

Monitoring programs for aquatic ecosystem health

a) Monitoring Framework for Aquatic Ecosystem Health (2024)

The School of Fisheries, Centurion University, Paralakhemundi, Odisha operates a structured **Monitoring Framework for Aquatic Ecosystem Health**.

2024 Monitoring Activities

- **Sites Covered:** 25 sites (Biofloc tanks – 5, RAS tanks – 3, Aquaponics – 3, Cemented tanks – 10, Ponds – 4 categories totalling 41 units). The **School of Fisheries** conducts **quarterly water quality and biodiversity assessments** in nearby streams, ponds, and irrigation reservoirs across **Gumma Block and Srikakulam District**, assessing parameters such as plankton diversity, dissolved oxygen, and nutrient loading. These activities are part of **community-based aquatic ecosystem restoration**.
- **Samples Collected:** ~200 water samples across sites in 2024.
- **Frequency:** Bi-weekly in biofloc/RAS systems; monthly in ponds and aquaponics.
- **Indicators Monitored:** Dissolved Oxygen (DO), pH, Ammonia, Nitrate, BOD, COD, Turbidity, Plankton diversity.
- **Stakeholder Involvement:** 40+ B.F.Sc. students are engaged in data collection on water quality, plankton diversity, and fish health from neighbouring aquatic ecosystems, including community ponds, village tanks, and minor irrigation water bodies around the Paralakhemundi, with farmers and SHG women participating through training-linked monitoring exercises.



Figure 1: Collection sample from diseased fish and identification of fish disease.



Figure 2: Plankton identification at a farmer's field



Figure 3: Water quality estimation

Monitoring Data Table – 2024

Table 1: Monitoring Data Table – 2024

Results & Trends (2024)

- Water Quality: DO increased by 8%; ammonia levels reduced by 10%; BOD decreased by 6% compared to 2023.

Indicator / Parameter	Sites Monitored	Average Trend 2024	Ecological Outcome
Dissolved Oxygen (DO)	25 sites (200 samples)	↑ 8% vs. 2023	Better fish health, reduced stress
Ammonia (NH ₃)	25 sites	↓ 10%	Lower ecological toxicity
BOD (Biological Oxygen Demand)	25 sites	↓ 6%	Improved water quality
Plankton Diversity	12 ponds	Increase in green algae & diatoms; decline in blue-green algae	More balanced pond ecology
Disease Prevalence	Biofloc tanks	↓ 12–15%	Healthier shrimp & tilapia stocks
Fingerling Survival	Nursery ponds	↑ 10%	Stronger juvenile fish supply

- Plankton Diversity: Higher presence of beneficial phytoplankton (green algae, diatoms) recorded in managed ponds; decline in blue-green algal dominance.
- Disease Surveillance: Disease prevalence in biofloc tanks reduced by 12–15%, with improved survival of shrimp and tilapia.
- Fingerling Survival: Survival in nursery ponds improved by 10% due to adaptive stocking and better water quality.

Adaptive & Corrective Measures

- Stocking density adjusted based on dissolved oxygen and ammonia readings.
- Biosecurity protocols strengthened after seasonal spikes in bacterial load.
- Water exchange frequency increased in RAS during summer months to reduce stress.
- Feed inputs optimised to maintain water quality and reduce nutrient overload.
- Farmer training modules updated to incorporate real-time monitoring data into best practices.

B) "Monitoring Framework for Aquatic Ecosystem Health (2024)

Centurion University, through its School of Fisheries, implements a structured program to monitor the health of aquatic ecosystems around its Paralakhemundi and Srikakulam campuses. The monitoring extends beyond campus tanks to community ponds, village tanks, and minor irrigation water bodies, ensuring both academic and community engagement.

Sampling is carried out weekly and monthly, assessing dissolved oxygen, pH, ammonia, nitrate, plankton diversity, and fish health to track ecosystem stability. Over 40 B.F.Sc. students, together with local farmers and SHG women, participate in data collection and analysis, integrating learning with community stewardship.

The “Ornamental Fish Culture and Health Management (2024)” initiative supports this framework by applying fish health diagnostics to evaluate ecosystem-level conditions in nearby natural water bodies. These activities strengthen Centurion University’s commitment to aquatic ecosystem restoration

Community Outreach & Livelihood Diversification:

In 2024, five training sessions were organised for SHG women and local farmers, demonstrating how small-scale ornamental fish rearing can be established in backyard tanks and community ponds. Farmers reported using these skills to improve pond water quality management and diversify income streams beyond food fish production.

Outcomes (2024):

- **15 aquaria units are maintained** as live demonstration models.
- **40+ students** trained in fish health and aquaria management.
- **~60 farmers/SHG women** engaged in ornamental fish awareness and training.
- Improved **knowledge transfer on water quality monitoring, fish health, and biodiversity awareness.**
- Contribution to **reduced ecological pressure** on natural ecosystems from over-harvesting ornamental species.



Figure 4: Cleaning of tanks & Siphoning

Activities of students: ▼

1) Polar Blue Parrot Cichlid (*Amatitlania nigrofasciata* blue)

Key Factors in Breeding Polar Blue Parrot Cichlids Tank Setup for Breeding

Setting up an ideal environment is essential for successful breeding. Tank Size: 3 feet in length and 1.5 feet of width

▼ **Water Parameters:**

- ◆ Temperature: Keep the water between 78°F and 82°F (25-28°C).

pH range is 7.5-8

- ▼ **Hardness:** They thrive in moderately hard water (8-12 dGH.)

Angel fish breeding (*Pterophyllum scalare*)

Angelfish eggs are attached to the substance.

- Mating of both sexes and parental care.
- **The three spot gourami breeding (*Trichopodus trichopterus*),**
- **▪Bubble Nest of Gourami**

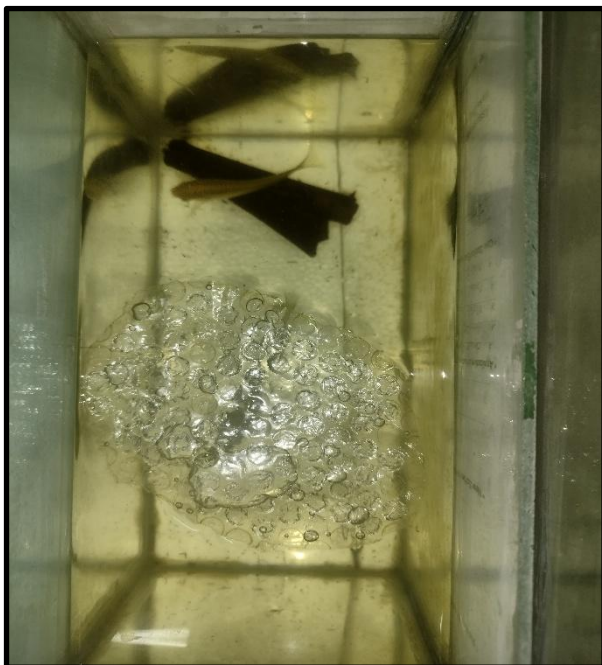




Figure 5: Breeding of Egg layers