Centurion University
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SDG 14: LIFE BELOW WATER

Minimising Alteration of Aquatic Ecosystems

945 m³/day (9.45 lakh litres/day) Wastewater treated and reused every day; no effluent released	**30–50%** Lower ammonia in biofloc tanks than control (2025 trial)	**17–18 Jun 2025** External environmental audit	**45** Students at the World Fisheries Day seminar (21 Nov 2025)

1. Overview

CUTM's plan to minimise alteration of the aquatic ecosystems focuses on three elements: the water-management objectives of the University's Sustainability Policy; a set of operating measures that keep wastewater and aquaculture effluent out of natural water bodies, managed largely through the School of Fisheries' aquaculture facilities; and annual external environmental audits that monitor the results and set follow-up actions. The plan continued in force through 2025. The campus ponds, biofloc, RAS, aquaponics and hatchery units remained in operation, all campus wastewater continued to be treated and reused with no effluent released, and the most recent external audit was carried out on 17–18 June 2025.

2. Policy

The implementation is anchored in the CUTM Sustainability Policy (Version 2, 2024, issued by the Registrar), whose objectives include:

- **Water management:** the University should recycle at least 90% of its wastewater; rainwater harvesting should be integrated with campus architecture; the green landscape must include water bodies for biodiversity; and water management should be integrated into higher education through research, practice and skill training.
- **Recycling and waste management:** diverting 90% of waste from landfill.
- **Plastic waste reduction:** a campus-wide ban on single-use plastics, which keeps plastic out of campus water bodies.

3. Plan Measures by Type of Alteration

Table 1. How the plan minimises physical, chemical and biological alteration

Type of alteration	Measures in place in 2025
Chemical (pollutants, nutrients, effluent)	All campus wastewater, about 9,45,000 litres a day, is treated in four sewage treatment plants and reused for gardening, playgrounds, landscaping and farms, so the campus releases no effluent. Aquaculture uses closed-loop Recirculating Aquaculture Systems (RAS) and zero-water-exchange biofloc tanks that retain nutrient-rich water instead of discharging it, and aquaponics units that recycle fish-culture water to grow vegetables without chemical fertiliser. Single-use plastics are banned on campus.
Physical (habitat, sediment, water flow)	Campus ponds and water bodies are retained as part of the green landscape; rainwater harvesting is built into campus architecture; and water use and overflow are reviewed through the annual audit, which in 2025 flagged sediment accumulation in the campus lake as a risk to its water quality and recommended enhanced rainwater harvesting, automated overflow prevention and water-conservation drives.
Biological (species, disease, nutrient balance)	Fish are cultured in contained systems (ponds, tanks, RAS and biofloc units) rather than released into natural waters; water quality in culture systems is monitored to keep ammonia low and oxygen high; and the School's farmer training covers disease prevention and water-quality monitoring so that the same practices are adopted on surrounding farms.

Source: Environmental Audit Report 2024–25, CUTM (audit of 17–18 June 2025); CUTM Sustainability Policy; School of Fisheries

4. Aquaculture Facilities in Operation in 2025

The School of Fisheries operates an Aquaculture Research Farm with culture ponds, biofloc units, ornamental fish systems, aquaponics, Recirculatory Aquaculture Systems (RAS), hatchery systems, a feed mill and a fish processing and value-addition unit. The June 2025 environmental audit mapped these facilities on the campus land-use plan. In 2025 they comprised 41 culture units across 25 monitored sites (5 biofloc tanks, 3 RAS tanks, 3 aquaponics systems, 10 cemented tanks and 20 ponds); species cultured included the Indian major carps (rohu, catla and mrigal), singhi, Amur carp, pacu (under containment only) and ornamental fish; and the units were used to train 148 farmers and fishers in water-saving, low-discharge practices.

Table 2. Aquatic and water-treatment facilities recorded in the June 2025 audit

Facility	Area (acres)
Ponds 1–6	3.00
Other campus ponds (three)	2.20
Recirculatory Aquaculture System (RAS)	0.85
Sewage treatment plants (four)	0.30

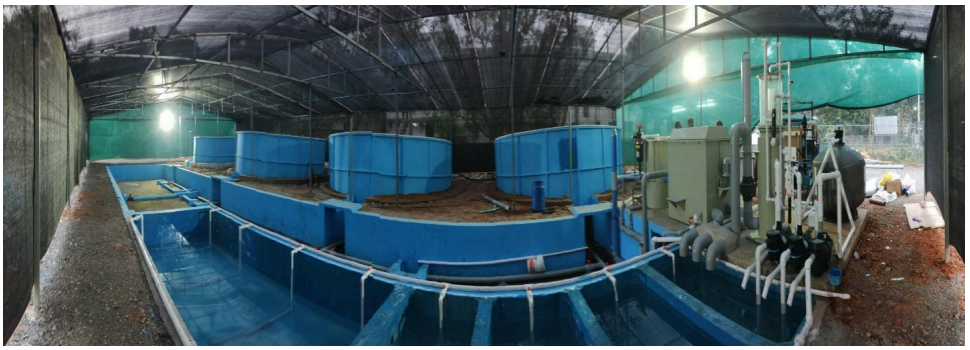


Figure 1. Recirculating Aquaculture System at the School of Fisheries, CUTM

Source: CUTM Annual Report 2025–26, Section 2.7; Environmental Audit Report 2024–25, CUTM, land-use table

5. Water-Quality Results

The School of Fisheries monitored water quality in a controlled biofloc trial for Amur carp, comparing a conventional control with two biofloc treatments over eleven parameters. The key results show how zero-exchange biofloc culture keeps water quality stable without discharging effluent:

Table 3. Selected water-quality results, 2025 biofloc trial

Parameter	Control	Biofloc (T1, jaggery)	Biofloc (T2, millet)	Change vs control
Dissolved oxygen (mg L^{-1})	5.30	7.23	7.50	+36% to +42%
Total ammonia nitrogen (mg L^{-1})	0.50	0.25	0.35	−30% to −50%
Feed conversion ratio	2.05	1.23	1.47	28–40% better (less waste feed)

Source: School of Fisheries, CUTM, 2025 biofloc trial

6. Monitoring and Review: June 2025 Environmental Audit

Auditor: Centre for Envotech and Management Consultancy Pvt. Ltd., Bhubaneswar (ISO 14001-certified; NABET-accredited; Category "A" consultant with the Odisha State Pollution Control Board)

Dates: 17–18 June 2025

Key findings on aquatic ecosystems: about 9,45,000 litres of wastewater treated daily in the University's STPs and reused, with no effluent produced; treated water released to campus ponds in an environmentally compliant manner; sediment accumulation in the campus lake identified as a threat to its water quality and ecological balance; aquatic life supported through ornamental fish ponds and an aquarium, with the School of Fisheries promoting recirculatory aquaculture.

Follow-up actions recommended: enhanced rainwater harvesting, campus-wide water-conservation drives, automated overflow prevention in water tanks, and sensor-operated taps.

Source: Environmental Audit Report 2024–25, CUTM

7. Institutional Collaboration

The plan is supported by formal collaborations with national research institutes that were in force during 2025:

Table 4. Research collaborations (MoUs) in force during 2025

Partner	Purpose	Period
ICAR-Central Institute for Women in Agriculture (ICAR-CIWA)	Student training and collaborative research	May 2021 – May 2026
ICAR-Central Institute of Freshwater Aquaculture (ICAR-CIFA), Bhubaneswar	Student training and internships, postgraduate research, and exposure to and involvement of scientists	July 2022 – July 2025
ICAR-Indian Institute of Soil and Water Conservation (ICAR-IISWC), Dehradun	Student exchange, joint research, and sharing of academic and research resources	Signed 29 June 2025

Soil and water conservation work under the ICAR-IISWC agreement reduces erosion and sediment inflow to water bodies, supporting the physical-alteration component of the plan, while the ICAR-CIFA and ICAR-CIWA collaborations support research and training in sustainable freshwater aquaculture.

Source: CUTM list of MoUs 2025–26; CUTM list of active MoUs (as on 23 June 2026)

8. Education Supporting the Plan: World Fisheries Day Seminar

On 21 November 2025 the School of Fisheries observed World Fisheries Day at the Fisheries Resource Management Laboratory, Paralakhemundi, with a seminar on “Blue Growth and Sustainable Fisheries: Challenges and Opportunities”, attended by 45 students. The programme was led by Dr. Sambid Swain (Associate Dean, Programme In-charge), with Dr. Suman Nama (Assistant Professor) as coordinator and speaker. It covered the physical, chemical and biological pressures on aquatic ecosystems and was followed by a structured SWOT analysis of world and Indian fisheries focused on sustainability, governance and technology.



Figure 2. Seminar on “Blue Growth and Sustainable Fisheries”, World Fisheries Day (21 November 2025)



Figure 3. Students at the World Fisheries Day seminar, Fisheries Resource Management Laboratory (21 November 2025)