



Dr. B. K. Das assumed the directorship of the institute for the second term on 27 October 2022



CIFRI-HDPE Circular Cage is commercialized and licensed to M/s. Das and Kumar, Varanasi



हिन्दी संगोष्ठी "स्वाधीनता के 75 बरसों में भारत में विज्ञान और प्रौद्योगिकी का विकास"

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## Director's Column



The institute always encourages the staff to work in Official Language. Keeping the same tradition, we organized a Hindi Sangosthi on development of science and technology during the last 75 years. The event was much appreciated by the dignitaries. It is a matter of great pleasure in informing you that the "CIFRI-HDPE Circular Cage" technology has been commercialized. Two patents namely, "A remote controlled drone-based water sampling system" and "Sensor device to detect toxic metalloids in water" have also been filed. MoUs were signed with

NTPC, Hemnagar Sundarban Dream, M/s. Das & Kumar and Andhra Pradesh Fisheries Department for license agreement, academic and research exchanges.

Certain fish species have been recorded for the first time in some stretches of river Ganga. A maiden attempt towards hilsa culture in circular cages in river was made. We have been relentlessly trying to restore the biodiversity of fish species, particularly IMC in the river Ganga through ranching and awareness. In this direction, we have conducted six ranching programmes in which 7 lakh fingerlings were released into the river Ganga.

We have organized several important events during this period, including the 76<sup>th</sup> Independence day, *Har ghar tiranga*, solidarity programme at old age homes, Fit India freedom run 3.0, World rivers day, Mahilakisan diwas, National dolphin day, Vigilance awareness week, Tribal pride day, World Fisheries day, World antimicrobial resistance awareness week, Communal harmony campaign week &

Flag day, World soil day. Hon'ble Minister of Fisheries, Govt. of Manipur visited the CIFRI cage culture site at Dumbur reservoir.

Many of the staff are bringing laurels to the institute. Dr. U. K. Sarkar was selected as the director ICAR-NBFGR, Lucknow and Dr. B. K. Behera was selected as Dean, College of Fisheries Rani Laxmibai Central Agri. University, Jhansi. The institute bagged 2<sup>nd</sup> prize in an exhibition displaying the activities and achievements of NMCG project at the *Sundarban Krishti Mela O Loko Sanskriti Utsab*. I congratulate all the staff who got promoted and also got awards/recognitions in different fora. I wish a happy and healthy retired life to all the 4 staff who got superannuated during this period. I invite suggestions from the learned readers to improve the institute newsletter.

February 2023

**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 helped in bringing the blue revolution in the country. 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 two Research Stations at Kolkata and Kochi, 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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# सिफरी समाचार CIFRINEWS

(July - December 2022)

## Research Highlights

### First record of the exotics *Pangasianodon hypophthalmus* in the river Yamuna at Delhi and *Pterygoplichthys disjunctivus* in Ramgarh tal in Gorakhpur



*Pangasianodon hypophthalmus*

The striped catfish, *Pangasianodon hypophthalmus* (Sauvage, 1878) was documented for the first time in the river Yamuna at Okhla, Delhi. It was initially introduced illegally from Bangladesh and Thailand and entered into the culture systems in West Bengal and Andhra Pradesh due to its fast growth rate, low cost of production, and ability to withstand low dissolved oxygen. It has found its way into the river Yamuna probably due to the religious practice of releasing fish into the natural environment. The vermiculated sailfin catfish, *Pterygoplichthys disjunctivus* (Weber, 1991) was recorded for the first time in Ramgarh tal in the Gorakhpur district of Uttar Pradesh. It is a native of the Amazon River basin in South America. It was introduced in India for the ornamental fish culture. It might have introduced in the Ramgarh tal as contaminants along with carp fish seed transported from the hatcheries of West Bengal. Globally several investigations have highlighted the concerns and threats to native fish species and their ecology from alien fish species.

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*Pterygoplichthys disjunctivus*

Absar Alam, D. N. Jha, V. R. Thakur and Jeetendra Kumar

### *Channa quinquifasciata*, a high value ornamental snakehead from Jaldapara National Park complex

*Channa quinquifasciata* (Praveenraj et al., 2018) is an endemic freshwater species so far only reported from the Torsa River drainage, northern India. A total of 2 specimen of *C. quinquifasciata* were collected during the monsoon sampling from Kodalbasti area (26°39'10.5" N, 89°20'18.5" E) of river Torsa under Jaldapa National Park complex. Using the taxonomic keys provided by Praveenraj et al. (2018), the species was identified. It can be distinguished morphologically from its closely related species *C. stewartii* by having fewer dorsal-fin rays (33-35 vs. 38-40), less caudal-fin rays (12 vs. 13), and fewer mid-row lateral-line scales (10-13 vs. 14-16). The species has a limited geographic range and has only been documented once, in the river Torsa region of West Bengal's New Alipurduar district. However, it may be treated as one of the most colourful snakehead species, such as the rainbow snakehead, which might create a new interest in ornamental fish trade. Local fishermen now exploit it as a food fish, only. During collection time, water depth was recorded as 110 cm with low transparency (21 cm) and high turbidity (151 NTU). Monsoon rain associated dilution caused low conductivity (126.3  $\mu$ S/cm) and TDS (87 mg/l). Water pH was alkaline (8.3), a congenial habitat for fishes. Sufficient dissolved oxygen (7.3 mg/l) was recorded in river water during collection of the species.



*Channa quinquifasciata* collected from Jaldapara National Park complex

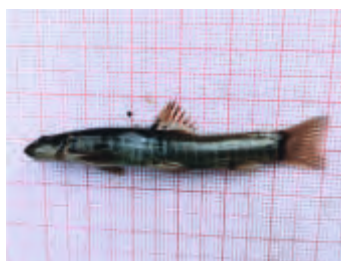
Dibakar Bhakta, R. K. Manna, Sangeetha M. Nair, Raban C. Mandi, S. Samanta and B. K. Das



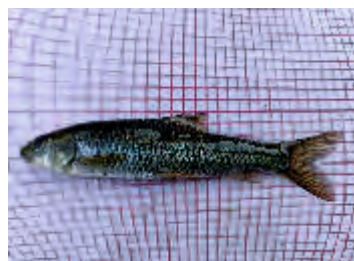
## Pre-impoundment fishery survey of Goriganga for Sirkari Bhyol Rupsibagar Hydroelectric Power Project in Munsiyari, Pithoragarh, Uttarakhand



*Schizothorax richardsonii*



*Nemacheilus rupicola*



*Naziritor chelynooides*

The Goriganga originates from the dual glaciers, Shankulpa glacier near Untadhura ridge and the Milam Glacier, northeast of Nanda Devi peaks. The proposed Sirkari Bhyol Rupsiabagar Hydroelectric Power project (120 MW) is located upstream of the confluence of Ralm Gad and

Goriganga between the latitude 30° 11' 06" N and longitude 80° 14' 16" E at an altitude of 2040 m MSL. The fishing is carried out in the December of 2022 in the river Goriganga covering a stretch of 35 km downstream and about 0.1 km upstream of the barrage site through experimental fishing that employed cast nets, hook and line, gill net locally called Surka and pot and pan method along with interactions with local people. The experimental fishing resulted in the collection of only three species of fish namely *Schizothorax richardsonii*, *Naziritor chelynooides*, and *Nemacheilus rupicola*. The fish species *S. richardsonii* and *N. chelynooides* are categorised as vulnerable under the IUCN Red List. They were observed below 35 km of the proposed barrage site at Banga Pani, only at one sampling site. The absence of fish fauna at the other three sites could be attributed to the prevailing harsh environment, like high water velocity, low water temperature, temporal variation like seasons, and low availability of the food and their breeding ground.

**B. K. Das, Absar Alam and Jeetendra Kumar**

## The indigenous fishing crafts and gears of river Mahanadi

ICAR-CIFRI has conducted an exploratory survey across the river Mahanadi in Chhattisgarh and Odisha and surveyed around 146 fishing villages. The fishing crafts operated in river Mahanadi were wooden boats



(Plank built and dug out) locally known as *Donga* or *naav* and inflatable rubber tube. The tube fishing was mainly observed in the upper stretch of the

river Mahanadi in Chhattisgarh. These fishing crafts are mostly used for the gill net operation. Fishing gears comprised of gill net, trammel net, cast net, dragnet, scoop net, hook and line and traps. In the upper stretch, the traditional scoop net, locally known as *pelna* mostly used for the prawn fishing during monsoon season. The hook and line are another traditional gear used in which single hook and multiple hook system are used which, locally called as *jitasula* and *Dawri* in Odisha and *Garhi* in Chhattisgarh. The long line measuring 100-400 m in length in which about 50-100 individual lines with hooks attached at an interval of one meter along the main line. The gear mainly used for



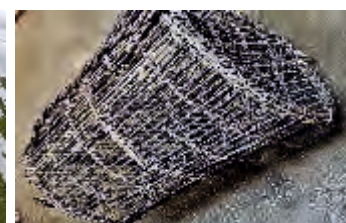
Wooden boat (*Donga*)



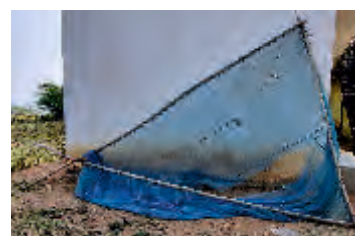
Single hook (*Garhi* or *jitasula*)



Inflated tube



Fishing bamboo trap (*Benda*)



Scoop net (*Pelna*)



Iron Spear (*Chiran* or *loha*)

Indigenous fishing crafts and gears operating in river Mahanadi





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murrel, eel, catfish and carp fishing during pre-monsoon and post monsoon season. Spear fishing locally called as *chiran* or *loha* is an indigenous gear used in middle stretch of river in Odisha. It is made of sharp iron piece (spear) attached to the long pole and mainly operated in shallow area of the river for the fishes like *Bagarius* sp., *Channa* sp. and other catfishes. Traps are very common gear used in the entire stretch, predominantly used for prawn fishing and catching small fishes during monsoon and post-monsoon seasons.

**Mitesh Ramteke, Canciyal Johnson and B. K. Das**

## ‘Holar jal’- a specialized fishing gear for catching hilsa fish in Barak River, Assam

Among many gears, *Holar jal*, a specialized gear, was found to be used for catching hilsa (*Tenualosa ilisha*) in River Barak. The net is also known as *Sola/Lewa/ Holar jal*.



Holar jal for hilsa fishing

It is a semi-circular purse net consisting of an elliptical frame with two split bamboos on either side with a bag shaped net attached to it. A big knot is placed at a specific distance on the rope which limits opening of the mouth and a heavy object such as stone or brick is attached to the middle of the curve to keep the net submerged. The *Holar* net length varies from 15-27 ft and 12-13 ft in width and is operated by 2-3 persons. The mesh



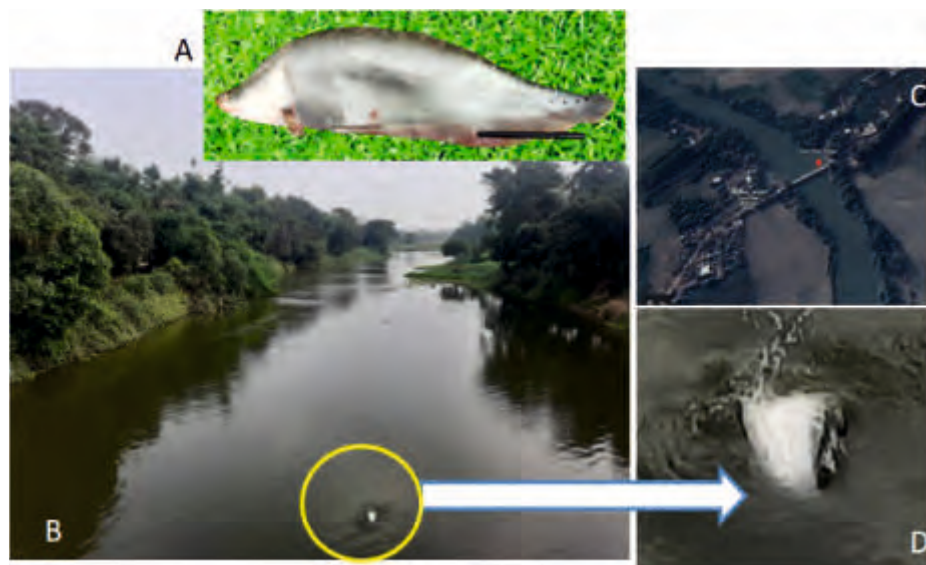
Operation of Holar jal in river Barak

size varies from 2 to 4 inches. In peak season, Hilsa fish caught in the net ranges from 0.5-3.0 kg/day. The net is found in almost every fisherman's household in Barak valley as Hilsa fish is the major fish caught from the Barak River of Assam.

**Niti Sharma, B. K. Das and Amulya Kakati**

## Community conservation of *Chitala chitala* in Kamla River, Darbhanga, Bihar

*Chitala chitala* (Hamilton, 1822), is a highly priced fish with quality flesh and also hold ornamental value. This species deserves high conservation importance as its natural populations are declining alarmingly due to multiple factors such as overexploitation, habitat alteration, disturbance in breeding grounds, pollution and other anthropogenic pressure. IUCN Red data list has categorized *C. chitala* as near threatened species (NT). A site of community conservation of *C. chitala* exists at Koni Ghat (25°56'44" N 86°12'49" E) of Pokhram village of Biraul block under the Darbhanga district of Bihar. Koni Ghat is situated near the Koni bridge made on the Kamala River flowing from Nepal and joining Bagmati river of southern Bihar. The local community at Koni Ghat has conserved the *C. chitala* in the river stretch and there are many mythical stories spread in the form of folklores, preventing the villagers and the community from catching the species in the conserved site. Fish are fed with fistfuls of puffed



A) *Chitala chitala* of 52.53 cm in length B) Koni ghat on Kamla River C) Google earth image of Koni ghat *C. chitala* conservation site D) Glimpse of *C. chitala* from Koni bridge

rice and fishing is strictly prohibited in a stretch of 500 meters at Koni Ghat including river stretch of both sides of bridge.

**Suman Kumari, Sajina A. M., Mukesh Kumar Singh and Y. Ali**

## Edible freshwater crabs and molluscs of Mizoram

The institute documented three freshwater crabs from Sialsuk village (23°24' 0.20" N & 92° 45' 47" E), Aizwal district in November 2022, namely *Maydelliathelphusa lugubris*, *M. falcidigitis* (locally called *aikam*) and *Sartoriana spinigera* (locally called *dumchakai*) having high market demand. Crabs are normally marketed live in bamboo baskets made with banana steam peels. A total of 8 to 10 individuals of *M. lugubris* and *M. falcidigitis* packaged live were sold at Rs. 250. Three molluscan (snail) species namely *Paludomus conica*, *Brotia costula* (*chengkawlbial*), and *Melanoides tuberculata* (*chengkawlsawl*) were collected from Tut River in Dapchhuah village (23°46'17" N & 92°31'18" E) of Mamit district. These snails were sold in live condition; one small bowl (approx. 250 g) was normally sold at Rs. 30-50. Considering the high consumer preference and demand of crab, one progressive fish farmer in Dumlui Zau, Kolasib district, Mizoram initiated crab farming in 2020 taking *Maydelliathelphusa* spp. with financial assistance from the Department of Fisheries, Govt. of Mizoram. However, limited success was achieved due to large-scale mortalities.



*Maydelliathelphusa falcidigitis*



*M. lugubris*



*Sartoriana spinigera*



*Brotia costula*



*Paludomus conica*

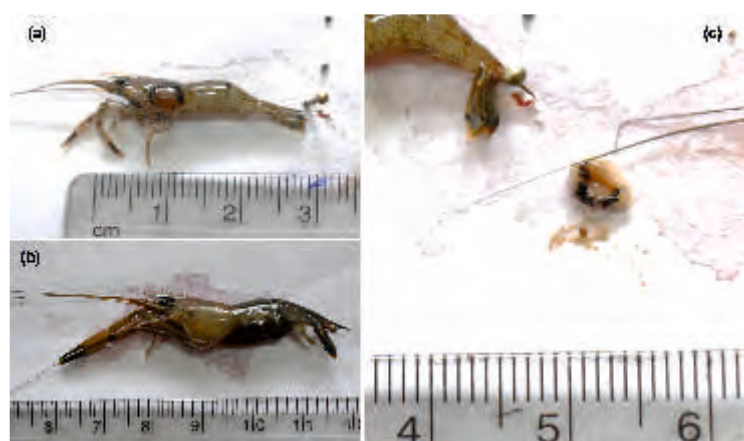


*Melanoides tuberculata*

Species of crabs and molluscs reported in Mizoram

**S. C. S. Das, D. Debnath, Lianthuamluaia, B. K. Bhattacharjya and B. K. Das**

## First report of isopod parasite (Family: Bopyridae) infection in *Macrobrachium scabriculum* in Mandovi River



*Macrobrachium scabriculum* (a) infected specimen

(b) normal specimen (c) isopod parasite

## Maiden attempt towards hilsa culture in circular cages in river

Developing aquaculture practices for anadromous migratory fish hilsa (*Temualosa ilisha*) has been a key challenge. For the first time an attempt was made to develop aquaculture practices of hilsa in freshwater ecosystem through circular cages. Circular cages of 16 m



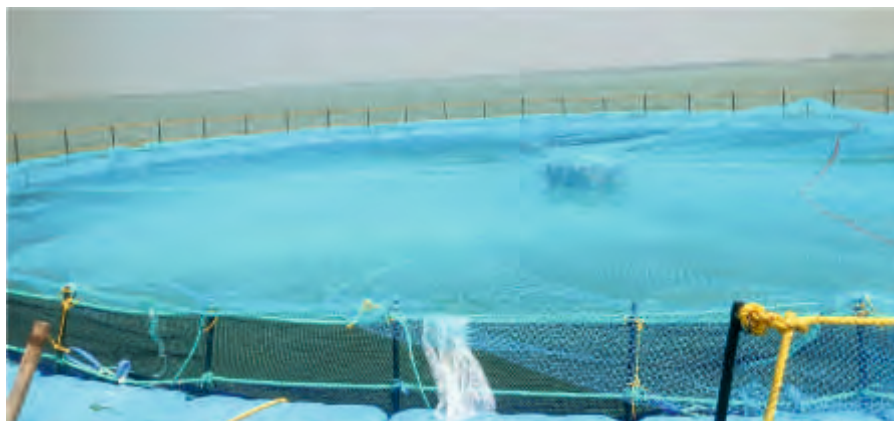


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diameter and 8 m depth were specifically designed by ICAR-CIFRI for hilsa and installed at Farakka in river Ganga. Total of 87 adult hilsa, with initial avg. weight of 275 g and avg. length of 18.9 cm were stocked. Artificial feed was supplemented in addition to the available natural feed from the river. Due to heavy influx of macrophytes from the upstream of the river Ganga, the activities could restrict for a period of one month. The preliminary results may guide us in the future hilsa aquaculture in captive conditions including cages.



Cage structure installed at Farakka for hilsa culture in river Ganga

**A. K. Sahoo, D. K. Meena, Mitesh Ramteke and B. K. Das**

## Water quality index of Natravathi - Gurupur estuary for brackish water fisheries



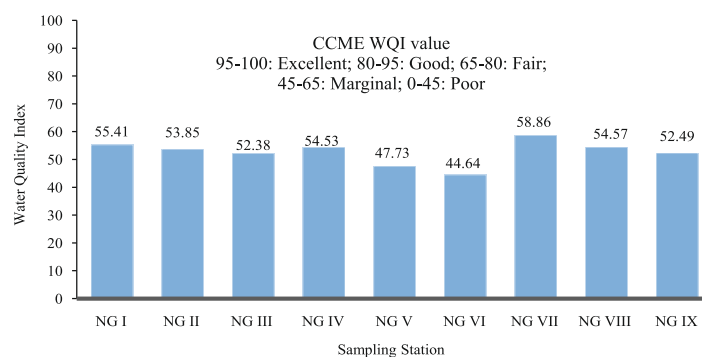
Netravathi-Gurupur estuary sampling locations

The water quality index (WQI) of the Natravathi-Gurupur estuary for brackish water fisheries has been calculated with the help of Canadian Council for Ministers of the Environment (CCME) water quality index calculator, and the permissible limits were replaced with an ideal range of water quality parameters for brackish water fisheries. A total of 11 water quality parameters viz., pH, temperature, dissolved oxygen, orthophosphate, nitrate, nitrite, total dissolved solid (TDS)/ salinity, free CO<sub>2</sub>, total hardness, transparency, and turbidity for three seasons were used for the calculation. The WQI for the post-monsoon, pre-monsoon and monsoon seasons were calculated to be 66, 64 and 42, respectively. According to the CCME guideline, the Netravathi-Gurupur estuary falls under fair to marginal quality in post and pre-monsoon seasons and poor quality in monsoon season for brackish water fisheries. The poor water quality during monsoon season was mostly due to very low salinity or TDS which is unsuitable for osmoregulation of brackish water fishes and due to higher turbidity. The WQI was also calculated for the individual stations. It

was observed that the WQI

decreased towards the upstream of the estuary. All the stations were of marginal quality except station VI which falls under poor category. This indicates that the Natravathi-Gurupur estuary water quality is frequently impaired, and the conditions are often departed from natural or desirable levels for brackish water fisheries.

**Sonalika Sahoo, Ajoy Saha, Sibina Mol S., Vijaykumar, M. E. and S. Samanta**



## *Cyprinus carpio* recorded from Umiam reservoir, Meghalaya

Umiam, located in Ri-Bhoi District of Meghalaya (25°39'30" N and 91°43'51" E) at an altitude of 900 m above mean sea level is a small reservoir with a water spread area of 500 ha. Different varieties/ strain of common carp (*Cyprinus carpio*) has established their natural populations in the reservoir and dominates fish catches from the reservoir. Five varieties / strain of *Cyprinus carpio* viz.,



Umiam reservoir, Ri-Bhoi district, Meghalaya

riparian population in Umiam reservoir since the catches of the indigenous fishes including *Neolissochilus hexagonolepis* have been declining in the reservoir. We recorded the Leather and Amur carp in the reservoir for the first time in 2022.

*Cyprinus carpio* var. *communis* (Scale carp), *Cyprinus carpio* var. *specularis* (Mirror carp), *Cyprinus carpio* var. *nudus* (Leather carp), *Cyprinus carpio* var. *koi* (Koi carp) and *Cyprinus carpio* var. *haematopterus* (Amur carp) were recorded. Among all, scale carp was recorded most frequently. It contributes significantly to the livelihood of

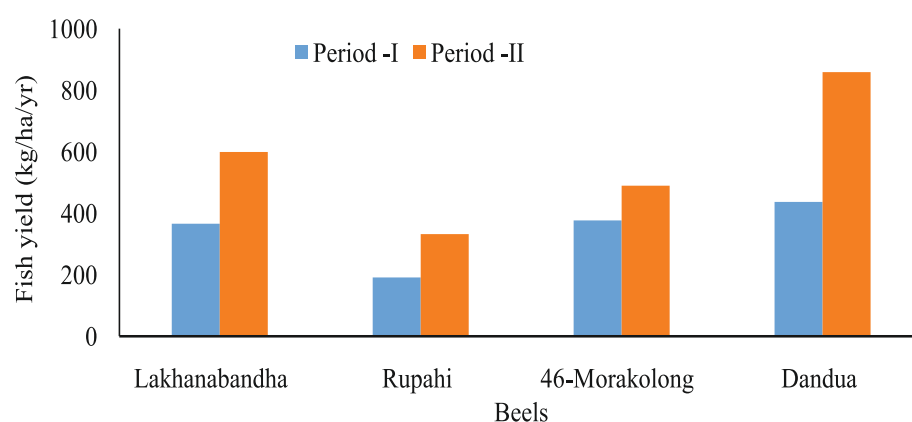


*Cyprinus carpio* var. *specularis* (Mirror carp) caught from Umiam reservoir

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

## Fish yield and riverine connectivity: A study of beels of Brahmaputra valley

The study was undertaken to assess fish yield pattern of two closed beels viz., Lakhanabandha (30 ha) and Dandua (50 ha) and two seasonally open beels viz., Rupahi (75 ha) and 46-Morakolong (76 ha) in central Brahmaputra valley of Assam. Lakhanabandha and Rupahi beels are in Nagaon district, whereas Dandua and 46-Morakolong beels in Moriagaon district of Assam. Analysis of time-series data on fish production of these 4 beels shows that fish yield of closed beels were observed to be higher in comparison to that of seasonally open beels. Among closed beels, the fish yield of Dandua beel increased significantly from  $437.1 \pm 230.9$  kg/ha/yr during 2001-10 to  $859.5 \pm 355.1$  kg/ha/yr, registered an increase of 97% over the decades. Similarly, the fish yield of Lakhanabandha beel registered 66% increase from  $366.2 \pm 102.9$  kg/ha/yr (2001-10) to  $599.2 \pm 65.6$  kg/ha/yr. Among seasonally open beels, Rupahi beel registered 74% increase in fish yield from  $191.1 \pm 76.1$  kg/ha/yr (2001-10) to  $332.1 \pm 123.8$  kg/ha/yr (2011-20) whereas 46-Morakolong registered 30% increase in fish yield from  $376.9 \pm 329.1$  kg/ha/yr to  $489.7 \pm 96.8$  kg/ha/yr over the decades.



Note: period I: 2001-10 to 2010-11; Period II: 2011-12 to 2020-21

Fish yield in beels of Brahmaputra valley, Assam

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

## Growth performance of Amur carp (*Cyprinus carpio haematopterus*) in inland cages in Maithon reservoir

In Maithon reservoir, Jharkhand India (23°47' N and 86°48' E) the fingerlings of Amur carp ( $12.27 \pm 0.31$  cm,  $35.6 \pm 3.16$  g) were stocked in CIFRI GI model cages (5m x 5m x 3.5 m) in triplicate at three different stocking densities viz., 10, 20 and 30 nos./m<sup>3</sup> designated as low, medium, and high stocking density. Fishes fed with a commercial floating feed (28% protein and 4% fat) and fed @ 5-3% of body weight twice daily (at 10.00 h and 16.00 h). After 240 days of culture, the higher growth in terms of weight gain

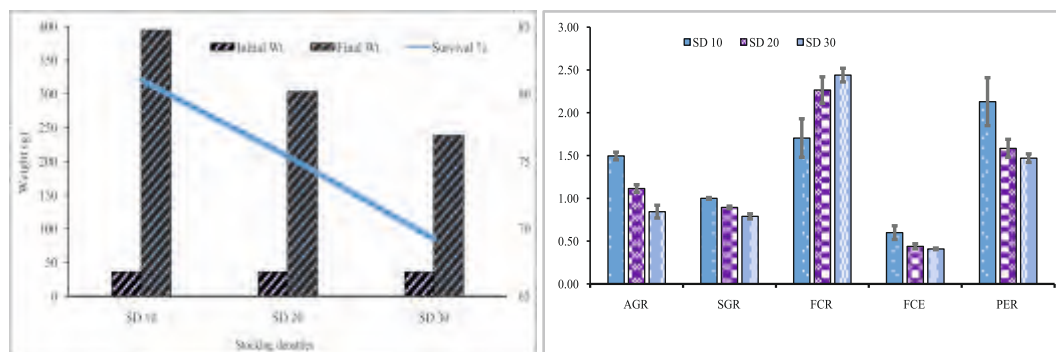




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Growth performance of Amur carp at different stocking densities

study suggests that the optimum stocking density of amur carp (10 nos. m<sup>-3</sup>) ensured the best growth performances in terms of weight gain, survival and feed and protein utilization.

(358.64±10.05 g), absolute growth rate (1.50±0.05) and specific growth rate (1.00±0.01) achieved in lower stocking density of SD 10 followed by SD 20 and lowest value recorded in SD 30. Better feed utilization and feed efficiency observed in lower stocking density (SD 10) with higher survival rate. The study showed that, stocking density significantly affects the growth performance, survival, and feed utilization of the fishes. The present

Mitesh Ramteke, B. K. Das, H. S. Swain, Vikas Kumar, A. Upadhyay, Suman Kumari and Rakesh Pal

## Successful cage culture at Algapur Anoa beel in Barak Valley of Assam

Under the Chief Minister's *Samagra Gramya Unnayan Yojana* (CMSGUY) of Govt. of Assam, cage culture was initiated in ten different floodplain wetlands (beels) of the state during 2019-20 in public-private partnership (PPP) mode, wherein the CMSGUY and private party share was 70:30. ICAR-CIFRI provided training and technology backstopping to the beneficiaries of the scheme. Out of all the wetlands, cage culture was most successfully carried out in Barak Valley. Ten modular cages measuring 6 × 4 × 2 m<sup>3</sup> each were installed in Algapur Anoa (24°46'62" N and 92°53'43" E) of Cachar district by the Algapur Fishery Development Co-operative Society Ltd. There were three nursery and seven grow-out cages in one battery. The first attempt during March 2020 was not much successful. In the second year (2020-21), the Society in consultation with ICAR-CIFRI, initiated culture of Indian carps including *Labeo catla* (catla), *L. rohita* (rohu), *L. calbasu* (calbausa) and *Barbonymus gonionotus* (Java puthi). Fry of these fishes were brought from Kolkata. When these fries grew to a size of 5-10 g in 2-3 months, they are transferred to grow-out cages at a



Cage culture facility in Algapur Anoa, Barak Valley, Assam

stocking density of 500-600 no. per cage. In the subsequent eight months of culture, fishes grew to a size of 300-800 g yielding a production of about 180 kg per cage and 1800 kg from 10 cages. Gross income and net income were Rs. 2.7 lakhs and Rs. 1.8 lakhs, respectively. The mortality in cages averaged 6%; there were no cost incurred on medicines. After the initial success, the society was able to install two more batteries (of 10 cages each) in the beel during 2021-22 and in the process of installing another during 2022-23.



Basir Ahmed Majumder, the fore-runner of cage culture in Algapur Anoa, Assam

Dipesh Debnath, S. C. S. Das, Sona Yengkokpam, Niti Sharma, B. K. Bhattacharjya and B. K. Das

## Successful rearing of *Cyprinus carpio* in cages in a mid-altitude reservoir of Manipur

ICAR-CIFRI initiated cage culture in Mapithel, a medium reservoir with 1182 ha total water-spread area located in Kamjong district of Manipur. With the construction of Mapithel Dam, approximately 7,000 villagers (ST community) belonging to 6 villages were displaced and they have gradually shifting from their main occupation of paddy farming to fishing as their source of livelihood. The institute had provided 10 net cages and 5.3 tonnes of CIFRI CageGrow feed for cage culture purposes in the reservoir. Approximately,



*Cyprinus carpio* harvested from cage

25,200 numbers of common carp (*Cyprinus carpio*) fingerlings having an average weight of 35.65 g and an average length 12.43 cm were stocked in the cages for rearing them to marketable size at five different stocking densities i.e., 10, 20, 30, 40 and 50 fingerlings  $m^{-3}$ . Fish were fed with pelleted feed (CIFRI CageGrow feed) containing 28% CP @ 3-5% of body weight and reared for 5 months. High survival rate (81.7-93.5%) was observed with fish production ranging from 200 kg  $cage^{-1}$  at low stocking density to 550 kg  $cage^{-1}$  at high stocking density.

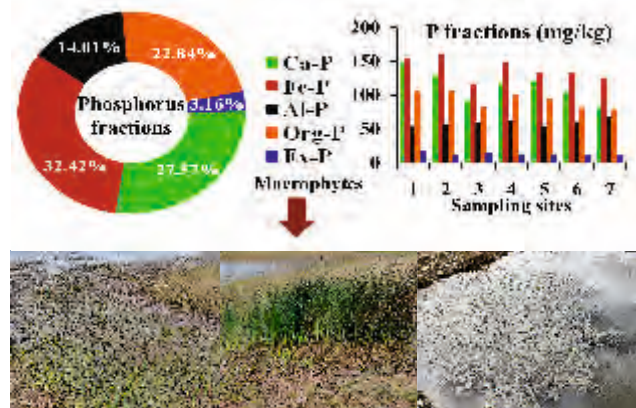


Harvesting of fish from the cages at Mapithel reservoir

Sona Yengkokpam, Dipesh Debnath, T. N. Chanu, Niti Sharma, B. K. Bhattacharjya and B. K. Das

## Phosphorus fractionation in the sediments of a macrophyte-dominated mesotrophic reservoir of Peninsular India

This study examined the distributions of phosphorus fractions in the sediment of macrophyte-dominated mesotrophic Gayathri reservoir, Karnataka, India. Sampling was carried out during monsoon, post-monsoon, and pre-monsoon seasons from non-infested (1 & 2), moderately infested (4, 5 & 6) and moderately to heavily macrophyte infested (3 & 7) sites. The total P concentrations of the sediment samples ranged between 551.0 and 260 mg/kg, and the trophic level of the reservoir was oligotrophic to mesotrophic during the whole study period. On average, inorganic P fractions comprised the largest fraction (77.16%), while organic-bound P (Org-P) constituted 22.84% of the total P. In the macrophyte infested sites, the concentrations of calcium bound P (Ca-P) and total P were lower than in the non-infested area. Exchangeable-P did not differ among sites. Iron bound (Fe-P) was less affected by the macrophyte,



may be due to the formation of Fe plaques in the root zone of macrophytes. P fractionation was dominated by Fe-P followed by Ca-P in monsoon and pre-monsoon season may be due to iron rich sediment. However, heavy rainfall due to retreated monsoon during the post-monsoon sampling resulted in disappearance of floating macrophytes and development of anoxic zone at the bottom which resulted in dominance of Ca-P followed by Org-P. The decreasing order of P fractions was Fe-P > Ca-P > Org-P > Al-P > Ex-P. Macrophyte communities along with dissolved oxygen concentration in bottom water can effectively control the sediment P fractions in this reservoir. Approaches used in this research should be extended to other locations, especially in mesotrophic and oligotrophic reservoirs, to provide information on macrophyte impacts in such aquatic ecosystems.

Ajoy Saha, Preetha Panikkar, M. E. Vijaykumar, B. K. Das, U. K. Sarkar and Lianthuamluaia

## Arsenic removal from the water using agri waste-based microalgae biofilm

Banana pseudostem (BS) is one of the abundantly available agri-wastes in India. It is utilized for growing microalgae biofilm and the same was used for removing arsenic from the contaminated waters. The BS based microalgae biofilm was kept in arsenite contaminated water for 5 days and removed 97.6% arsenite [As (III)] from the water. The BS itself adsorbed 70.4% of as (III); out of which 86% was in the form of arsenate and 14% was in the form of dimethyl arsenic acid (DMA). The remaining arsenic present in the





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water was also in organic form. The study suggests that utilizing banana pseudostem waste-based microalgae biofilm would convert toxic inorganic arsenic into nontoxic arsenic besides removing the arsenic from the contaminated water.

**Santhana Kumar V., B. K. Das, Dhruba Jyoti Sarkar and S. Samanta**

## The complete mitochondrial genome of two *Mystus* species (Bagrid catfishes)

For the first time next-generation Illumina sequencing technology was used to characterize the whole mitochondrial genome of *Mystus gulio* (commonly known as long whiskers catfish/nona-tengra) and *Mystus cavasius* (commonly known as Gangetic mystus/ golsha-tengra). The



*Mystus gulio*

According to our findings, *Mystus* species mitogenomic organization consisted of 37 genes in total, including 13 protein-coding genes (PGCs), two ribosomal RNA (rRNA), 22 transfer RNAs (tRNAs), and a D-loop regulatory region which is comparable to that of typical vertebrate or other fish mitogenomes, which indicates that mitogenomes may be highly conserved throughout the evolutionary process. In addition to providing unique genetic markers for the study of conservation genetics and species identification, the current work provides significant insights into the variability and evolution of fish mitochondrial genomes.

**Suvra Roy, P. K. Parida, Ramya V. L., Dibakar Bhakta, Vikash Kumar, Asim K. Jana, B. K. Behera and B. K. Das**



Banana pseudostem

mitochondrial genomes of *Mystus gulio* and *Mystus cavasius* are circular DNA molecules of 16,554 bp in length, well within the range of a typical vertebrate mitogenome size of 15–20Kb. The complete mitochondrial genome sequences have been submitted in GenBank with an accession number OP856487 and OP893799, respectively. The total base composition for *Mystus gulio* was A 31.88%, T 26.91%, G 15.05%, and C 26.16% and *Mystus cavasius* A 31.94%, T 25.7%, G 14.93%, and C 27.43% respectively.



*Mystus cavasius*

## Activities Under NEH Projects

### ICAR-CIFRI initiated cage culture in Doyang Reservoir, Wokha, Nagaland

Doyang (26°13'10" N and 94°17'90" E) is a medium reservoir (2258 ha) located in Wokha district of Nagaland having potential for augmenting fish production in the state. Fish catch in the reservoir is mainly contributed by stocked fishes (80-90 %) comprising Indian major carps and exotic carps (Common carp, Silver carp). More than 250 fisher families including 100 full-time fishers depend on the reservoir for their livelihood. However, fish yield rate in the reservoir is lower (157.2-158.5 kg ha<sup>-1</sup> yr<sup>-1</sup>). The Institute initiated culture of Pangas (*Pangasianodon hypophthalmus*), Common carp (*Cyprinus carpio*) and Silver barb (*Barbonymus gonionotus*) in cages installed in Doyang reservoir in



Cage unit at Doyang reservoir, Wokha, Nagaland



collaboration with the DoF&AR, Nagaland. A total of 21,600 fingerlings of Pangas, Common carp and Silver barb were stocked in ten cages each having dimension of 6m x 4m x 4m (L x B x D) on 19 October, 2022. The Institute also provided 6 tons of CIFRI CageGrow floating feed (28% CP) and net cages to local tribal fishers of the reservoir for conducting the cage culture trial along with required technical support.

**Simanku Borah, S. C. S. Das, Pronob Das, A. K. Yadav, B. K. Bhattacharjya and B. K. Das**

## Popularization of CIFRI CAGEGROW feed and CIFRI HDPE pen among wetland fishers of Assam



Distribution of inputs in wetlands of Assam

With the objective of popularizing ICAR-CIFRI technologies among the masses, CIFRI HDPE pen and CIFRI CAGEGROW feed were distributed among beel fishers of Assam by officials of ICAR-CIFRI Regional centre, Guwahati. A total of 54 tonnes of CIFRI CAGEGROW Feed (28% CP) was distributed among the fishers of 14 beels located in upper, middle and lower Brahmaputra valley as well as in Barak valley of Assam. Further, CIFRI HDPE Pen



Seed rearing in pens in wetlands of Assam

(44 no.; 0.05 ha area each) were also distributed and installed in 6 beels located in Dibrugarh, Tinsukia and Dhemaji districts of Assam. Fish seed (fry) were stocked in these pens and will be reared till fingerling stage. The produced seed will be used as stocking materials for stock enhancement in the beels.



Feed distribution programme at Umiarong village, Ri-Bhoi district, Meghalaya

and distribution of 3500 kg CIFRI-CAGEGROW floating feed among 50 tribal fisher families representing 16 villages of the district were done.

In collaboration with Ri-Bhoi Farmers' Union, Meghalaya the Guwahati centre organized another popularization programme of CIFRI-CAGEGROW feed at Umiarong village, Ri-Bhoi district, Meghalaya on 02 Dec 2022. The programme was attended by 80 tribal fish farmers of the locality under Ri-Bhoi Farmers' Union. On the occasion, interaction programme

**Simanku Borah, B. K. Das, B. K. Bhattacharjya, P. Das, A. K. Yadav and S. C. S. Das**

## Post-flood environmental monitoring of water bodies of Baksa district of Assam

Assam was severely affected by flood during April-July this year. Due to influx of flood waters in different water bodies including beel and ponds, there was a significant loss not only to the crop but also to the environment. The institute Regional Centre, Guwahati organized a post-flood environmental monitoring camp on the occasion of "National Fish Farmers' Day, 2022" at Charan beel, Baksa district, Assam on 10 July, 2022. The programme was attended by more than 50 tribal fish



Team of scientists monitoring environmental conditions of post flood wetland





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farmers of the locality under the *Dhulabari Charanpar Janajati Unnayan Samity*, Deulkuchi led by Mr. Naren Basumatary (President) and Mr. Jadu Swargiary (Secretary). Scientists from the Centre led by Dr. B. K. Bhattacharjya, monitored environmental conditions of water bodies of the locality including Charan beel.

**Pronob Das, B. K. Bhattacharjya, Simanku Borah, S. C. S. Das, A. K. Yadav, A. Kakati and B. K. Das**

## Field day conducted at Mapithel reservoir, Manipur



Field day at Mapithel reservoir

local fishers. The programme was attended by Shri H. Balkrishna, Director of Fisheries; staff from Department of Fisheries and ICAR-CIFRI; Shri Rockson Kasung, Chairman, Mapithel Fish Farmers Society, Kamjong and more than 35 fishers.

A field day was conducted on the occasion of final fish harvest from cages at Mapithel Dam at Chadong village, Kamjong district, Manipur in collaboration with the Department of Fisheries, Govt. of Manipur on 31 October 2022. Under the NEH project, a total of 25,200 fingerlings of common carp (*Cyprinus carpio*) were stocked in the cages (10 no.) for rearing them to marketable size. After rearing the fish for 5 months, the fishes were harvested giving an average fish production of 420.6 kg per cage and benefiting the



Fish harvested from cages at Mapithel reservoir

**Sona Yengkokpam, Dipesh Debnath, T. N. Chanu, Niti Sharma, B. K. Bhattacharjya and B. K. Das**

## Field day conducted at cage culture site of Umiam reservoir

ICAR-CIFRI in collaboration with ICAR Research Complex for NEH Region (ICAR RC-NEHR), Umiam has successfully carried out cage culture in Umiam Reservoir through participation of tribal fishers under the Ri-Bhoi Farmers' Union (RFU). Cage culture trials were carried out in CIFRI-GI cage (6 nos.; 100 m<sup>3</sup>/cage) using CIFRI-CageGrow floating feed in the reservoir. On successful completion of the 3<sup>rd</sup> culture trial in the reservoir, a field day was organized in collaboration with the Department of Fisheries, Govt. of Meghalaya and Ri-Bhoi Farmers' Union, Meghalaya at UmniuhKhwan village on 09 December 2022. The programme was attended by 80 tribal fishers (including 25 women beneficiaries). Scientists and technical personnel of the two ICAR Institutes acted as technical expert. The fish sale directly benefited 25 fisher women families of the Ri-Bhoi Farmers' Union.



Harvest of fishes from cages in Umiam

**Pronob Das, B. K. Das, B. K. Bhattacharjya, Simanku Borah, Sona Yengkokpam, D. K. Meena and A. K. Yadav**



## Technology Demonstration

### Successful demonstration of culture based fishery (CBF) of Pearl spot (*Etroplus suratensis*) in Vembanad lake, Kerala

The Kochi centre of the institute, conducted a fish harvesting programme at Ochanthuruthu, Vypin, Kerala with the help of a group of SC beneficiaries (under NICRA, SCSP programme) in which 25 fishers attended the programme. The aim of the



Harvest mela

programme was to improve the adaptability of the climate resilient technology and to boost fish production. About 6,000 seeds of climate resilient fish species viz., *Etroplus suratensis* and *Liza* sp. were stocked and reared in the climate resilient culture-based fisheries (CR-CBF) pond and harvested on 30 September 2022. This multi species stocking system using *E. suratensis* and *Liza* sp. ensured complete utilization of the niche of the ecosystem. Nearly 60 kg of climate resilient species and 22 kg of minor fish varieties worth ₹ 37,000 were harvested from the CR-CBF technology of which *E. suratensis* earned an amount of ₹ 30,000 alone. Through this CR-CBF technology, the fishermen got a profit of ₹ 6,870 which is around 23% of the annualized return.

### Demonstration of CIFRI HDPE pen technology for fingerling rearing in Dev Dam and Ukai Reservoir, Gujarat



The Vadodara research station demonstrated the CIFRI HDPE pen installation in a small reservoir named Dev dam and a large reservoir in Ukai, Gujarat for the purpose of rearing fingerlings of Indian major carps for stocking in the reservoir. The fishers were made familiar with method of pen installation and stocking of fish seeds in pen. The other precautions to be taken in case of water level fluctuations in reservoir during rearing period of the

fish seed were also explained to the fishers. The research team included Dr. Suhas Kamble, Dr. Vaisakh G., Mr. Lohith Kumar and the other technical and supporting staff of the research station.



### Demonstration of "CIFRI ARGURE" for argulosis control in cultured fishes

Argulosis, caused by crustacean ectoparasite, *Argulus* spp. infests and reoccurs in pond cultured fishes, especially carps and the estimated the loss is approximately US\$ 615/ha/year in India. The institute has developed a nano formulation of antiparasitic molecule (CIFRI ARGURE) for effective control of argulosis in freshwater cultured fishes. "CIFRI ARGURE" was tested in freshwater cultured fishes of Odisha, West Bengal and Bihar. The recommended dose of 40-80 ml/acre-m water depth have been found effective with application of second dose of same quantity after 5-7 days, if not eradicated. The application performance of the developed formulation was found better than conventional antiparasitic formulations with their highly variables dose ( $\geq 100$  ml/acre-m) and





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application frequencies. The analysis of field data suggested “CIFRI ARGCURE” is better alternative to the presently available formulations in the market.

## Popularization of CIFRI CAGEGROW to the tribal cage growers of Jharkhand

ICAR-CIFRI developed and commercialized CIFRI-CAGEGROW feed to provide comparatively cheaper and efficient fish feed for cage growers of *P. hypophthalmus*. The CIFRI-CAGEGROW feed has got wider acceptability to other cultured fishes also. The institute in collaboration with the District Fisheries Office, Jharkhand organized an “Outreach activities on cage culture management (*Kisan Gosthi*)” to fishers of Gogna village, Maithon dam and awareness cum popularisation of ICAR-CIFRI CAGEGROW technology among cage growers of Panchet dam of Dhanbad district, Jharkhand on 26 and 27 December 2022, respectively. More than 50 fishers, office bearers and other beneficiaries of the societies participated in the program at each dam.



**Raju Baitha, D. K. Meena, Rahul Das, Md. Rabuil S. K., Rakesh Pal, M. A. Hassan and B. K. Das**

## Technology Management News

### Patent filed

- The patent application entitled "A Remote Controlled Drone Based Water Sampling System" has been filed to the Indian Patent Office, Kolkata on 17 December 2022 in the name of the Indian Council of Agricultural Research. Patent application No. is 202231073303.
- The patent application entitled “Sensor Device to detect toxic metalloids in water and thereof” has been filed to the Indian Patent Office, Kolkata on 29 December 2022 in the name of the Indian Council of Agricultural Research. Patent application No. is 202231076888.

### Trademark filed

- The trademark application entitled “CIFRI HDPE Circular Cage™” has been filed on 30 November 2022, under class 22 in the name of the Indian Council of Agricultural Research. Trademark application No. is 5703691.

### Commercialization and licensing of technologies

**CIFRI circular cage:** The Circular HDPE cages are structurally sturdier and therefore can withstand a higher degree of wave action and storms. CIFRI circular cage structure with 16 meter diameter and 5 meter depth having 900 cubic meter water area for cage culture. The product is commercialized through Agrinnovate India Ltd. and licensed to M/s Das and Kumars, Varanasi, Uttar Pradesh on 27 September 2022.

### Technology ready to be commercialized

- **BSF floating fish feed:** Black soldier fly (BSF), *Hermetia illucens* incorporated feed is a cost-effective feed formulation suitable for successful rearing and production of Pangas, GIFT Tilapia and Amur carps in cages. The technology is developed by ICAR-CIFRI and ICAR-NBAIR.
- **CIFRI fish tanavhari:** CIFRI fish tanavhari is a unique sedative and anesthetic plant essential oil formulation used for fish handling and transportation under laboratory and field conditions. The formulation is prepared from plants, particularly edible plant-based materials so it is environmentally safe and cost-effective.

- **Tissue embedding machine:** This machine is a user-friendly equipment for histological studies with extremely low cost in comparison to automatic tissue embedding machines. The machine can handle more than 500 samples at a time due to the large volume (8l) of the paraffin reservoir.
- **CIFRI portable assembly for submersible echo sounder:** This equipment will make it easy to attach and unlatch the echosounder with pre-determined lodging positions.

## Memorandum of Understanding (MoU)

- MoU was signed between the institute and NTPC on 16 July 2022 for imparting state of knowledge on fish breeding to the local fishermen for livelihood improvement and enhancing the native fish population through ranching programme in river Ganga during the project period of 2022-2025.
- ICAR-CIFRI signed a MoU with the Hemnagar Sundarban Dream, a leading NGO and community based social development organization on 26 July 2022. The institute will implement STC, SCSP, demonstration, livelihood, training & extension activities, awareness campaign, scientist-farmer interaction, *Swachha Bharat* activities, *Mera Gaon Mera Gourav*, etc., in collaboration with this NGO during the period from July 2022 to 2025 in different areas of West Bengal. The Institute will help in capacity building of the NGO trainers and progressive farmers on fisheries related activities.
- MoU was signed between M/s Das & Kumar, Varanasi, Agrinnovate India Ltd. (AgIn) and ICAR-CIFRI, Barrackpore on 27 September 2022 at Barrackpore for non exclusive license agreement of "CIFRI CIRCULAR CAGE" technology.
- MoU was signed between the institute and Andhra Pradesh Fisheries Department on 21 November 2022 for development of sustainable fisheries model including reservoir-wise management plan and design framework for cost effective laboratories at RBK level and vision building for Fisheries University.



MoU with NTPC



MoU with M/s Das and Kumar



MoU with Hemnagar Sundarban Dream





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## Success Story

### Community participated culture-based fisheries in small reservoir improved livelihoods of displaced tribal community

Odisha state has 1.97 lakh ha of reservoir area which account for about 90% of the total inland fisheries resource of the state. The Kalo reservoir is a small tropical reservoir covering an average submerged area of 584 ha located in Mayurbhanj district. This small reservoir is a direct source of livelihood for 130 fishers of the surrounding villages which are dominated by tribal community. The average fish yield from this reservoir was 42 kg/ha/yr against production potential of 500 kg/ha/yr for small reservoir of India.

Culture Based Fisheries (CBF) is an effective management tool in increasing fish yields when recruitment of desired fish species is lower than the carrying capacity of the reservoirs. The institute made an intervention of culture-based fisheries along with pen culture for increasing the production of this water body under Tribal sub-Plan. The fishers cooperative society used to stock IMC fish seed in the reservoir. However, due to poor quality of seeds the mortality of the fish seeds was high and subsequently the production from the reservoir was much less than its potential. The institute installed CIFRI HDPE Pen (0.77 ha area) and demonstrated the culture technology in the reservoir for in-situ raising of fish seed followed by stocking of the advanced fingerlings in the reservoir since 2019-20. The fish fry was reared in the pen for 3 months. Besides this, one FRP boat and six coracles were also given to the members of the PFCS. Beside input support, technical guidance, off-campus training programme were also imparted on reservoir fisheries management. After the interventions by ICAR-CIFRI, the total fish production was increased from 25 tonnes to 50 tonnes (85/kg/ha/yr) in the year 2020-21. On an average each member of the cooperative society got an additional yearly income of Rs. 23,913. The production has been doubled by the intervention of ICAR-CIFRI. Through increased area under pen culture the production can be improved further in the years to come. This initiative has motivated the tribal fishers and they are adopting CBF including the pen culture for fish seed rearing and to improve the fish production from this reservoir and their livelihood.

Priti Jyoti Majhi, P. K. Parida, Aparna Roy, Lianthuamluaia and B. K. Das



Pen culture at the Kalo reservoir



Beneficiaries of the Kalo reservoir

## Women Empowerment

### Backyard ornamental fish culture for socio-economic empowerment of women folks

The institute encouraged small-scale backyard ornamental fish culture enterprise by woman to earn additional livelihood towards fulfilling the Sustainable Development Goals (SDGs). For a housewife (especially SC and ST) the additional income gives a sense of becoming an earning member of the family and enhances their self-esteem. The institute distributed ornamental fish culture kits and attempted skill development through exposure visits, hands on training and demonstration in the state of Jharkhand. Under this program, 95 women (30 from Simdega, 25 from East Singhbhum, 15 from Bokaro and 25 from Ranchi) of SC and ST community were benefitted.



Raju Baitha, B. K. Das, A. K. Das, P. K. Parida and Aparna Roy

## Awards / Recognition to the Institute

The CIFRI-NMCG pavilion bagged the second prize at the 'Sundarbans Kristi Mela O Lok Sanskriti Utsav' at Kultoli, Sundarban, West Bengal.

## Awards / Recognition to the Staff

- Dr. B. K. Das, Director was honoured with the Chief guest in the valedictory session at International conference on 'Responsible Aquaculture and Sustainable Fisheries Interact' (RASHI) held at College of Fisheries, CAU (Imphal), Tripura during 13-16 December 2022.
- Dr. Archan Kanti Das, Principal Scientist got the best presentation award at International conference on sustainable fisheries (ICSF-2022) organised by Department of Fisheries, Sylhet Agricultural University, Sylhet during 16-18 September 2022.
- Dr. Suvra Roy received the Dr. M. L. Bhowmik award for best young scientist for the contribution in fisheries research at International Conference on 'Responsible Aquaculture and Sustainable Fisheries Interact (RASHI) held at College of Fisheries, CAU (Imphal), Tripura during 13-16 December 2022.
- Dr. Srikanta Samanta, Principal Scientist received the best oral presentation award for the paper on "Conservation aquaculture: Initiatives for protection of hilsa fisheries in India" under the theme 'Fisheries Resources and Sustainability' at International Conference on 'Responsible Aquaculture and Sustainable Fisheries Interact (RASHI) held at College of Fisheries, CAU (Imphal), Tripura during 13-16 December 2022.



Second prize awarded to CIFRI-NMCG pavilion at Sunderban Mela 2022



Dr. A. K. Das (first from right), receiving best presentation award at ICSF-2022





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- Dr. Dibakar Bhakta received the best oral presentation award for paper on "Winter migratory bag net fishery in Hooghly-Matlah Estuary: present predicament and prospects" at International Conference on 'Responsible Aquaculture and Sustainable Fisheries Interact (RASHI) held at College of Fisheries, CAU (Imphal), Tripura during 13-16 December 2022.
- Dr. Dibakar Bhakta secured 1<sup>st</sup> position in the international photography contest at International Conference on 'Responsible Aquaculture and Sustainable Fisheries Interact (RASHI) held at College of Fisheries, CAU (Imphal), Tripura during 13-16 December 2022.
- Dr. Ajoy Saha has been nominated by the Ministry of Science and Technology, Government of India for the project evaluation submitted to Technology Development Board, New Delhi.
- Dr. Dipesh Debnath was awarded with the Life Fellow Award of CFSI (on 18 November 2022) by Coldwater Fisheries Society of India, Bhimtal, Uttarakhand.
- Dr. Pronob Das received "Research Excellence Award 2022" by Society of Biotic and Environmental Research (SBER), Tripura for Contribution in the field of Fisheries and Aquaculture Research.
- Dr. Pronob Das, Dr. B. K. Bhattacharjya and Dr. B. K. Das received best oral presentation award for their paper "Strategies for sustainable utilization of open water fisheries resources of Meghalaya: A way forward" at the "2<sup>nd</sup> Biotic Congress 2022" and "International Conference on Recent Advances in Agricultural, Biological and Applied Sciences Research" organized by SBER, Tripura in collaboration with Nowgong College, Nagaon, Assam and ICAR-CAFRI, Jhansi during 8-9 August 2022.
- Dr. A. K. Yadav received best PhD thesis award from Society of Biotic and Environmental Research (SBER), Tripura for Outstanding research and quality of PhD thesis.
- Dr. Sona Yengkokpam, Dr. Dipesh Debnath and Dr. Pronob Das acted as expert in interview committee at Assam Public Service Commission for selection of FDO for the Department of Fisheries, Govt. of Assam during 28-29 November 2022.



Dr. B. K. Das being honoured as the chief guest at RASHI



Dr. S. Samanta, recipient of best oral presenter at RASHI



Dr. D. Bhakta, recipient of the best oral presenter at RASHI



Dr. S. Roy, recipient of best young scientist award at RASHI



## PhD Degree Awarded

Scientist	Date of awarding degree	Awarding University/Institute	Title of the PhD thesis
Dr. Sangeetha M. Nair	24 Aug 2022	ICAR - Central Institute of Fisheries Education, Mumbai	Taxonomic study of selected fishes of the genus <i>Mustus</i> Scopoli, 1777 from India with special reference to Kerala



Dr. Dipesh Debnath receiving Life Fellow Award from the Coldwater Fisheries Society of India, Bhimtal, Uttarakhand



Dr. A. K. Yadav receiving best PhD thesis award

## Human Resource Development

### Farmers' Training (July-Dec, 2022)

Sl. No.	Title of the training programme	Date	No. of participants	Venue
1.	Inland fisheries management for livelihood improvement of rural populace of Sundarban, West Bengal	05-08 Sept	24 trainees from Sundarban, West Bengal	CIFRI HQ
2.	Reservoir fisheries management for production enhancement under STC	22-28 July	Tribal fishers of Mapithel reservoir, Manipur	CIFRI HQ
3.	Fisheries and aquaculture in inland waterbodies of Assam	24-26 Nov	15 fishers and fish farmers	ICAR-CIFRI, Guwahati Regional Centre



Training programme for fishers of Mapithel reservoir



Training programme by Guwahati centre on 24-26 Nov 2022





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## Students' Training (July-Dec, 2022)

Sl. No.	Title of the training programme	Date	No. of participants	Venue
1.	Inland fisheries management	26 Aug - 01 Sep	23 nos. final year B.F.Sc. students of The Neotia University, West Bengal	CIFRI HQ
2.	Inland fisheries management	09-16 Nov	45 nos. M.Sc. Zoology (Spl Fish and Fisheries) students from Binod Bihari Mahato Koyalanchal (BBMK) University, Dhanbad, Jharkhand	CIFRI HQ
3.	Inland fisheries management	06-20 Dec	6 nos. the M.F.Sc (FRM) students of ICAR-CIFE, Mumbai	CIFRI HQ
4.	Advanced methodological approach on benthos in the inland open waters	27-29 Dec	18 nos. students from Kerala and West Bengal	CIFRI HQ



Neotia University students



BBMK University students

## Official Training (July-Dec, 2022)

Sl. No.	Name of the training programme	Date	Participants	Venue
1.	Tank based fish production model	20 - 24 Sep	25 nos. DoF officials of Govt. of Andhra Pradesh	CIFRI HQ
2.	Ecosystem modelling: towards management of inland fisheries	27 Jul - 02 Aug	25 nos. CIFRI scientists and other staff from different state Govts.	CIFRI HQ



Training on ecosystem modelling



Training on tank based fish production

## Mass awareness campaign (July-Dec, 2022)

Sl. No.	Title of the training programme	Date	No. of participants	Venue
1.	Fish conservation including hilsa across Haldi River	12 Nov	35	Haldia



Mass awareness at Haldia

## Exposure / Educational Visits (July-Dec, 2022)

Sl. No.	Visitors	Date of visit	Venue
1.	25 Students from College of Fisheries (CoF), Gumla	22 Sep	ICAR-CIFRI HQ
2.	27 students from BKC college	03 Nov	ICAR-CIFRI HQ
3.	9 students from Zoology Dept, D. M. College, Imphal	03 Nov	ICAR-CIFRI HQ
4.	33 nos. 4 <sup>th</sup> year B.F.Sc. students from CoF, RPCAU, Dholi, Bihar	20 Dec	ICAR-CIFRI HQ
5.	16 nos. B.Sc. Zoology Hons. 1 <sup>st</sup> year students of Bethun College, Kolkata	20 Dec	ICAR-CIFRI HQ
6.	29 nos. 4 <sup>th</sup> year B.F.Sc students from the CoF, Udgir, Latur, Maharashtra	21 Dec	ICAR-CIFRI HQ



BKC College students





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# सिफरी समाचार CIFRINEWS

(July - December 2022)

## Participation in exhibitions/mela (July-Dec, 2022)

Sl. No.	Date	Particulars	Place
1.	10-12 Aug	33 <sup>rd</sup> AICZ and National Seminar on “Emerging Trends in Biological Science in the Light of Environmental Degradation and Life Sustainability” organized by the Deptt. Of Zoology, Pandit S. N. Shukla University	Shahdol, MP
2.	24-27 Aug	NMCG team participated in the exhibition on 25 <sup>th</sup> National Exhibition, Kolkata 2022	Central Park, Salt lake, Kolkata
3.	3-5 Nov	Farmers’ Fair organized by the Banda University for Agriculture and Technology	Banda, UP
4.	18-19 Nov	National Symposium on ‘Fisheries and aquaculture for livelihood and nutritional security’ organized by ICAR -DCFR in association with CFSI, Bhimtal, Uttarakhand	Bhimtal, Uttarakhand
5.	11-18 Dec	37 <sup>th</sup> Manomohan Mela O Loko Sanskriti Utsav organized by Srijani Sanstha	Chotojagulia, North 24 PGS, West Bengal
6.	13-16 Dec	International conference on ‘Responsible Aquaculture and Sustainable Fisheries Interat (RASHI)’ organized by CoF, Tripura in collaboration with COFLAA and NESFA	CoF, Lembucherra, Tripura
7.	20-29 Dec	26 <sup>th</sup> Sundarban Krishti Mela O Loko Sanskriti Utsab	Kultoli, Sundarbans, West Bengal



Exhibition at Banda by the ICAR-CIFRI, Prayagraj centre



ICAR-CIFRI stall at the CoF, Lembucherra, Tripura



CIFRI NMCG pavillion at 25<sup>th</sup> National Exhibition, 2022 at Salt Lake, Kolkata

- At Kultoli, Sundarban, West Bengal. The CIFRI-NMCG pavilion was awarded with second prize. The exhibition pavilion included various publications of NMCG describing the activities by NMCG to make the river Ganga clean. Former minister for Sports, Youth Welfare and Sundarbans Development, Government of West Bengal, Mr. Kanti Ganguly visited the exhibition stall and appreciated the works of the CIFRI-NMCG project.

## Awareness programme of hilsa and dolphin conservation

A total of 93 hilsa and dolphin awareness programmes were organized covering Bihar, Jharkhand and West Bengal states. Active participation of 1710 (approx. 97.8% males, 96.4% SC/ST communities) people was recorded in the awareness programmes.



Awareness programme at Taltolaghat, Farakka, West Bengal



Glimpses of dolphin and hilsa awareness programme in Jharkhand and West Bengal







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# सिफरी समाचार CIFRINEWS

(July - December 2022)

## Staff Corner

### Transfer

#### Inter-institutional transfer

Sl. No.	Name of the staff	From	To
1.	Shri Shravan Kumar Sharma, Scientist	ICAR-CIFRI, Regional Centre, Prayagraj	ICAR-CIFT, Research Station, Vashi
2.	Dr. H. S. Swain, Scientist	ICAR-CIFRI, Barrackpore	ICAR-CIFA, Bhubaneswar
3.	Dr. U. K. Sarkar, Principal Scientist	ICAR-CIFRI, Barrackpore	ICAR-NBFGR, Lucknow (on selection as Director)
4.	Shri Sudipta Gupta, AO	ICAR-CIFRI, Barrackpore	ICAR-NINFET, Kolkata



Dr. H. S. Swain (2<sup>nd</sup> from left)



Dr. U. K. Sarkar (left)

#### Intra-institutional transfer

Sl. No.	Name of the staff	From	To
1.	Dr. Ajoy Saha, Scientist	ICAR-CIFRI Research Centre, Bangalore	ICAR-CIFRI, Barrackpore
2.	Md. Quasim, Chief Technical Officer	ICAR-CIFRI, Barrackpore	ICAR-CIFRI Regional Centre, Prayagraj
3.	Shri Ravi Kumar Sonkar, Skilled Support Staff	ICAR-CIFRI, Barrackpore	ICAR-CIFRI Regional Centre, Prayagraj
4.	Shri Anita Gawate, Skilled Support Staff	ICAR-CIFRI, Barrackpore	ICAR-CIFRI Research Centre, Vadodara
5.	Shri Divakar R, Skilled Support Staff	ICAR-CIFRI, Barrackpore	ICAR-CIFRI Research Centre, Bangalore
6.	Shri Bijoy Kumar Roy, Assistant	ICAR-CIFRI, Barrackpore	Regional Centre, ICAR-CIFRI, Guwahati

## Promotion

### Administrative staff

Sl. No.	Name & Designation	Promoted to
1.	Shri Sudipta Gupta	Administrative Officer
2.	Shri Biswajit Barua	Administrative Officer
3.	Shri Santosh Sarkar	AAO
4.	Shri C. D. Parmar	AAO

### Technical staff

Sl. No.	Name & Designation	Promoted to
1.	Shri Subhendu Mandal	Technical Officer (T-5)
2.	Shri Asim Kumar Jana	Technical Officer (T-5)
3.	Md. Yousuf Ali Sk.	Technical Officer (T-5)

### Skilled Support Staff

Sl. No.	Name & Designation	Promoted to
1.	Ms. Shibani Bhattacharya	LDC

## Superannuation

Sl. No.	Name	Designation	Date of Retirement	Place of posting
1.	Mr. Subhendu Mondal	STA	31 July 2022	Barrackpore
2.	Mrs. G. Vinoda Laxmi	Private Secretary	31 July 2022	Bangalore
3.	Mr. Atanu Das	TO	31 October 2022	Barrackpore
4.	Mr. Arunava Mitra	TO	30 November 2022	Kolkata



Sh. Suwendu Mondal (extreme left)



Mrs. G. Vinoda Laxmi





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# सिफरी समाचार CIFRINEWS

(July - December 2022)

## River Ranching Programme

### Ranching in River Ganga

The institute frequently carries out ranching programmes at different places of river Ganga under the NMCG project for the conservation and restoration of fisheries. To celebrate *Azadi Ka Amrit Mahotsav*, the institute released 2 lakh fingerlings of IMC at Mukteshwar Ghat, Sahibganj, Jharkhand on 02 August 2022. The programme was graced by District Magistrate, Shri Ramniwas Yadav, IAS and District Fisheries Officers. On the occasion of Holy Janmashtami, about 2 lakh IMC fingerlings were released in the Ganga river at Assi Ghat, Varanasi, Uttar Pradesh on 19 August 2022. The event was graced by the Hon'ble Union Minister of Fisheries, Animal Husbandry and Dairying Shri. Parshottam Rupala. Dr. J. K. Jena (DDG, Fy. Sc), ICAR, Dr. Sandeep Kumar Behera (Consultant Biodiversity, NMCG) were also present. At the same place another



Ranching programme at Mukteshwar Ghat, Sahibganj,  
02 August 2022

river ranching programme was held on 20 October 2022 in which five thousand of IMC fingerlings were released. The event was graced by Sri G. Ashok Kumar, D.G., NMCG.

In association with the NTPC 0.8 lakh of artificially bred wild germplasm of Indian Major Carps fingerlings were released in river Ganga at Taltala Ghat, Farakka, West Bengal on 22 October 2022. The event was graced by Mr. R. D. Deshpandey (GM Farakka barrage), Mr. Deepak Nayak (In charge, KVK, Malda), Dr. B. K. Das (PI, CIFRI-NMCG Project) and other scientific staff of the CIFRI-NMCG team.

On the World Fisheries Day 1 lakh fish juveniles of Indian Major Carps were ranched in the river Ganga on 21 November 2022 at Daspara Ghat, Barrackpore. In addition to this, 3,000 indigenous riverine prawns, *Macrobrachium rosenbergii* were also released during the event. The programme was graced by



Ranching programme at Balagarh, West Bengal,  
06 December 2022

In continuation of the 'National Ranching Programme-2022', a ranching cum awareness programme was organized on 06 December 2022 at Balagarh Ferry Ghat District-Hooghly. A total of 1.15 Lakh artificially bred wild fish germplasm of rohu, catla and mrigal fingerlings were released by Dr. B. K. Das, Director CIFRI and PI NMCG project into the river Ganga. 32 active fisherwomen also took part in the event.

Ranching programme at Assi Ghat, Varanasi,  
19 August 2022



Ranching programme at Assi Ghat, Varanasi,  
19 August 2022



Ranching programme at Taltala Ghat, Farakka,  
West Bengal 22 October 2022



## Activities under Scheduled Tribe Component (STC)

The activities under the STC aim at enhancing the livelihood of the Schedule Tribes (STs) population by imparting scientific knowledge, distributing the fisheries inputs, conducting demonstrations.

### Livelihood improvement initiatives for dam-affected tribal fishers

The institute undertook reservoir fisheries production enhancement programme involving the Department of Fisheries, Government of Manipur, Co-operative societies of three reservoirs viz., Mapithel in Kamjong district, Khoupum in Noney district and Khuga in Churachandpur district of Manipur. Two tonnes of CIFRI HDPE Pen, 2 tonnes of CIFRI CAGEGROW feed and 50,000 fish seed of Indian Major Carps were provided to the selected societies of these reservoirs. The reservoir fisheries enhancement programme was inaugurated on 02 September 2022 at Khoupum reservoir with a mass awareness programme. Shri Leishiyo Keishing, Hon'ble MLA of Phungyar AC initiated the pen culture in Mapithel reservoir, Kamjong District on 03 September 2022. On this occasion, a mass awareness programme was also conducted. The pen culture in Khuga reservoir

was initiated by Shri Paolienlal Haokip, Hon'ble MLA, Saikot AC on 04 September 2022 with the stocking of IMC seed. A mass awareness on the reservoir fisheries management was also successfully conducted with the participation of more than the 100 fishers of Kuga Reservoir.

An on-campus capacity building programme on 'reservoir fisheries management for production enhancement' was organized at CIFRI, HQ during 22 - 28 July 2022, for the fishers of the Mapithel reservoir. Gill nets were also distributed among the trainees in the valedictory session.



### Demonstrated 'CIFRI HDPE Pen Technology' at Dev Dam, Panchmahal, Gujarat

Vadodara Research Station of the Institute demonstrated 'CIFRI HDPE Pen Technology' at Dev Dam, Panchmahalon on 13 October 2022 to the tribal fishers of 'The Dev Dam Asargrast Vikas Matsya Uchher Sahakari Mandali Ltd' at Bhamariya Village. About 30,000 fish seeds of catla and rohu were released in the 0.1 ha CIFRI HDPE pen for production of stockable size fish fingerlings. During the programme tribal fishers of the mandali were trained on stocking of fish seed, feeding and other management aspects of the CIFRI HDPE pen.







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(July - December 2022)

## Livelihood improvements through fisheries for tribal women of Malda



An initiative has been taken to upscale the socio-economics of tribal women at 8 villages under Habibpur Gram Panchayat of Malda District, West Bengal in collaboration with ICAR-CISH KVK, Malda on 21 October 2022. A total of 150 tribal women were selected for livelihood improvement programme. These women



groups formed a FPO to boost up their economy. Dr. B. K. Das, Director, ICAR-CIFRI distributed 12.6 tonnes fish feed, 360 kg fish seed and 2.4 tonnes lime to 120 tribal women to support their livelihood through pisciculture in their household ponds and also conducted a mass awareness programme at Habibpur Gram Panchayat office.

## Empowering tribal women of Jharkhand through ornamental fish culture



An attempt on empowering women through ornamental fish culture has been made involving 30 tribal women of Simdega district, Jharkhand. One 400 L tank each, ornamental fish culture kit comprising one thermostat, hand bet, one kg feed, aerator, suction cleaning pipe, aeration accessories, disease control chemical, etc. were distributed.



## Input distribution programme at Gosaba, Sundarbans

An input distribution programme was organized at Rangabelia village under Gosaba block, Sundarban on 28 October 2022. Fifty two tribal beneficiaries were given fisheries input for their livelihood support. Each beneficiary was given 5 kg fish fingerlings of Indian Major Carp, 20 kg lime and 105 kg CIFRI Cage Grow feed for culturing IMCs in their household ponds. The activities will meet their nutrition demand and will also help them to earn better livelihoods.

## Activities under Scheduled Caste Sub-Component (SCSP)

### Ornamental fisheries for empowering the SC women

A mission mode approach was undertaken to develop some villages as 'ornamental fish farming villages' on cluster basis in different states of the eastern India. The institute adopted villages of Murshidabad and Sundarbans of West Bengal for developing ornamental fish culture clusters and provided FRP ornamental fish tank, fish feed, medicine, aerators and other accessories as well as live-bearer fish, with the goal of providing a livelihood and doubling







the income of the rural SC women. The local support was provided by the Nimpith KVK, Murshidabad KVK and Milon Tirtha Society (NGO).

## Adoption of the SC families of Sundarbans for sustainable livelihood development

ICAR-CIFRI adopted more than 500 SC families and provided various fisheries inputs such as fish seed, fish feed and lime under 19 villages of Sundarbans mangrove areas with an objective to increase their income through fish farming in their backyard ponds. The beneficiaries were from Basanti block and Gangasagr.



## Fish production enhancement in inland open waters

Reservoir fisheries enhancement programme was

initiated in two peninsular reservoir, Poondi in Tiruvallur district, Tamil Nadu and Manchanbele in Ramanagara district, Karnataka. Sensitization and awareness programme were organized and distributed fishing nets to the fishers of the two reservoirs. Apart from this, the fisheries enhancement programme were going on in the selected reservoirs of Jharkhand and Odisha. The integrated wetland fisheries management programmes were

going on in the selected wetlands of West Bengal and Odisha. IMC seed and fish feed for raising the fish fingerlings were provided to meet the required stocking material for culture based fisheries to the SC community of Duma and Beledanga wetlands.



During the period a total of 7 mass awareness/sensitization programmes were carried out for the fishers of wetlands, reservoirs and estuaries in different parts of the country on different thematic areas including integrated wetland management, reservoir fisheries management and livelihood improvement of women folk through ornamental fish culture.





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# सिफरी समाचार CIFRINEWS

(July - December 2022)

## Meetings and Events



### National Fish Farmers Day

The institute celebrated the National fish farmers' day at Moyna fisheries hub, East Medinipur, West Bengal in collaboration with Moyna Ramkrishnayan Association. On this day ICAR-CIFRI also celebrated the National Campaign on 'Emerging Aquaculture Systems and practices' with the sub theme of intensive and industrial aquaculture systems to promote innovation and entrepreneurship initiatives in

aquaculture sector. Every year on July 10<sup>th</sup>, National Fish Farmers' Day is observed to commemorate the path-breaking accomplishment of the induced breeding technique by Dr. Hira Lal Chaudhury and Dr. K. H. Alikunhi.

### Interactive Meeting on 'Open water fisheries development in Assam'

ICAR-CIFRI, Barrackpore and Directorate of Fisheries (DoF), Govt. of Assam jointly organized an interactive meeting on 'Open water fisheries development in Assam' on 21 July 2022 at Meen Bhawan, Guwahati. It was inaugurated by Mr. Rakesh Kumar, IAS, Commissioner & Secretary to Govt. of Assam, Fisheries departments. He appreciated past collaborative activities by the organizations and urged them to continue to work together for open water fisheries development for enhancement and conservation of the resources.



Interactive meeting on 'Openwater fisheries development in Assam'

### हिन्दी संगोष्ठी "स्वाधीनता के 75 बरसों में भारत में विज्ञान और प्रौद्योगिकी का विकास"



Inauguration of the Hindi Sangosthi

A Hindi workshop on "Development of Science and Technology in India" was organized by ICAR-CIFRI at Barrackpore during 29-30 July 2022. It was aimed at showcasing the developments in the field of science and technology in the country in the last 75 years and to highlight the latest research and development schemes and technologies in the inland fisheries sector. The Workshop was attended by Dr. (Mrs.) Vijayalakshmi Saxena, General President, Indian Science Congress Association, Kolkata; Dr. Ashok Kumar Saxena, Former General President, Indian Science Congress Association, Kolkata; Mr. Priyankar Paliwal, Secretary, Town Official Language Implementation Committee, Kolkata (Office-2), Department of Official Language, Ministry of Home Affairs, Government of India, Kolkata; Shri Kamakhya Narayan Singh, Assistant Director (R.I.), Department of Science & Technology; New Delhi; Revered Swami Vishwamayanaand Ji Maharaj, Ramakrishna Mission, Saragachhi, Murshidabad.

### Participatory Management for Sustainable Fisheries and Biodiversity Conservation

To commemorate the 75<sup>th</sup> anniversary of Indian independence "Azadi Ka Amrit Mahotsav", ICAR-National Bureau of Fish Genetic Resources (ICAR-NBFR) jointly with seven ICAR Fisheries Research Institutes (CIFRI, CMFRI, CIFE, CIFT, CIFA, CIBA & DCFR) has organized a National Campaign on 'Participatory Management for Sustainable Fisheries and Biodiversity Conservation'





Staff at Headquarters at the campaign

on 04 August 2022. On the occasion a *Kisan Gosthi* was organized at Ramghat, Varanasi, UP. Fourteen fishers participated in the programme. Bangalore Research Centre organised the campaign at Kakolu village, Bangalore North on 04 August 2022. About 24 fishermen and stakeholders of the Kakolu village had attended the programme.



Staff of Bangalore Research Centre at the Kakolu village



## 76<sup>th</sup> Independence Day “Har Ghar Tiranga”



The institute celebrated 76<sup>th</sup> Independence Day on 15 August 2022 with great fervour. As part of *Azaadi Ka Amrit Mahotsav*, *Har Ghar Tiranga* campaign was launched from 13-15 August at Institute headquarters Barrackpore and all the regional centres. The Independence Day celebration initiated with the march past by the members of security staff from the Director's residence to the main building of the institute. Cultural programme was also organized on the occasion.

## Solidarity Programme at Old Age Homes

The staff of the institute led by Dr. B. K. Das, director, visited the old age home run by the Ramakrishna Mission at Barrackpore on 14 August 2022. Staff interacted with them, tied rakhi distributed sweets to them. The National flag was also handed over to unfurl in the

premises. The institute also distributed bed sheets and entertained them by playing games, narrating stories, playing entertainment videos and short movies, riddles, etc. The objective of this activity was to sensitize the institute staff about the problems faced by the elders, learn how to respect them, care for them, and listen to their experiences and their advices. The same programme was also organized at an old age home in Agarpara, North 24 Parganas, West Bengal on 15 August 2022.



## Fit India Freedom Run 3.0

The institute organized Fit Indian Freedom Run 3.0 under the aegis of *Azadi Ka Amrut Mahotsav* on 14 August and 02 October 2022 at Barrackpore. The institute staff resolved to include physical activity of at least 30 minutes daily in their lives. The run was also aimed at making the general public aware of this noble initiative. The Run commenced at 7.00 am from the Institute HQ at Fisheries Gate, Manirampur and came back after reaching Chiriamore, Barrackpore which is around 5 km from the institute headquarters. All the staff





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Fit India freedom run on 14 August

day workshop with the objectives to discuss the potential for increasing fish production in West Bengal reservoirs through cage culture and to train DoF officials of WB on different aspects of cage culture. Dr. B. K. Das, Director emphasised that improvement of fish production from the state's reservoirs and wetlands is possible through scientific management and technical intervention. He promised to provide DoF with all necessary assistance, technical support, and hand holding for the implementation of cage culture programmes. Detailed discussion took place on design, construction, operation, and culture protocol of commercially important species, feed, feeding, and health management in cages.

## Hindi Saptah



members joined the run. The Director led the team and encouraged the general public to make fitness activities a daily routine in their life.

## Workshop on Fish Production Enhancement through Cage Culture

On 17 August 2022, ICAR-CIFRI conducted this one-



Fit India freedom run on 02 October



Workshop on fish production enhancement through cage culture

'Hindi Saptah' was organized from 14 to 20 September 2022 at the institute headquarters and all the regional centres. It was inaugurated on 14 September 2022 at the institute headquarters in both offline and online mode. The chief guest of the ceremony, Mr. Naveen Kumar Prajapati, Senior Advisor and Officer-in-Charge, Central Translation Bureau, Kolkata, explained the importance of Hindi in his speech and discussed the role of foreign writers in the promotion of Hindi. Various competitions were organized on the occasion. The winners were given prizes in the concluding ceremony.

## World Rivers Day

World rivers day is celebrated on the fourth Sunday of September every year to raise the public awareness about rivers and to encourage their conservation. The Institute celebrated the Day on 25 September

theme of this year World Rivers Day was "the importance of rivers for biodiversity". The Institute celebrated the Day on 25 September 2022 at Karela Bagh ghat, Prayagraj, Uttar Pradesh and Sonia Vihar, Delhi on the bank of river Yamuna and Kodalbasti, Subhasini area on the bank of river Torsha in Jaldapara National Park Complex, West Bengal.

## Mahila Kisan Diwas

ICAR-CIFRI celebrated 'Mahila Kisan Diwas' with the presence of Swami Vishwamayanda ji,







**Mahila Kisan Diwas**

Secretary, Ramakrishna Mission, Sargachhi, Murshidabad as a chief guest on 15 October 2022. Around 100 progressive women farmers from various agriculture and allied sectors were invited in this programme many of whom shared their experiences. A scientist-farmer women interactive sessions was organised. The day was celebrated by ICAR-CIFRI with an aim to empower and leverage farm women with fisheries sector to bring second blue revolution in the country.

## National Dolphin Day

Dolphins are the ideal ecological markers of a healthy aquatic

ecosystem. On 15 August 2020, the “Project Dolphin” was launched by the Hon'ble Prime Minister Shri Narendra Modi to include both river dolphins and marine dolphins in its conservation program. Hon'ble Environment Minister Shri Bhupendra Yadav declared 05 October as “National Dolphin Day”, to be observed annually to raise awareness for dolphin conservation. The Institute commemorated 'National Dolphin Day' on 05 October 2022 at Farakka, Nabadwip, Tribeni, and Balagarh on the bank of river Ganga under *Namami Gange* Program. On this occasion, more than 200 personnel including active fishers, social activities, and students gathered.



## Vigilance Awareness Week

The Institute observed "Vigilance Awareness Week" during 31 October to 06 November 2022 focusing on the theme area "Corruption free India for a developed nation". The week long observance was started with administration of integrity pledge to the officials and staff on 31 October by the Director. Many of the staff also took e-pledge. Large numbers of posters,

banners, placards were displayed at the campus premises. On the next day all the staff formed a human chain showing the solidarity and unity in fighting the corruption. The human chain was followed by a walkathon up to local ferry ghat, a busy commuting point. The week-long celebration was culminated through a concluding ceremony on 07 November in which Shri Alok Rajoria, IPS, Commissioner of Police, Barrackpore Police Commissionerate was the Chief Guest.



## Tribal Pride Day

To commemorate the birth anniversary of Birsa Munda, one of the greatest Indian freedom fighters, ICAR-CIFRI reached to the remote villages of Sundarbans of West Bengal on 15 November 2022. On this occasion, Dr. B. K. Das, Director along with his team comprising scientist, technical staff and research scholar organized a mass awareness-cum-input distribution programme under the





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Tribal Pride Day

Scheduled Tribe Component in the village of Palotghat, Kakdwip. The Director distributed 750 kg fish seed, 15 tonnes fish feed and 3 tonnes lime to 150 number of tribal families.

## World Fisheries Day

World Fisheries Day is observed every year on 21 November to show solidarity with all fisherfolk, fish farmers, and concerned stakeholders of fisheries throughout the world. To commemorate this day and raise awareness about sustainability in the management of fisheries of inland waters in the country, ICAR-CIFRI celebrated World Fisheries Day on



Tribal Pride Day



21 November 2022 at its headquarters (Barrackpore). Shri Swami Shivapurnananda, Asstt. Administrative Head, IRDM F/C and Vice Chairman SSKVK, and Chairman RKMVERI (Ramakrishna Mission Vivekananda Educational and Research Institute) was the Chief Guest and Prof. Ashis Kumar Panigrahi, Pro-Vice Chancellor, University of Burdwan was the Guest of Honour.

## World Antimicrobial Resistance Awareness Week

The institute celebrated the World Antimicrobial Awareness Week (WAAW) with a theme “Preventing antimicrobial resistance together” at different locations of West Bengal during 18 to 24 November 2022. The aim of the programme was to create awareness among the fishermen and fish farmers to



reduce the unnecessary use of antibiotics/chemicals in the aquaculture and open water fisheries and to encourage best management practices for sustainable fish production. More than 250 farmers were participated the programme.





## Communal Harmony Campaign Week and Flag Day

The institute observed Communal Harmony Campaign Week from 19-25 November 2022 and the Flag Day on 25 November 2022 to spread message on peace, harmony and national integration and to foster and reinforce the spirit of communal harmony among the staff of the organization. The ICAR-CIFRI observed this campaign as partner of National Foundation for Communal Harmony, New Delhi, an autonomous organization with the Ministry of Home affairs, Govt. of India.



## World Soil Day

The institute celebrated 'World Soil Day' with the theme "Soils: Where the food begins" on 05 December 2022 by inviting eminent scientist and Professor of Soil Science, and 50 farmers. Dr. J. C. Tarafdar, former National Fellow, and Principal Scientist, ICAR-CAZRI was the Guest-of-Honour while Dr. R. K. Basak, Retd. Professor, BCKV was the Chief Guest of the programme.

## Hon'ble Minister of Fisheries, Govt. of Manipur Visited the CIFRI Cage Culture Site at Dumbur Reservoir

Hon'ble Shri Heikham Dingo Singh, Minister of Fisheries, Social Welfare, Skill, Labour, Employment and Entrepreneurship, Government of Manipur along with Shri Heisnam Balkrishna Singh, Director, Department of Fisheries, Govt. of Manipur visited Dumbur Reservoir, Tripura on 14 December 2022 to see the cage culture experiments conducted in the reservoir. He appreciated the efforts of ICAR-CIFRI in developing the fisheries sector in the North-Eastern States, especially Manipur, and assured to adopt the CIFRI technologies for inland open water fisheries production enhancement in the state.



## Eminent Visitors



Visitors from French Embassy on 11 July 2022



Visit of officers from the Min. of Textiles on 06 August 2022





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## Other Major Events



Shri G. P. Sharma, Director (Finance), ICAR visited CIFRI on 08 December 2022



Meeting of animal ethics committee on 18 July 2022



National campaign on fish for health and prosperity on 16 July 2022



National campaign on non-conventional aquacultural systems on 27 July 2022



Ganesh Puja on 31 August 2022



PM Kisan Kalyan Sammelan on 17 October 2022



## Swachha Bharat Activities

Glimpses of special campaign 2.0 during 02 -31 October 2022 and *Swachhata Pakhwada* during 15-31 December 2022.



Paying homage to the Father of Nation by the Director



Awareness at ICAR-CIFRI campus



Laboratory cleaning at Barrackpore



Awareness at Sundarbans



Swachhta pledge at Kolkata Research Station



Swachhta campaign at HOUSEFED Complex, Guwahati

Contd....





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(July - December 2022)



Pledge at Barrakpore on 16 December 2022



Awareness at Diamond Harbour, West Bengal



Swachhta programme at Anchuruli district, Kerala



Awareness programme by Vadodara Regional Centre



Swachhta campaign at Mapithel Reservoir, Manipur



Swachhta campaign by Prayagraj Centre



## अनुसंधान उपलब्धियां

दिल्ली में यमुना नदी में विदेशी प्रजाति, *पंगेसियानोडोन हाइपोथालमस* और गोरखपुर के रामगढ़ ताल में विदेशी प्रजाति, *टेरीगोलिथिस डिसजंक्टिवस* उपस्थिति का प्रथम रिकॉर्ड

धारीदार कैटफिश, *पंगेसियानोडोन हाइपोथालमस* (सॉवेज, 1878) की उपस्थिति को पहली बार ओखला, दिल्ली में यमुना नदी में देखा गया। प्रारम्भ में बांग्लादेश और थाईलैंड में इन प्रजातियों का अवैध पालन किया जाता था पर इसकी तेज विकास दर, कम उत्पादन लागत और कम घुलित ऑक्सीजन में भी अतिजीविता दर अधिक होने के कारण पश्चिम बंगाल और आंध्र प्रदेश में इनका पालन किया जाने लगा। उत्तर प्रदेश के गोरखपुर जिले के रामगढ़ ताल में पहली बार वर्मीक्यूलेटेड सेलफिन कैटफिश, *पर्टिगोलिथिस डिसजंक्टिवस* (वेबर, 1991) दर्ज की गई थी। यह दक्षिण अमेरिका के अमेज़न नदी की मूल प्रजाति है जिसे भारत में सजावटी मछली पालन के तौर पर पालन किया जाने लगा। रामगढ़ ताल में इसकी उपस्थिति संभवतः पश्चिम बंगाल की हैचरी से लाए गए कार्प मछली के बीज के साथ संदूषण के कारण हो सकता है। विश्व स्तर पर किए गए कई परीक्षणों में विदेशी मछली प्रजातियों से देशी मछली प्रजातियों और उनकी पारिस्थितिकी के लिए खतरों की संभावना जताई गई है। ये संभावित खतरे कई प्रकार के हो सकते हैं, जैसे देशी मत्स्य प्रजातियों का विलुप्त होना, मत्स्य प्रजातियों के बीच आपसी प्रतिस्पर्धा के कारण प्रजनन के लिए भोजन और स्थान की उपलब्धता में कमी, जलीय वनस्पतियों का विनाश, स्थानीय जीनपूल में आनुवंशिक प्रदूषण तथा जलीय पारिस्थितिक तंत्र में परिवर्तन आदि।

आबसार आलम, डी एं झा, वी आर ठाकुर और जीतेंद्र कुमार

जलदापारा राष्ट्रीय उद्यान परिसर से एक उच्च मूल्य सजावटी स्नेकहेड प्रजाति *चन्नाविवनक्यू फ़ैसिएटा* की उपस्थिति

*चन्नाविवनक्यू फ़ैसिएटा* एक स्थानिक मीठा जल प्रजाति है जो अब तक केवल उत्तरी भारत के तोरसा नदी जल में देकही जाती है। जलदापारा राष्ट्रीय उद्यान परिसर के तहत तोरसा नदी के कोडालबस्ती क्षेत्र से मानसून में *चन्नाविवनक्यू फ़ैसिएटा* के कुल 2 नमूने एकत्र किए गए। प्रवीणराज व अन्य द्वारा सुझाए गए वर्गीकरण कुंजियों का उपयोग करके इस प्रजाति की सी स्टीवर्टी के तुलनात्मक अध्ययन कर इनकी रूपात्मक (morphological) पहचान की गई। इस प्रजाति की एक सीमित भौगोलिक सीमा है और इसे केवल एक बार पश्चिम बंगाल के न्यू अलीपुरद्वारा जिले के तोरसा नदी क्षेत्र में दर्ज किया गया है। हालांकि, इसे रंगीन स्नेकहेड प्रजातियों में से एक माना जा सकता है, जैसे इंद्रधनुष स्नेकहेड, जो सजावटी मछली व्यापार के प्रति लोगों में रुचि और जागरूकता पैदा कर सकता है। पर स्थानीय मछुआरे इसे केवल एक खाद्य मछली के रूप में उपयोग करते हैं। संग्रहण के दौरान, जल की गहराई कम पारदर्शिता (21 सेमी) और उच्च मैलापन (151 एनटीयू) के साथ 110 सेमी दर्ज की गई थी। कम मानसून के कारण चालकता (126.3  $\mu\text{S}/\text{cm}$ ) और घुलित ठोस तत्व (87  $\text{mg}/\text{l}$ ) कम देखी गई। पानी का पीएच क्षारीय (8.3) था, जो मछलियों के आवास के लिए अनुकूल था। प्रजातियों के संग्रह के दौरान नदी के पानी में पर्याप्त घुलित ऑक्सीजन (7.3  $\text{mg}/\text{l}$ ) दर्ज की गई।

दिबाकर भक्त, आर.के. मन्ना, संगीता एम. नायर, रबन सी. मंडी, एस. सामंत और बि.के. दास

मुनस्यारी, पिथौरागढ़, उत्तराखंड में सरकार भ्योल रूपीबागर जलविद्युत परियोजना के लिए गोरीगंगा का प्री-इम्पाउंडमेंट मात्स्यिकी सर्वेक्षण

गोरीगंगा दो ग्लेशियरों, उंटाधुरा रिज के पास शंकुलपा ग्लेशियर और नंदा देवी के उत्तर-पूर्व में मिलम ग्लेशियर से निकलती है। इसे 7 बड़ी पनबिजली परियोजनाओं के विकास के माध्यम से बिजली उत्पादन के संभावित संसाधन के रूप में जाना जाता है जिनमें से सरकारभ्योलरूपियाबागर 120 मेगावाट की एक जलविद्युत परियोजना है। इस परियोजना के तहत प्रस्तावित बैराज 2040 मीटर MSL की ऊंचाई पर रेलम गाड और गोरीगंगा के संगम के ऊपरी भाग में स्थित है। गोरीगंगा नदी में दिसंबर, 2022 में मछली पकड़ने का काम 35 किमी के नीचे और बैराज क्षेत्र के लगभग 0.1 किमी ऊपरी भाग में कास्ट नेट, हुक और लाइन, गिल नेट को स्थानीय रूप से सुरका और पॉट और पैन द्वारा प्रायोगिक मछली पद्धति द्वारा किया जाता है। इस प्रायोगिक पद्धति से केवल तीन प्रजातियों का संग्रह हुआ, जैसे *साइज़ोथोरेक्स रिचर्डसोनी*, *नाज़िरिटोचेलिनोइड* और *नेमावेइलुस रुपेकोला*। इन मछली प्रजातियों जैसे *एस. रिचर्डसोनी* और *एन. चेलिनोइड* को आईयूसीएन रेड लिस्ट के तहत असुरक्षित के रूप में वर्गीकृत किया गया है। वे केवल एक नमूना स्थल, बंगापानी में प्रस्तावित बैराज स्थल के 35 किमी के नीचे देखे गए थे। अन्य तीन स्थलों पर मछली प्रजातियों की अनुपस्थिति के लिए वर्तमान प्रतिकूल पर्यावरण कारक, जैसे उच्च जल वेग, पानी का कम तापमान, जलवायु की अस्थायी भिन्नता, भोजन की कम उपलब्धता और उनकी प्रजनन क्षेत्र को जिम्मेदार ठहराया जा सकता है।

ए.के. दास, अबसार आलम और जीतेंद्र कुमार

महानदी नदी के स्वदेशी मछली पकड़ने की पद्धति और गियर

भाकृअनुप-सिफरी ने छत्तीसगढ़ और ओडिशा में महानदी नदी क्षेत्र में स्थित लगभग 146 गांवों का सर्वेक्षण किया है। महानदी नदी में संचालित





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# सिफरी समाचार

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मछली पकड़ने में लकड़ी की नाव प्रयोग करते हैं जिन्हें स्थानीय रूप से डोंगा या नाव और इन्फ्लेटेबल रबर ट्यूब के रूप में जाना जाता था। ट्यूब फिशिंग मुख्य रूप से छत्तीसगढ़ में महानदी नदी के ऊपरी हिस्से में देखी गई। मछली पकड़ने में अधिकतर गिल नेट का उपयोग किया जाता है। फिशिंग गियर में गिलनेट, ट्रैप नेट, कास्ट नेट, ड्रगनेट, स्कूप नेट, हुक और लाइन और ट्रैप शामिल हैं। ऊपरी खंड में, पारंपरिक स्कूप नेट, जिसे स्थानीय रूप से पेलना के रूप में जाना जाता है, उनको अधिकतर मानसून में झींगा मछली पकड़ने के लिए उपयोग किया जाता है। हुक और लाइन एक पारंपरिक गियर हैं, जिसमें सिंगल हुक और मल्टीपल हुक सिस्टम का उपयोग किया जाता है और जिन्हें स्थानीय रूप से उड़ीसा में जीतसूला और दावरी और छत्तीसगढ़ में गढ़ी कहा जाता है। यह लगभग 100–400 मीटर लंबी लाइन जाल होती है जिसमें मुख्य लाइन के साथ एक मीटर के अंतराल पर हुक के साथ लगभग 50–100 अलग-अलग लाइनें जुड़ी होती हैं। गियर मुख्य रूप से पूर्व-मानसून और मानसून के बाद के मौसम में मरेल, ईल, कैटफिश और कार्प मछली पकड़ने के लिए उपयोग किया जाता है। स्पीयर फिशिंग को स्थानीय रूप से चिरन या लोहा कहा जाता है। यह एक स्वदेशी गियर है जिसका उपयोग ओडिशा में नदी के मध्य खंड में किया जाता है। यह लोहे के टुकड़े (भाले) से बना होता है जो लंबे पोल से जुड़ा होता है और मुख्य रूप से बगारियस एसपी, चन्ना एसपी और अन्य कैटफिश जैसी मछलियों के लिए नदी के उथले क्षेत्र में संचालित होता है। जाल पूरे क्षेत्र में उपयोग किए जाने वाले बहुत ही सामान्य गियर हैं, जिनको मुख्य रूप से झींगा मछली पकड़ने और मानसून के बाद के मौसम में छोटी मछलियों को पकड़ने के लिए उपयोग किया जाता है।

मितेश एच रामटेके, केंसियाल जॉनसन और बि के दास

‘होलर जाल’— बराक नदी, असम में हिल्सा मछली पकड़ने के लिए एक विशेष गियर

असम की बराक नदी में प्रयोग होने वाले विभिन्न पारंपरिक गियर का अध्ययन किया गया था। उपयोग किए जाने वाले कई सामान्य गियर में से होलर जाल एक विशेष गियर है जिसका उपयोग हिल्सा (*टेनुआलोसा ईलिशा*) मछली पकड़ने के लिए किया जाता है। इस जाल को सोला/लेवा/ होला जाल के नाम से भी जाना जाता है। यह एक अर्ध-वृत्ताकार बटुआ जाल है जिसमें एक अण्डाकार फ्रेम होता है। इसके दोनों ओर दो विभाजित बांस होते हैं और इसके साथ एक बैग के आकार का जाल जुड़ा होता है। रस्सी पर एक विशिष्ट दूरी पर एक बड़ी गाँठ लगाई जाती है जो मुंह के खुलने को सीमित करती है और जाल को जलमग्न रखने के लिए पत्थर या ईंट जैसी भारी वस्तु को वक्र के मध्य से जोड़ा जाता है। होलर नेट की लंबाई 15–27 फीट और 12–13 फीट चौड़ाई में भिन्न होती है और 2–3 व्यक्तियों द्वारा संचालित होती है। जालछिद्र का आकार 2 से 4 इंच तक होता है। नेट मुख्य रूप से मानसून और मानसून के बाद में 4–5 घंटे की अवधि के लिए कैच उपलब्धता के आधार पर संचालित किया जाता है। अधिकतम उपलब्धता अवधि में हिल्सा मछली 0.5–3.0 किलोग्राम प्रति दिन पकड़ी जाती है। यह जाल बराक घाटी में लगभग हर मछुआरे के घर में पाया जाता है क्योंकि हिल्सा मछली असम की बराक नदी से पकड़ी जाने वाली प्रमुख मछली है।

नीति शर्मा, बि के दास और अमूल्य ककाती

कमला नदी, दरभंगा, बिहार में चितला मछली का सामुदायिक संरक्षण

*चीताला चीताला* (सी. चीताला) मछली एक उच्च कीमत वाली और पोषक गुणों से भरपूर मछली के रूप में प्रचलित है। इसको सजावटी मछली के रूप में भी जाना जाता है। पर वर्तमान में इसकी संख्या कई प्राकृतिक कारणों से तेजी से घटती जा रही है जैसे, अतिदोहन, आवास परिवर्तन, प्रजनन क्षेत्र की हानि, प्रदूषण और अन्य मानवजनित कारक। अतः इस प्रजाति को तत्काल संरक्षण की आवश्यकता है। आई यु सी एन रेड लिस्ट के अनुसार, सी. चीताला को निकट संकटग्रस्त प्रजातियों के रूप में वर्गीकृत किया गया है। बिहार के दरभंगा जिले के अंतर्गत बिरौल प्रखंड के पोखराम गांव के कोनीघाट पर सी. चीताला के सामुदायिक संरक्षण का एक स्थल बना हुआ है। कोनीघाट नेपाल से बहने वाली कमला नदी पर बने कोनी पुल के पास स्थित है और दक्षिणी बिहार की बागमती नदी में मिलती है। कोनीघाट के स्थानीय मछुआरा समुदाय ने सी. चीताला को संरक्षित किया है। यहाँ की लोककथाओं में भी ग्रामीणों को संरक्षित स्थल में प्रजातियों को पकड़ने से मना किया गया है। संरक्षण उपायों में मछलियों को मुरमुरा खिलाया जाता है और कोनीघाट में पुल के दोनों किनारों से 500 मीटर की दूरी पर मछली पकड़ना सख्त वर्जित है।

सुमन कुमारी, सजीना ए.एम., मुकेश कुमार सिंह और वाई. अली

मिजोरम में केकड़ा प्रजाति केकड़ा प्रजातियों और मोलस्क की उपस्थिति

भाकृअनुप—सिफरी के वैज्ञानिकों ने नवंबर 2022 में सियालसुक गाँव, आइजोल जिले से तीन मीठाजल केकड़ा प्रजाति, *मेडेलियाथेलफुसा लुगुब्रिस*, एम. फाल्सीडिजाइटिस (स्थानीय रूप से ऐकम कहा जाता है) और *सातोरियाना स्पिनिगेरा* (स्थानीय रूप से दुमचकाई कहा जाता है) को दर्ज किया गया जिनकी बाजार में उच्च मांग है। केकड़ों को आमतौर पर बांस की टोकरीयों में जीवित बेचा जाता है। एम. लुगुब्रिसैंड और एम. फाल्सीडिजाइटिस के कुल 8 से 10 जीवित केकड़ों को रु. 250 प्रति कि.ग्रा. बेचा गया। तीन मोलस्क (घोंघा) प्रजातियाँ अर्थात् *पलुडोमुस कोनिका*, *ब्रोडिया कोस्टुला* (चेंगकाव्ल बियल) और *मेलानोइडस तुबेरकुलाता* को मिमित जिले के दपछुआ गाँव में तुत नदी से एकत्र किए गए थे। ये घोंघे जीवित अवस्था में बेचे जाते हैं; एक छोटा कटोरा (लगभग 250 ग्राम) सामान्यतः रूप से 30–50 रुपये में बेचा गया। इन केकड़ों की उच्च उपभोक्ता और मांग को ध्यान में रखते हुए, मिजोरम के कोलासिब जिले के डुमलुईज़ाऊ में एक प्रगतिशील मछली किसान ने वर्ष 2020 में *मेडेलियाथेलफुसा*



एसपीपी के साथ मत्स्य विभाग, मिजोरम सरकार के वित्तीय सहायता के साथ केकड़े की खेती शुरू की। हालाँकि, इस पालन में बड़े पैमाने पर केकड़ों की मृत्यु भी हुई थी।

एस. सी. एस. दास, डी. देबनाथ, एल. लियान्थुमलुआया, बी. के. भट्टाचार्य और बि. के. दास

मांडोवी नदी में मैक्रोब्राचियम स्कैब्रिकुलम में आइसोपोड परजीवी संक्रमण की पहली रिपोर्ट

भारत में गोवा के मांडोवी नदी में मानसून के वर्तमान नमूनों (सितंबर 2022) में मैक्रोब्राचियम स्कैब्रिकुलम को पहली बार आइसोपोड परजीवी संक्रमित के 15 नमूनों को दर्ज किया गया। लगभग 25–60 मिमी लंबाई वाले संक्रमित झींगों को गंजेम गांव, गोवा के पास मीठा जल ज्वारीय क्षेत्र (लवणता: 0.33–0.45 पीपीटी) से एकत्र किया गया था। एम. स्कैब्रिकुलम व्यावसायिक रूप से महत्वपूर्ण एक मीठा जल पैलेमोनिड झींगा है जो आमतौर पर भारत की नदियों में पाया जाता है। बोपारीद आइसोपोड (Bopyrid isopod) को झींगे के जीएल और लार्वा पश्चात चरणों को संक्रमित कर सकते हैं जिससे इनका प्रजनन और सामान्य विकास बाधित होने की संभावना होती है। संक्रमण परजीवी को झींगों के गिलक्षेत्र से जुड़ा हुआ पाया गया, जबकि इनके गलफड़ों में कोई घाव नहीं देखा गया।

वैसाख जी., लोहित कुमार, एस. सामंत, जे. के. सोलंकी, आर. के. साह और एस. पी. कांबले

नदी में गोलाकार पिंजरों में हिल्सा पालन का प्रथम प्रयास

हिल्सा (*टेनुआलोसा ईलिशा*) एक समुद्रापगामी प्रवासी मछली है जो न केवल भारत बल्कि दक्षिण एशियाई देशों में भी इसका एक मानक जलीय कृषि पद्धति विकसित करना एक महत्वपूर्ण चुनौती रहा है। संस्थान ने इस दिशा में पहली बार सर्कुलर पिंजरों को मीठा जल क्षेत्र में स्थापित कर हिल्सा पालन पद्धतियों को विकसित करने का प्रयास किया गया। इसके लिये संस्थान ने 16 मीटर व्यास और 8 मीटर गहराई के सर्कुलर पिंजरों को विशेष रूप से आईसीएआर-सिफरी द्वारा हिल्सा के लिए डिजाइन किया और गंगा नदी में फरक्का में स्थापित किया। कुल 87 वयस्क हिल्सा मछलियों (प्रारंभिक औसत वजन – 275 ग्राम और औसत लंबाई – 18.9 सेमी) को स्टॉक किया गया। नदी से उपलब्ध प्राकृतिक चारे के अतिरिक्त इनको कृत्रिम भोजन भी दिया गया। गंगा नदी के ऊपर से मैक्रोफाइट के प्रचुर प्रवाह के कारण पालन गतिविधियां लगभग एक महीने के लिए बाधित हो सकती हैं। प्रारंभिक परिणाम के आधार पर घेरे अथवा पिंजरों में हिल्सा पालन संबंधी भावी योजनाओं को बनाने में सहायता मिल सकेगी।

ए. के. साहू, डी. के. मीना, मितेश रामटेके और बि. के. दास

खारे पानी की मत्स्य पालन के लिए नटावती-गुरुपुर मुहाना का जल गुणवत्ता सूचकांक

खारा जल मात्स्यिकी के लिए नटावती-गुरुपुर मुहाने के जल गुणवत्ता सूचकांक (WQI) की गणना कनाडा के पर्यावरण मंत्रियों की परिषद (CCME) के जल गुणवत्ता सूचकांक कैलकुलेटर की मदद से की गई है और स्वीकृत सीमा को एक आदर्श सीमा के स्थान पर रखा गया है। खारे पानी में मछली पालन के लिए पानी की गुणवत्ता के मापदंड हेतु कुल 11 जल गुणवत्ता मानक अर्थात् पीएच, तापमान, घुलित ऑक्सीजन, ऑर्थोफॉस्फेट, नाइट्रेट, नाइट्राइट, कुल घुलित ठोस (टीडीएस)/लवणता, मुक्त कार्बन डाई ऑक्साइड, कुल कठोरता, पारदर्शिता और मैलापन का उपयोग किया गया था। मॉनसून पश्चात, मॉनसून पूर्व और मॉनसून के लिए जल गुणवत्ता सूचकांक की गणना क्रमशः 66, 64 और 42 की गई थी। मानसून के मौसम में पानी की खराब गुणवत्ता ज्यादातर बहुत कम लवणता या टीडीएस के कारण होती है जो खारे पानी की मछलियों के ऑस्मोरग्यूलेशन के लिए अनुपयुक्त है और यह उच्च मैलापन के कारण होता है। अलग-अलग स्थलों पर जल गुणवत्ता सूचकांक की गणना में यह सूचकांक मुहाना क्षेत्र के ऊपर की ओर कम देखा गया। नटावती-गुरुपुर मुहाने के पानी की गुणवत्ता उच्च नहीं है और इससे खारे पानी की मछलियों के लिए प्रतिकूल स्थिति उत्पन्न हो सकती है।

सोनालिका साहू, अजय साहा, सिबिना मोल, एस., विजयकुमार, एम.ई. और एस. सामंत

मेघालय के उमियम जलाशय से साइप्रिनस कार्पियों की उपस्थिति

मेघालय के री-भोई जिले में स्थित उमियम जलाशय (औसतन समुद्र तल से 900 मीटर की ऊंचाई स्थित) एक 500 हेक्टेयर के जल प्रसार क्षेत्र वाला एक छोटा जलाशय है। इसमें कॉमन कार्प (*साइप्रिनस कार्पियो*) की विभिन्न प्रजातियों की प्रचुरता देखी गई है। यहाँ तक कि कॉमन कार्प की बहुलता जलाशय में पाई जाने वाली मूल प्रजातियों से भी अधिक पाया गया है। *साइप्रिनस कार्पियो* की पांच प्रजातियाँ जैसे स्केल कार्प, मिरर कार्प, लेदर कार्प, कोई कार्प और अमूर कार्प को दर्ज किया गया। इन सबके बीच, स्केल कार्प को सबसे अधिक बार पाया गया जो उमियम जलाशय पर निर्भर मछुआरों के आजीविका संवर्धन में महत्वपूर्ण योगदान देता है क्योंकि जलाशय में *नियोलिसोचिलशेक्सा गोनोलीपिस* सहित अन्य स्वदेशी मछलियों की उपलब्धता कम हो रही है। वर्ष 2022 में पहली बार इस जलाशय में लेदर और अमूर कार्प को दर्ज किया गया।

प्रनब दास, बी. के. भट्टाचार्य, एस. बोराह, एस. येंगकोकपम, डी. के. मीना और बसंत के. दास



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# सिफरी समाचार

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मछली की उपज और नदीय संपर्क : ब्रह्मपुत्र घाटी स्थित बील का अध्ययन

असम के ब्रह्मपुत्र घाटी के मध्य क्षेत्र में स्थित दो बंद बील, लखनबंदा बील (30 हेक्टेयर) और दंडुआ बील (50 हेक्टेयर) तथा दो मौसमी तौर पर खुला बील, रूपाही बील (75 हेक्टेयर) और 46—मोराकोलॉंग बील (76 हेक्टेयर) के मछली उपज के आकलन हेतु अध्ययन किया गया। लखनबंदा और रूपाहीबील नागांव जिले में हैं, जबकि दंडुआ और 46—मोराकोलॉंग बील असम के मोरियागांव जिले में हैं। इन 4 बीलों के मछली उत्पादन पर समयबद्ध आंकड़ों के विश्लेषण से पता चलता है कि बंद बील की मछली की उपज मौसमी रूप से खुली बील की तुलना में अधिक देखी गई। जैसे, दंडुआ बील की मछली उपज 2001—10 के दौरान  $437.1 \pm 230.9$  किग्रा/हेक्टेयर/वर्ष से बढ़कर  $859.5 \pm 355.1$  किग्रा/हेक्टेयर/वर्ष हो गई, अर्थात् पिछले दशक की तुलना में 97 प्रतिशत की वृद्धि दर्ज की गई। इसी तरह, लखनबंदाबील की मछली उपज  $366.2 \pm 102.9$  किग्रा/हेक्टेयर/वर्ष (2001—10) से 66 प्रतिशत बढ़कर  $599.2 \pm 65.6$  किग्रा/हेक्टेयर/वर्ष हो गई। मौसमी रूप से खुला बील, रूपाही बील ने मछली उपज में  $191.1 \pm 76.1$  किग्रा/हेक्टेयर (2001—10) से  $332.1 \pm 123.8$  किग्रा/हे/वर्ष (2011—20) तक 74% वृद्धि दर्ज किया, जबकि 46—मोराकोलॉंग ने मछली उत्पादन में 30 प्रतिशत की वृद्धि दर्ज की गई (पिछले दस वर्षों में  $376.9 \pm 329.1$  किग्रा/हेक्टेयर/वर्ष से  $489.7 \pm 96.8$  किग्रा/हे/वर्ष तक) दंडुआ बील (8-89%) की मछली उपज वृद्धि दर लखनबंदा (4-51%), रूपाही (4-41%) और 46—मोराकोलॉंग बील (0-69%) के बाद सबसे अधिक देखी गई।

ए के यादव, एस. बोरा, पी. दास, डी. देबनाथ, एस. येंगकोकपम, एस. सी. एस. दास, बी. के. भट्टाचार्य और बि. के. दास

मैथन जलाशय में अंतर्देशीय पिंजरों में अमूर कार्प (साइप्रिनस कार्पियोहेमेटोप्टेरस) का विकास प्रदर्शन

वर्तमान अध्ययन में मैथन जलाशय, झारखंड में ग्रे आउट पिंजरों में अमूर कार्प के विकास प्रदर्शन का मूल्यांकन किया गया था। अमूर कार्प की अंगुलिकाओं ( $12.27 \pm 0.31$  सेमी,  $35.6 \pm 3.16$  ग्राम) को तीन अलग-अलग स्टॉकिंग घनत्वों पर तीन प्रतियों में सिफरी जी आई मॉडल पिंजरों ( $5m \times 5m \times 3-5$  मीटर) में स्टॉक किया गया था जिनमें क्रमशः 10, 20 और 30 अंगुलिका प्रति घन मी को निम्न, मध्यम और उच्च स्टॉकिंग घनत्व के रूप में नामित किया गया है। मछलियों को एक वाणिज्यिक फ्लोटिंग फीड (28% प्रोटीन और 4% वसा) उनके शरीर के वजन के  $5-3\%$  की दर से दिन में दो बार खिलाया जाता है। संवर्धन के 240 दिनों के बाद, वजन बढ़ाने ( $358.64 \pm 10.05$  ग्राम), पूर्ण विकास दर ( $1.50 \pm 0.05$ ) और विशिष्ट विकास दर ( $1.00 \pm 0.01$ ) के मामले में उच्च वृद्धि सबसे के निचले स्टॉकिंग घनत्व (10 अंगुलिका प्रति घन मी) में प्राप्त हुई और उसके बाद 20 अंगुलिका प्रति घन मी और 30 अंगुलिका प्रति घन मी सबसे कम वृद्धि दर दर्ज किया गया। उच्च उत्तरजीविता दर के साथ कम स्टॉकिंग घनत्व (10 अंगुलिका प्रति घन मी) में बेहतर फीड उपयोग और फीड दक्षता देखी गई। अध्ययन से पता चला है कि स्टॉकिंग घनत्व मछलियों के विकास प्रदर्शन, उत्तरजीविता और फीड उपयोग को महत्वपूर्ण रूप से प्रभावित करता है। वर्तमान अध्ययन से पता चलता है कि अमूर कार्प (10 अंगुलिका प्रति घन मी) का इष्टतम स्टॉकिंग घनत्व वजन बढ़ाने, उत्तरजीविता और फीड और प्रोटीन उपयोग के मामले में सर्वोत्तम विकास को सुनिश्चित करता है।

मितेश एच. रामटेके, बि. के. दास, एच. एस. स्वेन, विकास कुमार, ए. उपाध्याय, सुमन कुमारी और राकेश पाल

अलगपुर अनोआ (बील), बराक घाटी, असम में पिंजरा पालन: एक सफलतम प्रयास

असम सरकार के मुख्यमंत्री समग्र ग्राम उन्नयन योजना के तहत सार्वजनिक—निजी भागीदारी (पीपीपी) मोड में वर्ष 2019—20 के दौरान राज्य के दस अलग-अलग बाढ़कृत मैदानी बीलों में पिंजरे में मछली पालन आरंभ किया गया था। इसमें मुख्यमंत्री समग्र ग्राम उन्नयन योजना और निजी भागेदारिता का अनुपात 70:30 रखा गया। इस योजना के अंतर्गत सिफरी ने योजना के लाभार्थियों को प्रशिक्षण और प्रौद्योगिकी प्रदान किया। सभी बीलों में बराक घाटी में पिंजरा पालन का प्रयास सबसे अधिक सफलतम रहा। अलगपुर मत्स्य विकास सहकारी सोसाइटी लिमिटेड द्वारा कछार जिले के अलगपुर अनोआ में प्रत्येक  $6 \times 4 \times 2$  घन मी वाले दस मॉड्यूलर पिंजरे स्थापित किए गए थे—एक बैटरी में तीन नर्सरी और सात ग्रे—आउट पिंजरे। इस पालन में मार्च 2020 के दौरान पहली फसल में ज्यादा सफलता नहीं मिली पर दूसरे वर्ष (2020—21) में इस सोसायटी ने सिफरी के परामर्श से लेबियो कतला (कतला), एल. रोहिता (रोहू), एल. कैलबासु (कैलबसु) और बारबोनीमस गोनीनोटस (जावा पुथी) सहित इंडियन मेजर कार्प का पालन आरंभ किया। कोलकाता से लाई गई इन फ्राई मछलियों का वजन 2—3 महीनों में 5—10 ग्राम तक बढ़ जाता है, तो उन्हें 500—600 मछली प्रति पिंजरा की स्टॉकिंग घनत्व पर ग्रे—आउट पिंजरों में स्थानांतरित कर दिया जाता है। पालन के बाद के आठ महीनों में, मछलियाँ 300—800 ग्राम के आकार तक बढ़ीं और प्रति पिंजरे में लगभग 180 किलोग्राम और 10 पिंजरों से 1800 किलोग्राम का उत्पादन हुआ। सकल आय और शुद्ध आय क्रमशः रु.1.8 लाख और रु.2.7 लाख प्राप्त हुआ। पिंजरों में मृत्यु दर औसतन 6% थी अतः दवाओं पर कोई खर्च नहीं हुआ। इस प्रारंभिक सफलता के बाद, सोसायटी ने 2021—22 के दौरान बील में दो और बैटरी (प्रत्येक 10 पिंजरों की) स्थापित किया है और 2022—23 के दौरान एक और स्थापित करने की प्रक्रिया चल रही है।

दीपेश देबनाथ, एस. सी. एस. दास, सोना येंगकोकपम, नीति शर्मा, बी. के. भट्टाचार्य और बि. के. दास

मणिपुर के मध्य ऊंचाई वाले जलाशय में पिंजरों में साइप्रिनस कार्पियो का सफल पालन

भाकृअनुप—सिफरी ने मणिपुर के कमजोंग जिले में स्थित 1182 हेक्टेयर कुल जल—प्रसार क्षेत्र के साथ एक मध्यम जलाशय मापीथेल में पिंजरा पालन



आरंभ किया गया। मापीथेल बांध निर्माण के साथ, 6 गांवों के लगभग 7000 ग्रामीण (अनुसूचित जनजाति समुदाय) विस्थापित हो गए थे और वे धीरे-धीरे धान की खेती के अपने मुख्य व्यवसाय से अपनी आजीविका के स्रोत के रूप में मछली पकड़ने में लग गए हैं। सिफरी ने जलाशय में पिंजरा पालन उद्देश्यों के लिए 10 शुद्ध पिंजरे और 5.3 टन सिफरी केजग्री फीड उपलब्ध कराया था। लगभग 25,200 कॉमन कार्प (साइप्रिनस कार्पियो) अंगुलिकाओं का औसत वजन 35.65 ग्राम और औसत लंबाई 12.43 सें.मी. होती है, जिन्हें पांच अलग-अलग स्टॉकिंग घनत्वों यानी 10, 20, 30, 40 पर विपणन योग्य आकार में पालने के लिए पिंजरों में रखा गया था। और 50 अंगुलियां प्रति घन मी मछलियों को पिलेटयुक्त आहार (सिफरी केजग्री फीड) खिलाया गया और 5 महीने के लिए पाला गया। उत्तरजीविता दर (81.7–93.5%) मछली उत्पादन के साथ 200 किलोग्राम प्रति पिंजरा से कम स्टॉकिंग घनत्व पर 550 किलोग्राम प्रति पिंजरा उच्च स्टॉकिंग घनत्व के साथ देखी गई।

सोना येंगकोकपम, दीपेश देबनाथ, टी. एन. चानू, नीति शर्मा, बी. के. भट्टाचार्य और बि. के. दास

मैक्रोफाइट बहुल मेसोट्रोफिक जलाशय के तलछट में फास्फोरस का विभाजन

इस अध्ययन में कर्नाटक के मैक्रोफाइट प्रचुर मेसोट्रोफिक जलाशय के तलछट में फास्फोरस के मात्रा के वितरण की जांच की गई। इसके अंतर्गत बिना संक्रमित, मध्यम रूप से संक्रमित तथा अधिक मैक्रोफाइट संक्रमित स्थलों से मानसून, मानसून पश्चात और मानसून पूर्व मौसम से नमूने एकत्र किए गए। तलछट के नमूनों की कुल फास्फोरस सांद्रता 551.0 और 260 मिलीग्राम प्रति किग्रा के बीच थी, और पूरे अध्ययन अवधि के दौरान जलाशय का ट्राफिक स्तर ओलिगोट्रोफिक से मेसोट्रोफिक पाया गया। औसतन, अकार्बनिक फास्फोरस परिमाण में सबसे बड़ा अंश (77.16 प्रतिशत) था, जबकि कार्बनिक—फास्फोरस में कुल फास्फोरस का 22.84 प्रतिशत पाया गया। मैक्रोफाइट संक्रमित स्थलों में, कैल्शियम—फास्फोरस (Ca-P) की सांद्रता और कुल फास्फोरस असंक्रमित क्षेत्र की तुलना में कम देखा गया। फास्फोरस विभाजन में Fe-P का वर्चस्व था और उसके बाद मानसून में कैल्शियम—फास्फोरस और मानसून पूर्व में आयरन से भरपूर तलछट के कारण हो सकता है। हालांकि, मानसून के बाद के नमूने में मानसून के कारण भारी वर्षा के परिणाम स्वरूप फ्लोटिंग मैक्रोफाइट नहीं पाए गए। तलछट में घुलित ऑक्सीजन सांद्रता के साथ-साथ मैक्रोफाइट समुदाय इस जलाशय में तलछट कैल्शियम—फास्फोरस अंशों को प्रभावी ढंग से नियंत्रित कर सकते हैं। इस तरह के जलीय पारिस्थितिक तंत्रों में मैक्रोफाइट प्रभावों के बारे में जानकारी प्रदान करने के लिए इस शोध में उपयोग किए जाने वाले पद्धतियों को अन्य जलाशयी क्षेत्रों, विशेष रूप से मेसोट्रोफिक और ओलिगोट्रोफिक जलाशयों में भी किया जाना चाहिए।

अजय साहा, प्रीता पणिक्कर, एम. ई. विजयकुमार, बि. के. दास, यू. के. सरकार और लियांनथुमलुआया

कृषि अपशिष्ट आधारित माइक्रोअलगी बायोफिल्म द्वारा जल से आर्सेनिक को हटाना

भारत में बनाना स्यूडोस्टेम (बीएस) प्रचुर मात्रा में उपलब्ध कृषि-कचरे के रूप में जाना जाता है। इसका उपयोग सूक्ष्म शैवाल बायोफिल्म उगाने के लिए किया गया है और उसी का उपयोग दूषित पानी से आर्सेनिक को हटाने के लिए किया गया था। बीएस आधारित माइक्रोअलगी बायोफिल्म को 5 दिनों के लिए आर्सेनाइट दूषित पानी में रखा गया था और देखा गया कि इससे प्रदूषित पानी में 97.6% आर्सेनाइट की मात्रा कम हो गई है। अध्ययन से पता चलता है कि केले के स्यूडोस्टेम अपशिष्ट—आधारित माइक्रोएलगी बायोफिल्म का उपयोग दूषित पानी से आर्सेनिक को हटाने के अलावा जहरीले अकार्बनिक आर्सेनिक को गैर विषैले आर्सेनिक में बदल देगा।

संथाना कुमार वी., बि. के. दास, धुबा ज्योति सरकार और एस. सामंत

दो मिस्टस प्रजाति (बाग्रिड कैटफिश) का पूर्ण माइटोकॉन्ड्रियल जीनोम

संस्थान ने पहली बार इल्लुमिना सीक्वेंसिंग तकनीक का प्रयोग मिस्टस गुलियो (लंबी मूँछ वाली कैटफिश / नोना-टेंगरा) और मिस्टस कैवैसीयस (गंगा मिस्टस / गोल्शा-टेंगरा) के पूरे माइटोकॉन्ड्रियल जीनोम का अध्ययन किया गया। मिस्टस गुलियो और मिस्टस कैवैसीयस के माइटोकॉन्ड्रियल जीनोम चक्रीय आकार के डीएनए अणु (लंबाई 16,554 बीपी) हैं जो 15–20Kb के एक विशिष्ट कशेरुक माइटोजेनोम आकार सीमा के भीतर पाए गए। जीनबैंक में पूर्ण माइटोकॉन्ड्रियल जीनोम अनुक्रम क्रमशः परिग्रहण संख्या OP856487 और OP893799 के साथ रखे गए हैं। निष्कर्ष के अनुसार, मिस्टस प्रजाति के माइटोजेनोमिक संगठन में कुल 37 जीन शामिल हैं, जिसमें 13 प्रोटीन—कोडिंग जीन (पीजीसी), दो राइबोसोमल आरएनए (आरआरएनए), 22 ट्रांसफर आरएनए (टीआरएनए) और एक डी-लूप रेगुलेटरी क्षेत्र शामिल हैं। विशिष्ट कशेरुकी या अन्य मछली माइटोजेनोम के लिए विकासपरक प्रक्रिया के दौरान माइटोजेनोम अत्यधिक संरक्षित हो सकते हैं। संरक्षण आनुवंशिकी और प्रजातियों की पहचान के अध्ययन के लिए अद्वितीय आनुवंशिक मार्कर प्रदान करने के अलावा, वर्तमान कार्य मछली माइटोकॉन्ड्रियल जीनोम की परिवर्तनशीलता और विकास में महत्वपूर्ण अंतर्दृष्टि प्रदान करता है।

सुब्रा रॉय, पी. के. परिदा, राम्या वी. एल., दिबाकर भक्त, विकास कुमार, असीम के. जाना, बी. के. बेहरा और बि. के. दास