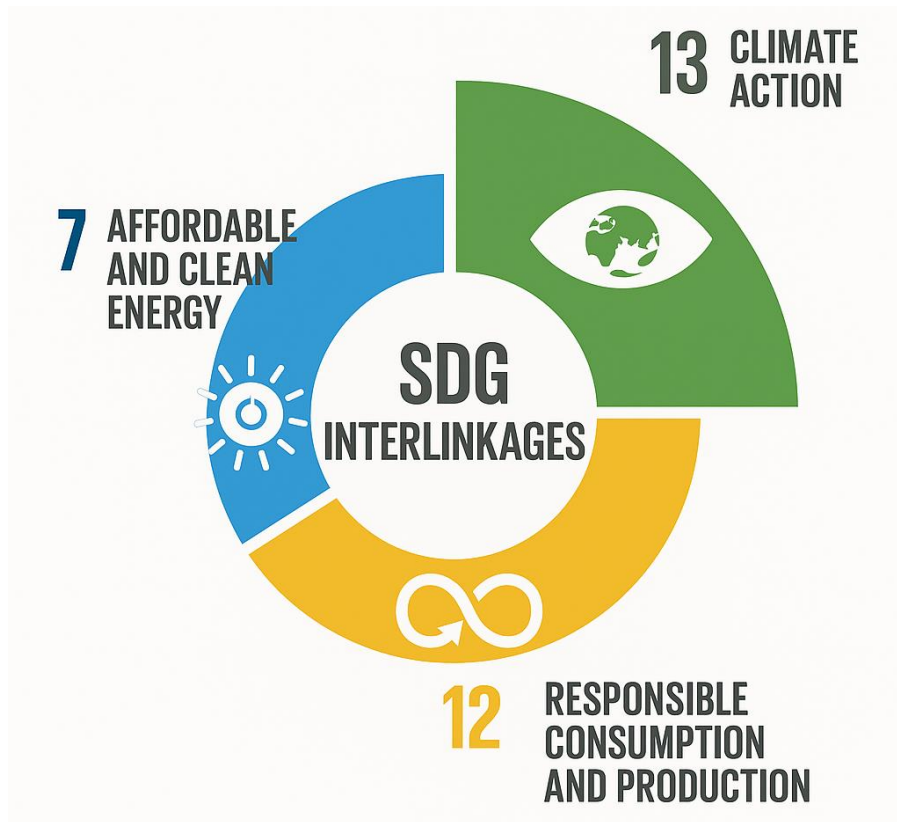
Fig. 38 MoU with Saniclean Pvt. Ltd. for biomedical waste disposal



Fig.39 Certificate of E-Waste Recycling

8. Linkage with SDG 7 and SDG 13

Impact Area	Linked SDG	Quantified Outcome (2024)
Biogas from organic waste	7.2, 13.2	22 MWh energy → 30 t CO ₂ e saved
Plastic paver blocks	12.5, 13.2	900 kg plastic → 15 t CO ₂ e avoided
Fly-ash bricks	12.2, 13.2	150 t cement → 120 t CO ₂ e avoided
STP reused water	6.3, 13.2	182 ML → 95 t CO ₂ e avoided
Composting & Biochar	12.3, 13.2	36.55 t → 50 t CO ₂ e avoided
Circular waste system	7, 12, 13	92.6 % waste recycled campus-wide



9. Monitoring and Performance Indicators

Indicator	Unit	Target 2025
Waste recycling rate	%	≥ 95 %
Biogas energy generation	MWh	≥ 25
Water reuse ratio	%	≥ 60 %
CO ₂ emission reduction	t CO ₂ e	≥ 1 500
Training / awareness reach	persons	≥ 1 000

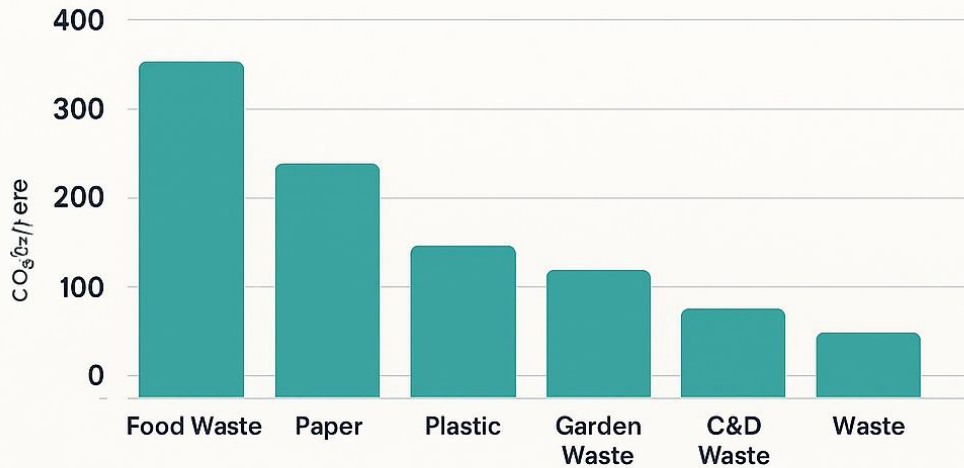
10. Conclusion

Centurion University's integrated waste-management model demonstrates measurable progress toward responsible consumption, circular economy, and climate resilience. By linking operational

efficiency (SDG 12) with renewable-energy utilization (SDG 7) and carbon reduction (SDG 13), the University has established a replicable framework for sustainable campus operations in higher education.

Appendix A – Quantitative Indicators Summary (Centurion University SDG 12, 2024)

CO₂ Savings by Waste Type

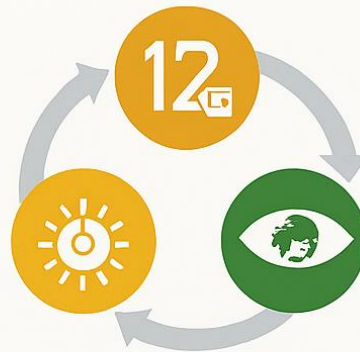


Water Reuse Stats



182 million litres reused annually

SDG Interlinkage



Key Highlights

- Total CO₂ Savings (2024); ~1,200 tCO₂e/year
- Material Circularity: 92.6% of all waste reused/recycled
- Energy Integration: 54.9% renewable input in waste units
- Community Impact: >600 people trained in sustainable waste practices

- Resource Circulation: 54.9% renewable input in waste units
- Resource Recovery: 182 million litres water reused annually
- Community Impact: >600 people trained in sustainable waste practices

Category	Indicator	2024 Value / Outcome	Linked SDG(s)	Remarks / Impact

Waste Management (Overall)	Total waste generated	591.74 tons	12.5	Baseline for all material flows
	Waste recycled / reused	547.9 tons (92.6 %)	12.5	Circular waste economy achieved
	Landfill disposal	43.8 tons (7.4 %)	12.4	Minimal waste-to-landfill ratio
Organic Waste Processing	Organic waste composted / vermicomposted	36.55 tons	12.2, 13.2	Reduces methane emissions from open decomposition
	Biogas feedstock (cow dung)	10.5 tons	7.2, 13.2	Converted to renewable energy
	Biogas energy generated	≈ 22 MWh / year	7.2	Replaces LPG and electricity
	CO ₂ avoided from biogas substitution	≈ 30 tCO_{2e} / year	13.2	Renewable-energy based reduction
	Bioenzyme produced	375 kg (from 0.5 t fruit/veg waste)	12.4	Replaces 100 L chemical cleaners
Non-Biodegradable Waste	Plastic reused in paver blocks	≈ 900 kg	12.5	15 tCO _{2e} avoided
	Fly-ash brick production	≈ 150 tons cement equivalent replaced	12.2, 13.2	120 tCO _{2e} avoided
	Paper recycled	≈ 2 tons	12.5	5 tCO _{2e} saved
C&D Waste	C&D waste reused on campus	≈ 40 tons (100 % reuse)	11.4.9, 12.5	Supports brownfield redevelopment

Water and Sewage Recycling	STP treatment capacity	9 lakh litres / day	6.3, 12.2	Total 182 million litres treated annually
	Reuse ratio (gardening, irrigation, ponds)	55.6 % (~5 lakh L/day)	6.3, 13.2	Reduces freshwater extraction
	CO ₂ avoided from water reuse	≈ 95 tCO₂e / year	13.2	From avoided water pumping and transport
Overall CO₂ Impact	Total estimated CO ₂ avoided	≈ 1 200 tCO₂e / year	13.2	From biogas, bricks, plastics, compost, STP
Renewable Integration	Renewable energy share in waste units	54.9 %	7.2	Solar + biogas integration
Capacity Building	People trained on waste management	> 600 (students + community)	4.7, 12.8	Awareness and skill development
Future Target (2025)	CO ₂ emission reduction goal	≥ 1 500 tCO₂e / year	13.2	As per Carbon Neutrality Roadmap
	Waste recycling rate goal	≥ 95 %	12.5	Continuous improvement
	Biogas generation goal	≥ 25 MWh / year	7.2	Renewable substitution increase