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SDG 14: LIFE BELOW WATER

Sustainable Fisheries - Community Outreach

Overview

Centurion University, the School of Fisheries provides educational outreach on sustainable management of fisheries and aquaculture through hands-on training and demonstration facilities. The evidence documented in this report includes three community activities: a training programme on pond management and carp breeding at Totagomuda for 25 local fishermen; a four-day capacity enhancement workshop on fisheries governance and blue economy practices for 25 farmers and 20 students; and an exposure visit by 28 farmers of the Centre for Community Development (CCD), Gajapati, which included the university's Recirculating Aquaculture System (RAS) unit. The School also hosted a 15-day internship on advanced fisheries practices for zoology students from Gargaon College, Assam.

Eco-tourism Demonstration Models

The School of Fisheries' aquaponics, biofloc and RAS units and the Aquaculture Research Farm serve as eco-tourism and educational demonstration models for visiting farmers, fishermen and students. In 2025, through the 3rd Utkal Krishi, these facilities received 200 participants, including farmers, students, researchers, agricultural experts, entrepreneurs and government representatives, providing a platform for agricultural knowledge exchange, technology demonstrations and awareness of farming and allied livelihood practices, including aquaculture.

25 fishermen for hands-on training at the Aquaculture Research Farm, Totagomuda. 28 farmers from the Centre for Community Development (CCD), Gajapati, who were shown the RAS unit during an exposure visit on 2 December 2025 and four students from Gargaon College, Assam, who were trained on the RAS and biofloc units during a 15-day internship.

National Sustainable Fisheries Education and Capacity Building — Gargaon College, Assam

The School of Fisheries hosted four students from the Department of Zoology, Gargaon College, Simaluguri, Assam, for a 15-day Internship Programme on Advanced Fisheries Practices, held from 30 June to 14 July 2025 at the Paralakhemundi Campus. The internship combined theory and hands-on practical sessions covering nursery management, water-quality assessment, Recirculating Aquaculture Systems (RAS), biofloc technology, ornamental fish farming, fish nutrition and feed technology, live fish-feed culture, fish-disease diagnostics and post-harvest handling. Students also undertook field visits to the Fish Landing Centre at Gopalpur and the regulated fish market at Berhampur.



Figure 7. Internship Programme on Advanced Fisheries Practices — Gargaon College students at the School of Fisheries fish-rearing unit

Local Training on Sustainable Pond Management and Carp Breeding Practices — Totagomuda

A 4-day hands-on training programme on pond management and carp breeding practices was conducted from 2 to 5 August 2025 at the Aquaculture Research Farm, Totagomuda, with participation from 25 fishermen. Participants received practical exposure to pond management and induced breeding of Rohu using the ICAR-CIFA model.

Table 2. Programme details

Item	Details
Programme	Training on Pond Management and Carp Breeding Practices
Dates	2–5 August 2025
Duration	4 days
Venue	Aquaculture Research Farm, Totagomuda (School of Fisheries, CUTM)
Participants	25 fishermen from the local community
Student involvement	7 FELP students (hands-on training)
Resource persons	Dr. Sambid Swain, Dr. Iffat Jahan and Dr. Pritam Tripathy (Aquaculture faculty)
Technique demonstrated	Complete induced-breeding procedure of Rohu using WOVA-FH and the ICAR-CIFA carp model hatchery



Figure 1. Case study summary — Training on Pond Management and Carp Breeding Practices, Totagomuda (2025)



Figure 2. ICAR-CIFA model carp hatchery — hatching pool, School of Fisheries, Aquaculture Research Farm, Totagomuda

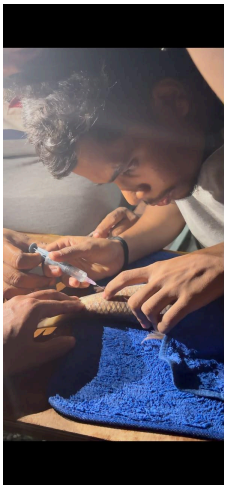


Figure 3. Hands-on demonstration of induced spawning (hormone injection) in Rohu broodstock

3.1 Practical Training Process

1. **Brood stock:** selection of healthy Rohu brooders.
2. **Hormone administration:** use of WOVA-FH for induced breeding.
3. **Induced breeding:** breeding carried out in the ICAR-CIFA carp model hatchery.
4. **Egg incubation:** controlled incubation for healthy hatching.
5. **Hatching and larval rearing:** hatching to fry under optimal conditions.

3.2 Training and Participant Outcomes

- **Participant outcome:** 4% of the participating farmers subsequently adopted the demonstrated carp-breeding technique on their own pond.
- **Survival during training:** approximately 70% survival from egg to spawn and approximately 50% survival from spawn to fry. Considering the relatively high water hardness in the region, the survival rates achieved are encouraging in the context of prevailing aquaculture conditions across Gajapati district.
- **Capacity building:** farmers gained direct exposure to carp breeding and pond-management practices, strengthening local capacity for sustainable freshwater aquaculture and seed availability.

Case Study : Farmers' Exposure Visit to the RAS Unit — CCD Gajapati

A one-day Farmers' Exposure Visit was held on 2 December 2025 for 28 farmers associated with the Centre for Community Development (CCD), Gajapati, together with CCD staff members. The visit was organised by the Department of Agricultural Extension Education, M.S. Swaminathan School of Agriculture, and sponsored by CCD Gajapati. Farmers were taken through the university's demonstration units, including the Recirculating Aquaculture System (RAS) unit, where students, staff and resource persons explained the technology and answered farmers' questions.

- **Date and duration:** 2 December 2025
- **Participants:** 28 farmers associated with CCD Gajapati, with CCD staff members; signed registration forms on record
- **Aquaculture content:** exposure to the RAS unit, a closed-loop, water-efficient fish-culture system, as one of the demonstration stops, with explanation and question-and-answer session
- **Coordinators:** Mr. Biswajit Sahoo (Assistant Professor) and Mrs. Oggu Kirti Priya (Project Executive), MSSSoA
- **Outcome:** participants' feedback forms record positive remarks; farmers expressed interest in adopting several of the technologies observed. The visit was covered by The Yugabdha (Odia news daily) on 3 December 2025.



Figure 4. CCD Gajapati farmers at the Recirculating Aquaculture System (RAS) unit, CUTM



Figure 5. The Yugabdha, 3 December 2025

Urban Waterbody Conservation and Sustainable Aquatic Ecosystem Awareness

Bhubaneswar's ponds and urban waterbodies are important freshwater ecosystems that support aquatic biodiversity and provide opportunities for environmental education and community engagement. CUTM's campus-level water-management initiatives provide a relevant institutional example of responsible waterbody management. The Bhubaneswar Water Audit documents the treatment and reuse of wastewater for gardening and irrigation, with surplus treated water directed towards a campus pond for groundwater recharge. The Environmental Audit 2024–25 also identifies the campus lake as an important aquatic resource and highlights sediment accumulation as an issue requiring attention. These observations reinforce the importance of water-quality monitoring, responsible wastewater management and the protection of freshwater habitats.

Local Four-Day Capacity Enhancement Workshop on Fisheries Governance and Blue Economy Practices

The School of Fisheries conducted a four-day capacity enhancement workshop from 16 to 19 July 2025, bringing local fish farmers and students together in a structured, day-wise extension programme on fisheries governance, sustainable aquaculture technologies, blue economy livelihoods and community action planning.

Table 3. Workshop details

Item	Details
Dates	16–19 July 2025 (4 days)
Organised by	School of Fisheries, CUTM Paralakhemundi
Overall coordinator	Mr. Chinmaya Nanda
Resource faculty	Dr. Iffat Jahan, Dr. Aurobindo
Participants	25 farmers and 20 students (45 in total)
Day 1	Fisheries governance and sustainable resource management: responsible fishing practices and fisheries regulations; community participation and co-management of aquatic resources; aquatic biodiversity conservation
Day 2	Sustainable aquaculture technologies: biofloc, Recirculating Aquaculture Systems (RAS) and water reuse, aquaponics, integrated aquaculture
Day 3	Blue economy and diversified aquatic livelihoods: ornamental fish culture, fish seed production and nursery management, small-scale aquaculture, value addition and post-harvest management
Day 4	Entrepreneurship, livelihoods and community action: fisheries-based enterprises, women and youth participation, market linkages and value chains, community-level action planning

Field component: participants and faculty visited a community pond and reservoir site to observe cage culture infrastructure and to discuss water resource management and community co-management practices directly with local stakeholders.

Outcome: the workshop built capacity among 25 farmers and 20 students across the governance, technology and livelihood dimensions of sustainable fisheries and aquaculture, ending with a community-level action-planning session on Day 4 to carry the training into farmer-led sustainable practice.



Figure 6. Faculty, students and farmer participants at a community pond field site during the workshop (July 2025)

2025 Measurement Evidence — Supporting Technical Data

The following 2025 results from the School of Fisheries biofloc trial for Amur carp, comparing a control with jaggery-based (T1) and millet-based (T2) biofloc, provide current-year technical evidence on water quality and production efficiency, supporting the sustainable aquaculture practices demonstrated through the outreach activities above.

Table 4. 2025 biofloc trial performance relative to control (Amur carp)

Measure	Control	T1 (Jaggery)	Change vs control	T2 (Millet)	Change vs control
Dissolved oxygen (mg L^{-1})	5.30	7.23	+36%	7.50	+42%
Total Ammonia Nitrogen (mg L^{-1})	0.50	0.25	−50%	0.35	−30%
Final weight (g)	124.00	215.00	+73%	171.67	+38%
Feed Conversion Ratio	2.05	1.23	−40% (better)	1.47	−28% (better)
Survival (%)	100	100	No loss	100	No loss

Both biofloc treatments outperformed the control on every growth metric, with the jaggery-based biofloc (T1) performing best overall: 73% higher final body weight, more than double the weight-gain percentage and a markedly better feed conversion ratio (1.23 vs 2.05), with **100% survival maintained across all three groups.**

Ornamental Fish Culture and Health Programme

The Ornamental Fish Culture and Health Programme continued in 2025 as a hands-on and livelihood-oriented activity that applies water-quality and fish-health management at the level of individual systems. Aquaria serves as live demonstration units for students, farmers and Self-Help Group (SHG) members, and in 2025 day-to-day management of the units was led by four final-year FELP students.

Table 6. Ornamental fish programme: 2025

Measure	2025
Aquaria maintained as demonstration units	30
Farmers and SHG members engaged	~70
Students trained in breeding, rearing and fish-health management	41

Species bred in 2025 included Betta (fighter fish), Polar Blue Parrot, goldfish (Carassius auratus), guppy (Poecilia reticulata), molly (Poecilia sphenops) and platy (Xiphophorus maculatus). Each breeding line involved species-specific management of temperature, pH and tank set-up, spawning observation and fry care. Breeding performance was recorded for each line; fighter fish achieved about 98% fertilisation, 90% hatching and 71% larval survival.

7.1 Ornamental Fish Laboratory, Department of Zoology

The Department of Zoology, School of Applied Sciences, CUTM, maintains an ornamental fish laboratory with a documented reference collection of 14 species — pleco, tetra, blood parrot cichlid, molly, cherry shrimp, three-spot gourami, tiger barb, zebrafish, guppy, electric yellow cichlid, swordtail, koi, betta and goldfish — recording the breeding biology, feeding behaviour and colour pigmentation of each species.

A two-day workshop, “Exploring Ornamental Fishes: Sexual Dimorphism, Breeding Biology and Aquascaping”, was held in the laboratory from 25 November 2025. Students practised sex identification, breeding set-ups, courtship and spawning observation, larval management, aquarium set-up, water-quality management, fish handling and aquascaping with mollies, guppies and bettas, and swordtail juveniles and betta hatchlings were raised in the laboratory.



Figure 7. Students in the ornamental fish breeding and aquascaping workshop, Department of Zoology, CUTM Bhubaneswar (November 2025)

3rd Utkal Krishi Mela (Farmers’ Fair)

The 3rd Utkal Krishi Mela, held in Paralakhemundi on 7–8 April 2025, was organised by the M.S. Swaminathan School of Agriculture, Centurion University of Technology and Management (CUTM). The two-day event brought together 200 participants, including farmers, students, researchers, agricultural experts, entrepreneurs and government department representatives. The fair provided a platform for agricultural knowledge exchange, technology demonstrations and awareness of farming and allied livelihood practices.

Key activities and their relevance to sustainable management included:

- Aquaculture Awareness and Sustainable Fisheries: A panel discussion addressed aquaculture alongside livestock management, farm mechanisation and crop protection. The event provided an opportunity to

discuss aquaculture as an allied livelihood activity and its relevance to rural communities. This aligns with outreach on sustainable fisheries and aquaculture management, particularly when supported by evidence of practices such as responsible fish farming, efficient water use and aquatic resource conservation.

- CUTM Campus as a Learning Site for Aquaculture and Tourism: CUTM's campus can also serve as a site for educational outreach on sustainable aquaculture and the relationship between aquatic ecosystems and tourism, where relevant facilities and activities are documented. Campus-based demonstrations and learning activities can help students and community visitors understand responsible aquaculture practices, freshwater resource management and the importance of conserving aquatic environments that support recreational and nature-based tourism.
- Technology Demonstrations: Agricultural innovations and technologies showcased at the fair familiarised participants with approaches relevant to farm productivity and resource use, supporting awareness of technology-based solutions for rural livelihoods.
- Farmer–Expert Knowledge Exchange: Technical discussions enabled participants to exchange knowledge on scientific farming practices and challenges faced by farmers, strengthening opportunities for community learning on agriculture and allied activities.

The farmers' fair provides evidence of community outreach on agriculture and aquaculture awareness. CUTM's campus may provide a complementary learning site for sustainable aquaculture, fisheries and tourism, provided that the relevant facilities, educational activities and community engagement are documented.