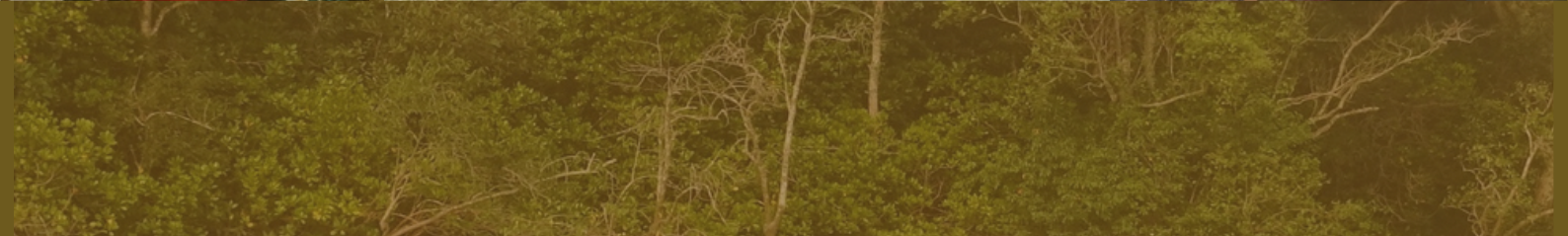




South 24 Parganas, West Bengal,
Canning, West Bengal, India
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Long 88.760374°
25/03/23 01:57 PM GMT +05:30



ANNUAL REPORT

2023 - 2024

www.ecsfindia.org



Annual Report (2023 – 2024)

Prepared By

Sumit Manna

Debarati Sengupta

Dr. Sourav Paul

Estuarine and Coastal Studies Foundation

(Registered under Section 8 of Companies Act, 2013)

CIN: U80100WB2021NPL248544

Darpan ID: WB/2021/0297074

From the Director's desk

The coasts of India are under multiple stressors be it natural or anthropogenic; therefore, it demands newer generations of multi-disciplinary organizations which breaks barriers of reductionist approach of the traditional academia. The Estuarine and Coastal Studies Foundation (ECSF) being an unique multi-disciplinary institution in India is continuing its service to estuaries, coasts and people. The ECSF is bringing together scientists, professionals, advisors and students across various domains for conducting educational activities, hands-on training, internships, research and development with an aim to expand the horizon of estuarine and coastal studies so that the knowledge touches the lives and livelihoods of the marginalized coastal communities. In one end the institution is working with young people helping them to express their ideas and providing them the necessary platforms to practise on the other end the institution is expanding its research footprints along Indian coasts drawing scholars and collaborations. The students and the scientists of the ECSF are presenting their views and opinions on coastal issues throughout India and even in the world stages. In order to promote and expand the coastal and estuarine studies, the foundation is collaborating with leading institutions of West Bengal as well as India for research and educational programs. The institution has started to host doctoral and postdoctoral fellows and some of them are funded by extramural grants of the government funding agencies of India. The foundation has become a vibrant research platform for visiting scientists coming from various institutions of India, Uruguay, Australia and Oman. The ECSF on its behalf is continuously expanding its infrastructure, manpower and other supports to provide better services to education and research activities related to estuaries and coasts. Finally, as a part of its social responsibility the institution is promoting ocean literacy among young Indians and planting mangroves for maintaining socio-ecological balance of the lower Ganges delta.

I conclude by thanking all the members, students, scientists, staffs and well-wishers whose continuous cooperation and support made it possible for the ECSF to make a difference for estuaries and coasts of India.

Thank you



Mr. Sinchan Chatterjee



Content

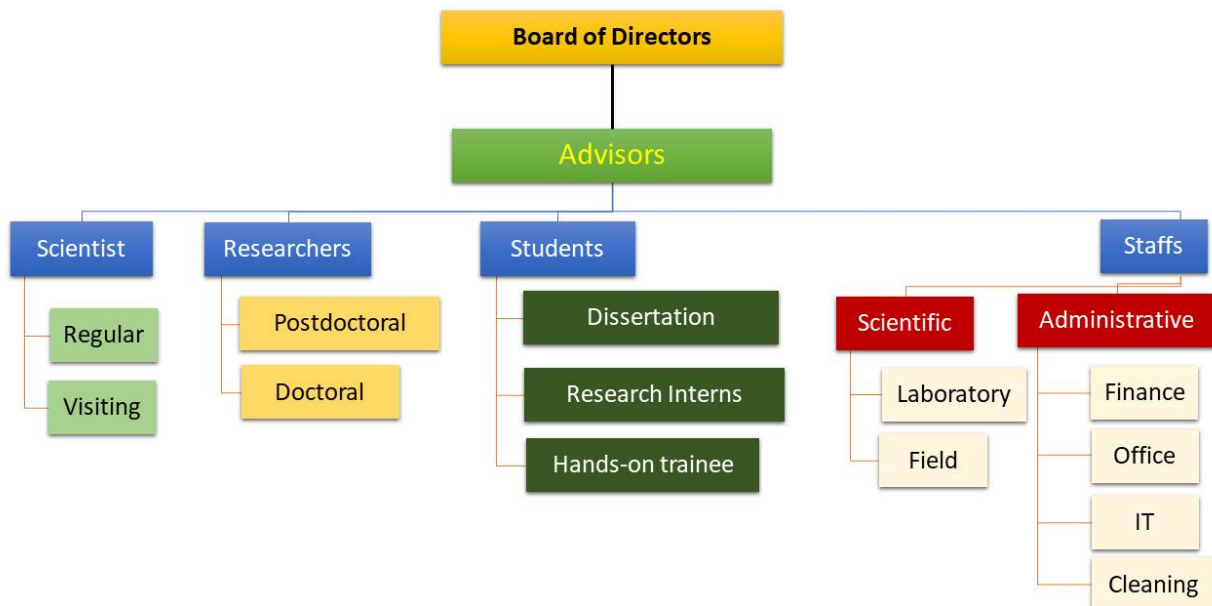
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1. Introduction

Estuarine and Coastal Studies Foundation (ECSF) is a non-profit organization focused on interdisciplinary research and education on estuarine and coastal issues. It is recognized by the Ministry of Corporate Affairs; NITI Ayaog; Department of Biotechnology (G.O.I), IOC-UNESCO, DST & BT (W.B.), INSA, Berhampur University, Adamas University, different government and government-aided colleges of West Bengal and NGOs. The foundation has trained scientists who are willing to promote, facilitate and collaborate zoological, environmental, ecological, marine, biodiversity, botany, geographic, social and quantitative research and education activities among students, researchers, scientists and faculty members of various career stages.

2. Institution structure





Board members

- **Dr. Amalesh Mukhopadhyay:** Director of Administration
- **Dr. Sourav Paul:** Director of Education & Research
- **Mr. Sinchan Chatterjee:** Director of Finance & Administration

Advisors

- **Prof. Srimanta Kumar Raut**
Expertise: Ecology and Ethology
Designation: Senior Professor, Department of Zoology, University of Calcutta
- **Prof. S. Bijoy Nandan**
Expertise: Mangrove and Marine Biology
Designation: Senior Professor of Department of Marine Biology, Microbiology and Biochemistry, School of Marine Sciences, CUSAT, Kerala
- **Prof. Satheesh Sheno**
Expertise: Physical Oceanography
Designation: Ministry of Earth Science Chair Professor, INCOIS, MoES (GoI).

Regular Scientists

- **Dr. Bhaskar Deb Bhattacharya**
PhD in Marine Science
Expertise: Pollution and Plankton
- **Dr. Kanailal Das**
PhD in Geography
Expertise: Geomorphology, Vulnerability Assessment
- **Dr. Mohammad Moniruzzaman**
PhD in Zoology
Expertise: Fish biology and Endocrinology
- **Dr. Jhimli Mondal**
PhD in Zoology
Expertise: Tunicate Taxonomy and Ecology



- **Dr. Nilabja Sikdar**
PhD in Biotechnology
Expertise: Molecular biology and Bioinformatics
- **Ms. Debarati Sengupta**
MSc in Marine Science
Expertise: Ocean Literacy and Science Communication

Visiting Scientists

- **Dr. Anish Bhattacharya**
PhD in Biochemistry
Expertise: Coastal Microbiology, Biochemistry
- **Mr. Ashis Biswas**
MA in History
Expert: Coastal community development and policy
- **Dr. Tanoy Mukherjee**
PhD in Zoology
Expertise: Wildlife, Geospatial Applications
- **Dr. Tanmoy Nandy**
PhD in Marine Science
Expertise: Zooplankton, Benthos
- **Moumee Jesmin**
PhD Scholar, Social work
Expertise: Social Development, Public Health, Gender Equity, Environment
- **Dr. Anirban Akhand**
PhD in Oceanography
Expert: Blue Carbon and Biogeochemistry
- **Dr. Danilo Calliari**
PhD: Biological Oceanography
Expert: Plankton ecology, ecological-physiology, food web, coastal ecosystems.
- **Dr. Sachinandan Dutta**
PhD in Oceanography
Expert: Fisheries Management



Staff members

- **Mr. Supriya Paul**
Administrative Officer
- **Mr. Sourav Nandy**
Graphics and IT
- **Mr. Sohoni Dhar**
Laboratory Assistant
- **Mr. Samya Karan**
Field Assistant
- **Mr. Hiral Dey**
Finance Officer

3. Programs

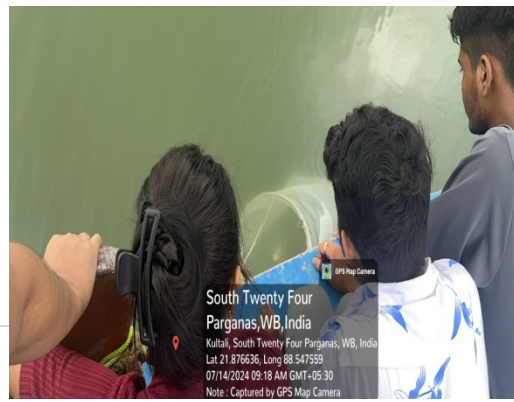
3.1 Education and training

3.1.1 Hands-on

Foundation organized various science based hands-on programs to provides real life scientific experiences to students and early-career researchers. Aim of this hands-on program is to develop skills of critical thinking, handle scientific equipment for field and laboratory. Following specializations are offered

- **Coastal ecology and biodiversity**
- **Coastal dynamics and communities**
- **Coastal aquaculture and environment**

Students of Bachelors, Masters qualifications and the junior research fellows of different institutions like University of Calcutta, Presidency University, University of Burdwan, Diamond Harbour Women's University, Techno India University, Alagappa University, Savitribai Phule Pune University, Vidyasagar College, Ashutosh College, Krishnanath College, Serampore College, Rishi Bankim Chandra College, Bethune College, Lady Brabourne College, Parameswar Mahavidyalaya, JNP College of Education (BSAEU), Chandaneswar High School are participated in various hands on programme organized by the foundation.





3.1.2 Field course

Foundation provides field exposure to students and researchers so that they are equipped to carry out field experiments. The objectives of this course are to study biodiversity, ecology, conservation, geography, environment, pollution, soil/water quality of estuaries and coastal ecosystems. This course allows students and researchers to gain hands-on experience of sampling and handling of different field gears and equipment. The course includes planning and preparations for the fieldwork, sampling and data procurement techniques, sample preservation and transportation methods. The field course assesses vegetation, benthos, pelagic and terrestrial samples followed by sample analysis in laboratory.

Foundation organizes different field-based workshop in two Ramsar Sites of West Bengal such as **the estuary of Indian Sundarban and East Kolkata Wetland.**



3.1.3 Internship

- **INSA Summer Fellowship- Teacher's category**

Dr. Laxmi Devi P, Assistant Professor (Department of Marine Science) of JAIN (Deemed-to-be-University), Kochi, India has joined the foundation on **5th June, 2023** and carried out ***“Bioaccumulation of Heavy metals in the planktonic food web of Indian Sundarbans”*** under the guidance of Dr. Sourav Paul for a period of 67 days. During her stay at the foundation, Dr. Laxmi has gained considerable exposure in plankton and bioaccumulation studies at the estuaries of Indian Sundarbans. Her program was supported by ***Indian National Science Academy's Summer Research Fellowship 2023***. She later presented (poster) her work in the **World Ocean Science Congress 2024** held at IIT Madras between **27- 29 February, 2024**.



*Summer Research Fellowship Programme
Certificate*

This is to certify that Ms P Lakshmi Devi worked on a project entitled "Bioaccumulation of heavy metals in the planktonic food web of Indian Sundarbans" during June - July 2028 as a Summer Research Fellow under the supervision of Dr Sourav Paul, Estuarine & Coastal Studies Foundation, Howrah. The Summer Research Fellowship Program is jointly sponsored by IASc (Bengaluru), INSA (New Delhi) and NASI (Prayagraj).



*Place: Bengaluru
Date: 18-10-2028*

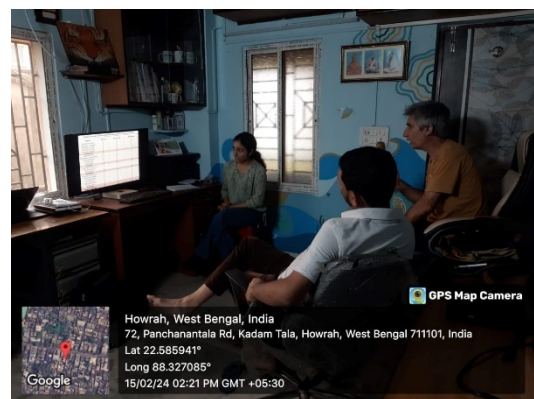
*P. K. Das
Chairman, Science Education Panel*

INDIAN ACADEMY OF SCIENCES, C. V. RAMAN AVENUE, POST BOX No. 8005,
RAMAN RESEARCH INSTITUTE CAMPUS, SADASHIVANAGAR P.O.,
BENGALURU 560 080, INDIA



- **Young Estuarine and Coastal Scientist (YECS)**

The foundation is committed to develop critical thinking and hands-on skills among young scientists through the ‘**Young Estuarine and Coastal Scientist (YECS)**’ program. An YECS in future may take up estuarine, coastal and marine research and profession. Each YECS is encouraged to take up his/her unique project and implement that during the course. The students of **University of Calcutta, Diamond Harbor Women University, University of Kalyani** have conducted short to medium term (2-12 months) internship research program under the mentorship of **Dr. Kanailal Das, Dr. Bhaskar Deb Bhattacharya, Dr. Mahammed Moniruzzaman, Dr. Sourav Paul, Dr. Danilo Calliari and Dr. Jhimli Mandol**. Those students have published their research works on different articles and book chapters as well as represented the foundation on various *International, National and Local conferences, seminars and symposiums*. Some of them have secured their own funding to pursue research and or dissemination of their results on various platforms.





3.2 Research

3.2.1 Student research

- *Calibrating the measurement of zooplankton diversity in Indian Sundarbans* by **Debarati Sengupta** under the guidance of **Dr. Sourav Paul** and **Dr. Danilo Calliari**.
- *Microzooplankton diversity of salinity limiting zone of Ganges estuary* by **Puja Mishra** under the guidance of **Dr. Jhimli Mondal** and **Dr. Bhaskar Deb Bhattacharya**.
- *Acoustic variations of birds in contrasting landscapes* by **Aritra Bhattacharya** under the guidance of **Dr. Tanoy Mukherjee**.
- *Assessment of copepod grazing in the lower stretch of Ganges estuary* by **Jhinook Mitra** under the guidance of **Dr. Bhaskar Deb Bhattacharya**.
- *Efficacy of Melatonin in the amelioration of endotoxin induced brain inflammation in Zebrafish* by **Susmita Hazra** under the guidance of **Dr. Mahammed Moniruzzaman**.
- *Role of Folate gold nanoparticle in amelioration of hepatotoxicity* by **Soumi Ghosh** under the guidance of **Dr. Mahammed Moniruzzaman**.
- *An assessment of the vulnerability of Mousuni island, Indian Sundarbans: Insights into sustainable planning options* by **Shreya Das** under the guidance of **Dr. Kanailal Das** and **Karabi Das**.
- *A comparison between planned and unplanned urban sprawl* by **Srirupa Saha** under the guidance of **Dr. Kanailal Das** and **Karabi Das**.

3.2.2 M.Sc. Dissertation

The foundation along with its partner organizations have conducted various academic dissertation programs which leads to completion of various degree programs (M.Sc.) of the students. So far students of Adamas University, Veer Narmad South Gujarat University and B.B. College, Asansol (Kazi Nazrul University) have jointly conducted their dissertation works with the foundation.

- *The pursuit of livelihoods of climate refugees and social vulnerability of Sagar Island, Indian Sundarbans* by **Mohor Samadder** of **Adamas University** under the guidance of **Dr. Kanailal Das** and **Dr. Anu Rai**.
- *Spatio-temporal shoreline change assessment and livelihood vulnerability at the dialuvating island Ghoramara, Indian Sundarbans* by **Debisha Ghosh** of **Adamas University** under the guidance of **Dr. Kanailal Das** and **Dr. Anu Rai**.
- *An assessment of abiotic variability and heavy metal pollution of lower Ganges delta* by **Pratyush Kumar Jana** of **Veer Narmad South Gujarat University** under the guidance of **Dr. Sourav Paul** and **Dr. Kapila Manoj**.
- *Food fish diversity of brackish waters of Indian Sundarbans* by **Arnob Paul** of **Veer Narmad South Gujarat University** under the guidance of **Dr. Sourav Paul** and **Dr. Kapila Manoj**.
- *Evolution of the halophytic organisms isolated from the Indian Sundarban estuary from the perspective of antibiotic resistance* by **Krittika Chatterjee** of **B.B. College, Asansol (Kazi Nazrul University)** under the guidance of **Dr. Atrayee Dey** and **Dr. Anish Bhattacharya**.



- *Antibiotic resistance evolvability of Environmental isolates in its native habitat* by **Biswajoti Mukherjee** of **B.B. College, Asansol (Kazi Nazrul University)** under the guidance of **Dr. Atrayee Dey** and **Dr. Anish Bhattacharya**.
- *Antibiotic resistance evolvability of environmental isolates in laboratory habitat* by **Almas Fatma** **B.B. College, Asansol (Kazi Nazrul University)** under the guidance of **Dr. Atrayee Dey** and **Dr. Anish Bhattacharya**.



3.2.3 Research conducted by scientists

- **Intramural research**

1. **Species specific bioaccumulation of heavy metals in copepods of lower stretch of Ganges estuary**

PI: Dr. Bhaskar Deb Bhattacharya

CO-PI: Dr. Sourav Paul

Start date: 1st April, 2023; End date: 31st March, 2024

Brief description:

The project aimed to assess the *bioaccumulation of different heavy metals (Cr, Cd and As) in the lower food web of various sites along the stretch of the Hooghly estuary*. The said project also in *detail analyze the pollution status of the Ganges estuary*.



2. Meroplankton and holoplankton variability along lower stretch of Ganges estuary

PI: Dr. Bhaskar Deb Bhattacharya

CO-PI: Dr. Sourav Paul

Start date: 1st April, 2023; End date: 31st March, 2024

Brief description:

The project aimed to assess *the diversity and distribution of different mero- and holoplankton species of various sites along the stretch of the Hooghly estuary*. The said project also in detail *analyze the physico-chemical variability of the Ganges estuary*.

3. Impact of cyclones on the lower food web of Ganges estuary

PI: Dr. Sourav Paul

Start date: 1st April 2023; End date: 31st March, 2024

Brief description:

The project assessed *the changes of water quality, shoreline shifts and impact on mangroves of different estuarine stretches of Indian Sundarbans by taking a multidisciplinary approach*.

4. Hourly variability of structural and functional aspects of lower food web of Ganges estuary.

PI: Dr. Sourav Paul

Co-PI: Dr. Danilo Calliari and Dr. Jhimli Mondal

Start date: 1st December, 2023; End date: 31st March, 2024

Brief description:

The project assessed *the structural variability (diversity and distribution) of phytoplankton, micro- zooplankton and meso- zooplankton in a complete tidal cycle of the Ganges estuary*. The said project also *estimated the production rate of both phytoplankton and zooplankton species over a 24 hours tidal cycle* coupled with a detailed measurement of water quality, biogeochemistry and bathymetry of the habitat.



5. Identification and characterization of methylation regulated differentially expressed genes for Pancreatic cancer.

PI: Dr. Nilabja Sikdar

Start date: 1st July, 2023; End date: 31st March, 2024

Brief description:

Pancreatic cancer presents a significant challenge in oncology due to its aggressive nature. We are using *web-based data from TCGA and identify the MEDEG genes* that might have some *impact and importance to develop the pancreatic cancer*.

3.2.4 Extramural research

Dr. Jhimli Mondal has secured prestigious *Department of Biotechnology (Govt. of India) BioCare Women Scientist award* (sanction number: **BT/PR50710/BIC/101/1241/2023**; total cost: **Rs. 40,68,000** for three years) under the mentorship of **Dr. Sourav Paul** for conducting the project titled, “**Diversity and ecology of ascidians: perspective of Indian Sundarbans and Gujarat Coast**”.

No. BT/PR50710/BIC/101/1241/2023

भारत सरकार/Government of India

विज्ञान और प्रौद्योगिकी मंत्रालय/Ministry of Science & Technology

बायोटेक्नोलॉजी विभाग/Department of Biotechnology

ब्लॉक-2, 6-8 तल/Block-2, 6-8th Floors,

सीजीओ कॉम्प्लेक्स/CGO Complex,

लोधी रोड/Lodhi Road,

नई दिल्ली- 110003/New Delhi- 110 003

Dated: 07/12/2023

प्रशासनिक आदेश/ADMINISTRATIVE ORDER

Sanction of the President is hereby accorded, under Rule 18 of the Delegation of Financial Powers Rules, 1978, for the implementation of the project entitled “*Diversity and ecology of ascidians: perspective of Indian Sundarbans and Gujarat Coast*” for a period of **three (3) Years** at a total cost of **₹40,68,000 (Rupees Forty Lakhs Sixty-Eight Thousand Only)** on the terms and conditions detailed here under:-

2. The Project:

2.1 Title: Diversity and ecology of ascidians: perspective of Indian Sundarbans and Gujarat Coast.

2.2 Details of the Investigators:

Dr. Jhimli Mondal,
C/o Dr. Sourav Paul, Director, Estuarine and Coastal Studies Foundation,
10/5 Amrita Pyne Lane, Howrah, West Bengal-711101

MENTOR:

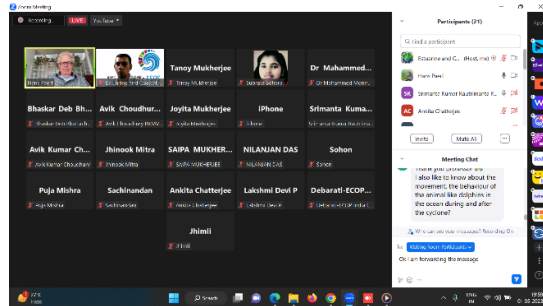
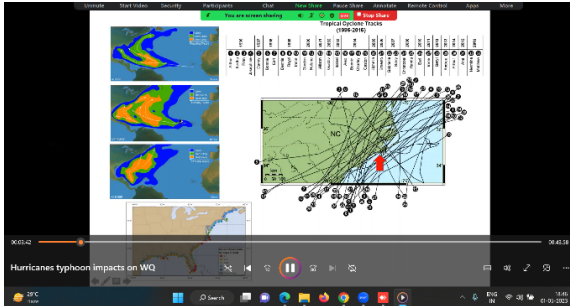
Dr. Sourav Paul,
Director, Estuarine and Coastal Studies Foundation,
10/5 Amrita Pyne Lane, Howrah, West Bengal-711101



3.3 Outreach

3.3.1 Seminars/ Webinar

- UN Ocean Decade endorsed Webinar on ‘**Tropical Cyclone at Zoom platform**’ on **1 May, 2023**. The Speaker **Professor Hans W Paerl** spoke about hydrological, biogeochemical, carbon cycle and planktonic changes that cyclones cause to estuaries. The webinar attracted a PAN India audience and some distinguished guests across different countries of Asia. The webinar was endorsed by the **IOC-UNESCO UN Ocean Decade (2021-2030)**.



- The foundation has hosted a national Webinar on ‘**Demystifying Human-Wildlife Conflict**’ delivered by **Mr. Ratul Saha** of Ernest & Young, India on Zoom platform at **6.30 PM IST of 15 May, 2023**.

ESTUARINE AND COASTAL STUDIES FOUNDATION
(Registered with NITI Aayog DARPAN, Govt. of India)

National Webinar
Demystifying Human-Wildlife Conflict

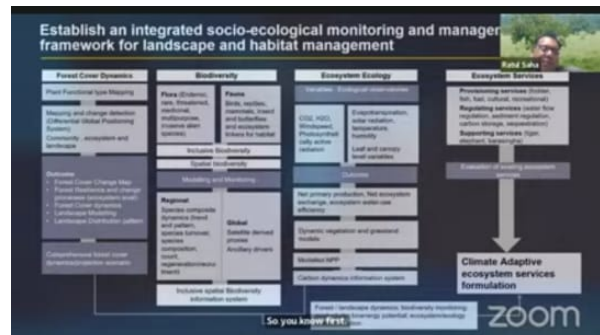
SPEAKER

Mr. Ratul Saha
Senior Business Consulting
Ernst & Young Services Pvt Ltd.

Date: 15-05-2023 Time: 06:30 PM IST

President: Dr. A Mukhopadhyaya Vice President: Mr. S Chatterjee Members: Dr. S Paul, Dr. BD Bhattacharya and Dr. M. Moniruzzaman Coordinator: Dr. Tanoy Mukherjee

Registration link: https://docs.google.com/forms/d/e/1FAIpQLSfNI-Zkxh6cSA37steU-V5TgZhu-kH0xnr3oP-Jt9l14qQw/viewform?usp=pp_url Venue: **zoom**



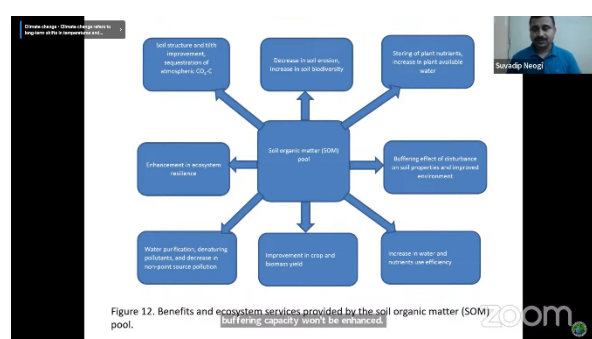
- A National Webinar on ‘**Agricultural Soil Carbon Sequestration and Climate Change Mitigation**’ on **21st May, 2023 at 6:30 PM IST on Zoom Platform**. The lecture was delivered by **Mr. Suvadip Neogi** on Sustainable Agriculture, Carbon Emission and Food Security.

2. SOM status on corn farms (CF) influenced due to conventional (CCF) regenerative (RCF) agriculture in USA

Farm location	Agriculture type	SOM (%)
Bladen (Nebraska)	RCF	6.23
	CCF	4.52
York (Nebraska)	RCF	6.21
	CCF	5.55
Bismarck (North Dakota)	RCF	5.82
	CCF	3.85
Toronto (South Dakota)	RCF	7.60
	CCF	6.38

Table 1 shows soil organic matter (SOM) status on corn farms (CF) due to conventional (CCF) and regenerative (RCF) agriculture in different regions in USA (LaCanne and Lundgren, 2018).

The organic carbon content of soil, is reported as percentage of C or calculated as organic matter by multiplication with a factor of 1.724 assuming soil organic matter contains on an average 58% carbon, so that $100/58 = 1.724$. A conversion factor of 1.724 is commonly used to convert organic carbon to organic matter.





- An International webinar ‘**Ocean and Life: Tides are changing**’ to celebrate World Ocean Day 2023 on **8 June, 2023 from 11 A.M. to 4 P.M. IST**. The webinar was endorsed by **IOC-UNESCO UN Decade of Ocean Science for Sustainable Development (2021-2030)**. This was also a joint venture between the foundation and the Early Career Ocean Professional (ECOP) Program for providing young scientist a platform to disseminate their research and views on Ocean Literacy. Scientists and faculty members of United Kingdom, Oman, Kuwait, Taiwan, Germany and India have presented their research and perspectives on sustainability of estuarine, coastal and marine issues and raised concerns about the changing climate. The webinar drew about 250 participants over Zoom and YouTube. Participants include faculties, scientists, students, nature enthusiasts of various universities of Indian and abroad.



- One day international lecture cum hands-on training on ‘**Environmental overview and current research on coastal oceanography in Uruguay**’ Delivered by **Dr. Danilo Calliari** (Associate professor, Ecology and environment, University of the Republic, Uruguay) **12 PM onwards of 6th February, 2024** at the department of Zoology, West Bengal State University, India. The seminar was conducted jointly by the foundation and WBSU. The programme also imparted a hands-on training of water quality and plankton biology.



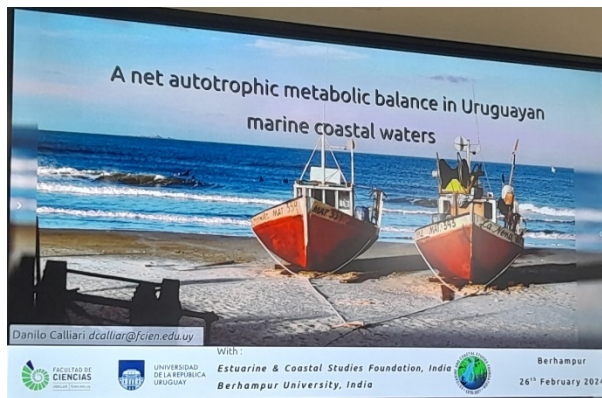


- The foundation and Diamond Harbour Women's University jointly hosted international seminar on **Biological Oceanography** on **22nd February, 2024**. **Dr. Danilo Calliari**,



Associate Professor of Ecology and Environment, University of the Republic, Uruguay presented his lecture on ‘**Plankton diversity and current research in Uruguayan waters of the South West Atlantic**’. His seminar engaged discussions on developing estuarine studies in the Ganges. The event was jointly convened by **Dr. S Das** of Zoology and **Dr. S Paul** of the foundation.

- An International workshop on ‘**A net autotrophic metabolic balance in Uruguayan marine coastal waters: background and recent results**’ of **Dr. Danilo Calliari**, Associate Professor of Ecology and Environment, University of the Republic, Uruguay was organized jointly by the foundation and the Berhampur University. The seminar was held at the Seminar Hall of the Department of Marine Sciences on **26 February, 2024**. The program was attended by various faculties, scientists and postgraduate students of Odisha and West Bengal.

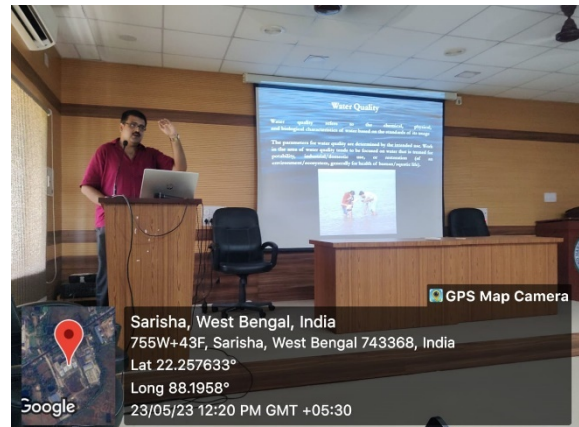


- A one-day seminar was held at the **Chandernagore College** as part of the MoU activity on ‘**Future imperfect? A case study on Kolkata**’ on **27th April, 2024** presented by **Dr. Kanailal Das** the in charge of the social science wing of the foundation has eloquently described the timeline of **Kolkata's past present and future from a perspective of sustainability**.

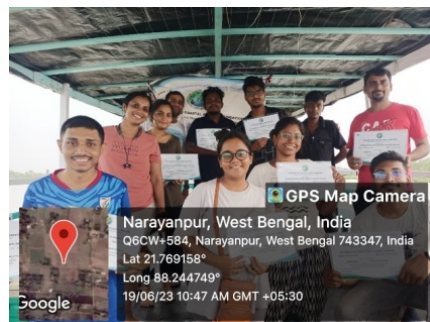


3.3.2 Workshop

- A workshop on **Fresh water quality of inland aquatic ecosystem in the coastal areas of South (24p), West Bengal** was carried out jointly by **Diamond Harbour Woman's University** and the Foundation on **23rd May, 2023**. The workshop highlighted the *importance of maintaining a healthy water quality for biodiversity and food web management of different pond ecosystem.*



- A workshop on **Biomagnification of heavy metals in Gangetic food web** was conducted on **18-19 June, 2023** to demonstrate **pollution studies targeted at various levels of an estuarine food web**. *The workshop demonstrated how to conduct environmental sampling, continuous recording of hydrological parameters, biological sampling of various types of plankton.*







- A workshop on **Ocean Literacy** (*'Thinking Beyond The Waves'*) had been conducted at the **Shibpur B.E. College Model High School** on **7th July, 2023**. The workshop which was carried out in collaboration with **UN Ocean Decade endorsed Early Career Ocean Professionals programme** to plug in those knowledge gaps.

United Nations Decade of Ocean Science for Sustainable Development
(2021 - 2030)

Early Career Ocean Professionals & Estuarine & Coastal Studies Foundation (ECOP & ECSF)

 **ECOP**
Early Career
Ocean Professionals



Thinking Beyond The Waves....


'Ocean Literacy'


Date: July 7, 2023
Time: 12:15 pm onwards
Host: B.E. College Model School, West Bengal, India

Highlights


Learn more about Life under water and UN Ocean Decade challenges

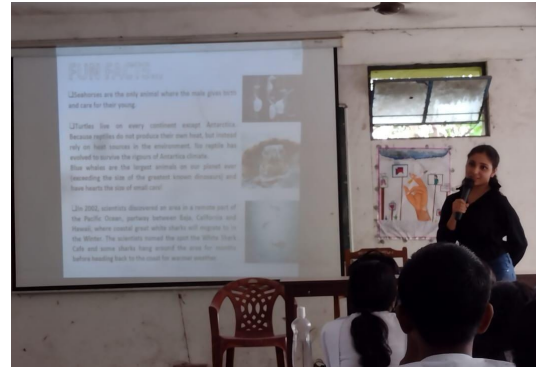
Event Co-ordinator

 **Debarati Sengupta**
Former ECOP-Asia Intern & ECOP-Ocean Literacy Focal Point for Asia

 **Dr. Sourav Paul**
Director & Co-founder
Estuarine & Coastal Studies Foundation

Contact:

 debarati@ecopdecade.org
estuarycoast@gmail.com



- The foundation has partnered with ‘Purbasha Eco-Helpline Society’ to celebrate the ‘International Mangrove Day’ on **26 July, 2023**. For the occasion a workshop entitled, “*Understanding the ecological balance of Indian Sundarbans facing periodic cyclones*” was held from **25 to 27 July, 2023** at the **Chargheri of Indian Sundarbans**. This **IOC-UNECSCO endorsed UN Ocean Decade (2021-2030) Workshop** was focused on the *socio-ecological balance of a mangrove ecosystem considering the increasing intensity of cyclones in the region.*

আন্তর্জাতিক ম্যানগ্রোভ দিবস উদযাপন ও কর্মশালা
 ২৫শে জুলাই, ২০২৩ - ২৭শে জুলাই, ২০২৩

এতদ্বারা শংসায়িত করা যাইতেছে যে.....
 পূর্বশা ইকো হেল্পলাইন সোসাইটির আয়োজনে (২৫শে জুলাই থেকে ২৭শে জুলাই, ২০২৩) সুন্দরবনে আন্তর্জাতিক ম্যানগ্রোভ দিবস অনুষ্ঠান ও কর্মশালায় অংশগ্রহণ করেছেন এবং সাফল্যের সঙ্গে পরিবেশের প্রতি দায়িত্ব পালন করেন।
 অংশগ্রহণকারীর / প্রতিষ্ঠানের সর্বস্বীকৃত সাক্ষ্য ও উজ্জ্বল ভবিষ্যৎ কামনা করি।

অধ্যাপক অমর্ত মুখোপাধ্যায়
 অধ্যাপক অশ্বিনী কুমার পাল
 ড. কনাইলাল দাস
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 অধ্যাপক শশঙ্ক পাল



- The foundation conducted a field workshop on ‘**Ecosystem services and vulnerabilities: perspectives of fisheries, water quality and embankments**’ on **12-13 September 2023** in *Indian Sundarbans*. The workshop was endorsed by the **Early Career Ocean Professional (ECOP) Program of the IOC-UNESCO UN Ocean Decade (2021-2030)**. The program imparted hands- on training on fish catch, fish tissue and organ extraction, measurements of different water quality parameters.

ESTUARINE AND COASTAL STUDIES FOUNDATION
 (registered with NITI Aayog DARPAN, Govt. of India)

IOC-UNESCO United Nation Ocean Decade (2021-2030) Early Career Ocean Professionals (ECOP) endorsed field workshop on
Ecosystem services and vulnerabilities: perspectives of fisheries, water quality and embankments.

Venue: Sundarbans, India • Date: 12 - 13 September 2023

Intake - 20
 Eligibility - Scholars/PG and UG students/Scientist/Faculty/Professional/Nature enthusiasts

Fisheries Fish handling, Tissue collection and Tissue processing, Food, feeding, growth identification, collection and evaluation of the functions of different endocrine glands Expert: Dr. Mohammed Moniruzzaman	Coastal Dynamics Water quality, mangroves and embankments Expert: Dr. Kanailal Das	Instrumentation pH/pH-mV/DO/Temperature meter, Salinity meter, GPS, Range finder, Clinometer compass, Anemometer, Soil pH meter Experts: Mr. Debabrata Samanta Sponsored By: HANNA instruments
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Coordinator: Dr. Mohammed Moniruzzaman (Scientist B, ECSP)
 Patron: Dr. A. Mukhopadhyay | President: Mr. S. Chatterjee | Secretary: Dr. S. Paul
 Registration: estuarycoast@gmail.com | 8240469894, 9830622765

CERTIFICATE to participants





- One day field workshop on **Water quality work at East Kolkata Wetland, a Ramsar Site** on **12 December 2023**. The workshop was conducted by the foundation in collaboration with **B.E. College Model High School**.



- The foundation and the **B.B. College Asansol** have jointly organized a one-day state-level workshop on **‘Environmental data analysis and decision making’** on **13th December, 2023** at the **Department of Zoology of the B.B. College Asansol**.



- **The foundation and Purbasha Echo-helpline Society of Indian Sundarbans** have jointly organized a workshop on **‘Mangrove and Climate with the communities of Indian Sundarbans’** between **27 and 28 December, 2023**. The workshop was endorsed by the **ECOP program of the IOC - UNESCO UN Ocean Decade (2021-2030)**.



- An international workshop on **‘Ecosystem Dynamics of estuaries’** was conducted on **Ganges estuary** on **10-11 February, 2024**. Participants included students, researchers and professionals of various colleges of **University of Calcutta, CUSAT and KUFOS Kerala, College of Fisheries (OUAT) Odisha, Linkon University of Malaysia**.



- **The foundation and Purbasha** jointly conducted *UN Ocean Decade endorsed international field workshop on ‘Socio-ecological balance of World’s largest deltaic mangroves: Perspectives of ecosystems functions and vulnerabilities’* in Indian Sundarbans on *17th and 18th Feb, 2024*. The workshop had sessions of *water quality, estuarine biology, mangroves and their importance, embankments and their vulnerabilities and science communication*.



- **The foundation and Berhampur University, Odisha** had jointly organized *‘International skill building workshop on coastal science’* on *25-26 February, 2024*. In this workshop a *hands-on training of ecosystem study* was conducted at the





Haripur Creek followed by data analysis in the laboratory. The workshop also included a lecture on '*A net autotrophic metabolic balance in Uruguayan marine coastal waters: background and recent results*' of **Dr. Danilo Calliari**. A discussion on '*how to write a scientific paper of coastal ecology*' by **Dr. Sourav Paul** was also a part of this workshop.

- **A hands-on training of measuring abiotic environment of an aquatic ecosystem** was jointly hosted by on **18th March, 2024** the foundation and **Rabindra Mahavidyalaya, Chapadanga, Hooghly** at the college campus. The students under the supervision of **Dr. Sourav Paul** (Director of the foundation) and faculty members of the departments of Geography and Zoology have been trained to *measure water quality, soil and air parameters*.



- **The foundation** organized a one-day workshop on '*R Statistical Software: Basic knowledge*' at the **Department of Conservation Biology at Durgapur Government College** on **19 March, 2024**. The foundation Director **Dr. Sourav Paul** has acted as the resource person and demonstrated on *theory and practice the need of decision making in the environmental data analysis while using R Statistical software*.





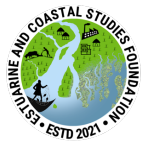
3.3.3 Ocean Literacy

In 2023, ECSF's Ocean Literacy Coordinator **Ms. Debarati Sengupta** initiated its ***Ocean Literacy (OL) program 'Beyond the Waves'*** to advance and promote marine and environmental science courses in India. This program is inspired by the '**Ocean Literacy for All**' program of **IOC-UNESCO** and **Early Career Ocean Professionals- Ocean Literacy Task Team (UN Ocean Decade endorsed programme)**. Ocean Literacy (OL) is defined as "**An understanding of the ocean's influence on you and your influence on the ocean (UNESCO)**". Our primary objective is *to educate young minds about Ocean, Climate and Community*.

Objectives:

- Educating youths about Ocean and Climate.
- Reaching underrepresented coastal communities to connect them to the sea.
- Creating awareness among general public and spreading the messages of UN Ocean Decade.
- Promoting the establishment of Ocean Literacy network in India.
- Production of resource materials, engaging visual contents and launching youth focused webinars.





3.3.4 Institutional social responsibilities

The foundation is committed to carry out its *socio-environmental responsibilities*. Foundation is building environmental resilience among coastal communities by *planting mangroves in the coastal belts of India*. That activity is also helping the foundation to *minimize its carbon footprint*. Following actions have been taken so far

1. Plantation of mangroves in the **Chargheri of the Indian Sundarbans** by the summer-intern students of the foundation.
2. Plantation of mangroves along the **banks (i.e., Chandannagar) of the Ganges estuary** by students and faculty members of the foundation.



3.4 Consult

The foundation is associated with the various types of consultancy facilities such as *field works* and *surveying* by the experts of various domains and **field instruments, laboratory-based assessment to monitor soil and water quality** of freshwater, brackish and marine environments. Foundation also provides expertise in *taxonomy and biodiversity of plankton, fishes in mangroves of estuaries and coasts*. The trained scientists of the foundation provide *statistical solutions*. The PG departments of the **Lady Brabourne College, University of Calcutta** consulted the foundation for training man power, supporting in field and laboratory works related to **DBT Builder Project** of the college.



4. Memorandum of understanding

The foundation is currently working with the students, researchers, scientists and faculty members of reputed educational, research institutions and NGOs of India.

- **Kabi Nazrul College, Murarai**

The foundation has signed a MoU with **Kabi Nazrul College, Murarai** on **22nd March, 2024**. Two institutions would jointly probe into academic and research ventures. On the occasion of ‘**World Water Day 2024**’ this MoU was signed at the College campus.



- **Durgapur Government College**

The foundation and the **Durgapur Government College** have entered into a MoU for *five years* on **19th March, 2024**. This was to facilitate student mobility, scientific research and joint use of resources.



- **Berhampur University, Odisha**

Berhampur University, Odisha and the foundation have signed a MoU on **06th October, 2023** for joint ventures of *education and research on interdisciplinary issues* related to *estuaries and coasts*.



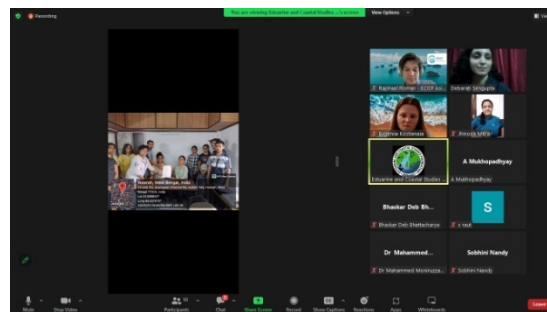
- **Banwarilal Bhalotia College, Asansol**

The foundation has entered into a MoU with **BB College of Asansol, West Bengal** for *5 years* on **07th June, 2023**. The goal is to jointly conduct education and research ventures and student and faculty exchanges.



- **IOC-UNESCO ECOP Programme UN Ocean Decade (2021-2030)**

The foundation, from its commitment to promote issues of **Ocean among young of India**, has done a partnership with the **IOC-UNESCO Early Career Ocean Professional (ECOP)** program of the **United Nations Ocean Decade (2021-2030)** on **25th May, 2023**. The foundation and ECOP would partner in *promoting ocean literacy among various stakeholders of the society*.





Two partners would jointly conduct short-term courses, including *internship opportunities, conduct webinars, and at times, host different in-person activities*. The MoU stands valid for this decade with a possibility of extension beyond.

5. Publications

5.1 Research articles

- Dutta S*, Al-Jufaili S, Al-Anbouri I and Paul S*. 2023. **Population Status of *Sardinella longiceps* of the Sultanate of Oman: Perspectives of Length-based Approach.** *Thalassas: An International Journal of Marine Sciences*, 40, 356-365.
- Bhattacharya P and Paul S*. 2023. **Effects of Abiotic Changes on a Pelagic Chaetognath *Zonosagitta bedoti* Population of the Ganges Estuary, India.** *Journal of Aquatic Biology and Fisheries*, 11(1), 12-18.
- Paul S*, Karan S and Bhattacharya BD. 2023. **Effects of tropical cyclone Amphan on the copepods of the Ganges estuary.** *Marine Biology Research*, 19 (6-7), 342-354.
- Paul S*, Karan S and Bhattacharya BD. 2024. **Copepods (Zooplankton) of Muriganga Estuary, at West Bengal Coast, India.** *Proceedings of the Zoological Society*, 77, 126-135.

5.2 Book chapters

- Das K and Das K (2023): **Traditional Knowledge and Community Participation in the Light of Natural Hazards as a Consequence of Climate Change: A Case Study of Chargheri Village, Gosaba Block, Indian Sundarbans** *Climate change, Disaster Resilience and Human Well Being*, pp 88-99.
- Mondal K, Bose T, Das S, Das K and Das K (2023): **Tourism Initiatives – Dichotomy between Adaptation and Bottleneck: A Case Study of Mousuni Island, Indian Sundarban** *Climate Change, Disaster Resilience and Human Well Being*, pp 305-315.

5.3 Conference proceedings

- Sengupta D, Calliari D and Paul S (2023): **Revisiting the concept of Zooplankton diversity assessment: perspectives from carcasses.** *National Conference on Ecosystem and Biogeochemistry of the North Indian Ocean, Odisha*, pp: 21-22.
- Das S, Saha S, Bose T, Mondal K, Das K, Das K (2023): **Recurrent coastal erosion- A comparative analysis of Bakkhali and Mousuni, Indian Sundarbans** on *35th National conference IGI, 2023* pp.23-24.
- Das S, Saha S, Bose T, Mondal K, Das K, Das K (2023): **Coastal retreat- A comparative analysis of Bakkhali and Mousuni, Indian Sundarbans** on *E- ConSus 2023*. pp. 25.
- Mishra P and Mondal J * (2023): **Hourly variation of Ciliates at Sajnekhali, Indian Sundarbans.** *International Interdisciplinary Conference on Revisiting Strategies on Sustainable Development, e-ConSus 2023*. pp.



- Mishra P and Mondal J* (2023): **Spatial variability of microzooplankton and abiotic environment of Indian Sundarbans.** *Ecosystem and Biogeochemistry of North Indian Ocean*, pp. 23-24.
- Mitra J, Sengupta D, Paul S and Bhattacharya BD (2023): **Hourly variation of mesozooplankton and water quality of Thakuran estuary, Indian Sundarbans.** *National Conference on Ecosystem and Biogeochemistry of the North Indian Ocean, Odisha*. pp 19-20.
- Mitra J, Sengupta D, Paul S and Bhattacharya BD (2023): **Hourly variation of mesozooplankton and environment of Thakuran estuary, Indian Sundarbans.** *5th International Conference on Sustainability Education, New Delhi*. pp 63.
- Mitra J and Bhattacharya BD (2023): **Hourly variation of mesozooplankton in relation to environment of Thakuran estuary, Indian Sundarbans.** *International Interdisciplinary Conference on Revisiting Strategies on Sustainable Development, Asansol*.
- Naiya P (2023): **Land and water resources management strategies for economic development of Birbhum district, West Bengal.** *Revisiting Strategies for Sustainable Development (e-ConSus)*. pp 17.
- Bose T, Das S, Mondal K, Das K and Das K (2023): **Combatting climate change with sustainable measures: A case study of Mousuni Island, Indian Sundarbans**
- Das S, Saha S, Bose T, Mondal T, Das K and Das K (2023): **Coastal retreat – A comparative analysis of Bakkhali and Mousuni, Indian Sunderbans.** *Advances in Geosciences with Special Reference to Coastal Hazards*. pp 23-24.
- Bose T, Das S, Mondal K, Das K, Saha J and Das K (2023): **Combatting climate change with sustainable measures: A case study of Mousuni Island, Indian Sundarbans.** *Educating for climate action and sustainability*. pp 65-66.
- Sengupta D, Calliari D and Paul S (2024): **Revisiting the concept of Zooplankton diversity assessment: perspectives from carcasses.** *6th Regional Science & Technology Congress 2024*. pp: 240.
- Paul S (2024): **Perspectives of cyclone ecology program for Indian estuaries in United Nations Decade of Ocean Science for Sustainable Development (2021-2030).** *West Bengal State Science & Technology Congress 2024*. pp. 134.
- Saha S, Das S, Das K, Das K (2024): **Coastal Restoration-A Comparative Analysis between Bakkhali and Mousuni, Indian Sunderbans.** *World Ocean Science Congress 2024*.
- Devi PL, Bhattacharya BD, Paul S (2024): **Heavy metal accumulation in plankton in 24 hour tidal cycle, Ganges estuary.** *World Ocean Science Congress*. pp. 298.
- Das S, Saha S, Das K, Das K (2024): **Sustenance of embankment in protecting the coastal islands- A case study in Bakkhali, Indian Sundarbans.** *World Ocean Science Congress 2024*.
- Das S, Bose T, Das K, Das K (2024): **Sustenance of embankment with climate change- A case study of Mousuni island, Indian Sundarbans on 31th WBSSTC (2024)**, pp. 82.
- Bhattacharya A, Mukherjee T (2024): **Bioacoustic differentiation of Greater Coucal (*Centropus sinensis*) at the subspecific level.** *National Symposium on Avian Biology 2024*. pp. 79.



6. Achievements

- The foundation's research work on cyclone was featured in **Times of India** on April 16, 2023.
- **Dr. Bhaskar Deb Bhattacharya, Dr. Mahammed Moniruzzaman and Dr. Sourav Paul** from the foundation were featured in a widely circulated **Bengali daily newspaper Eisomay** on August 6, 2023.
- **Dr. Jhimli Mondal**, the visiting scientist at the foundation, secured prestigious **DBT BioCare fellowship** on August 18, 2023 under the mentorship of Dr. Sourav Paul.
- **Dr. Sourav Paul** Chaired the panel discussion on '**Cyclone and human well-being**' at **ICCCDRHW 2023** at Berhampur University on September 16, 2023.
- **Dr. Mahammed Moniruzzaman**, Scientist-D at the foundation, selected at the College Service Commission, West Bengal on September 16, 2023.
- **Dr. Sourav Paul** delivered an invited lecture in **2 Mega-Delta Programme Endorsed by IOC-UNESCO** on November 7, 2023 held in Shanghai, China, hosted by SKLEC, ECNU.
- **Ms. Shreya Das** (YECS intern of the foundation) has secured the **2nd place** in **31st West Bengal State Science and Technology Congress 2023-24** held at University of Kalyani by representing the foundation through her research work conducted on Mousuni Islands. Shreys's participation was in the **Thematic topic: Science and Technology for Disaster Management**.
- **Ms. Debarati Sengupta** (YECS intern of the foundation) acted as an expert in the Regular Process meeting at UNESCO HQ, Paris Symposium on December 9, 2023.
- The foundation officially represented India in the **NGO Task Group of IOC-UNESCO UN Ocean Decade (2021-2030)** on December 13, 2023.
- **Dr. Sourav Paul** has been awarded the prestigious **Fellowship of the Future Earth Coasts** for 3 years. January 31, 2024.
- **Ms. Debarati Sengupta** (YECS intern of the foundation) represented the foundation & ECOP Ocean Literacy(OL) programmes in the **Indian Ocean Regional Decade Conference (IO-Con '24), INCOIS, Hyderabad** on February 5, 2024.
- **Dr. Sourav Paul** selected as a special session convener in **ECSA60, Hangzhou, China** on February 8, 2024.
- **Dr. Sourav Paul** won the '**Outstanding Paper**' in Environmental Science including Climate Change category of **31st West Bengal State Science and Technology Congress 2023-24** on February 29, 2024.



7. Student placements

- **Ms. Ankita Chatterjee** (Science hands-on student) secured position in **WWF-India** on April 7, 2023.
- **Ms. Adrita Chakraborty** (Science hands-on alumni) has secured **JRF in NCBS-TIFR** on July 19, 2023.
- **Mr. Palash Naiya** (Science hands-on alumni) secured **PhD admission in Oceanography at Berhampur University** on August 29, 2023.
- **Ms. Puja Mishra** (YECS intern of the foundation) secured PhD at Department of Zoology, Diamond Harbor Women University on February 26, 2024.
- **Ms. Ishani Banerjee** secured the Projects Scientist position at CSIR- National Institute of Oceanography (NIO) on March 15, 2024.

8. Institutional facilities

8.1 Central Instrumentation Facility

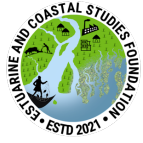
Foundation provides arrays of state-of-the-art equipment for education and research.

Spectrophotometer, Multiparameter water quality probes, Hot air oven, Precision balance, Turbidity meter, Vacuum pumps, Electrical Conductivity (EC) meters, Light meter, Nitrate meter, pH meter, Soil pH meter, Soil EC Meter, Soil moisture meter, Mechanical flow meter, Depth, Sensor, ORP meter, Sieves of various size class, Filtration hand pump, Hygrometers, Niskin bottles, Refractometer, Mechanical current meter, Sound level meter, Infrared thermometer, Digital Thermometer, Van Veen Grab, Abney level, 4m leveling stand, Prismatic Compass, Ranging Rod, Planimeter, Clinometer compass, Anemometer, Vernier Calipers, Hygrometer, Dumpy level, Handheld GPS, Rotameter, Vortex mixture, Vertical Gel Electrophoresis, Stereo Microscope with Camera, Rotary Shaker, Desiccator, Horizontal Gel Electrophoresis, Centrifuge, Micro Centrifuge, BOD Incubator, Autoclave, -20° Freezer, Magnetic stirrer with hot plate and so on.

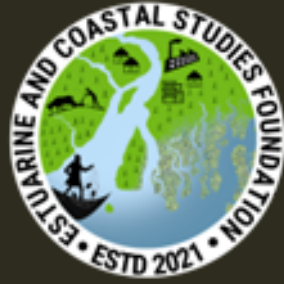
8.2 Other facilities

Office, Laboratory, Administrative / Secretarial support, Accommodation, Water and Electricity, Internet and Telecommunication, Computation, Storage, Library, CCTV, Fire safety, Vehicle.

****End****



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