सिफरी समाचार
CIFRINEWS

(July - December 2023)

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International workshop cum training programme on "Sustainable Fisheries and Dairy" (page 03)

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ICAR-CENTRAL INLAND FISHERIES RESEARCH INSTITUTE
(An ISO 9001 : 2015 Certified Organisation)
Barrackpore, Kolkata - 700 120

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Director's Column

This institute mandated to develop the human resources in the field of inland fisheries. Every year tens of hundreds of fishers, fish farmers, fishery officials, students, teachers got trained by the institute. During the month of December an international workshop cum training programme on "Sustainable Fisheries and Dairy" under the aegis of the Ministry of External Affairs, Govt. of India, was organized. The participants from Cambodia, Lao PDR, Myanmar, and Vietnam attended the programme and were highly satisfied and benefited from this programme.

It is a matter of great pleasure to inform you that the trademark "CIFRI HDPE Cage" has been granted. Another two trademarks along with seven copyrights have been filed. Simultaneously, two design registrations were granted and two copyrights were registered. For academic and research collaboration, we have signed four MoUs with different universities. As a new initiative, cage culture activities was started at the Kangsabati reservoir of West Bengal with table fish production. The institute-developed catch assessment survey software was disseminated to the Government of Chhattisgarh.

We have been relentlessly trying to restore the fish diversity, particularly IMC in the River Ganga through ranching and awareness for the last couple of years. In this direction, we have conducted four ranching programmes in the last six months in which five lakh fingerlings were released into the river Ganga at different places.

Several scientific meetings *viz*. Workshop on livelihood development of wetland fishers addressing SDGs, Review meeting of the NASF project on hilsa, Workshop on Vulnerability of inland fisheries due to climate change, Concluding workshop under the NMCG project, and stakeholders consultation cum consultative workshop on Hilsa fisheries improvement were held.

I heartily welcome four newly joined HoDs at the headquarters, Dr. S. Samanta, Dr. R. K. Manna, Dr. S. K. Manna, Dr. Sullip Kumar Majhi, Dr. (Mrs.) Archana Sinha. I also welcome Shri Rakesh Kumar, Scientist who joined at our Guwahati centre. A number of scientists received prizes, honours in different forum. I congratulate all of them. Congratulation to the women sports team of 4 x 100-meter relay, who clinched the silver medal in the ICAR Zonal Sports Meet 2023. Three of our beloved staff, Shri Feroz Khan, Scientist; Ms. Keya Saha, Chief Technical Officer, and Dr. M. A. Hassan, Principal Scientist, got superannuated during this period. I wish them a happy and healthy retired life. I invite suggestions from the learned readers to improve the institute newsletter.

February 2024

Dr. B. K. Das
Director

About ICAR-CIFRI

Started as Central Inland Fisheries Research Station in March, 1947 at Barrackpore, West Bengal, ICAR-CIFRI has carved a niche in inland fisheries research. Induced fish breeding, composite fish culture and other scientific fish production practices developed during the sixties by the Institute contributed to the nation's blue revolution. Reservoirs and wetland fisheries management technologies developed and disseminated by the institute resulted in enhanced fish production from these resources. By the turn of the year 2000, the research and development agenda of the Institute concerning inland open waters shifted from fish as the only benefit to ecosystem health and ecological benefits with emphasis on sustainability, livelihood and nutritional security. In addition to the Headquarters at Barrackpore and research station at Kochi, ICAR-CIFRI has four Regional Research Centres at Allahabad, Guwahati, Bengaluru and Vadodara, through which the issues of inland open water fisheries are being addressed.

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International Training-cum-Workshop on "Sustainable Fisheries and Dairy"

An international training cum workshop on "Sustainable Fisheries and Dairy" under the Indian Technical and Economic Cooperation (ITEC) of the Ministry of External Affairs, Govt. of India, was inaugurated virtually by Dr. Himanshu Pathak, Secretary, DARE and DG, ICAR on 06 December 2023. The 14-day training program aimed at capacity building of the participants from Cambodia, Lao PDR, Myanmar, and Vietnam (CLMV). Dr. J. K. Jena, DDG, Fisheries Sciences as well as Animal Sciences, ICAR; Ms. Paramita Tripathi, IFS, Joint Secretary, Indo-Pacific Division, Ministry of External Affairs, Government of India; and Prof. Shyam Sundar Dana, Vice Chancellor, West Bengal University of Animal and Fisheries Science, graced the inaugural session. The ICAR-CIFRI publication on "Catch Estimation Methodology for Inland Waterbodies" was released during the inaugural ceremony. The concluding programme was held on 19 December with the gracious presence of Dr. B. Meena Kumari, Former DDG (Fy. Sc.), ICAR, and Former Chairperson, NBA; and Dr. P. Krishnan, Director, BOBP-IGO. The training programme covered various aspects of dairy and fishery enterprises management. Both caputre and cuture fisheries were covered. In-house experts as well as experts from outside the organization like ICAR-NDRI, ICAR Headquarters, IIT Kharagpur and Austria discussed various topics. Field tours were also conducted.

Inaugural programme

A trainee giving her inputs

A section of trainees

Concluding programme

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Research Highlights

Water quality at Panch Prayag, Uttarakhand during monsoon

Panch Prayag refers to a group of five places in the state of Uttarakhand, where five rivers merge into the river Alaknanda, forming the Holy river, Ganga. These five places are Vishnu Prayag (confluence of Dhauliganga and Alaknanda Rivers), Nanda Prayag (confluence of Nandakini and Alaknanda), Karna Prayag (confluence of Pindar and Alaknanda), Rudra Prayag (confluence of Mandakini and Alaknanda), and Dev Prayag (confluence of Alaknanda and Bhagirathi). The institute conducted hydrological sampling at these rivers in September 2023. Water samples were collected from above and below-confluence sites of the Panchaprayag rivers. The vital water quality parameters such as water temperature, pH, dissolved oxygen, and BOD ranged from 13.6 to 21.5 °C, 8.4 to 9.0, 8.0 to 9.6 mg/l, and 1.0 to 2.0 mg/l, respectively. Specific conductivity and TDS ranged from 59.7–203 µS/cm and 42.5–144.0 mg/l. The maximum water turbidity was 628 NTU, and the minimum was 33.3 NTU, which is above the prescribed drinking water limit of 5 NTU. The high value of turbidity was due to the high amount of eroded soil discharged into the river systems through runoff. The alkalinity ranged from 30 to 102 mg/l. Total nitrogen and total phosphate ranged from 0.62 - 2.61 mg/l and 0.11-0.95 mg/l, respectively. The study suggests that there were minimal or no influences from anthropogenic activities, and most of the studied water parameters were within the safe limit for drinking purposes (FAO, BIS).

Dev Prayag

Rudra Prayag

Karna Prayag

Nanda Prayag

Vishnu Prayag

Confluences of river Alaknanda at Panch Prayag

B. K. Das, S. K. Mishra, V. Kumar, D. N. Jha, A. Alam, V. R. Thakur, J. Kumar, S. K. Verma, U. Singh, R. B. Verma and R. Kumar

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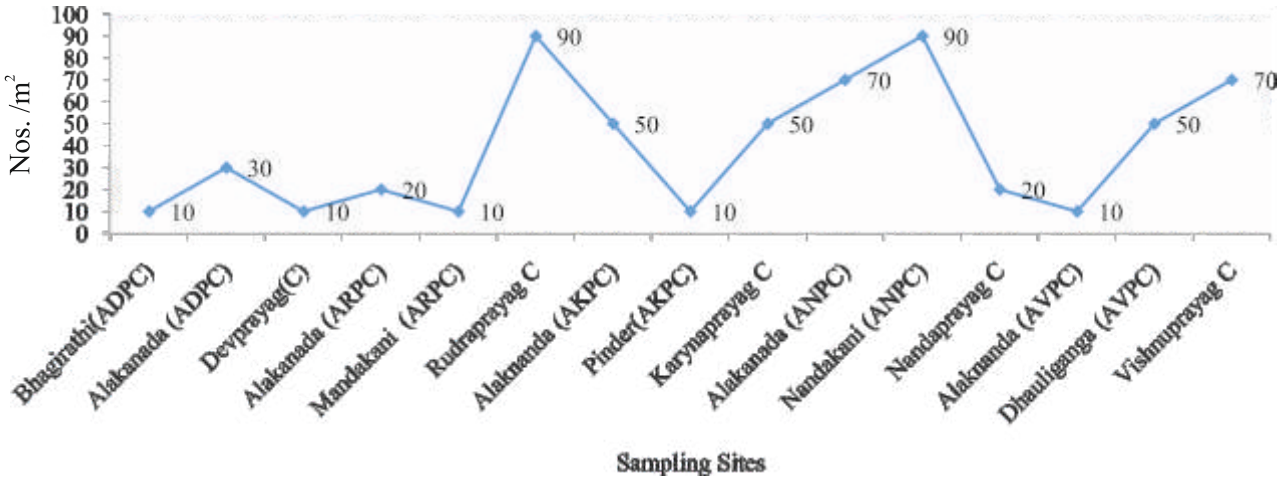
Benthic diversity and abundance from Panch Prayags of Uttarakhand

The study was conducted at the holy Panch Prayags, namely Dev Prayag, Rudra Prayag, Karna Prayag, Nanda Prayag, and Vishnu Prayag of Uttarakhand, comprising of the pristine rivers such as Bhagirathi, Alaknanda, Mandakini, Dhuliganga and Pindar. The study revealed the presence of a total of seven benthic taxa belonging to three orders and five families. The Ephemeroptera order was dominated, followed by Trichoptera and Diptera at different sampling sites. The highest abundance (nos. /m^2) of the benthic fauna was recorded from the confluence of Rudra Prayag, and river Mandakini above the confluence of Nanda Prayag (90 nos. /m^2). The dominant benthic fauna were *Heptagenia* sp., *Baetis* sp., and *Leptophlebia* sp. at different sampling sites in the Panch Prayags. *Platybaetis* sp., *Hydropsyche* sp., *Blepharicera* sp., and *Ironodes* sp. were recorded from the rivers Alaknanda and Nandakini above the confluence of Nandprayag and Dhauliganga above the confluence of Visnuprayag, respectively.



(ADPC = Above Dev Prayag, ARPC = Above Rudra Prayag, AKPC = Above Karna Prayag, ANPC = Above Nanda Prayag, AVPC = Above Visnu Prayag and C = at Confluence)

V. R. Thakur, S. K.Verma, D. N. Jha, A. Alam, J. Kumar, Vikas Kumar, S. K. Mishra, U. Singh, R. B. Verma and B. K. Das

'Khor' and *'Thali'* fishing in Sitareva River in Madhya Pradesh

During the post-monsoon and monsoon sampling of the Narmada River in Madhya Pradesh, a team of ICAR-CIFRI scientists reported two unique fishing methods, namely *'Khor'* and *'Thali'* fishing, from the Sitareva River, a tributary of the Shakkar River. The *khor* fishing was observed only at Sitareva during the post-monsoon season. *Khor* fishing was done by utilizing bamboo poles and a net to transform the rivers flow into a conical form. The border of the flow is maintained at 2 feet, and a conical-shaped net is attached at the end of the flow to collect the fishes coming along the flow. The fishes collected is attached to a conical net. The major fish species caught were consist of *Puntius sophore, Mastacembelus armatus, Tor putitora, Channa striata, Macrognathus pancalus, Schistura multifasciata, Barilius barna, Lepidocephalichthys guntea, Rita gogra, Olyra horae, Labeo calbasu, Danio rario*, small prawns, etc. The CPUE was found to be 500 g to 1 kg in 12 hours of fishing. Another fishing method observed at Sitareva is *'Thali'* fishing. A 12-inch plate is used, which is covered by a cloth that has a hole of 3–4 inches at the center. Wheat dough is used as bait and placed in the center of the plate. The ready plate for

Khor fishing

Thali fishing

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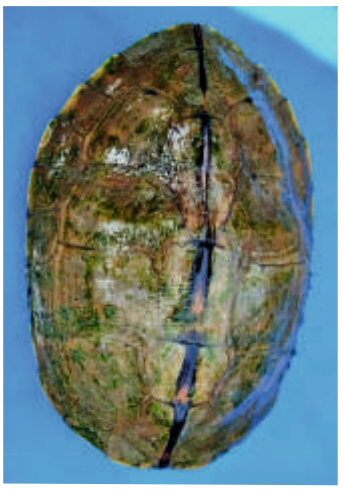
fishing is then placed in water for fish to come inside the plate. *Thali* fishing is mostly used as a subsistence fishing method, and nearly 0.25 to 0.30 kg of small barbs, minnows, and loaches (BML) are captured in the *Thali* in 45 minutes.

S. P. Kamble, Vaisakh, G., J. K. Solanki, S. K. Das, S. Samanta and B. K. Das

Freshwater turtles of the Kosi River

During a reconnaissance survey conducted in four riverine districts (~200 km) along the Kosi River in Bihar, *viz*. Supaul, Saharsa, Khagaria, and Bhagalpur, the surveyors recorded wo species of freshwater turtles, namely the crowned river turtle (*Hardella thurjii*) at Paharpur and Nauhatta (26 º00' 46.1 "N, 86 º27' 31.0") of Saharsa district, and the Indian peacock soft shell turtle (*Nilssonia hurum*) from Dumrighat (25 º32' 35.7 "N, 86 º43' 23.4" E) of Khagaria district. Both species of turtle have been categorized as vulnerable as per IUCN criteria.



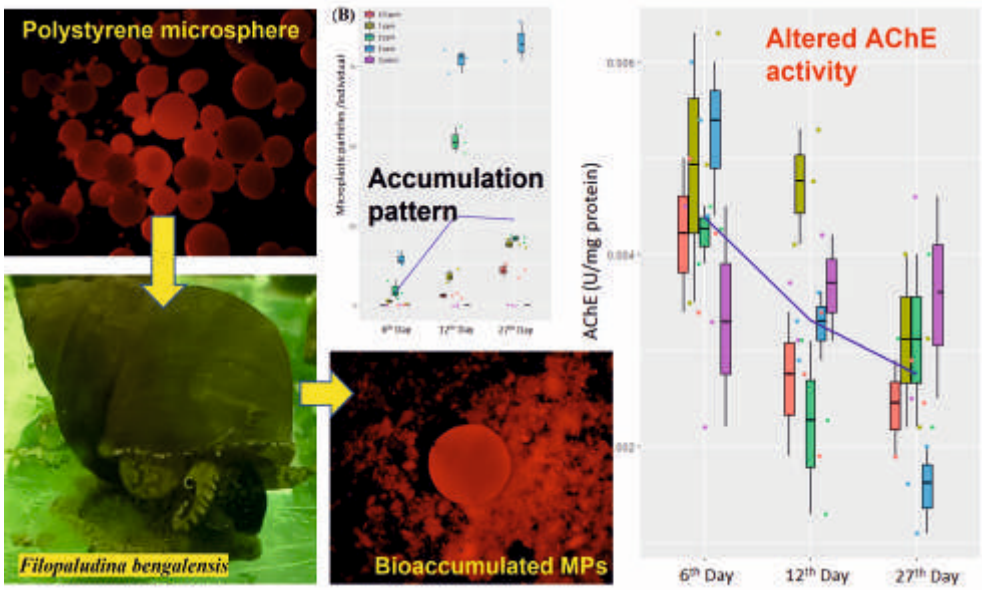
Hardella thurjii

Nilssonia hurum

Raju Baitha, Kausik Mondal, Suraj K. Chauhan and B. K. Das

Bio-accumulation of polystyrene microplastics in freshwater snail of River Ganga

A study was done to study the microplastic bio accumulation pattern in the freshwater snail *Filopaludina bengalensis*, which was subjected to 0.5 ppm to 5 ppm levels of polystyrene microsphere t (~30 µm) for 27 days. The study showed that microplastics were easily accumulated in the test organism in a dose- and time-dependent manner, amounting to 82 ± 6.02 particles per individual at a 5-ppm dose on the 27th day. However, no mortality was observed at the test microplastic dosages. The present study, for the first time, shows the direct impact of microplastics on a freshwater snail widely available in the Indian subcontinent, indicating that microplastic pollution will create havoc in the Ganga River eco-biosystem in the long run.



D. J. Sarkar, Shreya Roy and B. K. Das

Fish diversity of Dirang, an unexplored Eastern Himalayan River

Fish diversity in Dirang, an important tributary of Kameng in Aruanchal Pradesh, was studied in 2023. A total of 23 species of fish belonging to five families, namely, Cyprinidae, Nemacheilidae, Psilorhynchidae, Sisoridae, and Anguillidae, were recorded in our study. Cyprinids (9 species) were the most dominant group, followed by Sisorid catfishes (8 species), loaches, and eels. The exotic

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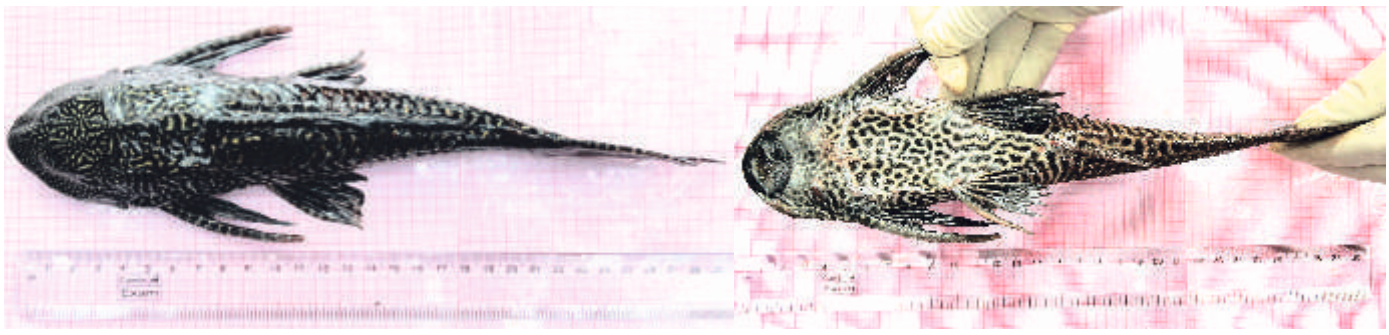
common carp was recorded from Bichom reservoir during the study. Among the 22 indigenous fish species recorded, *Schizothorax richardsonii* is categorized as vulnerable (VU) as per the IUCN, *Neolissochilus hexagonolepis*, *Bagarius bagarius,* and *Anguilla bengalensis* are categorized as near threatened (NT), while *Psilorhynchus arunachalensis* and *Creteuchiloglanis kamengensis* are categorized as data deficient (DD). The remaining indigenous fish species collected from the Dirang River fall under the Least Concern (LC) category.

Experimental fishing in Dirang

Simanku Borah, Mishal P. and B. K. Das

First report of exotic vermiculated sailfin catfish *Pterygoplichthys disjunctivus* in Chiri River

The occurrence of exotic vermiculated sailfin catfish, *Pterygoplichthys disjunctivus* in Chiri River a tributary of the Barak River, was reported for the first time in August 2023. The total length of the single specimen was 29.5 cm, with a total weight of 166.5 g. The fish was caught by a fisherman with a gill net (mesh size of 24 mm) during the morning hours in the Chiri River (24°48′39″ N; 93°55′52″ E), Chandrapur, Bashkandi, Silchar, and Assam. During the field visit on 24 August 2023, the average pH of the river (6.24) was found to be slightly acidic. Dissolved oxygen and total alkalinity values were 6.58 mg/l and 44.24 mg/l, respectively. The species is considered to have rapid dispersibility, and its invasive nature could result in serious ecological and economic consequences. To limit the spread of invasive fish species and their harmful consequences, the introduction and dispersal paths must be strictly regulated. Furthermore, local fishermen should be made aware of the ecological ramifications of this species and educate hobbyists to avoid releasing this fish alive into open waters.



Dorsal and ventral view of *Pterigoplichthys disjunctivus* caught from the Barak River, Silchar, Assam

S. C. S. Das, D. Debnath, A. Kakati, S. K. Majhi and B. K. Das

A new distributional record of skeleton shrimp (Caprellid amphipods) from West Bengal, India

During September 2023, while conducting physico-chemical sampling in the lower zone of the Matla estuary near Pathar Pratima within the Indian Sundarban region, growth of a biofouling community on submerged fishing ropes in the river was noticed. Upon closer examination, it was found that this fouling was predominantly made up of hydrozoa (*Eudendrium* sp. and *Bougainvillia* sp.). Further investigations revealed a significant aggregation of skeleton shrimps utilizing the hydroid stalks as a suitable habitat for shelter and reproduction. These specimens were identified as male and female *Paracaprella pusilla* Mayer, 1890. Limited information is available on Indian Caprellids, with only 12 species of these amphipods documented in India. *P. pusilla* was previously documented in Maharashtra, Kerala, Tamil Nadu, and Andhra Pradesh. This discovery extends the species' range to the northernmost part of the Bay of Bengal. Notably, the same species had been observed in Maharashtra's creeks, associated with epizootic hydroid

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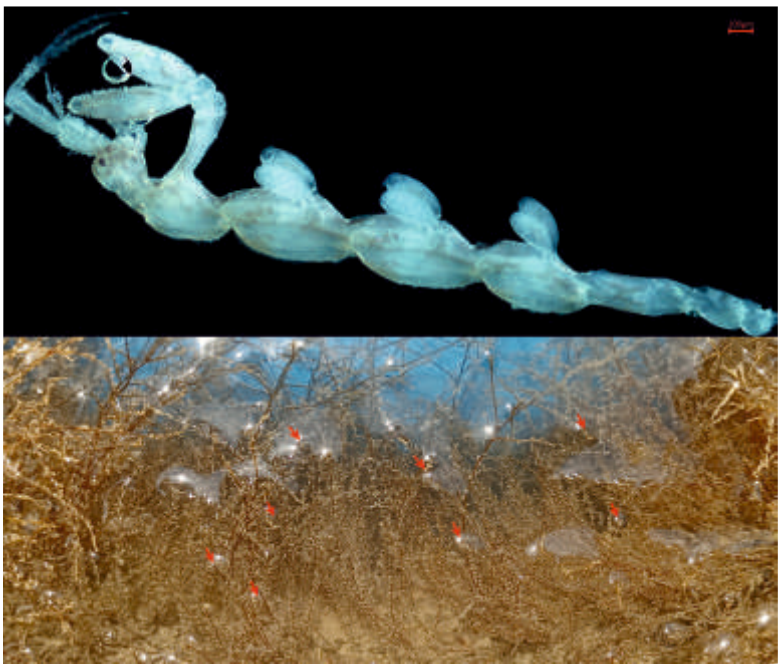
colonies on anchoring ropes. This study shows that epizootic hydroid colonies are used as breeding and nursing grounds by Caprellid amphipods, strengthening the connection between the two species. The surrounding water parameters during the survey were: water temperature 30.4 °C, turbidity 25.9 NTU, pH 8.6, dissolved oxygen 6.2 mg/l, total alkalinity 107 mg/l, total hardness 2687 mg/l, salinity 25.2 ppt, and BOD 0.4 mg/l.

Ranjan K. Manna, Arya Sen, Dibakar Bhakta, Chayna Jana, Sangeetha M. Nair, Subhendu Mandal, Abhijita Sengupta, Srikanta Samanta and B. K. Das

Stone loach *Schistura chindwinica* (Tilak and Husain, 1990) at Jaldapara National Park complex – a new record



Paracaprella pusilla Mayer, 1890 (male) and its Hydroid habitat

The stone loach, *Schistura chindwinica,* (Cypriniformes: Nemacheilidae) has been recorded for the first time from the Kodalbasti part of the river Torsa (26°39′10.5″ N, 89°20′18.5″ E) within the Jaldapara National Park complex, West Bengal. Two specimens of *S. chindwinica* were caught using a small, meshed drift gill net (less than 30 mm in mesh size) during the monsoon sampling in and around the Jaldarapa National Park complex. It is classified as a vulnerable species according to the IUCN Red List of threatened species. This benthopelagic tropical species is endemic to Manipur, India. There are only two streams in the Brahmaputra drainage in Manipur and Mizoram where this species has been observed. This is reportedly the first time that the species has been found outside its native region in the river Torsa, West Bengal. Among the identifying characters, eleven soft dorsal rays, eight soft anal rays, and nine cryptic dark grey bars are used to identify the species. The water parameters were collected and found to be low water depth (110 cm), low transparency (21 cm), and high turbidity (151 NTU). The pH of the water was 8.3, which is an ideal environment for fish. In the river, there was sufficient dissolved oxygen (7.3 mg/l) and a higher flow rate (0.4 m/sec). The current research widens the species' geographic range from its original habitat in the river Torsa in West Bengal, India.

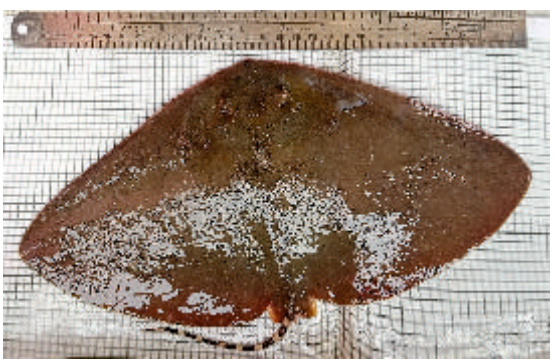
Dorsal view of *Schistura chindwinica*

Collection site of *Schistura chindwinica*

Dibakar Bhakta, R. K. Manna, Sangeetha M. Nair and B. K. Das

Vulnerable Long-tailed butterfly ray *Gymnura poecilura* (Shaw, 1804) at lower stretch of Hooghly-Matlah estuary

Long-tailed butterfly ray *Gymnura poecilura,* a Vulnerable (VU) elasmobranch was spotted in the bagnet at Fraserganj, in the lower stretch of the Hooghly-Matlah estuary. It belongs to the family Gymnuridae (Butterfly Rays) under the order Myliobatiformes (Sting rays). The long-tailed butterfly ray is a tropical marine demersal species that is sometimes caught using trammel nets and is frequently caught in demersal trawls. The chief diagnostic characters of the species include: dorsal surface of the species is smooth, denticle-free, disc uniform and brown; the ventral disc is consistently pale; the tail has nine to ten black stripes that alternate with white bands. Short nose and a disc width that is 1.71 times longer than its length.



Dorsal view of Long-tailed butterfly ray

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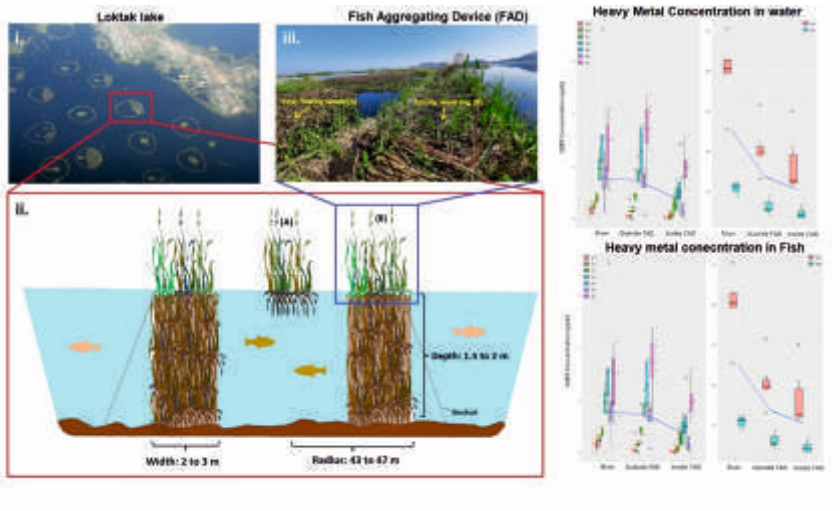
Gymnura poecilura differs from *G. micrura*, a closely related species, by having more tail bands (9–10) compared to *G. micrura* (only 5). Although the species is primarily marine, the fact that it was recorded from estuarine waters with salinities between 25 and 28 ppt and depths between 10 and 15 m suggests that its range has been extended. According to the IUCN, this species is classified as vulnerable; hence, any form of catch must be strictly controlled.

Dibakar Bhakta, B. K. Das, Saurav Nandi, Archisman Ray and Suraj K. Chauhan

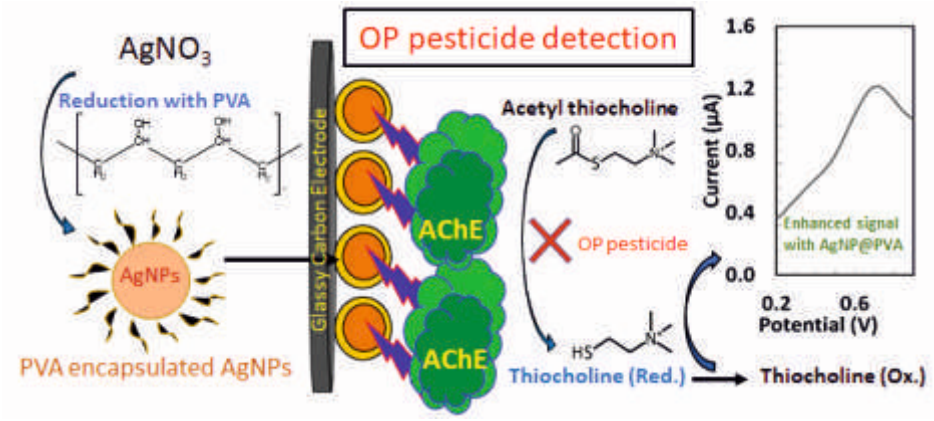
Heavy metal level in Loktak lake, Manipur

A study was conducted to evaluate the effect of a natural floating island in the form of fish aggregating devices (FADs) made of native weed mass on the distribution of heavy metals in the abiotic and biochemical compartments of Lokatak Lake, Manipur. Lower concentrations of surface water heavy metals were observed inside the FADs, with a reduction of 73.91%, 65.22%, and 40.57–49.16% for Cd, Pb, and other metals (*viz*., Co, Cr, Cu, Ni, and Zn), respectively, as compared to outside the FAD. These led to a 14.72–55.39% reduction in the heavy metal pollution indices inside the FAD surface water. The fish species inside the FADs were also found to be less contaminated (24.07–25.07% reduction) with lower health risk indices. The study signifies the valuable contribution of natural floating islands as FADs in ameliorating the effects of heavy metal pollution, emphasizing the tremendous role of the natural floating islands in sustainable maintenance of freshwater wetlands for better human health and livelihood.



D. J. Sarkar, Soma Das Sarkar, Santhana Kumar V., Thangjam Nirupada Chanu and B. K. Das

Amperometric biosensor for detection of OP pesticides



Polyvinyl alcohol (PVA)-capped AgNPs (AgNPs@PVA) were used as nano-carriers for the fabrication of an acetylcholinesterase (AChE) biosensor for organophosphate (OP) pesticide detection. The AChE enzyme was immobilized via glutaraldehyde on a drop cast AgNPs@PVA layer on a glassy carbon electrode (GCE) for the fabrication of the electrochemical biosensor. Through differential pulse voltammetry (DPV), the biosensor measured the peak current at 0.6 V generated by AChE-mediated hydrolysis of acetylthiocholine (ATCl) to thiocholine and its subsequent oxidation to dimer. By hindering the AChE hydrolysis activity of the sensor probe with a model OP pesticide, malathion, the pesticide biosensor was developed, as the inhibition effect was found to be proportional to the concentration of malathion. The fabricated biosensor exhibits linearity in the range of 0.01 to 1 ng/mL of malathion at optimal conditions with a detection limit (LOD) of 2.6 pg/mL. The fabricated AChE biosensor showed good selectivity for OP pesticides and exhibited good efficiency in real sample analysis.

D. J. Sarkar, B. K. Behera and B. K. Das

Trace metals in commercially important fish and crab species from Netravathi-Gurupur estuary

A thorough understanding of the different trace metal (Cd, Co, Cr, Cu, Fe, Ni, Pb, Zn, and Mn) levels in fish species (*Nematalosa nasus*, *Gerres filamentosus*, *G. erythrourus*, *Arius arius*, *Sardinella fimbriata*, *Caranx ignobilis*, *Etroplus suratensis*, *Mugil cephalus*, *Sillago sihama*, and *Euryglossa orientalis*) and crabs (*Portunus pelagicus* and *Scylla serrata)* was revealed from the Netravathi-

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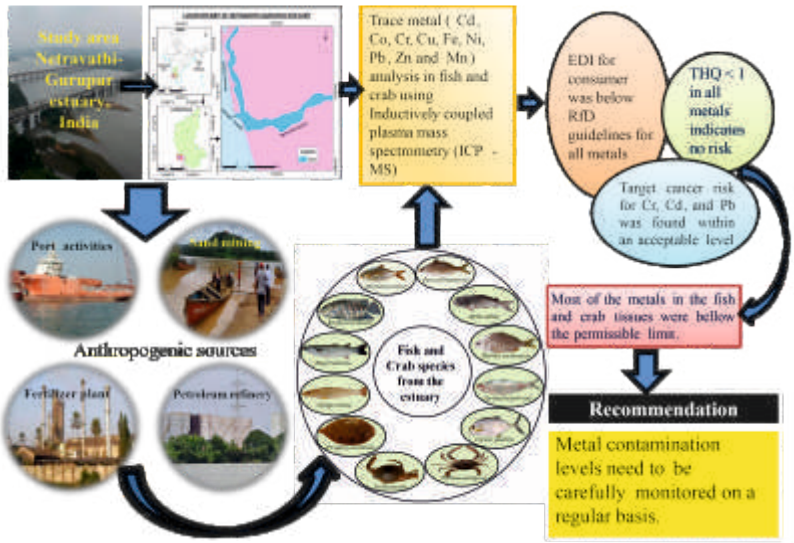


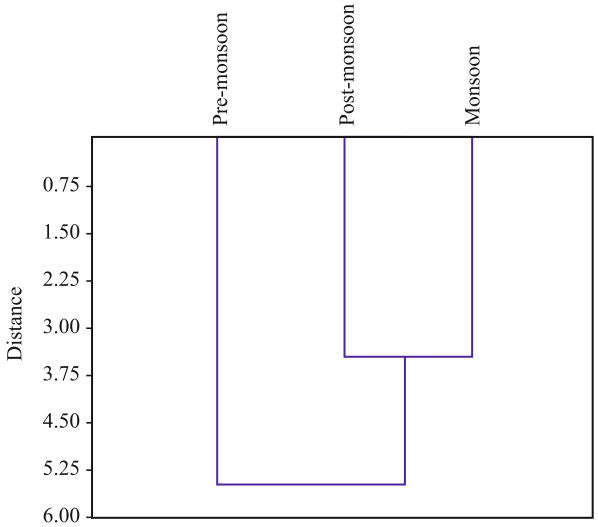
Assessment of human health risk due to trace metals through consumption of fishes and crabs

Gurupur estuary, India, and quantified their potential risk to humans by measuring the estimated daily intake (EDI), target hazard quotient (THQ), hazard index (HI), and target cancer risk (TR). The hierarchy of toxic metals (mg/kg) in different species showed as Fe (12.83 ± 6.30) > Pb (3.19 ± 1.86) > Cr (1.18 ± 0.51) > Mn (0.61 ± 0.33) > Zn (0.52 ± 1.13) > Cu (0.19 ± 0.34) > Ni (0.14 ± 0.08) > Cd (0.08 ± 0.07) > Co (0.005 ± 0.01) in muscle and Fe (70.17 ± 24.91) > Pb (3.19 ± 1.21) > Cr (1.61 ± 0.97) > Mn (0.91 ± 0.34) > Zn (0.32 ± 0.37) > Ni (0.17 ± 0.16) > Cu (0.02 ± 0.02) > Cd (0.015 ± 0.01) > Co (0.012 ± 0.01) in gill. For all species evaluated, the EDI shows values below its reference dose (RfD). The THQ values for all the metals in the respective fish are below 1, which indicates that indirect intake of metals by consuming these selected fish will not result in a potential health hazard in humans. However, estimated HI values were > 1 for children and were found to be more susceptible to health risks from continuous consumption of contaminated fish from the target area. On the other hand, the target cancer risk for Cr, Cd, and Pb was found to be within an acceptable level. Though the results indicate that heavy metal concentrations detected in the study do not pose a major risk to human beings, it is suggested for continuous monitoring of the study area as some of the fish show a tendency to accumulate metals.

Ajoy Saha, B. K. Das, D. J. Sarkar, S. Samanta, M. E. Vijaykumar and M. Feroz Khan

Temporal variations of phytoplankton community in the Gayathri reservoir, Karnataka

The Gayathri (13° 50' 13" N, 76° 44' 49" E), in Chitradurga District, Karnataka, is a small reservoir constructed across the river Suvarnamukhi on the Krishna basin. The phytoplankton community in the Gayathri reservoir was studied and recorded as belonging to 29 genera belonging to nine algal classes. Cyanophyceae, Bacillariophyceae, and Trebouxiophyceae were found to be present in the reservoir during all seasons. The blue-green algae dominated the reservoir in terms of percentage composition (89%, 47%, and 63% in pre-monsoon, monsoon, and post-monsoon, respectively), followed by Trebouxiophyceae. *Microcystis*, *Polycystis,* and *Oscillatoria* were the predominant genera among the Cyanophyceae. The maximum number of taxa was associated with the monsoon season (21) followed by the pre-monsoon (15) and post-monsoon (7) seasons. The average phytoplankton density was found to be highest during the pre-monsoon season (9.3×10^4 No./L). In the present study, the values of the Simpson and Shannon indices revealed that phytoplankton richness and diversity were highest during the monsoon season and lowest during the post-monsoon season. But the evenness was found to be highest in the post-monsoon season and lowest in the pre-monsoon season. The phytoplankton abundance subjected to the hierarchical cluster analysis projected similarity among the monsoon and post-monsoon seasons compared to the pre-monsoon season. The basic information on the phytoplankton community that forms the base of the food web may help in sustainable fisheries management through trophic modelling and further improve the livelihood of the fishers in Gayathri reservoir.



Hierarchical cluster dendrogram

Sibina Mol S., Jesna P. K., Ajoy Saha, Preetha Panikkar, Vijaykumar M. E., Lianthuamluaia and B. K. Das

Spear Fishing in Panam Reservoir, Gujarat

Locally called as *bala,* the spears are made indigenously by the fishers of Panam reservoir located in Panchmahal district of Gujarat, using a bamboo stick and sharpened metal pieces. The spears used in Panam reservoir are mostly multi-pronged and barbed ones. The total length of a *bala* ranged from 10 to 11 feet, and the barbed metallic part was about 20 inches long. In Panam reservoir, spear fishing was carried out in boats involving two fishermen; one manoeuvred the wooden fishing boat, whereas the other fisher operated the

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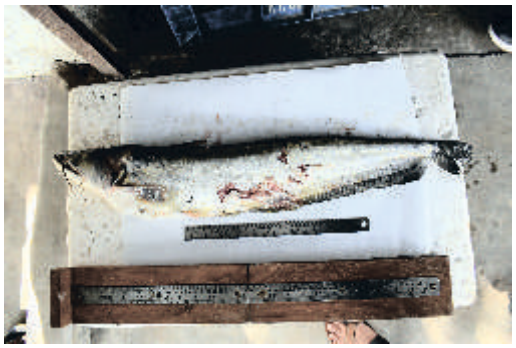
Bala/spear fisher explaining the fishing process

spear while holding a torch light. It is a night-fishing method, starting from 9-10 p.m. until 4 a.m. in the morning. As light is used in the fishing process, it can be included under light fishing, which is a banned fishing practice in India, especially in marine waters. This fishing practice only yielded large-sized fish, and hence, it is assumed to be a non-destructive fishing strategy, although it involves the use of light. The principal species speared include murrels (*Channa marulis*, *C. striata*), catfishes (*Wallago attu*, *Sperata* spp.), carps (*Labeo rohita*, *L. calbasu),* etc. The CPUE of spear fishing varies widely, from 30 kg/fisher/hour of fishing to less than 1 kg/fisher/hour of fishing, depending on the visibility in the water column, the number of fish in the clear littoral zone, etc.



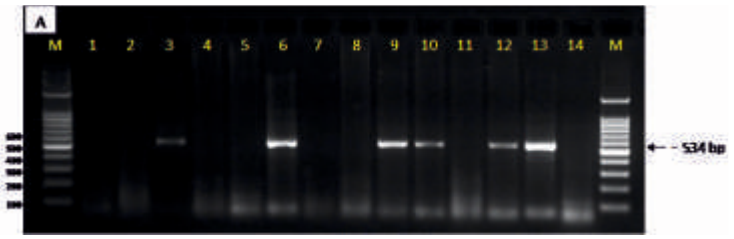
Wallago attu caught by *Bala*

Sajina A. M., R. K. Manna, J. K. Solanki, Y. Ali, A. K. Das and B. K. Das

Parvovirus infection in *Oreochromis niloticus*

Infected Tilapia sample collected from cage farms

A case of disease outbreak and severe mortality in cage and pond farms of tilapia in West Bengal and Odisha, India was investigated. The fish showed clinical signs including haemorrhage, ulcers, discoloration, and redness on the body surfaces. Further analysis revealed that the tilapia parvovirus was associated (validated by PCR, phylogenetic analysis, and cell line assay) with the infection and mortality of tilapia. The virus was detected in gill, heart, spleen, liver, and kidney samples collected from healthy and infected tilapia samples from cage and pond farms, while negative results were found in the brain and skin tissue samples. The virus was detected in healthy as well as diseased fish, indicating the virus may have a wider geographical distribution and may spread fast through the transboundary movement of tilapia. Apart from typical clinical conditions, the virus induces significant pathological and immunological modulation in the host, which might be responsible for high mortality in tilapia aquaculture.

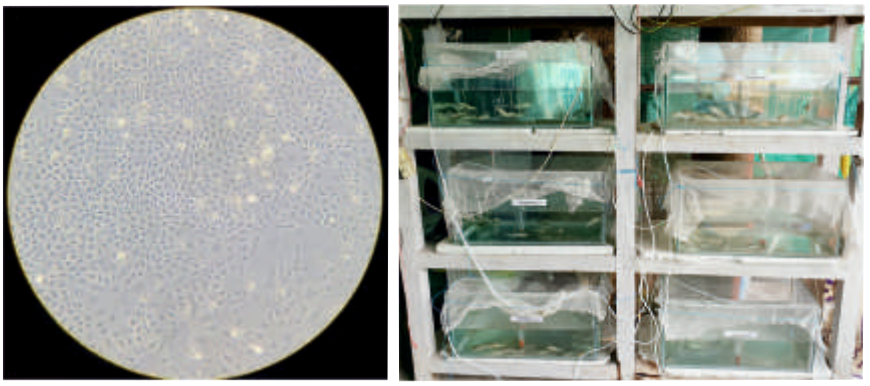


Agarose gel of PCR amplicon from infected and non-infected tilapia tissue samples using TiPV specific primer

B. K. Das, Vikash Kumar and Suvra Roy

Inferring toxicity assessment of ammonia and phosphate remediating nanostructured materials

Ammonia and phosphate are two frequently occurring pollutants in aquatic environments that can lead to fish death and adverse anoxic conditions for aquatic life. Carbon-based nanostructured materials (NSMs) have been considered one of the best adsorbents for removing organic and inorganic pollutants from aquatic systems. However, it is essential to assess the potential toxicity and detrimental effects of NSMs on aquatic organisms and ecosystems. Taking this into consideration, *in vitro*



(a) (b)

Cytotoxicity and acute toxicity assessment of developed NSMs (a) zebrafish gill cell line used in the study (b) *In vivo* acute toxicity test in fish (*L. rohita*) fingerlings

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fish cell lines and fish *in vivo* bioassays were used to evaluate the acute toxicity of the developed ammonia and phosphate remediating NSM compounds. The lower concentration of NSMs was not markedly cytotoxic to cells, but cytotoxicity increased in a dose-dependent manner. Furthermore, no fish mortality or behavioral abnormalities were observed in the *in vivo* assay. This implies that developed ammonia and phosphate remediating NSM materials have great potential for controlling pollution in the aquatic system.

Suvra Roy, D. J. Sarkar, Santhana Kumar V. and Tanushree Banerjee

Formaldehyde contamination in fish samples collected from wholesale fish markets of Guwahati, Assam: A case study

Known as formalin in liquid form, the low-cost formaldehyde, reported to have been used in agriculture and the food sector as a disinfectant and preservative. A survey was conducted in two wholesale fish markets in Guwahati, Assam, namely Uzanbazar and Betkuchi, for the detection of formaldehyde during November 2023. One out of six muscle samples that were collected from local fish was found to have traces of formaldehyde that ranged from 0.0169 to 0.0785 ppm. These values can be considered safe for human health and produced naturally during post-mortem degradation. On the contrary, fishes brought from Andhra Pradesh or West Bengal did not have any traces of formaldehyde, which might be due to the quick harvest and ice packaging followed before transportation. This could imply that if fish are kept in iced conditions, formaldehyde will not be naturally produced in fish. However, monitoring of fish samples coming into Assam from other states needs to be carried out at regular intervals to build confidence among consumers.

Survey for detection of formalin in Uzanbazar wholesale fish market

S. K. Majhi, D. Debnath, N. Sharma, A. Kakati, S. K. Nag, S. D. Sarkar and B. K. Das

Inequality in income, asset and debt among the fishers of Chilika lagoon

A study, involving 215 fishers in Chilika Lagoon, was carried out using the Gini coefficient to measure inequality and multiple regression to identify the influencing variables of inequality in income, assets, and debt. The study found that non-fishing activities contributed more than off-fishing activities to the total income. Among the incomes, the inequality of total income was found to be 0.23. In off-fishery income, the inequality was higher (0.87) than in non-fishery income. The distribution of the agricultural land was very skewed (0.83). But in dwelling houses, there was less inequality thanks to different government schemes. The equality in household assets was found to be 0.64, and the same in fishery assets was a bit less (0.50). Non-institutional sources contributed more to the total loan taken. Only a handful of fishermen could get the intuitional loan; hence, the inequality in the institutional loan was higher (0.90) than the non-institutional source (0.77). It is suggested that there is a need to provide easy access to institutional sources of loan, which will lessen the burden on fishermen and enhance their economic status. Also, proper policy attention is needed for the quick and efficient disposal of the catch. A well-designed market policy should be in place to minimize the dependence on middlemen.

Fishers of Chilika lagoon

Arun Pandit, Anjana Ekka and B. K. Das

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Activities Under NEH Projects

Cage culture in Umiam reservoir through fisher women participation

The institute, in collaboration with the ICAR Research Complex for the NEH Region, Umiam successfully carried out cage culture in Umiam Reservoir through the participation of tribal fisher women of the Ri-Bhoi Farmers' Union. The trial was carried out in CIFRI-GI cages (6 nos.; 100 m^3/cage) using CIFRI-CageGrow floating feed. Six CIFRI-GI cages (5 × 5 × 4 m^3) were stocked with fingerlings of *Cyprinus carpio* (60%), *Barbonymous gonionotus* (20%), and *Labeo rohita* (20%), with a stocking density of 10-20 no./m^3. After six months of rearing, an average fish production of 5-6 kg/m^3 was achieved. *C. carpio* and *B. gonionotus* performed well in terms of growth and survival. *B. gonionotus* also acted as a cleaner in the cages. Cage culture was managed through a participatory approach by local fisher women. The sale of cage-reared fish directly benefited 25 fisher women families of the Ri-Bhoi Farmers' Union. Some fish (mainly rohu) reared in cages were released into the reservoir as a fish stock enhancement.

Fisherwomen involved in cage culture in Umiam reservoir, Meghalaya

Harvested fish from cages installed in Umiam reservoir, Meghalaya, is for sale

P. Das, S. Borah, S. Yengkokpam, D. K. Meena, B. K. Bhattacharjya and B. K. Das

Feed distribution program-cum-awareness on pen culture in beels of Dhemaji, Assam

Dr. S. K. Majhi felicitating Dr. Ranoj Pegu, Hon'ble Minister of Education and Welfare of Plain Tribes and Backward Classes, Government of Assam, and Shri Pradan Baruah, Hon'ble Member of Parliament, Lakhimpur

The Institute organized an "Awareness on pen culture cum feed distribution program in beels" on 16 October 2023, at Dhemaji, Assam. The program was conducted for the benefit of fish farmers and fishers in the district. Dr. Ranoj Pegu, Hon'ble Minister of Education and Welfare of Plain Tribes and Backward Classes, Government of Assam, graced the event as Chief Guest. Shri Pradan Baruah, Hon'ble Member of Parliament, Lakhimpur, Assam, was the Guest of Honour. Shri Ankur Bharali, IAS, District Commissioner, Dhemaji, Shri Tulan Konwar, Chairman, Dhemaji Development Authority, Shri Lakhinath Lagachu, DFDO, Dhemaji were among the dignitaries. A total of 10 tons of fish feed developed and formulated by ICAR-CIFRI was distributed among 120 fishers in the district who were present in the program.

S. Borah, S.K. Majhi, B. K. Bhattacharjya, P. Das, A. K. Yadav and B. K. Das

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New Initiative

The institute initiated cage culture activities at the Kangsabati reservoir, Bankura, West Bengal with table fish production in 32 CIFRI GI Cages. The objectives of this development project are to disseminate and demonstrate the table fish production in cage culture; strengthening the capacity of Directorate of fisheries, the resource user communities and cooperatives. A MoU was signed with the Directorate of Fisheries, Government of West Bengal on 1 March 2023.

Success Stories

Pen aquaculture in Sone beel, Karimganj district, Assam

Adoption of pen aquaculture technology in Sone beel, Karimganj district, Assam proved to be a remunerative livelihood option for beel fishers

A successful model of adoption of pen aquaculture technology in the Sone beel of Assam was documented. A group of three fishermen-initiated pen culture in 2012–13 in Sone Beel, Karimganj district, and presently own three pens (one of 2 ha and two of 1 ha area each) constructed with mosquito netting materials supported by bamboo poles. Ten different species (*viz*., *Labeo catla*, *L. rohita*, *Cirrhinus mrigala*, *Hypophthalmichthys nobilis*, *H. molitrix*, *Cyprinus carpio*, *Barbonymus gonionotus*, *Oreochromis niloticus*, *L. calbasu,* and *L. angra*) were stocked with an average size of more than 115.5 g each in April 2022. Fishes were reared for up to five months, after which periodical harvesting was done. The average size of the harvested fish was 737 g. The average survival and growth rates of the cultured fish ranged between 83.3 and 95% and 229.4 and 866.7%, respectively. Total fish production achieved after one cycle of pen culture was 5437.4 kg/ha. Total expenditure (capital plus operational) was worked out around Rs. 6.75 lakh and total income around Rs. 10.43 lakh hence the net income from one ha of pen culture was Rs. 3.68 lakh. The benefit-cost ratio was worked out at 1.55. According to stakeholders' perception, productivity, cost efficiency, ease of management, control over production, technology complementarity, input complementarity, lesser complexity, trialability, and observability were the major factors for the adoption of the technology. The availability of fish seed for pen culture was not recognized as an issue by the farmers (70%). About 63% of the respondents confirmed that investment in fish culture in ponds was higher than pen culture and therefore a major incentive for its adoption. However, 1/3rd of the farmers thought that there was high financial risk in pen fish farming compared to pond fish farming, and 57% thought that there was less risk in the former than the latter.

D. Debnath, S. C. S. Das, S. Yengkokpam, P. Das, A. K. Yadav, S. Borah, N. Sharma, B. K. Bhattacharjya, A. K. Das, B. K. Das and S. K. Majhi

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Technology Management News

Sr. no.	Title	Registered/filed on	Application/diary no.	Status
	Trademark			
1.	CIFRI HDPE Cage	15 September 2023 under class 22	5703691	Granted
2.	CIFRI NutrifishIn	12 August 2023 under class 35	6063896	Filed
3.	Reshmeen	23 December 2023 under class 31	6232063	Filed
	Copyright			
4.	GIS mapping of inland waterbodies of Odisha	21 November 2023	30751/2023-CO/L	Filed
5.	Inland Waterbodies of Bihar	21 November 2023	30457/2023-CO/L	Filed
6.	Sarana-A Lucrative Fish Species for Auto Recruitment	24 November 2023	31186/2023-CO/CF	Filed
7.	Success Stories of Wetlands	21 December 2023	34130/2023-CO/L	Filed
8.	Catch Assessment Software for the Chhattisgarh State, India	21 December 2023	34187/2023-CO/SW	Filed
9.	A Guide to Ornamental Fish Farming	11 September 2023	L-132876/2023	Registered
10.	Rangeen Maach Chaaser Pustika	01 August 2023	L-130396/2023	Filed
11.	Rangeen Maach Chass Margdarshika	01 August 2023	L-131321/2023	Filed
12.	Alankari Machhli Palan par Sandarshika	11 September 2023	L-133440/2023	Registered

Memorandum of Understanding (MoU) signed for academic and research collaboration

- The MoU was signed between ICAR-CIFRI, Barrackpore, and Odisha University of Agriculture and Technology, Bhubaneswar, on 10 April 2023.
- The MoU was signed between ICAR-CIFRI, Barrackpore, and Himalayan University, Arunachal Pradesh, on 10 July 2023.
- The MoU was signed between ICAR-CIFRI, Barrackpore, and Central Agricultural University, Imphal Manipur, on 03 October 2023.
- The MoU was signed between ICAR-CIFRI, Barrackpore, and The Neotia University, West Bengal, on 15 September 2023.

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River Ranching Programme

The institute has been striving for rejuvenation of indigenous fisheries, especially IMC, in river Ganga since 2016. On 01 July 2023, 2.10 lakh of advanced fingerlings of rohu, catla, and mrigal were released in the Ganga River at Ballia (Kotwa Narayanpur), Uttar Pradesh, under the '*Namami Gange'* programme. The programme was conducted under the graceful presence of Shri Virendra Singh Mast, Hon'ble Member of Parliament from Ballia. Dr. B. K. Das, Director and staff of the Prayagraj centre along with the local state government officials, were present on the occasion. At Kalna (East Burdwan District), West Bengal, 1.56 lakh fingerlings of Indian Major Carps were released into the Ganga River on 23 August 2023 by Dr. B.K. Das, Director CIFRI, and the NMCG team.

Furthermore, one lakh fingerlings of Indian Major Carps were ranched into the Ganga River by the Institute on 8 September 2023 at Dalmau, Raebareli, U.P. The program was organized under the 'National River Ranching Programme' in the august presence of Srimati Nirmala Paswan, Hon'ble Member of Legislative Council, U.P., Dr. U. K. Sarkar, Director, ICAR-NBFGR, Lucknow, and the CIFRI-NMCG team from Prayagraj Regional Centre. Another river ranching was done as a part of the National Ranching Program 2023 on 27 September 2023, at Daspara Ghat, Barrackpore, West Bengal, on the concluding workshop under the NMCG project on "Stakeholders consultation and consultative workshop on Hilsa fisheries improvement for sustainable fisheries and conservation in the river Ganga." During the event, 30 thousand advanced fingerlings of Indian Major Carps (catla, rohu, and mrigal) were ranched.

River ranching at Kalna

River ranching at Ballia

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Human Resource Development

Training conducted for fishers/ fish farmers during July-December 2023

Sl. No.	Title of the training programme	Date	No. of participants	Venue
1.	Inland Fisheries Management	04-10 July	30 fishers and fish farmers from Rohtas district of Bihar	CIFRI HQ
2.	Inland Fisheries Management	13-19 July	30 fishers and fish farmers from Nawada district of Bihar	CIFRI HQ
3.	Inland Fisheries Management	02-08 August	30 fishers and fish farmers from Muzaffarpur district of Bihar	CIFRI HQ
4.	Management of open water fisheries for doubling the farmers income	21-28 August	14 fishers and fish farmers	ICAR-CIFRI, Prayagraj
5.	Inland Fisheries Management	05-11 September	30 fishers and fish farmers from Sheikhpura district of Bihar	CIFRI HQ
6.	Fisheries Enhancement in Open Waters of North-Eastern (NE) India	25-29 September	12 fishers and fishers and fish farmers	ICAR-CIFRI, Regional Centre Guwahati
7.	Inland Fisheries Management	05-11 October	30 fishers and fish farmers from Gopalganj district of Bihar	CIFRI HQ
8.	Inland Fisheries Management	03-09 November	30 fishers and fish farmers from Nawada district of Bihar	CIFRI HQ
9.	Fisheries enhancement in inland water bodies (on-line mode)	7-9 November	19 fishers and fish farmers	ICAR-CIFRI, Bangalore
10.	Enclosure culture in inland open water for production enhancement	08-10 November	26 fishers and fish farmers	ICAR-CIFRI, Regional Centre Guwahati
11.	"Fish production enhancement through cage culture in inland open waters of West Bengal"	07-10 November	29 fishers and farmers from Bankura district, West Bengal	CIFRI HQ
12.	Inland Fisheries Management	05-11 December	30 fishers and fish farmers from Sitamarhi district of Bihar	CIFRI HQ
13.	Methods and practices for fisheries enhancement in open water of Northeast India	12-14 December	25 fishers and fish farmers	ICAR-CIFRI, Regional Centre Guwahati
14.	Inland Fisheries Management	14-20 December	30 fishers and fish farmers from East Champaran district of Bihar	CIFRI HQ
15.	Genetically Improved Fish Stocks for Aquaculture	18-20 December	38 fishers and fish farmers	ICAR-CIFRI, Regional Centre Guwahati
16.	"Enclosure Culture for Enhancing Fish Production from Reservoir"	18-20 December	30 fishers and fish farmers	ICAR-CIFRI, Vadodara
17.	ATMA sponsored Training on "Inland Fisheries Management"	18-22 December	22 fishers and farmers from Pakur, Jharkhand	CIFRI HQ
18.	Feed formulation and low-cost feed preparation	20-22 December	40 fishers and fish farmers	Directorate of Fisheries, Govt. of Sikkim, Gangtok
19.	"Ornamental fisheries and culture: scope and opportunities" under PMMSY	22-24 December	30 women fishers and fish farmers from Jharkhand	CIFRI HQ
20.	Inland Fisheries Management	28-30 November	25 fishers and fish farmers	ICAR-CIFRI, Prayagraj
21.	"Opportunities of inland open water ornamental fisheries management for income generation" under STc	21-23 December 2023	12 ST fisherwomen from Saliasahi, Odisha	CIFRI HQ

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Training at Guwahati Regional Centre during 8-10 November 2023

Training at Prayagraj Regional Centre during 28-30 November 2023

Students Training

Sl. No.	Title of the training programme	Date	No. of participants	Venue
1.	One-day practical demonstration of use and handling of ArcGIS software	13 September	5 nos. of Ph.D. students of FRM Dept. of WBUAFS, Kolkata, West Bengal	CIFRI HQ
2.	Recent advances in river ecology and fisheries management	07-13 November	15 participants including teaching and research faculties and students from various Universities of Odisha, Chhattisgarh, West Bengal, and Andhra Pradesh	CIFRI HQ
3.	Advances in aquatic health management in inland open water fisheries	04-08 December	15 students	CIFRI HQ
4.	Advances in heavy metals and microplastics analysis (IC-PMS and µFTIR)	11-15 December	23 students	CIFRI HQ
5.	Fish disease diagnosis and health management in inland open waters	18-22 December	16 students	CIFRI HQ






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Official Training

Sl. No.	Name of the training	Date	Participants	Venue
01.	Inland fisheries management	24-28 July	21 Directorate of Fisheries, Chhattisgarh officials	CIFRI HQ
02.	Concept building in basic statistics for inland fisheries data analysis	22-24 August	15 Participants	ICAR-CIFRI Regional Centre, Guwahati
03.	Strategies for openwater fisheries management in Northeast India	22-24 November	25 Participants	ICAR-CIFRI, Regional Centre, Guwahati
04.	Advances in aquatic health management in Inland open water fisheries	4-8 December	9 Participants from ICAR-CIFE, Mumbai, WBUAFS, College of Fisheries, Kishanganj, Bihar	CIFRI HQ
05.	Advances in heavy metals and microplastics analysis (ICP-MS &μFTIR)	11-15 December	22 Participants from ICAR-IIHR, ICAR-CIRCOT, Calcutta University, Kalyani University, Burdwan University, Vidya Sagar University, WBUAFS, Kamdhenu University	CIFRI HQ
06.	International training-cum-workshop on "Sustainable fisheries and dairy"	06-19 December	24 participants representing Cambodia, Lao PDR, Myanmar, and Vietnam	CIFRI HQ
07.	Methods and practices for fisheries enhancement in openwaters of Northeast India	12-14 December	25 fisheries officials from different NE states (Assam, Meghalaya, Manipur, Tripura, and Mizoram); Kolong-Kopili (NGO), Bogibari, Assam and Ri-Bhoi Farmers Union, Meghalaya.	ICAR-CIFRI, Regional Centre, Guwahati
08.	"Feed formulation and low-cost feed preparation"	20-22 December	40 fishery officials from Directorate of Fisheries, Govt. of Sikkim, fish feed entrepreneurs and progressive fishers of Sikkim	Gangtok, Sikkim
09.	Inland fisheries management	26-30 December	23 nos. of officials under JOHAR programme, Jharkhand State Livelihood Promotion Society under Dept. of Rural Development, Jharkhand	CIFRI HQ

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Mass awareness campaign

Name of the Camp	Purpose	Date	Venue	Participants (No.)
Public Interest Disclosure and Protection of Informers, 2004 (PIDPI) awareness camp	Preventive vigilance campaign to fight against corruption	11 October	Tamrangabeel, Bongaigaon, Assam	15 beel fishers
		12 October	Dhirbeel, Dhubri, Assam	20 beel fishers
		18 October	Nongpoh, Ri-Bhoi district, Meghalaya	60 beel fishers
		31 October	Barak Valley, Assam	50 beel fishers
		09 November	Kalong-Kapili, Assam	30 beel fishers
		11 November	Gandacherra, Tripura	120 beel fishers
Awareness-cum-feed distribution programme	To create awareness among fishers on pen culture in beels	16 October	Dhemaji, Assam	130 beel fishers
Awareness-cum-input distribution programme	For popularizing pen and cage aquaculture in floodplain wetlands	31 October	Cachar College, Silchar	50 beel fishers
Mass awareness on responsible fishing	Responsible fishing	02 November	Hogenakkal, Dharmapuri, Tamil Nadu	50 reservoir fishers
Input distribution-cum-awareness programme	For popularizing cage aquaculture in reservoir	04 November	Dumburreservoir, Tripura	120 beel fishers
Awareness programme for the fishermen of Vazhani reservoir, Thrissur, Kerala	Reservoir fisheries management	21 November	Thrissur, Kerala	50 reservoir fishers
Management of reservoir fisheries for enhanced fish production	Reservoir fisheries management	06 December	Banasurasagar, Wayanad, Kerala	50 reservoir fishers
Awareness-cum-input distribution programme	FRP tanks and accessories for starting up ornamental fisheries	20-21 December	Geyzing, Namchi and Soreng districts	45 beel fishers


Awareness at Barrackpore


Awareness at Thrissur, Kerala


Awareness at Silchar, Assam


Awareness in Sikkim


Awareness at Hogenakkal, Tamil Nadu

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Exhibitions participated

ICAR-CIFRI stall at the ICAR-NBFGR, Lucknow

ICAR-CIFRI stall at the Start-up Conclave 2023 at Gandhinagar, Gujarat

ICAR-CIFRI stall at the 3rd anniversary of PMMSY, Indore

ICAR-CIFRI stall at Agricultural Science Congress, Cochin, Kerala

ICAR-CIFRI stall at Directorate of Fisheries, Guwahati

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Staff Corner

New Appointments

Name & Designation	Place of posting	With Effect From	Photographs
Dr. S. Samanta, Head, Fisheries Resources and Informatics	Barrackpore	04.07.2023	
Dr. R. K. Manna, Head, Reservoir and Wetland Fisheries	Barrackpore	06.07.2023	
Dr. S. K. Manna, Head, Riverine Ecology and Fisheries	Barrackpore	10.07.2023	
Dr. Sullip Kumar Majhi, Head, Guwahati Regional Centre	Guwahati	14.07.2023	
Shri Rakesh Kumar, Scientist	Guwahati	20.07.2023	
Dr.(Mrs.) Archana Sinha, Head, Aquatic Environmental Biotechnology	Barrackpore	10.11.2023	

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Superannuation

Name & Designation	Last Place of posting	Date of superannuation	Photograph
Shri Feroz Khan, Scientist	Bengaluru	31.07.2023	
Ms. Keya Saha, Chief Technical Officer	Barrackpore	31.08.2023	
Dr. M. A. Hassan, Principal Scientist	Barrackpore	31.12.2023	

Transfers

Name & Designation	From	To	Photograph
Shri S. Monoharan, Chief Technical Officer	Research Station, ICAR-CIFRI, Kochi	ICAR-Sugarcane Breeding Institute Coimbatore	

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Awards & Recognition

- Dr.Vikash Kumar received the *Young Scientist Award* (Dr. V.G. Jhingran Gold Medal) at the National Conference on "Transforming Rural Poverty to Prosperity through Sustainable Fisheries (TRPSF-2023), held on 19–21July 2023, organized by the College of Fisheries, Kishanganj, Bihar, India.
- Dr. Soma Das Sarkar received the *Best Oral Presentation Award* at the International Conference on "Aquatic Resources and Sustainable Management" on 30-31August 2023, at ICAR-CIFRI Barrackpore, Kolkata, for the paper "Ecofriendly viable solution to aquatic weed management in the Indira Gandhi drinking water treatment plant".
- Dr. Suvra Roy received the *Young Scientist Award* at the International Conference on 'Aquatic Resources and Sustainable Management' on 30-31August 2023, organized by the International Academy of Science and Research (IASR), Kolkata.
- Dr. Suvra Roy received the *Best Presentation Award* at the International Conference on 'Aquatic Resources and Sustainable Management' on 30-31August 2023, organized by the International Academy of Science and Research (IASR), Kolkata.
- Dr. Dhruba Jyoti Sarkar received the *Young Researcher Award* for the year 2022 for his contribution to environmental chemistry and pollution research by the Indian Society of Analytical Scientists, Delhi Chapter (ISAS-DC) on 26 October 2023, at Faridabad, Haryana.
- Dr. Vikash Kumar received the *Best Presentation Award* at the National Conference on "Transforming Rural Poverty to Prosperity through Sustainable Fisheries (TRPSF-2023), held on 19–21July 2023, organized by the College of Fisheries, Kishanganj, Bihar, India. He also received the *Best Presentation Award* (2nd) at the VIROCON International Conference: 2023 Advancements in Global Virus Research Towards One Health Date: 1-3 December 2023, organized by the ICAR-National Research Centre for Banana, Tiruchirappalli, and the Indian Virological Society, New Delhi.
- Dr. S. K. Majhi was the *Keynote Speaker* at the College of Fisheries, Rangailunda, Odisha, in the workshop on "Scope for Overseas Education in Fisheries Science." He was also the keynote speaker at the Department of Fisheries, Assam, on World Fisheries Day 2023.
- Dr. Pronob Das acted as *Academic Editor* in the Induction to the Editorial Board of "Journal of Applied Ichthyology" as an Academic Editor of the journal 'Journal of Applied Ichthyology' published by Hindawi in collaboration with Wiley-Blackwell.
- Dr. Simanku Borah acted as *Keynote Speaker* at KVK, Dhemaji, Assam, in the Workshop on "Strategic Approach for the Development of Agriculture and the Allied Sector of Dhemaji District." He also acted as an *editorial board member* for the journal 'BMC Environmental Science'.
- In the 4x100-meter relay competition, the ICAR-CIFRI women team, which included Drs. Deepa Sudhessan, Sajina A.M., Anjana Ekka, Sangeetha M. Nair, and Canciyal Johnson, clinched the silver medal at the ICAR Eastern Zonal Sports 2023 .

Dr. Dhruba Jyoti Sarkar receiving the Young Researcher Award

Dr. Suvra Roy Receiving the Young Scientist Award

ICAR-CIFRI sports contingent in Eastern Zonal Sports 2023

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Activities under Scheduled Tribe Component (STC)

Alternative livelihood options for tribal women of Birbhum, West Bengal

The institute has taken initiatives to support rural ST women in developing their knowledge and skills in ornamental fish farming for generating alternative livelihood options. This initiative is part of ICAR-CIFRI's 'Mission 3000', which targets to cover 3000 women across the country with active support for their economic empowerment. For this purpose, ICAR-CIFRI organized an 'Input Distribution and Demonstration Program' on ornamental fish farming under STC on 04 July 2023, at the campus of Rathindra KVK, Shriniketan, Birbhum. Thirty tanks and kits were distributed to the women of the tribal community.

Initiative to address SDG 5 (gender equality)

The institute has been supporting the tribal community, one of the most vulnerable sections of the population of Sagar Island, by providing technological inputs to supplement their livelihood through fish farming. In this program, ICAR-CIFRI distributed fisheries inputs to 252 ST woman-fishers who have backyard ponds in their household. All the households belonging to the Scheduled Tribe community residing on Sagar Island have been covered in this program. ICAR-CIFRI has distributed 6 kg of IMC seeds, 20 kg of lime, and 90 kg of fish feed to each beneficiary.

Distributed fish feed to the tribal farmers of Ri-Bhoi district, Meghalaya

Guwahati Regional Centre of the Institute, in collaboration with the Department of Fisheries (DoF), Govt. of Meghalaya, organized an “Awareness-cum-fish feed distribution program” at Nongpoh, Ri-Bhoi District, Meghalaya on 18 October 2023 for the benefit of 50 tribal fish farmers of the state. Shri Andrew L. Myrthong, MCS, Assistant Commissioner, Ri-Bhoi District, Government of Meghalaya, graced the program. It was attended by 60 participants (fish farmers and fisheries officials) from Ri-Bhoi District.

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Mass awareness programme on responsible fishing at Hogenakkal, Tamil Nadu

A mass awareness program on responsible fishing was organized by the Bengaluru Regional Centre of the Institute at Hogenakkal in Dharmapuri District, Tamil Nadu on 02 November 2023 which was attended by 50 fishermen. Coracles were distributed to 10 tribal fishermen.

Pumpset distribution at Paloterghat, Kakdwip

Two pumpsets were distributed to the fisherwomen belonging to the Scheduled Tribe community at Palotghat, Kakdwip, South 24 Parganas, Sundarbans on 20 November 20, 2023.

Training for tribal women

The Institute organized a three-day training program on "Ornamental fish rearing and management for income generation" for 12 tribal women beneficiaries from Salia-sahi, Odisha, on 21-23 December 2023, at ICAR-CIFRI, Barrackpore. The training program was organized to strengthen the skills and knowledge of the tribal women in different aspects of ornamental fish rearing.

Distribution of coracles to fishermen in Tamil Nadu and Kerala

The distribution of coracles to ten tribal fishermen was organized by the Bengaluru Regional Centre of the Institute at Hogenakkal in Dharmapuri District, Tamil Nadu, on 02 November 2023. Similarly, at Banasurasagar in Wayanad District, Kerala, coracles were distributed to ten fishermen on 06 December2023.

Fish seed distribution

2000 fish seeds (*Etroplus suratensis*) were distributed to the ST fishermen of Vazhani reservoir, Thrissur district, Kerala, on 21 November 2023, on World Fisheries Day. Nearly 10 active fishermen attended the stakeholders meeting and fish distribution program on the day.

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Activities under Scheduled Caste Sub-Plan (SCSP)

Assistance in ornamental fish culture for empowering SC women

The institute adopted 50 SC women from Sajnekhali, West Bengal to supplement their livelihood through ornamental fish culture. An ornamental fish culture unit consisting of a FRP tank, an aerator, and other accessories, ornamental fish, and ornamental fish feed were distributed to the each adopted women. Similarly, ornamental fish culture inputs comprising a 400-liter capacity CIFRI Model FRP ornamental tank, ornamental live bearer fish, and other ornamental kits were distributed to 28 SC women in Balagarh, West Bengal. An awareness program on ornamental fish culture was carried out in Dakshin Dinajpur, West Bengal where ornamental fish culture units were distributed to 50 SC women.

Backyard fishpond culture for livelihood development

In collaboration with the Kultali-Milon Tirtha Society, an awareness program on backyard pond fish culture was organized in Kultali, South 24 Parganas, West Bengal. Fish seed and feed were distributed to the 100 SC women from six villages (Amjhara, Basanti, Ramchandrakhali, Uttar Mokamberia, Fulmalancha, and Charavidya) in Basanti, Sunderban. An input distribution and awareness program on backyard pond fish culture was also conducted in Hashnabad, and Dakshin Dinajpur of West Bengal. Fish seed and feed were distributed to 102 women in Hashnabad and 104 women in Dakshin Dinajpur.

Enclosure culture for livelihood development

The institute provided HDPE pens to Chamta FCS, West Bengal, for seed raising for the purpose of culture-based fisheries (CBF) in the floodplain wetland. ICAR-CIFRI had already demonstrated in-situ fish seed raising through pen culture in the wetlands of West Bengal, which has motivated the local community to implement pen culture in a participatory mode.

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Interactive workshop

An interactive workshop on "Livelihood development addressing SDG through inland open water fisheries" was conducted at the institute headquarters, Barrackpore, under SCSP on 18 August 2023. The workshop was intended to discuss the various facets of sustainable enhancement of fish production in the adopted wetlands of the institute. Scientists, technical staff, research scholars, and 32 fishermen from the 16 adopted wetlands under the SCSP program in Murshidabad, Nadia, and North-24 Parganas districts of West Bengal participated in the workshop.

Meetings and Events

National Fish Farmers' Day

The institute celebrated "National Fish Farmers Day" on 10 July 2023. National Fish Farmers' Day is celebrated on 10 July to commemorate the stupendous achievement of the induced breeding technique, which is contemplated as the torchbearer of the 'First Blue Revolution' in India. Prof. Hiralal Chaudhary and Dr. K. H. Alikunhi pioneered the 'Induced Breeding Technique, which was successfully developed in Angul Fish Farm, Odisha, on this day in 1957. The ceremony commenced with a tribute to Dr. Hiralal Choudhury and Dr. K. H. Alikunhi. Dr. B. K. Das, the director of ICAR-CIFRI, informed that the institute has initiated a program that assist the fisher women to esttablish fish culture units, including ornamental fish culture, under the SCSP project, with the goal of empowering 3000 women. Dr. B. B. Jana, a retired professor from the University of Kalyani, West Bengal, praised the CIFRI's attempt to enhance farmers' livelihoods.

IJSC Meeting

The Institute Joint Staff Council (IJSC) had its 75th meeting on 03 August 2023 which was chaired by the Director Dr. B. K. Das. The IJSC staff members were present in the meeting. Various staff welfare-related activities were discussed in the meeting.

Independence Day

The institute celebrated the 77th Independence Day on 15 August 2023, with great fervor and enthusiasm. As part of *Aazaadi Ka Amrit Kaal*, the *Har Ghar Tiranga* campaign was launched from 13-15 August at the institute headquarters in Barrackpore, Kolkata, and all the regional

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centres. Dr. Basanta Kumar Das, Director, hoisted the national flag at this grand event. Officers, staff members, research scholars, and contractual staff gathered along with their family members for this celebration.

Parthenium Awareness Week

In observance of Parthenium Awareness Week during 16-22 August 2023, ICAR-CIFRI organized a number of events with the goal of raising awareness among the staff, construction workers, and research scholars. Employees of the institute uprooted and removed weeds from the institute premises as part of their active participation in the endeavour to get rid of parthenium. As a result of the initiatives, Parthenium has been eradicated from the ICAR-CIFRI campus and the surrounding areas.

Workshop on Livelihood Development of Wetland Fishers Addressing SDGs

ICAR-CIFRI successfully conducted an interactive one-day workshop entitled "Livelihood development addressing SDGs through inland open water fisheries" under SCSP and NICRA on 18 August 2023. The workshop was attended by the scientists, technical staff, research scholars, and 32 fisherman representatives from 16 wetland fishery cooperative societies of Murshidabad, Nadia, and North-24 Parganas districts of West Bengal, adopted under the SCSP program and the NICRA project. Since 2019, ICAR-CIFRI has extended its support to the livelihood improvement of Scheduled Caste communities across the country under the Government of India SCSP plan through inland fisheries activities like culture-based fisheries, stock enhancement, pen culture, etc.

Distribution of Inputs of Ornamental Fish Culture among the Rural Women

An input distribution and awareness program on ornamental fish culture for the livelihood development of rural women was organized in collaboration with Sasya Shyamala Krishi Vigyan Kendra, Sonarpur, West Bengal, under the Ramakrishna Mission on 19 August 2023. The program was organized to enhance the livelihood opportunities of the SC women's community. Ornamental fish rearing units consisting of FRP tanks and other accessories were distributed as start-up materials by Dr. B. K. Das, Director of the institute.

Review Meeting of the NASF Project on Hilsa

The review meeting of the NASF project "Captive Breeding of Hilsa, *Tenualosa ilisha*: Phase II" was held on 08 September at the institute headquarters. Dr. Jitendra Kumar, ADG chaired the meeting where the advisory committee members, Dr. K. K. Vass and Dr. S. Raizada were present in online mode. Dr. Samanta, Consortium PI, ICAR-CIFRI, other CCPIs of the cooperating institutes, *viz.* Dr. Debasis De from ICAR-CIBA, Kakdwip, Dr. S. Adhikari from ICAR-CIFA, Rahara and Dr. Gouranga Biswas from ICAR-CIFE, Kolkata were present in the meeting. Other Co-PIs of

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Review meeting of the NASF project on hilsa

the project, Dr. R. K. Manna, and Dr. A. K. Sahoo from ICAR-CIFRI, Dr. T. K. Ghosal from ICAR-CIFE were present whereas Dr. Gayatri Tripathi from ICAR-CIFE and Dr. Babita Mandal from ICAR-CIBA attended the meeting in online mode.

Hindi Saptah

The Hindi Saptah 2023 was organized at the institute from 14–20 September 2023. It was inaugurated on 14 September 2023, at the Institute Headquarters in both offline and online modes, in which various regional centers of the Institute participated in online mode. Dr. Puneet Kumar Singh, Research Officer, Central Ayurveda Research Institute, CCRAS, Ministry of AYUSH was the Chief Guest of the function arranged in Guwahati Regional Centre. In his speech he highlighted that promotion and propagation of Hindi is not only the responsibility of the Central Government but also our responsibility and stressed on 'समर्थन से ही समर्पण की भावना उत्पन्न होती है'. The Hindi monthly newspaper "CIFRI MasikSamachar" (August 2023) was released in the program. A workshop on "*Desh ke Vikas me Raajbhasha ki Bhoomika*" was organized at the Bangalore regional centre on 14 September 2023.

Hindi saptah at Guwahati


Hindi saptah at Kochi


Oath taking under the Hindi saptah at the institute Hqs.

Concluding ceremony of Hindi saptah


Catch assessment survey software to Government of Chhattisgarh

Handed over Catch Assessment Survey Software to the Department of Fisheries, Government of Chhattisgarh

The institute successfully developed CAS ver. 2.0 software in a participatory mode for fish catch estimation of water bodies below 10 ha for the species-IMC, pangas, tilapia, and prawn-specifically customized for the Department of Fisheries, Government of Chhattisgarh. Dr. B. K. Das, the Director, ICAR-CIFRI, handed over the software to Mr. Y. P. Singh, Assistant Statistical Officer, Department of Fisheries, Government Chhattisgarh on 20 September 2023.

Workshop on "Vulnerability of Inland Fisheries due to Climate Change"

A concluding workshop under the NICRA project "Impact of Climate Change in Inland Fisheries and Development of Adaptive Strategies" was organized at ICAR-CIFRI, Kolkata, on 25 September 2023. Dr. B. K. Das, Director, and PI, NICRA project, outlined the purpose of

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Workshop on climate change

the workshop with a brief discussion on achievements under the different phases of the NICRA project for 12 years. Dr. P. Dey, Director, ATARI, Kolkata was the Chief Guest and other invited experts and fish farmers were also present.

Concluding Workshop under the NMCG Project

The institute organized a one-day stakeholders' consultation-cum-consultative workshop on 'Fish conservation and ranching in the Ganga' on 26 September 2023, to review the accomplishments of the three-year project of NMCG under the Ministry of Jal Shakti, Government of India. Dr. B. K. Das, Director and Principal Investigator, NMCG, presented outcome of the project, and highlighted the mission of ranching, where more than 65 lakhs of fish fingerlings were released during the period 2020–23, covering five states, namely Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal. He also underlined the impact of the recent ranching program in the Ganga, which resulted in an increase in the landing of IMC by 24.70% in Prayagraj, 41.03% in Varanasi, Uttar Pradesh, and more than 25% in Patna, Bihar. He highlighted that around 140 public awareness programs covering 10 thousand fishers were conducted under this project for conservation of aquatic biodiversity and restoration of fish habitat in the Ganga.


Workshop under NMCG project

Stakeholders Consultation cum Consultative Workshop on Hilsa Fisheries Improvement

A stakeholders consultation cum consultative workshop on 'Hilsa fisheries improvement for sustainable fisheries and conservation in the Gangaunder the NMCG project" was organized at ICAR-CIFRI, Barrackpore, workshop on 27 September. Dr. Basanta Kumar Das, Director, ICAR-CIFRI, highlighted the importance of hilsa and dolphin conservation in the river Ganga and the scientific interventions taken up by ICAR-CIFRI since 2018. Dr. Sandeep Kumar Behera, Consultant, National Mission for Clean Ganga (NMCG), Mr. Rajdeep Mukherjee, Policy Analyst, Bay of Bengal Programme (BoBP-IGO), Mr. G. C. Das, Wildlife Institute of India (WII), Dr. D. K. Dey, Retired Principal Scientist of ICAR-CIFRI, Dr. U. Bhowmik, Retired Principal Scientist & Former HoD of REF Division, ICAR-CIFRI, Dr. Subrata Dasgupta, Retd. Principal

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Scientist of ICAR-CIFE, Dr. Ashim Kumar Nath, Professor, Department of Zoology, SBKU University, Prof. Sudhir Kumar Das, WBUAFS, and Dr. Gayatri Tripathi, Principal Scientist, ICAR-CIFE graced the occasion as expert members.

ICAR-CIFRI Observed 'National Dolphin Day'

Healthy aquatic environments contribute to the planet's overall well-being. Dolphins are the ideal ecological markers of a healthy aquatic ecosystem. On 15 August 2020, "Project Dolphin" was launched by the Hon'ble Prime Minister Shri Narendra Modi ji to include both river dolphins and marine dolphins in its conservation program. Subsequently 5th October has been observed as the National Dolphin Day to raise awareness for dolphin conservation.

Vigilance Awareness Week

The Institute observed "Vigilance Awareness Week" from 30 October to 05 November 2023, centered on the theme "Say No to Corruption, Commit to the Nation." The week-long observance started with the administration of a pledge to the officials and staff on 30th October by the Director-in-Charge, ICAR-CIFRI. Several staff members of the institute also took an e-pledge. Large numbers of posters, banners, and placards were displayed on the campus premises, showing the ill effects of corruption at work and in society and the commitment of ICAR-CIFRI towards zero tolerance for corruption.

Antimicrobial Resistance Awareness Week

The institute observed the World Antimicrobial Awareness Week (WAAW) from 18 to 24 November 2023, with a major theme of

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"Preventing Antimicrobial Resistance Together." The main aim of the program was to increase awareness of global antimicrobial resistance and encourage best practices among the public, health workers, and policymakers to avoid the further emergence and spread of drug-resistant infections. A series of lectures to the students and faculties from different colleges in and around Kolkata, awareness among the fishers and agriculture farmers in KVK, Malda and the river Ganga at Farakka were organized.

Communal Harmony Campaign and Flag Day

Community harmony campaign, fund-raising week, and Flag Day were observed at the institute during 19-25 November 2023 to spread messages on peace, harmony, and national integration and to foster and reinforce the spirit of communal harmony among the staff of the organization. The institute observed this campaign as a partner of the National Foundation for Community Harmony, New Delhi. A pledge on the themes of secularism, anti-communalism, and non-violence was taken by all the staff members on 19November 2023.

World Fisheries Day

The institute celebrated World Fisheries Day on 21 November 2023 at various corners of the country under the theme "Build enabling policy environments for small-scale artisanal fisheries." On this occasion, ICAR-CIFRI conducted three mass awareness camps at Hasnabad, West Bengal; Vazhani Reservoir, Kerala; and at Sangam, Prayagraj, Uttar Pradesh. More than 350 small-scale artisanal fishermen were sensitized on ecosystem health management and the importance of conservation through these awareness programs. The Guwahati Regional Centre participated in the exhibition organized by the Directorate of Fisheries, Govt. of Assam. The Bangalore Regional Research Centre participated in the exhibition conducted by the Department of Fisheries, Karnataka. More than 1000 people all over Karnataka witnessed the event.

Fish harvest Mela at the Cage Culture Site of Kangsabati Reservoir, Bankura

A fish harvest cum auction program was organized by the institute at the cage culture site, Kangsabati reservoir, Mukutmanipur on 02 December 2023. The program was organized under the project "Cage Culture in Kangsabati Reservoir," implemented by the Department of Fisheries, West Bengal, with the technical collaboration of ICAR-CIFRI. The purpose of the project was to showcase the potential of cage culture for fish production enhancement in reservoirs in West Bengal and build the capacity of fishers in different

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aspects of cage culture. The program was graced by Hon'ble Minister of State Sri Biplab Roychowdhury. Special Commissioner Sri. Atanu Kumar Roy, IAS; Karmadhakshy Ms. Sujata Mondal; ADM Sri Vivek Basmay, IAS; SDO Ms. Neha Banerji, IAS; and officials of the Fisheries Department were also present at the occasion. Many fishermen from the reservoir, belonging to 7 cooperative societies and local fish vendors and traders, participated in the program.

World Soil Day

World Soil Day 2023 was celebrated on the United Nations declared theme "Soil and Water: A Source of Life" on 05 December at the institute headquarters in both offline and online mode, connecting all the regional centers. A total of 150 participants, including scientists, students, research scholars, and fishermen participated in the program. Dr. Niharendu Saha, Professor, Department of Agricultural Chemistry and Soil Science, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, Chief Guest on the occasion lectured on importance of soil and water, their interrelationships, and balanced nutrition in fish production.

The Institute Hosts the Green Corner Platform

"Green Corner: Suitable Environment for All" is a program conducted to welcome and felicitate Mrs. Sudeshna Pal Kar, a solo expeditioner who is doing 400 km of solo kayaking from Murshidabad to Kolkata for the "Save River, Save Life" campaign. The 15-day kayaking trip was flagged off by Team WALK on 28 November 2023, from Ahiron Ghat, Murshidabad. The team WALK used kayaking as a medium to uphold the sport as a means of salvaging the environment in our lives; they had interacted with various stakeholders in the Ganga River during the expedition on various issues related to aquatic life diversity, including Gangetic Dolphins, tributaries, and other water bodies associated with the river Ganga.

Mrs. Sudeshna Pal Kar (at the middle)

Other Major Events

Kali Puja at the Institute residential campus

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Mahila Kisan Diwas on 15 October 2023

Women in Agriculture Day

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Eminent Visitors

- Prof Kuldeep Krishna Sharma, VC, Himalayan University, Itanagar on 10 July 2023
- Prof B. B. Jana, Kalyani University, West Bengal on 10 July 2023
- Dr. Gopal Krishna, Former VC, CIFE, Mumbai on 24 August 2023
- Sadhvi Niranjan Jyoti Sahni, Union Minister for State, Ministry of Rural Development on 05 September 2023
- Dr. Jeetendra Kumar, ADG, NASF, ICAR on 08 September 2023
- Dr. Satya Prakash Tiwari, Head, Department of Hindi, Shibpur Dinabandhu College, Howrah on 20 September 2023
- Shri Yatindra Pratap Singh, Assistant Statistical Officer, Department of Fisheries, Govt. of Chhattisgarh on 20 September 2023
- Shri Sandesh Kumar Nagotia, Sr. AO, DGGI, Kolkata on 18 October 2023
- Shri Rajneesh Meena, DD, DGGI, Kolkata on 06 November 2023
- Shri Rajesh Sahay, Director, Finance, ICAR, New Delhi on 21 December 2023

Director, ICAR-NBFGR (in the middle)

Dr. B. C. Deka (third from left)

Dr. R. Murugesan (in the middle)

Dr. B. Meenakumari, Former DDG visited Bangalore (third from right)

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Shri S. K. Nagotia (at the right)

Dr. Gopal Krishna, Former VC, ICAR-CIFE, Mumbai (at the left)

Sadhvi Niranjan Jyoti Sahni (at the left)

Shri Rajesh Sahay (fourth from left)

Swachha Bharat Activities

At ICAR-CIFRI Campus, Barrackpore

At Gangasagar, West Bengal

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Swachhta hi seva: Paying homage to the Father of Nation

Swachhta hi seva: at Barrackpore Ferry Ghat

Swachhata campaign 3.0 by Vadodara centre

Swachhata campaign at Prayagraj

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अनुसंधान उपलब्धियां

मानसून अवधि में पंचप्रयाग, उत्तराखंड में पानी की गुणवत्ता

उत्तराखंड राज्य में स्थित पंचप्रयाग पांच स्थानों का एक संयुक्त स्थल है जहां पांच नदियाँ, अलकनंदा नदी में विलीन होती हैं और पवित्र नदी गंगा के नाम से जानी जाती हैं। ये पांच स्थान हैं – विष्णुप्रयाग (धौलीगंगा और अलकनंदा नदियों का संगम), नंदप्रयाग (नंदाकिनी और अलकनंदा का संगम), कर्णप्रयाग (पिंडर और अलकनंदा का संगम), रुद्रप्रयाग (मंदाकिनी और अलकनंदा का संगम) और देवप्रयाग (अलकनंदा और भागीरथी का संगम)। संस्थान ने सितंबर 2023 में इन नदियों के ऊपरी और निचले संगम स्थलों से पानी के नमूने एकत्र किया। अध्ययन में पानी का तापमान 13.6 से 21.5 डिग्री सेल्सियस, पीएच 8.4 से 9.0, घुलनशील ऑक्सीजन 8.0 से 9.6 मिलीग्राम/लीटर और बीओडी 1.0 से 2.0 मिलीग्राम/लीटर के बीच पाए गए। विशिष्ट चालकता और टीडीएस क्रमशः 59.7–203 µS/सेमी और 42.5–144. 0 मिलीग्राम/लीटर, अधिकतम जल पारदर्शिता 628 एनटीयू और न्यूनतम 33.3 एनटीयू था, जो निर्धारित पेयजल सीमा 5 एनटीयू से अधिक है। जल पारदर्शिता का उच्च मान अपवाह के माध्यम से नदी में प्रवाहित कम गुणवत्ता वाली मिट्टी की उच्च मात्रा के कारण था। पानी की क्षारीयता 30 से 102 मिलीग्राम/लीटर, कुल नाइट्रोजन और कुल फॉस्फेट क्रमशः 0.62 से 2.61 मिलीग्राम/लीटर और 0.11 से 0.95 मिलीग्राम/लीटर के बीच पाये गए। अध्ययन में यह देखा गया कि है कि मानवजनित गतिविधियों का जल के गुणवत्ता पर कोई हानिकारक प्रभाव नहीं था और पेय जल (एफएओ, बीआईएस रिपोर्ट के अनुसार) उपभोग के लिए सुरक्षित पाया गया।

बि. के. दास, एस. के. मिश्रा, वी. कुमार, डी. एन. झा, ए. आलम, वी. आर. ठाकुर, जे. कुमार, एस. के. वर्मा, यू. सिंह, आर. बी. वर्मा एवं आर. कुमार

मानसून अवधि में उत्तराखंड के पंचप्रयाग स्थल की बेन्थिक विविधता

यह अध्ययन उत्तराखंड के पवित्र पंचप्रयाग, अर्थात् देवप्रयाग, रुद्रप्रयाग, कर्णप्रयाग, नंदप्रयाग और विष्णुप्रयाग में किया गया था, जिसमें भागीरथी, अलकनंदा, मंदाकिनी और पिंडर जैसी प्राचीन नदियाँ आती हैं। अध्ययन में कुल 7 बेंथिक प्रजातियों की उपस्थिति देखी गई। विभिन्न नमूना स्थलों पर एफेमेरोप्टेरा की प्रचुरता देखी गई। इसके बाद ट्राइकोप्टेरा और डिप्टेरा देखे गए। बेन्थिक प्रजातियों की सबसे अधिक बहुतायता रुद्रप्रयाग और मंदाकिनी नदी के संगम पर दर्ज की गई। पंचप्रयागों में विभिन्न नमूना स्थलों पर प्रमुख बेंथिक जीव *हेप्टाजेनिया* प्रजाति, *बैटिस* प्रजाति और *लेप्टोफ्लेबिया* प्रजाति थे। नंदप्रयाग के संगम के ऊपर अलकनंदा और नंदाकिनी नदियों और विष्णुप्रयाग के संगम के ऊपर धौलीगंगा नदियों से *प्लैटिबैटिस* एसपी., *हाइड्रोसाइके* एसपी., *ब्लेफेरिसेरा* एसपी., और *आयरनोड* एसपी. क्रमशः दर्ज किए गए थे।

वी. आर. ठाकुर, एस. के. वर्मा, डी. एन. झा, ए. आलम, जे. कुमार, विकास कुमार, एस. के. मिश्रा, यु. सिंह, आर. बी. वर्मा एवं बि. के. दास

मध्य प्रदेश में सीतारेवा नदी में 'खोर' और 'थाली' पद्धति से मछली पकड़ना

संस्थान ने मध्य प्रदेश के नर्मदा नदी में मानसून और मानसून–पश्चात शाकर नदी के सहायक नदी, सीतारेवा से नमूना सर्वेक्षण में यह देखा कि इस नदी में दो मत्स्ययन पद्धति, 'खोर' और 'थाली' का प्रयोग किया जाता है। खोर पद्धति के अंतर्गत बांस के खंभों और जाल के माध्यम से नदी के जल प्रवाह को शंक्वाकार आकार देते हैं। जल प्रवाह की सीमा 2 फीट रखी जाती है और प्रवाह के साथ आने वाली मछलियों को इकट्ठा करने के लिए एक शंक्वाकार आकार का जाल लगाया जाता है। पकड़ी गई मछलियों में *पुंटियस सोफोर, मास्टासेम्बेलस आरमेटस, टोर पुटिटोरा, चन्ना स्ट्रिएटस, मैक्रोग्नैथस पंकुलस, शिस्टुरा मल्टीफासिआटा, बैरिलियस बर्ना, लेपिडोसेफालिचथस गुंटिया, रीटा गोगरा, ओलिराहोरा, लेबियो काल्बासु, डैनियो रारियो,* छोटी झींगा आदि प्रमुख हैं (प्रति इकाई मत्स्ययन प्रयास 500 ग्राम से 1 कि. ग्रा.)। 'थाली' मत्स्ययन पद्धति में एक 12 इंच के प्लेट का उपयोग किया जाता है, जो एक कपड़े से ढकी होती है और जिसके केंद्र में 3–4 इंच का छेद होता है। इसमें गेहूं के आटे को चारे के रूप में प्रयोग किया जाता है और प्लेट के बीच में रखा जाता है। मछली पकड़ने के लिए तैयार प्लेट को पानी में रखा जाता है ताकि मछली प्लेट के अंदर आ सके। थाली मछली पकड़ने का उपयोग ज्यादातर निर्वाहन मछली पकड़ने के रूप में किया जाता है और 45 मिनट में लगभग 0.25 से 0.30 किलोग्राम छोटी बार्ब, मिनोज और लोच मछलियों को थाली में पकड़ा जाता है।

एस. पी. कांबले, वैसाख, जी., जे. के. सोलंकी, एस. के. दास, एस. सामंत और बि. के. दास

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कोसी नदी के मीठाजल कछुआ प्रजाति

बिहार के कोसी नदी के चार नदी तटीय जिलों अर्थात् सुपौल, सहरसा, खगड़िया और भागलपुर में एक सर्वेक्षण के दौरान पहाड़पुर में मीठे पानी के कछुओं, अर्थात् *क्राउन्ड रिवर टर्टल* (हरदेल थुरजी) और सहरसा जिले के नौहट्टा, बिहार के खगड़िया जिले के डुमरीघाट से पीकॉक सॉफ्ट शेल कछुआ (*निल्सोनियाहुरम*) को दर्ज किया। आईयुसीएन (IUCN) मानदंड के अनुसार कछुए की दोनों प्रजातियों को असुरक्षित श्रेणी में रखा गया है।

राजू बैठा, कौशिक मंडल, सूरज के. चौहान और बि. के. दास

गंगा नदी के मीठाजल घोंघे में पॉलीस्टाइरीन माइक्रोप्लास्टिक का जैव संचय

मीठाजल घोंघा प्रजाति, *फिलोपालुडिन बेंगालेंसिस* में माइक्रोप्लास्टिक के जैवसंचय का अध्ययन किया गया था। इसके लिए इसमें 27 दिनों के लिए पॉलीस्टाइनिन माइक्रोस्फीयर के 0.5 पीपीएम से 5 पीपीएम स्तर खुराक द्वारा संचित किया गया। अध्ययन से पता चला कि खुराक और समय–निर्भर तरीके से परीक्षण जीव में माइक्रोप्लास्टिक आसानी से जमा (27वें दिन पर 5–पीपीएम खुराक पर प्रति व्यक्ति 82 ± 6.02 कणों) हो गया। हालाँकि, परीक्षण माइक्रोप्लास्टिक खुराक में किसी जीव की मृत्यु नहीं देखी गई। वर्तमान अध्ययन में पहली बार, भारतीय उपमहाद्वीप में व्यापक रूप से उपलब्ध मीठाजल घोंघा प्रजाति पर माइक्रोप्लास्टिक के प्रत्यक्ष प्रभाव को देखा गया जो यह दर्शाता है कि माइक्रोप्लास्टिक प्रदूषण लंबे समय में गंगा नदी के पारिस्थितिकी–जैव तंत्र पर हानिकारक प्रभाव डाल सकता हैं ।

डी. जे. सरकार, श्रेया रॉय और बि. के. दास

दिरांग नदी की मछली विविधता

अरूणाचल प्रदेश में कामेंग की एक महत्वपूर्ण सहायक नदी दिरांग में मछली विविधता का वर्ष 2023 में अध्ययन किया गया था। इस अध्ययन में साइप्रिनिडे, नेमाचेलिडे, साइलोरिनचिडे, सिसोरिडे और एंगुइलिडे वर्ग से संबंधित मछली की कुल 23 प्रजातियां दर्ज की गईं। साइप्रिनिड्स (9 प्रजातियाँ) सबसे प्रमुख समूह देखे गए। इसके बाद सिसोरिड कैटफ़िश (8 प्रजातियाँ), लोचेस और ईल थे। अध्ययन के दौरान बिचोम जलाशय से एक विदेशी कॉमन कार्प रिकॉर्ड किया गया। दर्ज की गई 22 स्वदेशी मछली प्रजातियों में से, साईज़ोथोरैक्स रिचर्डसोनी को आईयूसीएन लिस्ट के अनुसार असुरक्षित (Vulnerable) *नियोलिसोचिलुशेक्सा गोनोलेपिस, बगारियस बैगारियस* और *एंगुइला बेंगालेंसिस* को लुप्तप्राय श्रेणी में वर्गीकृत किया गया है। *साइलोरहाइन्चस एरुनाचलेंसिस* और *क्रेटेउचिलोग्लानिस्कामेंगेंसिस* संबधित आँकड़े उपलब्ध नहीं हैं। दिरांग नदी से एकत्र की गई शेष स्वदेशी मछली प्रजातियाँ सुरक्षित श्रेणी में आती हैं।

सिमंकु बोरा, मिशाल पी. और बि. के. दास

चिरी नदी में विदेशी वर्मीक्युलेटेड सेलफिन कैटफ़िश *पर्टिगोप्लिचथिस डिजंक्टिवस* की पहली रिपोर्ट

बराक नदी की सहायक नदी चिरी नदी से विदेशी वर्मीक्युलेटेड सेलफिन कैटफ़िश, *पर्टिगोप्लिचथिस डिजंक्टिवस* को पहली बार अगस्त 2023 में रिपोर्ट की गई थी। इस एकल नमूने की कुल लंबाई 29.5 सेमी और कुल वजन 166.5 ग्राम था। मछली को एक मछुआरे ने सुबह के समय चिरी नदी, चंद्रपुर, बशकांडी, सिलचर, असम से गिल जाल (जाल का आकार 24 मिमी) द्वारा पकड़ा था। अगस्त, 2023 को नदी का औसत पीएच (6.24) थोड़ा अम्लीय तथा घुलित ऑक्सीजन और कुल क्षारीयता मान क्रमशः 6.58 मिलीग्राम/लीटर और 44.24 मिलीग्राम/लीटर पाया गया। ऐसा माना जाता है कि यह प्रजाति तेजी से फैलती है, और इसके आक्रामक प्रकृति के कारण गंभीर पारिस्थितिक और आर्थिक क्षति हो सकती हैं। अतः ऐसे आक्रामक मछली प्रजातियों के प्रसार और उनके हानिकारक परिणामों को सीमित करने के लिए अभिगमन और फैलाव मार्ग को सख्ती से नियमित किया जाना चाहिए। इसके अलावा, स्थानीय मछुआरों को इस प्रजाति को खुले पानी में जीवित छोड़ने के प्रभावों के बारे में जागरूक किया जाना चाहिए।

एस. सी. एस. दास, डी. देबनाथ, ए. काकती, एस. के. मझिआंद, बि. के. दास

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पश्चिम बंगाल से स्केलीटल झींगा (कैप्रेलिड एम्फिपोड) का एक नया रिकॉर्ड

सितंबर 2023 के दौरान, भारतीय सुंदरबन क्षेत्र के भीतर पथार प्रतिमा के पास मतला मुहाना के निचले क्षेत्र में भौतिक–रासायनिक नमूना संग्रहण के समय, नदी में मछली पकड़ने के जलमग्न रस्सियों पर एक बायोफ़ाउलिंग का जमाव देखा गया। जांच करने पर यह पाया गया कि यह जमाव मुख्यतः हाइड्रोजोआ (*यूडेंड्रियम* एसपी. और *बोगेनविलिया* एसपी.) के कारण हो रही है। साथ ही यह पता चला कि स्केलीटल झींगा अपने आवास और प्रजनन के लिए उपयुक्त निवास स्थान के रूप में हाइड्रॉइड डंठल का उपयोग करता है। इन नमूनों की पहचान नर और मादा पैराकैप्रेलापुसिला मेयर, 1890 के रूप में की गई थी। भारतीय कैप्रेलिड्स पर सीमित जानकारी उपलब्ध है और इन एम्फ़िपोड्स की केवल 12 प्रजातियाँ ही प्रलेखित हैं। *पी. पुसिल्ला* को पहले महाराष्ट्र, केरल, तमिलनाडु और आंध्र प्रदेश में प्रलेखित किया गया था। विशेष रूप से, यही प्रजाति महाराष्ट्र की खाड़ियों में देखी गई थी, जो एंकरिंग रस्सियों पर एपिजूटिक हाइड्रॉइड के रूप में पाई जाती हैं। इस अध्ययन से पता चलता है कि कैप्रिलिड एम्फ़िपोड्स द्वारा एपिजूटिक हाइड्रॉइड को प्रजनन और नर्सिंग आधार के रूप में उपयोग किया जाता है, जिससे दोनों प्रजातियों के बीच संबंध मजबूत होता है। सर्वेक्षण के दौरान निम्नलिखित पानी के पैरामीटर पाए गए– तापमान 30.4 डिग्री सेल्सियस, गंदलापन 25.9 एनटीयू, पीएच 8.6, घुलनशील ऑक्सीजन 6.2 मिलीग्राम/लीटर, कुल क्षारीयता 107 मिलीग्राम/लीटर, कुल कठोरता 2687 मिलीग्राम/लीटर, लवणता 25.2 पीपीटी, और बीओडी 0.4 मिलीग्राम/ली.।

रंजन के. मन्ना, आर्य सेन, दिबाकर भक्त, चायना जाना, संगीता एम. नायर, सुभेंदु मंडल, अभिजिता सेनगुप्ता, श्रीकांत सामंत और बि .के. दास

जलदापारा राष्ट्रीय उद्यान परिसर में स्टोन लोच, *शिस्टुराचिंडविनिका* – एक नया रिकॉर्ड

पश्चिम बंगाल के जलदापारा राष्ट्रीय उद्यान परिसर के भीतर टोरसा नदी के कोडालबस्ती भाग से पहली बार स्टोन लोच, *शिस्टुराचिंडविनिका* को दर्ज किया गया है। जलदरापा राष्ट्रीय उद्यान परिसर और उसके आसपास मानसून नमूना संग्रहण के दौरान दो एस चिंडविनिका नमूनों को एक छोटे, जालीदार ड्रिफ्ट गिल नेट (जाली आकार में 30 मिमी से कम) द्वारा पकड़ा गया था। आईसीयूएन रेड लिस्ट के अनुसार, नेमाचिलिडे और साइप्रिनिफोर्मेस को लुप्तप्राय प्रजाति के रूप में वर्गीकृत किया गया है। यह उष्णकटिबंधीय प्रजाति भारत के मणिपुर की एक मूल प्रजाति है। मणिपुर और मिजोरम में ब्रह्मपुत्र जल निकासी में केवल दो धाराओं में यह प्रजाति देखी गई है। कथित तौर पर पहली बार इसे अपने मूल क्षेत्र के बाहर पश्चिम बंगाल की टोरसा नदी में देखी गई है। इस प्रजाति में ग्यारह नरम पृष्ठीय धारियाँ, आठ नरम गुदा धारियाँ और नौ कृपटिक गहरे भूरे रंग की पट्टियाँ देखी जाती हैं। जल प्राचलों में पानी की गहराई (110 सेमी), कम पारदर्शिता (21 सेमी), और उच्च मैलापन (151 एनटीयू), पानी का पीएच 8.3, घुलनशील ऑक्सीजन (7.3 मिलीग्राम/लीटर) और उच्च प्रवाह दर (0.4 मीटर/सेकंड) पाए गए। वर्तमान शोध भारत के पश्चिम बंगाल में टोरसा नदी में अपने मूल निवास स्थान से प्रजातियों की भौगोलिक सीमा को विस्तृत करता है।

दिबाकर भक्त, आर.के. मन्ना, संगीता एम. नायर और बि .के.दास

लोकतक झील, मणिपुर में भारी धातु का स्तर

मणिपुर के लोकतक झील, अजैविक और जैव रासायनिक डिब्बों में भारी धातुओं के वितरण पर देशी खरपतवार द्रव्यमान से बने मछली एकत्रीकरण उपकरण (एफएडी) के रूप में एक प्राकृतिक तैरते द्वीप के प्रभाव का मूल्यांकन करने के लिए अध्ययन किया गया। एफएडी के अंदर सतही जल में भारी धातुओं की कम सांद्रता देखी गई, जिसमें कैडमियम, लेड और अन्य धातुओं (कार्बन मोनॉक्साइड, क्रोमियम, कॉपर, निकेल और जिंक) के स्तर में क्रमशः 73.91%, 65.22% और 40.57-49.16% की कमी देखी गई। इनसे एफएडी सतही जल के अंदर भारी धातु प्रदूषण सूचकांकों में 14.72–55.39% की कमी दर्ज की गई और एफएडी के अंदर मछली की प्रजातियां के स्वास्थ्य पर कम जोखिम (24. 07–25.07% की कमी) देखा गया। यह अध्ययन भारी धातु प्रदूषण के प्रभावों को काम करने में एफएडी की भूमिका को दर्शाता है। अतः बेहतर मानव स्वास्थ्य और आजीविका के लिए मीठे पानी की आर्द्रभूमि के स्थायी रखरखाव में प्राकृतिक तैरते द्वीपों की महत्वपूर्ण योगदान है।

डी. जे. सरकार, सोमा दास सरकार, संथाना कुमार वी., थांगजाम निरुपदा चानू और बि. के. दास

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ओपी कीटनाशकों की जांच हेतु एम्पेरोमेट्रिक बायोसेंसर

ऑर्गेनोफॉस्फेट कीटनाशक परीक्षण में एसिटाइलकोलिनेस्टरेज़ (एसीएचई) बायोसेंसर बनाने के लिए पॉलीविनाइल अल्कोहल (पीवीए)–कैप्ड एजीएनपी का उपयोग नैनोकैरियर के रूप में किया गया था। इस क्रम में इलेक्ट्रोकेमिकल बायोसेंसर बनाने के लिए एसीएचई एंजाइम को ग्लासी कार्बन इलेक्ट्रोड (जीसीई) पर एक ड्रॉप कास्ट AgNPs@PVA परत पर ग्लूटाराल्डिहाइड के माध्यम से स्थिर किया गया था। डिफरेंशियल पल्स वोल्टामेट्री (डीपीवी) के माध्यम से, बायोसेंसर द्वारा एसिटाइलथियोकोलाइन (एटीसीएल) के एसीएचई–मध्यस्थता वाले हाइड्रोलिसिस से थायोकोलाइन और उसके बाद डिमर में ऑक्सीकरण से उत्पन्न 0.6 वॉल्ट पर अधिकतम धारा प्रवाह को मापा गया। एक मॉडल ओपी कीटनाशक, मैलाथियान के साथ सेंसर जांच की एसीएचई हाइड्रोलिसिस गतिविधि को रोककर कीटनाशक बायोसेंसर विकसित किया गया था, क्योंकि निषेध प्रभाव मैलाथियान की एकाग्रता के लिए आनुपातिक पाया गया था। निर्मित बायोसेंसर 2.6 pg/mL की पहचान सीमा (एलओडी) के साथ इष्टतम स्थिति में 0.01 से 1 ng/mL मैलाथियान की सीमा को प्रदर्शित करता है। निर्मित एसीएचई बायोसेंसर में ओपी कीटनाशकों के लिए उत्तम चयन पद्धति के साथ वास्तविक नमूना विश्लेषण में दक्षता देखी गई।

डी. जे. सरकार, बी. के. बेहरा और बि. के. दास

नेत्रवती–गुरुपुर मुहाने से व्यावसायिक रूप से महत्वपूर्ण मछली और केकड़े की प्रजातियों में उपस्थित ट्रेस धातु का मानव स्वास्थ्य पर प्रभाव

भारत के नेत्रावती–गुरुपुर मुहाना से *एट्रोप्लस सुरटेन्सिस, मुगिल सेफलस, सिल्लागो सिहामा,* और *यूरीग्लोसा ओरिएंटलिस*) और केकड़ा (*पोर्टुनस पेलैजिकस* और *स्काइला सेराटा*) तथा ज्वारनदमुख मछली प्रजातियों (*नेमाटालोसा नासस, गेरेस फिलामेंटोसस, एरियस एरियस, गेरेसेरीथ्रोरस, सार्डिनेला फिम्ब्रिएटा, कैरानक्स इग्नोबिलिस*) में असंख्य ट्रेस मेटल (कैडमियम, कार्बन मोनॉक्साइड, क्रोमियम, लेड, आयरन, निकेल, जिंक और मैंगनीज) के स्तर का अध्ययन किया गया। साथ ही, मानव स्वास्थ्य पर इसके प्रभाव का भी अध्ययन किया गया। मानव उपभोग के लिए मछलियों के लिए धातुओं का खतरा सूचकांक हैः मांसपेशियों में – आयरन (12.83 ± 6.30) > लेड (3.19 ± 1.86) > क्रोमियम (1.18 ± 0.51) > मैंगनीज (0.61 ± 0.33) > जिंक (0.52 ± 1.13) > कॉपर (0.19 ± 0.34) > निकेल (0.14 ± 0.08) > कैडमियम (0.08 ± 0.07) > कार्बन मोनॉक्साइड (0.005 ± 0.01) और गिल में – आयरन (70.17 ± 24.91) > लेड (3.19 ± 1.21) > क्रोमियम (1.61 ± 0.97) > मैंगनीज (0.91 ± 0.34) > जिंक (0.32 ± 0.37) > निकेल (0.17 ± 0.16) > कॉपर (0.02 ± 0.02) > कैडमियम (0.015 ± 0.01) > कार्बन मोनॉक्साइड (0. 012 ± 0.01)। सभी धातुओं के लिए THQ मान 1 से नीचे हैं, जो यह बताता है कि इन चयनित मछलियों के सेवन से धातुओं के अप्रत्यक्ष सेवन से वयस्क मनुष्यों में संभावित स्वास्थ्य पर खतरा नहीं होगा पर बच्चों के स्वास्थ्य पर हानिकारक प्रभाव पड़ सकता है। यद्यपि परिणाम दर्शाते हैं कि अध्ययन में पाई गई भारी धातु सांद्रता मनुष्यों के लिए कोई बड़ा खतरा पैदा नहीं करती है, पर ऐसी मछलियों का लगातार उपभोग हानिकारक है।

अजय साहा, बि. के. दास, डी. जे. सरकार, एस. सामंत, एम. ई. विजयकुमार और एम. फ़िरोज़ खान

कर्नाटक के गायत्री जलाशय में पादपप्लवक की सामयिक विविधता

कर्नाटक के चित्रदुर्ग जिले में गायत्री जलाशय, कृष्णा बेसिन पर सुवर्णमुखी नदी पर निर्मित एक छोटा जलाशय है। गायत्री जलाशय में पादपप्लवक समुदाय का अध्ययन किया गया और नौ शैवाल वर्गों के अंतर्गत 29 प्रजातियों को दर्ज किया गया। सायनोफाइसी, बैसिलरियोफाइसी और ट्रेबौक्सियोफाइसी सभी मौसम में पाए गए। पादपप्लवक की प्रतिशत संरचना में नीले–हरे शैवाल जलाशय में प्रचुर तौर पर पाए गए। (मानसून पूर्व, मानसून और मानसून पश्चात क्रमशः 89%, 47% और 63%)। इसके बाद ट्रेबौक्सीफाइसी का स्थान रहा। सायनोफाइसी में माइक्रोसिस्टिस, पॉलीसिस्टिस और *ऑसिलेटोरिया* प्रमुख प्रजातियाँ थीं। टैक्सा की अधिकतम संख्या मानसून में 21, मानसून पूर्व 15 और मानसून पश्चात 7 पाए गए। मानसून पूर्व मौसम में औसत पादप प्लवक घनत्व सबसे अधिक (9.3 % 104 पादपप्लवक प्रति ली.) पाया गया। वर्तमान अध्ययन में, सिम्पसन और शैनन सूचकांकों के अनुसार, पादप प्लवक की सघनता और विविधता मानसून के दौरान सबसे अधिक और मानसून पश्चात सबसे कम थी। लेकिन इनका समान मान मानसून पश्चात सबसे अधिक और मानसून पूर्व सबसे कम पाया गया। पादपप्लवक खाद्य वेब का है, जो ट्रॉफिक मॉडलिंग के माध्यम से स्थायी मत्स्य पालन प्रबंधन में मदद कर सकती है और गायत्री जलाशय में मछुआरों की आजीविका में सुधार कर सकती है।

सिबिना मोल एस., जेसना पी.के., अजय साहा, प्रीता पणिक्कर, विजयकुमार एम.ई., लियानथुआमलुआया, बि. के. दास

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गुजरात के पानम जलाशय में भाले से मछली पकड़ना

विश्व में मछली पकड़ने के तरीकों के अनुसार भाले से मछली पकड़ने के पद्धति सबसे सरल माना गया है। स्थानीय रूप से 'बाला' कहे जाने वाले भाले को गुजरात के पंचमहल जिले में स्थित पानम जलाशय के मछुआरों द्वारा बांस की छड़ी और नुकीले धातु के टुकड़ों का उपयोग करके बनाया जाता है। हालाँकि भाला एक–कोणीय छड़ के समान होता है पर पानम जलाशय में उपयोग किए जाने वाले भाले अधिकतर बहु–कोणीय और कांटेदार होते हैं। एक बाला की कुल लंबाई 10 से 11 फीट तक होती थी और कांटेदार धातु वाला भाग लगभग 20 इंच लंबा होता था। पनाम जलाशय में, दो मछुआरों की नावों में भाला से मछली पकड़ा जाता है। एक मछुआरा नाव चलाता है जबकि दूसरे मछुआरे ने मशाल की रोशनी पकड़ते हुए भाला चलाता है। यह रात में मछली पकड़ने की एक पद्धति है, जो रात 9 अथवा 10 बजे से शुरू होकर सुबह 4 बजे तक चलती है। इस मछली पकड़ प्रक्रिया में प्रकाश का उपयोग किया जाता है जो भारत में विशेषकर समुद्री जल में मछली पकड़ने की प्रतिबंधित प्रथा है। चूँकि मछली पकड़ने की इस प्रथा से केवल बड़े आकार की मछलियाँ ही प्राप्त होती हैं इसलिए इसे एक गैर–विनाशकारी मछली पकड़ने की पद्धति माना जाता है। भाले से पकड़ी जाने वाली प्रमुख प्रजातियाँ हैं - मरेल (*चन्ना मारुलिस, सी. स्ट्रिएटस*), कैटफ़िश (*वालागो अट्टू, स्पेराटा* एसपीपी.), कार्प (*लेबियो रोहिता, एल. कैलबासु*), आदि। भाले से मछली पकड़ने का प्रति इकाई मत्स्ययन प्रयास 30 किग्रा / मछुआरा / घंटा आँका गया है। पारदर्शिता आदि को ध्यान में रखते हुए तटीय क्षेत्र में मछलियों की संख्या आदि के आधार पर मछली पकड़ने की दर 1 किलोग्राम / मछुआरे / घंटा से कम होनी चाहिए।

सजीना ए.एम., आर.के. मन्ना, जे.के. सोलंकी, अली, वाई., ए.के. दास और बि .के. दास

ओरियोक्रोमिस निलोटिकस में पार्वोवायरस संक्रमण

भारत के पश्चिम बंगाल और ओडिशा में तिलापिया के पिंजरे और तालाब में मछली रोग संक्रमण और मृत्यु दर की जांच की गई। मछली में रक्तस्राव, अल्सर, मलिनकिरण और शरीर की सतहों पर लालिमा सहित नैदानिक लक्षण दिखाई दिए। विश्लेषण से पता चला कि तिलापिया के संक्रमण और मृत्यु दर का कारण तिलापिया पार्वोवायरस है। पिंजरे और तालाब से स्वस्थ और संक्रमित तिलापिया के नमूनों से एकत्र किए गए और इनके गिल, हृदय, प्लीहा, यकृत और गुर्दे के नमूनों में वायरस की जांच की गई। विश्लेषण में मस्तिष्क और त्वचा के ऊतकों के नमूनों में नकारात्मक परिणाम पाए गए। यह वायरस स्वस्थ और रोगग्रस्त मछलियों में पाया गया जिसका अर्थ है कि यह वायरस व्यापक और तेजी से फैल सकता है। विशिष्ट नैदानिक स्थितियों के अलावा, यह वायरस मछली में महत्वपूर्ण रोगजनक स्थति पैदा करता है जिससे मृत्यु दर उच्च हो सकती है।

बि. के. दास, विकाश कुमार और सुव्रा रॉय

अमोनिया और फॉस्फेट उपचारात्मक नैनोसंरचित सामग्रियों की विषाक्तता का आंकलन करना

अमोनिया और फॉस्फेट आमतौर पर जलीय वातावरण में पाए जाने वाले ऐसे दो प्रदूषक हैं जो मछलियों की मृत्यु और जलीय जीवन के लिए प्रतिकूल एनोक्सिक स्थितियों का कारण बन सकते हैं। जलीय तंत्र से कार्बनिक और अकार्बनिक प्रदूषकों को हटाने के लिए कार्बन–आधारित नैनोस्ट्रक्चर्ड पदार्थ को सबसे अच्छे अवशोषक के तौर पर एक माना गया है। हालाँकि, जलीय जीवों और पारिस्थितिक तंत्रों पर एनएसएम की संभावित विषाक्तता और हानिकारक प्रभावों का आकलन करना आवश्यक है। इसे ध्यान में रखते हुए, विकसित अमोनिया और फॉस्फेट रीमेडियेटिंग एनएसएम यौगिकों की तीव्र विषाक्तता का मूल्यांकन करने के लिए इन विट्रो मछली सेल लाइनों और विवो बायोएसेज़ में मछली का उपयोग किया गया था। एनएसएम की कम सांद्रता कोशिकाओं के लिए स्पष्ट रूप से साइटोटोक्सिक नहीं थी, लेकिन खुराक के कारण साइटोटॉक्सिसिटी अधिक देखी गई। इसके अलावा, इन विवो एसे में किसी मछली में मृत्यु दर या व्यवहार संबंधी असामान्यताएं नहीं देखी गईं। इसका तात्पर्य यह है कि विकसित अमोनिया और फॉस्फेट रीमेडियेटिंग एनएसएम पदार्थ में जलीय प्रणाली में प्रदूषण को नियंत्रित करने की काफी क्षमता है।

सुव्रा रॉय, डी. जे. सरकार, संथाना कुमार वी. और तनुश्री बनर्जी

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गुवाहाटी, असम के थोक मछली बाजारों से एकत्र की गई मछली के नमूनों में फॉर्मेल्डिहाइड संदूषण: एक अध्ययन

फॉर्मेलिन का तरल रूप फॉर्मेल्डिहाइड के रूप में जाना जाता है जो कम लागत वाला होता है और इसका उपयोग कृषि और खाद्य क्षेत्र में कीटाणुनाशक और परिरक्षक के रूप में किया जाता है। नवंबर 2023 के दौरान मछलियों में फॉर्मेल्डिहाइड का पता लगाने के लिए असम के गुवाहाटी में दो थोक मछली बाजारों, उज़ानबाजार और बेटकुची में एक सर्वेक्षण किया गया था। स्थानीय मछलियों से एकत्र किए गए छह मांसपेशियों के नमूनों में से एक में फॉर्मेल्डिहाइड के अवशेष पाए गए (0.0169 से 0.0785 पीपीएम)। इन स्तर को मानव स्वास्थ्य के लिए सुरक्षित माना जा सकता है। इसके विपरीत, आंध्र प्रदेश या पश्चिम बंगाल से लाई गई मछलियों में फॉर्मेल्डिहाइड का कोई निशान नहीं था, जो परिवहन से पहले मत्स्ययन और बर्फ पैकेजिंग के कारण हो सकता है। इसका अर्थ यह हो सकता है कि यदि मछलियों को बर्फ़ीली परिस्थितियों में रखा जाता है, तो मछली में प्राकृतिक रूप से फॉर्मेल्डिहाइड का उत्पादन नहीं होगा। हालाँकि, अन्य राज्यों से असम में आने वाले मछली के नमूनों की निगरानी नियमित अंतराल पर की जानी चाहिए।

एस. के. माझी, डी. देबनाथ, एन. शर्मा, ए. काकती, एस. के. नाग, एस. डी. सरकार और बि. के. दास

चिल्का लैगून मछुआरों के बीच आय, संपत्ति और ऋण में असमानता

चिल्का लैगून में 215 मछुआरों के आय, संपत्ति और ऋण में असमानता के लिए उत्तरदायी कारकों का अध्ययन किया गया था। अध्ययन में पाया गया कि कुल आय में गैर–मछली पकड़ने की गतिविधियों का योगदान बाहरी गतिविधियों से अधिक है। कुल आय में असमानता 0.23 पाई गई। गैर–मत्स्य पालन आय में असमानता अधिक (0.87) थी। कृषि भूमि का वितरण विषम देखा गया (0.83)। लेकिन विभिन्न सरकारी योजनाओं की वजह से आवास गृहों में असमानता कम देखी गई। घरेलू संपत्ति में समानता 0.64 पाई गई, और मत्स्य संपत्ति में भी यही समानता थोड़ी कम (0.50) पाई गई। लिए गए कुल ऋण में गैर–संस्थागत स्रोतों का योगदान अधिक था। केवल कुछ मछुआरों को ही संस्थागत ऋण मिल सका; इसलिए, संस्थागत ऋण में असमानता गैर–संस्थागत स्रोत (0.77) की तुलना में अधिक (0.90) थी। यह सुझाव दिया गया है कि ऋण के संस्थागत स्रोतों तक आसान पहुंच प्रदान करने की आवश्यकता है, जिससे मछुआरों पर बोझ कम होगा और उनकी आर्थिक स्थिति में वृद्धि होगी। साथ ही, मछली पकड़ के त्वरित और कुशल निपटान के लिए उचित नीतिगत नियम बनाने के साथ बिचौलियों पर निर्भरता कम करने के लिए एक अच्छी बाजार नीति होना चाहिए।

अरुण पंडित, अंजना एक्का और बि. के. दास

FISHERIES FACT

The world's largest nesting ground for olive ridley turtles along the Gahirmatha Marine Wildlife Sanctuary extending from Dhamra river mouth to Brahmani river mouth in Odisha on India's east coast has shifted 14 km northwards over the past three decades because of severe coastal erosion

source: https://www.telegraphindia.com