

Name of the Department: AQUATIC ENVIRONMENT MANAGEMENT (AEM)

1. Introduction:

Department of Aquatic Environment Management is one of the integral academic and research units of the Dr. M.G.R. Fisheries College and Research Institute, Ponneri, functioning since its inception on 20.02.2013 and currently has two Assistant Professors, one lab assistant and one Attendant. The courses of aquatic environment management are so designed for imparting the skill and knowledge for addressing the existing problems and for better utility of resources to ensure the sustainability. Water quality management which finds its use in aquaculture systems and pollution monitoring in freshwater and coastal systems would not only enhance the productivity but also keep the aquatic systems free from pollution for recreational purposes and revenue generation. Since various industries are discharging their effluents into the different aquatic ecosystems, monitoring of pollution is of great importance as it will have greater impact over the fish production. Hence, waste water treatment and recycling of solid wastes which are of prime importance.

2. Objectives:

- To offer Fisheries environment courses for U.G, PG and PhD. programmes
- To impart the skills for the students on better water quality management
- To carry out studies related to ecosystem and biodiversity conservation
- To evaluate the ecological status of various aquatic ecosystems including Ennore and Pulicat lake.

3. Teaching:

UG Courses – 7 Nos

S.No.	Course No.	Title of the Course	Credit Hours
1	FS-104	Meteorology, Climatology and Disaster Management	2+1
2	FS-105	Soil and Water Chemistry	2+1
3	FS-115	Limnology	2+1
4	FS-116	Marine Biology	2+1
5	FS-205	Aquatic Ecology and Biodiversity	2+1
6	FS-215	Fishery Oceanography	1+1
7	FS-216	Aquatic Pollution and Coastal Zone Management	2+1

PG Courses- 14

Sl.No	Course No.	Title of the Course	Credit Hours
1	AEM 501	Inland Aquatic Resource Management	2+1
2	AEM 502	Chemical Interactions in Aquatic Environment	2+1
3	AEM 503	Analytical Techniques in Environmental Sciences	1+2
4	AEM 504	Climate Change: Impact and Management	1+0
5	AEM 505	Aquatic Pollution and Management	2+1
6	AEM 506	Eco-toxicology	1+1
7	AEM 507	Coastal Ecology and Coastal Management	2+1
8	AEM 508	Aquatic Microbiology	1+1
9	AEM 509	Aquatic Environment and Biodiversity	1+1
10	AEM 510	Plankton Ecology and Trophic Dynamics	1+1
11	AEM 511	Environmental Biotechnology	1+1
12	AEM 512	Fisheries Oceanography	1+1
13	AEM 513	Utilization and Management of Aquatic Algal Resources	2+1
14	AEM 514	Restoration Ecology`	1+1

Ph.D Courses-10

Sl.No	Course No.	Title of the Course	Credit Hours
1	AEM 601	Techniques in Aquatic Environmental Studies	0+2
2	AEM 602	Dispersal and Fate of Pollutants	1+1
3	AEM 603	Water Issues: Challenges and Governance	1+0
4	AEM 604	Management and Utilization of Waste and Waste water	2+1
5	AEM 605	Environment Impact Assessment	1+1
6	AEM 606	Ecology of Plankton and Benthos	1+1
7	AEM 607	Estuarine and Coastal Oceanography	1+1
8	AEM 608	Biotechnology in Aquatic Environment Management	1+2
9	AEM 609	Aquatic Plant Resource and its Management	1+1
10	AEM 610	Application of Remote Sensing and GIS in Fisheries	1+1

4. Research Projects:

Ongoing Research Projects:

Sl. No.	Title of the Project	Year	PI & Co- PI of the Project	Funds (in Rs)	Funding Agency
1	TANII scheme Artificial Coral Reef / Live Rock (ACR / LR) and Fish Aggregating Artificial Reef (FAAR) to Enhance Fish Diversity and Biomass in the Sea Near Pulicat Lake Towards Fishing Pressure Reduction and Livelihood Improvement of Fisherfolk in the Lake Region	2021	Dr. S. Aruna	430.66 lakhs	TANII
2	Self Financing Scheme - Water quality testing lab for the hatchery and farm sample.	-	-	-	TNJFU

Completed Research Projects:

Sl. No.	Title of the Project	Year	PI & Co- PI of the Project	Funds (in Rs)	Funding Agency
1	URP - "Documenting plankton of Pulicat lake of Tamilnadu region"	2017-18	Mrs. S. Aruna	-	TNJFU
2.	URP- "Characteristics of shrimp farm organic rich waters and its influence on the Pulicat ecosystem of Palaverkadu region	2017 - 18	P. Velmurugan	--	TNJFU
3.	URP – on "Impact of ionic concentration of low saline waters on the growth characteristics of Vannamei"	2016	Mrs. S. Aruna	--	TNJFU
4.	NFDB Funded - training programme on spirulina cultivation and value addition		Dr. Manikandavelu D.	2.04 Lakhs	NFDB

5. Outreach/Extension activities:

Sl. No.	Name of the Extension activities/ Program	Year	Beneficiary
1.	Farm Advisory services regarding water and soil quality management	-	150
2.	Technical advices on Spirulina cultivation	-	50
3.	Training on water and soil quality parameter analysis	-	56

6. Infrastructure

Aquaculture water quality testing laboratory

Aquaculture water quality testing laboratory is functioning under Department of Aquatic Environment Management at 320 square feet area. This laboratory consists of the equipments such as pH meter, Spectrophotometer, electronic weighing balance. The main function of this laboratory is to analyse the commercial water and soil samples received from aquaculture farmer's fields on cost basis. Advisory services will be given to farmers, based on the results. The basic parameters such as pH, Alkalinity, salinity, ammonia and hardness were analysed. Apart from this, other water and soil quality parameters such as calcium, magnesium, potassium, nitrite, nitrate, phosphate, available nutrients, water holding capacity etc. are analysed on charge basis. The list of equipments available in Aquaculture Water Quality Testing Laboratory are;

1. Spectrophotometer
2. pH meter
3. EC meter
4. Water bath
5. Heating mantle
6. Hot air Oven
7. Binocular Microscope
8. Distillation unit
9. ORP probe
10. pH/EC and TDS portable meter
11. Auto Analyzer
12. Histology equipment



UG LABORATORY



The under graduate laboratory of Department of Aquatic Environment Management is equipped with all the equipments for conducting practical classes for the B.F.Sc students. The total laboratory space is 800 square feet. The laboratory is having 7 Nos. of lab tables and 40 lab stools. Beside the laboratory is having the following equipments.

PG and Climatology lab

1. UV –Vis Spectrophotometer
2. Flame photometer
3. Automatic weather station (mini unit)
4. BOD incubator
5. Digital microscope
6. ORP meter
7. TDS meter
8. Algal culture unit
9. Water bath
10. Hot plate
11. Multiparameter analyser
12. Anemometer
13. Barometer
14. Psychrometer
15. Water sampler
16. Sediment sampler
17. Orbital shaking incubator
18. Fume hood
19. Bio – safety cabinet
20. Scuba gears and compressor



21. GARMIN- GPS
22. Refrigerated Centrifuge
23. Ultrapure water purification system
24. Gel Documentation System (UV)
25. Thermocycler (PCR)
26. Ultra- low temperature deep freezer
27. Vortex mixer
28. Underwater video camera and accessories (OLYMPUS & GO PRO)
29. Blue star deep freezer

Algal culture facility

The department also embarking on the collection and maintenance of various algal strains to evaluate them in combating climate change, and to serve in food security, waste management, feed, fuel, fertilizer in ecologically balanced and sustainable way.

The lists of strains maintained at algal culture facility are

- Spirulina,
- Chlorella
- Scenedesmus and
- Chroococcus



Mobile laboratory

The Department has a mobile laboratory to cater to the analytical needs of the fish farmers. Every week the mobile laboratory move around various farming regions, collecting samples from farmers, and analysing them on site to ensure accuracy and to encourage farmers for better management by regular periodic analysis of their farm water samples at their convenience.



Field testing of water quality (Mobile Lab)

7. Achievements:

8. Current Focus:

- Studies on the anthropogenic impact on the fauna and flora in Pulicat lake ecosystem.
- Aquatic production enhancement through ecosystem management.
- Water quality management for aquaculture
- Awareness on Conservation and sustainable management of fisheries resources
- Algal cultivation for ecological restoration and food security with least carbon foot print

9. Faculty:

Name	Designation	E-mail	Telephone / Mobile
Dr. S. Aruna	Assistant Professor and Head i/c,	aruna@tnfu.ac.in	+91-9884049570
Mrs. B.R. Sona	Assistant Professor	sona@tnfu.ac.in	+91-9600290112

10. Publications

1. Dhinesh, R., **Aruna, S.**, Ravaneswaran, K., Kirthiga, S.S., Keerthivarman, S.G., Al-Ghanim, K.A. and Kamaraj, C., 2024. Aquatic weed *Eichhornia crassipes* as sustainable feedstocks for biochar production: A potential of ammonium adsorption and kinetic models. *Journal of Cleaner Production*, 459, p.142566.
2. Subramanian, Keerthivarman G., Manikandavelu Dhanushkodi, **Aruna Satyapriyan**, Muralidharan Nagarajan, and Govarthanan Muthusamy. "Deciphering microalgal diversity of peculiar lentic ecosystem in Chennai, South India: a way towards sustainability." *Molecular Biotechnology* (2023): 1-12.

3. Subramanian, Keerthivarman G., Manikandavelu Dhanushkodi, **Aruna Satyapriyan**, Muralidharan Nagarajan, P. Muthuvinnayagam, Moulitharan Nallathambi, Elangovan Prabu, Dhinesh Rajendiran, and Govarthanan Muthusamy. "An Intensive Study on Algal Diversity in the Ancient Man-Made Aquatic Ecosystem of Tiruvallur, South India: Exploration for Sustainable Development." *Molecular Biotechnology* (2023): 1-11.
4. **Aruna, S.**, Manikandavelu, D., Uma, A., Antony, C. and Jayakumar, N., 2023. Assessment of Phosphorus Mobilizing Capacity of *Bacillus* spp. Isolated from Mangrove Rhizospheric Sediment and its Potential Application in Aquaculture. *Indian Journal of Animal Research*, 57(11).
5. **Aruna, S.**, Manikandavelu, D., Uma, A., Antony, C. and Jayakumar, N., 2024. Isolation of phosphorus solubilizing bacteria from mangrove rhizospheric sediment and its potential application in aquaculture. *Indian Journal of Animal Research*, 58(2), pp.302-309.
6. Felix, S, Bhosale, M.M., Rajagopalsamy, CBT., **Aruna, S.** 2020. RAS based culture system for continuous production of Rotifers (*Brachionus calyciflorus*) in mass. *Indian Journal Of Animal Sciences*, Vol. 90(6) : 954-959
7. Mangesh M. Bhosale, Felix, S and **Aruna, S.** Mass production of rotifers (*Brachionus calyciflorus*) in outdoor culture system for aquaculture. 2020. *Journal of Food, Agriculture & Environment* Vol. 18 (2) : 59-63.
8. D. Manimekalai, P.Padmavathy, S.Aanand and **S.Aruna**, 2016. Diversity of hydrocarbon-degrading bacteria from oil contaminated sites of Mumbai coast, Maharashtra. Vol. 19, No. 2, pp.1103-1107.
9. D. Manimekalai, C. S. Purushothaman, A. Vennila, P. Padmavathy, S. Aanand, **S. Aruna** and A. Srinivasan 2017. Isolation and characterization of phenanthrene Degrading bacteria from marine environment. *Biochem. Cell. Arch.* Vol. 17(1) pp. 229-237
10. D. Manimekalai, A. Srinivasan, P. Padmavathy, S. Aanand and **S. Aruna** 2016 Marine litter and its impacts on fisheries *International Journal of Current Research: Vol 8(4)*
11. **Aruna, S** and Felix, S. 2017. The effect of ionic concentration of low saline waters on growth characteristics of *Penaeus vannamei*. *International Journal of Fisheries and Aquatic studies*. 5(3):73-76.
12. **Aruna, S**, Vennila, A, Ranjith, L and Manimekalai, D. 2017. Internal loading and Phosphorus resorption efficiency of *A. marina* and *B. cylindrica* in Uttan mangroves. *J. Exp. Zool. India*. 20(2): 1079-1083.
13. Ranjith, L, Shukla, S. P., Vennila, A., Purushothaman, C. S., Lakshmi, M. S., **Aruna, S.** and A. K. Padmanabhan, 2011. An assessment on *Spirulina platensis* as a biosorbent for arsenic removal, *Water Science & Technology: Water Supply*, 11.3, Pp370-378
14. Mangesh M Bhosale, Felix, S, Mahadevi, **S, Aruna, S**, Cheryl Antony and Gopalakannan, A. 2017. Induced breeding of African Jewfish *Hemichromis bimaculatus* (Gill, 1862) using gonadotropic signaling molecular analogue WOVA-FH. *J. Entomol. Zool. Stud.* 5(6): 2547-2551
15. **Sona B. R**, Srikanta Samanta and Sangram Keshari Rout (2020). Sediment metal contaminations in sewage-fed aquaculture system of East Kolkata Wetland, West Bengal, India. *Journal of Inland Fisheries Society India* 52 (1): 42-51
16. **Sona B. R**, Vijay Sundar Deva G, Soumalika Guha, R. R. Anupama, Sriparna Chakraborty, Satyanarayana Boda and Sangram Keshari Rout (2019). Evaluation of water quality index in sewage fed aquaculture system in a Ramsar site

(Nalban East Kolkata Wetland), West Bengal, India. *International Journal of Chemical Studies*

17. **Sona B. R**, Vijay Sundar Deva G, Soumalika Guha, R. R. Anupama, Sriparna Chakraborty, Dayal Devadas and Sangram Keshari Rout (2019). Use of water hyacinth *Eichhornia crassipes* (Mart.) Solms as phytoremediator in sewage fed aquaculture system. *International Journal of Chemical Studies*
18. Rout S. K, Behera L, **Sona B. R**, Jana D, Chakraborty S and Anupama R. R (2017). Alternation in haematological parameters of *Labeorohita* (Hamilton) exposed to different concentrations of sewage water. *Journal of Inland Fisheries Society India*.
19. Vijay Sundar Deva G, Sayani Banerjee, Debapriyo Mukherjee, **B. R. Sona**, K. Karuppasamy, T. J. Abraham and Gadadhar Dash (2019). Morphometric and Molecular Characterization of *Thelohanellus catlae* Infecting the Gills of Indian Major Carp Catla, *Catla catla* (Hamilton, 1822) from West Bengal, India. *Indian Journal of Animal Research*.
20. Anupama R. R, Rout S. K, Chakraborty S, Ch. Babu S, **Sona B. R**, Sheetal A, Mondal A and Milli K. (2017). Use of water hyacinth as an eco-friendly management practice in controlling eutrophication. *Biochemical Cellular Archives*
21. Chakraborty S, Rout S. K, Anupama R. R, Milli K, **Sona B. R** and Behera L. (2017). Response of salinity (Brine solution) induced stress on cortisol hormone in Indian Major Carp, *Labeorohita*. *Journal of Experimental Zoology*.
22. Anupama R. R, Rout S. K, Ch. Babu S, Chakraborty S, Jana D and **Sona B. R. (2017)**. Phytoremediation potential of water hyacinth to remediate metals from three diversified lentic water bodies of Nadia District, West Bengal, India. *The Bioscan*