



Workshop for developing roadmap for Agriculture in Lower Gangetic Plains Region

Revised mandate of ICAR-CIFRI

- Basic and strategic research for sustainable management of inland open water resources
- Develop protocols for productivity enhancement in reservoirs and wetlands and aquatic ecosystems health management
- Act as repository of information on inland open water fisheries resources
- Human resource development through training, education and extension

Inside

Director's Column p-2; About CIFRI p-2; Research highlights p-3; NEH Activities p-11; Awards and Recognitions p-11; Publications p-12; Trainings p-13; Mass Awareness Programme p-14; Exhibitions p-14; Superannuations p-16; Promotions p-16; Transfers p-16; New Appointments p-17; Obituary p-17; Meetings p-18; Events p-20; Swachh Bharat Abhiyan p-22; Tribal Sub-Plan Activities p-22; Mera Gaon Mera Gaurav p-24; Flash Back p-24; Hindi Section p-26



हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

Agriculture with a human touch

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Director's Column

Interesting studies have been conducted on fish diversity in rivers, reservoirs and wetlands, biology of fishes, crab fisheries of Sundarbans, eDAS, participatory cage culture, disease investigations, fishery enhancement in reservoirs. A number of important programmes have been conducted: seminar on Hilsha fisheries conservation, meeting of Parliamentary Standing Committee on Agriculture, RAC, workshop on Lower Gangetic Plains Region, IMC meeting, World Fishery Day, Vigilance Awareness Week, CIFRI foundation day, International Women's Day.

In 'Flash back' section we revisited the CIFRI's journey during the seventies. This section was started in memory of late Dr. Hiralal Chowdhury, who passed away on 12 September 2015. Hope the younger generation will be greatly benefitted. Our sincere condolences go to the family of late Dr. HPC Shetty and Shri James Murmu who passed away during this period. We heartily welcome the new DG (ICAR) Dr. T. Mohapatra; DDG (F.S.) Dr. J. K. Jena and ADG (I.Fy) Dr. S. Raizada. We are sure that the NARS will scale new heights under their able leadership.

Dr. V. R. Suresh
Director (Acting)

July, 2016

About ICAR-CIFRI

Started as Central Inland Fisheries Research Station in March 1947 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 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, CIFRI has 4 Regional Centres: Allahabad, Guwahati, Bengaluru and Vadodara besides two Research Stations at Kolkata and Kochi, through which the issues of inland open water fisheries are being addressed.

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L. gonius observed during July to September at Narmada river and bulk harvest of the species recorded during that periods. The length and weight of the species ranged from 200-329 mm and 84.5-494 g with male: female ratio at 1:0.86. The smallest mature male encountered was 160.0 g and female was 172.5 g respectively. Relative fecundity was recorded at 28,696 to 296,860/kg body weight. The gonadosomatic index (GSI), which is indicative of the state of gonadal development and maturity value recorded as 0.062 to 25.342%. The peak GSI value recorded during July-August.



Mature *L. gonius* from Narmada river



Mature ovary of *L. gonius*

Dibakar Bhakta, B.K. Behera, W.A. Meetei, J.K. Solanki & R.K. Sah

Status of *Labeo calbasu* (Hamilton, 1822) fishery in Ukai reservoir, Gujarat

Labeo calbasu commonly known as Kalbasu, locally known as "Dohli" constitutes an important commercial fishery in Ukai reservoir, Gujarat. An increase in *L. calbasu* production was recorded since 2010-11. The total fish production of Ukai reservoir was recorded as 10004 t during the year 2013-14. The percentage share of this species to total catch was 4.30% in 2010-11 and increased to 8.98% in 2013-14. Auto stocking of the species in the reservoir is the main reason for increasing the production. It is a bottom dwelling fish and herbivorous in nature, although it consumes good quantity of benthic fauna. The fish food resources in the form of plankton and bottom rich detritus act as a boon for the species to establish in the reservoir. Kalbasu reported to breed in the upper part of the reservoir during monsoon where water is lotic in nature and spawn once in a year. A higher size class of the species dominated in the commercial catch with average length 35.8 cm and 503.5 g weight. It mature in the age of second year and size at first maturity

was recorded as 306 mm for male and 371 mm for female at Nagarjunasagar by Vinci & Sugunan (1981). The relative fecundity of Kalbasu is highest among the other major carps which also favorable to flourish the species in Ukai reservoir.



Mature *L. calbasu* from Ukai reservoir

Dibakar Bhakta, D.S.K. Rao, W.A. Meetei, R.K. Sah & J.K. Solanki

Stake net fishery in Narmada estuary

Stake net locally known as 'Kandari jal' is very common and popular in middle and lower parts of Narmada estuary for catching species like, *Tenualosa ilisha* during monsoon, post-monsoon & winter seasons and prawns, sciaenids, mullets, Bombay duck, etc. throughout the year. *Kandari jal* is made of nylon mono filament. For fish species like hilsa, 45-60 mm and 100-130 mm mesh size is used. To catch other species, smaller mesh size (10- 40 mm) is used. Wooden poles (Khutta) at a distance of 3-4 feet interval each are inserted in the soilbed to support and secure the net during tides. *Kandari jal* are fixed for about 7-8 days in a fortnight and its efficiency totally depends upon on tidal influence and water current. It is a kind of community fishing, where 5-12 fishermen are involved in the process from setting of nets to harvesting. The length of each set of *Kandari jal* ranges from 100-500 m and a single group of fishermen operates 2-4 sets of net. The catch per unit effort for the targeted species (hilsa) is recorded to be 0.5 to 15 kg/net/tide and non-targeted species (small fishes) at 1.5 to 11 kg/net/tide. The *Kandari jal* fishing provides a means of livelihood to the fishers in the middle and lower stretch of the Narmada estuary throughout the year.



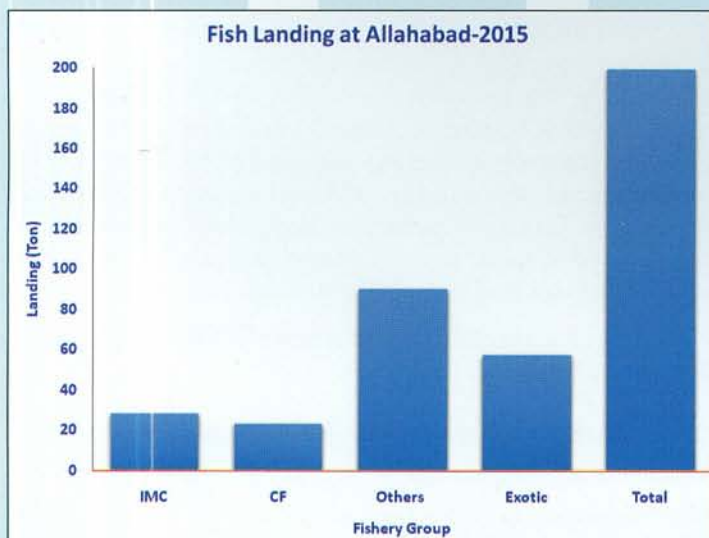
Harvesting Hilsa from stake net during low tide

Dibakar Bhakta, W. Anand Meetei, S.K. Das, R.K. Manna, & J.K. Solanki

Fish landing from river Ganga at Allahabad

Allahabad Regional Centre of ICAR-CIFRI has been collecting fish landing data from river Ganga at Allahabad since 1950s to assess the patterns of fish composition and fish health. Estimated fish landing in the year 2015 was 199.53 t with 29.0% share of exotic fishes. In total fish catch, other group of fishes (miscellaneous) dominated (45.29%), followed by exotic fishes (28.89%) Indian major carps (14.13%) and cat fishes (11.69%). The exotic fishes are common carp and tilapia. Slight increase of about 1.8% in total fish catch was registered in comparison to last year (195.99 t), which could be attributed to increase in fishing efforts linked with lesser flooding of the rivers.

Analysis of landing data of last 5 years is showed that total landing of fish at Allahabad stretch of Ganga river is almost constant during the period. While catch of Indian major carps (IMC) and cat fish (CF) have declined with reduction in their share in total landing. But catch of other fishes and exotic fishes are indicating an increasing trend with higher share in total landing. Decline in the catch of IMC and CF may be attributed to failure of recruitment. This condition may also have led to increase in the catch of exotic and other species at Allahabad.



D.N. Jha & K.D. Joshi

Mastacembelus armatus in river Ganga

Mastacembelus armatus (Lacepede) is a commercially important fish (locally known as Ban) along the stretches of the river Ganga. In general, the spiny eel, inhabits freshwater and brackish water bodies in India. It is a rheophilic species in nature and usually found in streams and rivers with sand, pebble, or boulder substrate. It is sold as a good table fish particularly in plains of India. *M. armatus* was recorded throughout the river including cold to estuarine zones. Percentage catch of the fish was between 0.5 and 2.0 of the total catch. Gut content analysis revealed that the fish mainly feed on fishes (*Apsodoparia*, *Chela*, *Gudusia*, *Barilius*, *Salmophasia* etc) followed by molluscs (*B. bengalensis*, *C. sriatella* etc) and insects (dragon fly nymph). Relative Gut Length (RGL) analysis indicated that

the *M. armatus* is carnivorous and values of RGL ranged between 0.597-0.67 with a mean of 0.63.

Average monthly GSI ranged between 1.06-9.3% and 0.09-3.2 % with mean of 3.53% and 0.22% in females and males. Matured and spent individuals were recorded in all months indicated year round spawning with peak in monsoon season (July-October). GSI values of males and females were found to be significant in all months (t test, $p > 0.05$). Fecundity of *M. armatus* weighing 80-276 g and length 305-490 mm varied from 2268 to 6058 eggs with mean of 3823 ± 264 eggs respectively. The relationship between fecundity and total body weight and fecundity and Total length of the fish was observed to be weak. The average number of ova present per gm body weight was 26 while the average number of ova present per gm ovary weight was 304.

A. Alam, K.D. Joshi, and Vaisakh, G.

Crab fishery in Indian Sundarbans

Sundarbans offers habitat for different varieties of crabs in its 1750 sq. km water area, which form major capture fishery resource of the area, besides about 50,000 ha brackish water wetlands (*bheri*) used for aquaculture including crab farming. Among different varieties of crabs, the mud crab *Scylla serata* occupies the major share among all commercially important crabs. During recent survey, it was observed that fishers use various innovative selective fishing practices to catch only *Scylla serata* from Sundarban rivers, majority of those crab fishing practices are hitherto unreported.

In upper and middle Sundarban, a trap locally known as *Chakjaal* is used to catch crabs from rivers. The trap is made of two same sized ring of 25 cm diameter made of bamboo strips. The length of the trap is also 25 cm approx. The body of the trap is made of thick nylon net with mesh size of 40 mm. A smaller ring of about 120 mm diameter at the middle of one side is used as entrance for the crab. A series of such traps is placed inside water one by one using brick as anchor from a rope. Fish flesh of locally available species especially catfishes and discarded poultry products are used as bait. In middle Sundarban, monofilament large mesh gill net of 85 mm (locally known as *Current jaal*) was used to catch crab when dead fishes like *Channa* sp. was



Chaak jaal

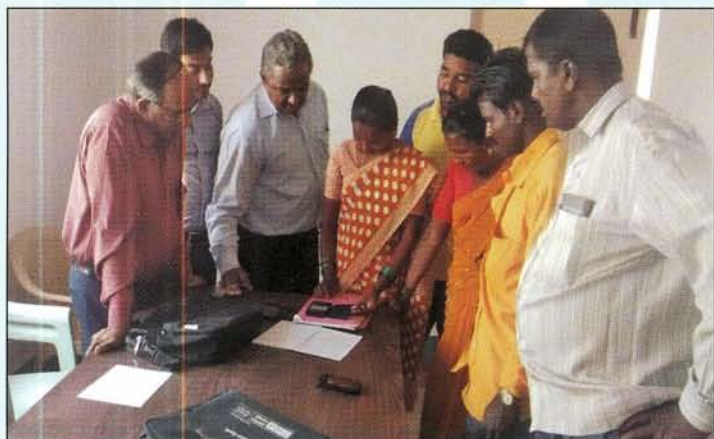
tied on the body of the net using thick nylon wire to attract crabs. When crabs come near the net to eat the dead fish, they get entangled in the net and get caught.

Scylla serata was also observed to be caught by nonselective fishing gears like bag net (*Binti jaal*), set barrier net (*Chaurpata* or *Khalpata jaal*), drift gill net (*Chhandi jaal* / *Current jaal*), etc. though percentage of suitable size of crab catch is generally insignificant with respect to total catch. Such nonselective gears caught crab juveniles without any commercial value and thus these types of gears are detrimental to sustainable crab fishery of Sundarban.

R. K. Manna, T. Nirupada Chanu, S. K. Das, Suvra Roy, D. Sudheesan, Roshith, C. M. and Manas H. M.

Mobile application based *Electronic Fish Catch Data Acquisition System (eDAS)*

Keeping in view the constraints of collections of fish catch data from inland open waters, CIFRI attempted to use the electronic gadgets to transmit catch data. Bengaluru Research Centre of the Institute has tested the mobile application based electronic data acquisition system in reservoirs through a training programme at Wayanad District of Kerala. Smt. Usha Kumari, District Panchayat President, Wayanad, inaugurated this programme on 19th March 2016. She lauded CIFRI for its efforts and hoped that at Wayanad a lot of tribal fishers would be given exposure to the innovative fish catch data acquisition methods using eDAS.



Fisher woman being trained on sending fish catch data using eDAS

The system transmits catch data directly into a database in the computer system. eDAS has been designed to collect fish catch data by deploying *fishery friends* (knowledgeable fishers at the fish landing centres who could be trained to send fish catch data through eDAS).

M. Karthikeyan and M. Feroz Khan

Fish diversity in Kangsabati reservoir

Systematic explorations were conducted to document fish diversity, spatial abundance of Kangsabati reservoir in West Bengal. This is a large reservoir (10,400 ha) across the river Kangsabati. Exploration were carried out during different seasons and altogether 33 fish species belonging to 5 orders and 13 families recorded with maximum species



Barilius bendelisis



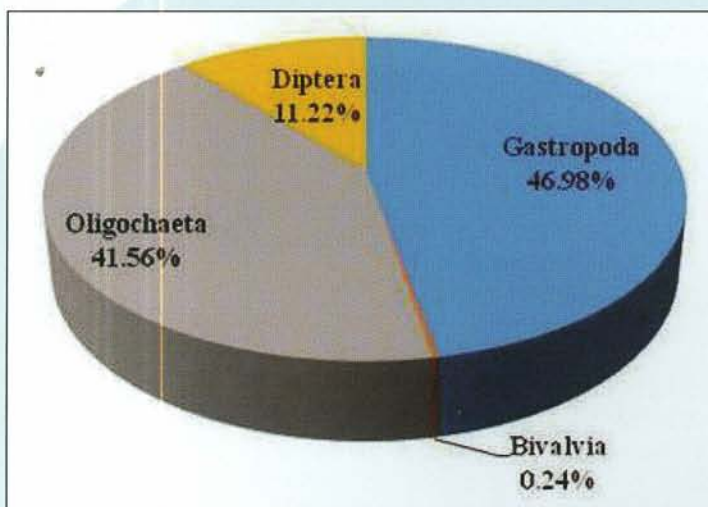
Chagunius chagunio

contributed from Cyprinidae family. Among the species recorded, 3 species (*Ompok bimaculatus*, *Parambassis lala* and *Oreochromis mossambicus*) were categorized in Near Threatened category as per IUCN status. Species contributing to a major portion of the fishery where *Cirrhinus reba* (35.29%), *Oreochromis niloticus* (21.17%), *Labeo rohita* (10.98%), *Ompok bimaculatus* (9.01%) and *Labeo calbasu* (8.23%). Fish diversity status indicated maximum diversity from lotic area (Shannon Weiner index, $H' = 2.34$). Most importantly, species inventory studies also documented two new records (*Chagunius chagunio* and *Barilius bendelisis*) from this reservoir indicating potential of the reservoirs for fisheries productivity and livelihood security of the local community. This study generated base line information and can be used to guide protection and management activities of the reservoir and support future research efforts.

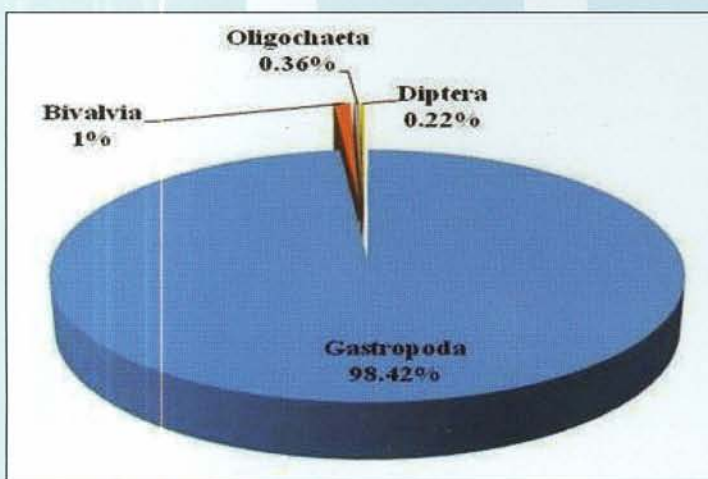
Vikash Kumar, Lianthumlualia, Sandhya K.M. U.K.Sarkar, B. Naskar, Y. Ali

Community structure of macro-zoobenthos of ox-bow lakes

Two ecologically different wetlands viz., Khalsi and Akaipur located in the sub-basin of Jamuna river in lower Gangetic basin in West Bengal were studied for abundance, species richness and diversity indices of macro-zoobenthic communities. The two wetlands differ in terms of ecological regimes such as, water volume, depth, link channel, agricultural runoffs macrophyte coverage, etc. Khalsi, a seasonally open beel (wetland) that occasionally exchange water with river Jamuna during high flood, while Akaipur is a closed one with no exchange of water. Community richness was higher in macrophyte dominated seasonally open Khalsi (19) compared to closed Akaipur (18). The community abundance was significantly ($p < 0.05$) higher in Khalsi (18496 nos/m²) compared to Akaipur beels. Average Dominance, Simpson and Shannon diversity indices for Khalsi and Akaipur beel were 0.3, 0.7 & 1.5 and 0.2, 0.8 & 1.7, respectively. The community structure of wetlands revealed the dominance by a single group, gastropoda (98.42%), followed by bivalvia (1%), oligochaeta (0.36%) and diptera (0.22%) in Khalsi may be because of the higher macrophyte



Community structure of macro-zoobenthos of Akaipur wetland



Average community structure of macro-zoobenthos of Khalsi wetland

coverage (65%) and exchange of water with adjacent river. Whereas, Akaipur depicted a different community structure with gastropods (46.98%), oligochaetes (41.56%), dipterans (11.22%) and bivalvia (0.24%).

Dominance, Simpson & Shannon values for Khalsi and Akaipur wetland were as: 0.3, 0.7 & 1.5 and 0.2, 0.8 & 1.7, respectively which indicates comparative diversity of macro-zoobenthic community in both the wetlands. Thus, there is need of deploying different kind of management approaches for both wetlands for sustainable fisheries and livelihood.

D.K. Meena, Lianthuamluaia, M.A.Hassan, Suvra Saha and Bablu Naskar

Participatory cage culture in reservoir

Sidhabari village in the undulating terrain in Asansol Division of Dist. Burdwan, adjacent to Jharkhand with a population of 1200 located on the eastern bank of Maithon reservoir, is inhabited mostly by Scheduled casts and tribes. The inopportune terrain, porous lateritic soil of the village is inconducive for both agriculture and aquaculture. Since livelihood opportunity is limited and difficult, villagers mostly dependent on daily labour in colliery, stone quarries, coke and sponge iron factory. Despite being located on the bank

of a reservoir, villagers never thought of any opportunity of livelihood from such vast (10,619 ha) water body.

ICAR-CIFRI initiated cage culture for last few years. A group was formed and given three days training on cage culture at CIFRI. Their female members formed a Self Help Group (SHG) for routine management of cages. CIFRI supported them with a battery of 8 cages with GI frame and HDPE net having dimension of 5m×5m with 15,750 over-wintered catfish (*Pangasionodon hypophthalmus*) seed (45-50g) in April 2015 and provided feed for their rearing in cages. The fishes were fed with soybean based floating feed of suitable size and nutrient content. The group shouldered the responsibility of daily feeding and overall maintenance of cages. On January 16, 2016 after 9 months of rearing 4000 kg fishes were harvested worth ₹ 2.8 lakh from the cages and handed over to all women, Sidhabari Adarsha Swanirbhar Gosthi (SHG). The success brought much enthusiasm among them and they planned to rear the fish further in the same cage of their own after withdrawal of CIFRI support.



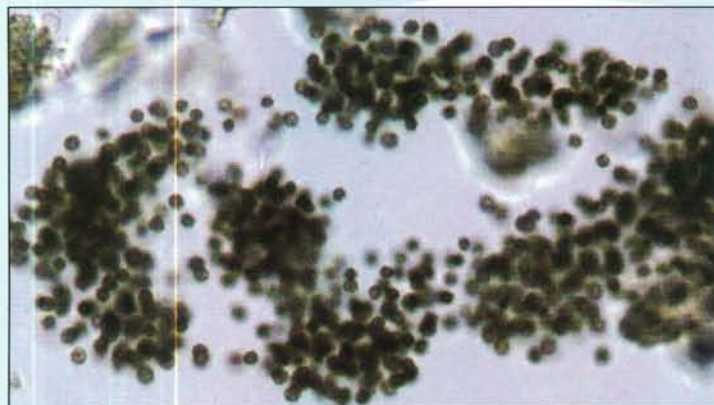
Fish harvesting from cages

M.A. Hasan, Vikash Kumar, D. Panda, U.K. Sarkar, A. K. Das, B. Naskar and Y. Ali

Macrophytes and phytoplankton diversity in wetlands

Seasonally open Khalsi beel (22.594°N 88.383°E), located in Nadia district of West Bengal occupying an area of 62 ha is an important fishery resource supporting 317 fishers families. A fisher's cooperative society manages this wetland following culture based fishery management practice. Intensive agriculture practices with multiple cropping in the catchment contribute nutrient load to this wetland through surface run off. Practice of Jute retting in the wetland has further enriched the wetland organically. Nutrient enriched water coupled with shallow depth and wide littoral zone favoured growth of diverse group of higher aquatic plants covering almost entire water body. As a measure of fisheries management, the macrophytes were removed without realizing it's ecological and fisheries consequence. A study of phytoplankton community in the wetland revealed presence of 64 species belonging to 33 genera with abundance of 38,920 cells/l with occurrence of a cyanophycean group, namely, *Microcystis aeruginosa* in the range of 7,310 to 11,220 cells/l before the clearance of macrophytes. The

plankton community structure of the wetland got drastically changed after this management with average abundance of 2,23,247 cells/l. The striking feature of the changed scenario was the unusually high occurrence of *Microcystis aeruginosa* (45,600 cells/l) belonging to the group Cyanophyceae. The change in plankton community will adversely affect the fish production, particularly Indian major carps, as this fish group is not effective in metabolising this plankton species. In addition, microcystin- a toxin released by this group, may cause fish mortality.

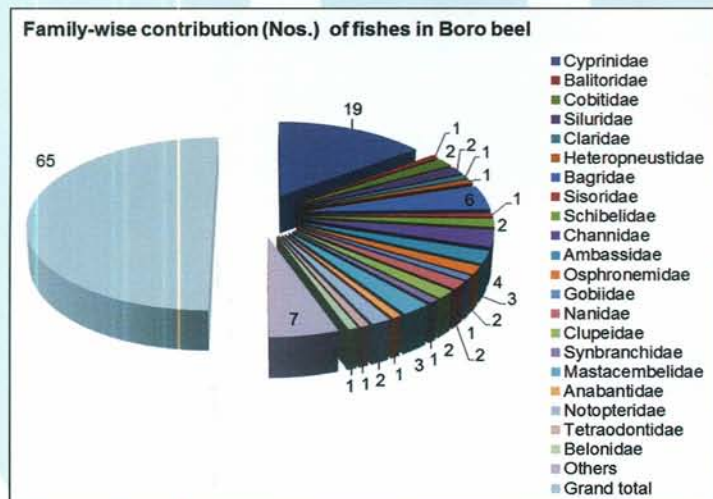


Microcystis aeruginosa

Suman Kumari, M. A. Hassan, U. K. Sarkar, Lianthuamluaia, Sandhya K.M, Vikash Kumar, Mishal P, Y. Ali and B. K. Naskar

Fish diversity in Boro beel, Meghalaya

Studies were made to record the diversity of fishes in Boro beel of Meghalaya. The beel (N 25° 44.499' & E 89° 57.755') is a floodplain wetland located in West Garo Hill district of Meghalaya. It is a medium sized (80 ha) open beel connected with River Jinjiram, an important south bank tributary of River Brahmaputra. The beel is managed as capture fisheries and is leased by Garo Hills Autonomous District Council. A total of 65 nos. of fishes were recorded during the present study from the beel belonging to 41 genera, 20 families and 8 orders. Family Cyprinidae (19 species) contributed highest numbers of species followed by Bagridae (6 species) and Channidae (4 species). Fin fish species recorded from the beel belonged to 8 orders of which Cypriniformes (22



Family-wise contribution of fishes in Boro beel

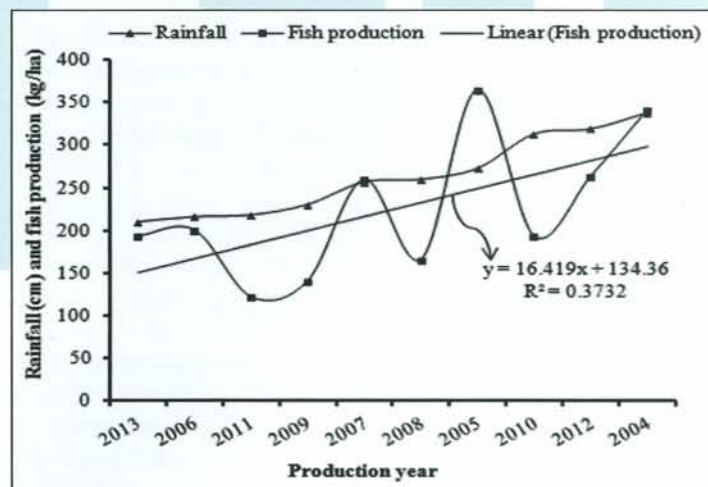
species) was the most dominant followed by Siluriformes (13 species) and Perciformes (12 species). Sporadic landing of Hilsa ilisha was reported during June-July, 2015 indicating migration of anadromous Hilsa to the beel connected to the river Brahmaputra through river Jinjiram.

P. Das, B. K. Bhattacharjya, A. K. Yadav, D. Debnath, S. Yengkokpam, K. K. Sarma, P. Gogoi and A. Kakati

Rainfall: a major climatic variable for fish production in floodplain wetlands of Assam

Influence of rainfall on fish production of 173 floodplain wetlands (beels) spread across 18 districts of Assam was analysed over a period of 10 years (2004 to 2013). The district-wise fish yield rate (kg/ha) data from the beels were segregated into three types – yield rates of all the beels, that of unstocked beels (87 nos.) and stocked beels (86 nos.). These data were analysed for possible correlation with total annual rainfall (cm) of that district. From the linear regression analysis it was evident that rainfall had positive influence on production of all beels of Barpeta (correlation coefficient, $r=0.61$), Dhubri ($r=0.58$), Karimganj ($r=0.87$), Nalbari ($r=0.73$), Sonitpur ($r=0.48$), Morigaon ($r=0.44$) and Sivsagar ($r=0.44$) districts. When fish yield rates of unstocked beels was analysed vis-a-vis total annual rainfall, it showed positive correlation with rainfall in Karimganj ($r=0.898$), Barpeta ($r=0.67$), Nalbari ($r=0.642$), Sonitpur ($r=0.61$), Dhubri ($r=0.51$) and Sivsagar ($r=0.45$) districts.

In rest of the districts, fluctuating trend of fish production was observed, which could not be directly attributed to changes in rainfall. Apparently, a number of factors such as soil and water quality, biotic communities, management regimes etc. had higher influence in the selected beels of the remaining districts. Fish production in stocked beels did not demonstrate any good correlation with rainfall in all the districts of Assam except Dhubri ($r=0.69$) and Morigaon ($r=0.56$) districts. The results indicate that supplementary stocking obliterates influence of rainfall on fish production in the selected floodplain wetlands of Assam.

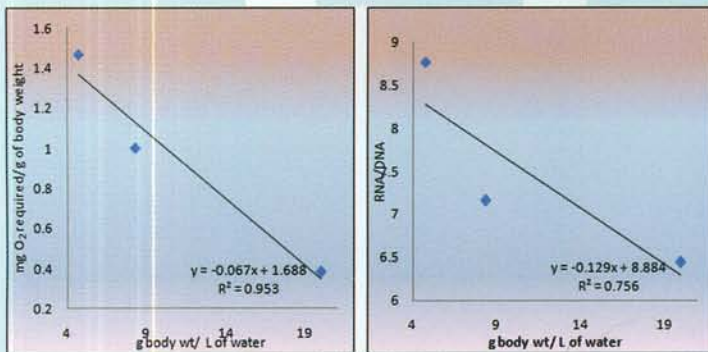


Relationship between total rainfall (cm) and fish production (kg/ha) of all beels of Barpeta district, Assam during 2004-2013 (production year is arranged in order of increasing total rainfall)

D. Debnath, A. K. Yadav, B. K. Bhattacharjya and B. J. Saud

Water availability affects physio-biochemistry of *Labeo rohita*

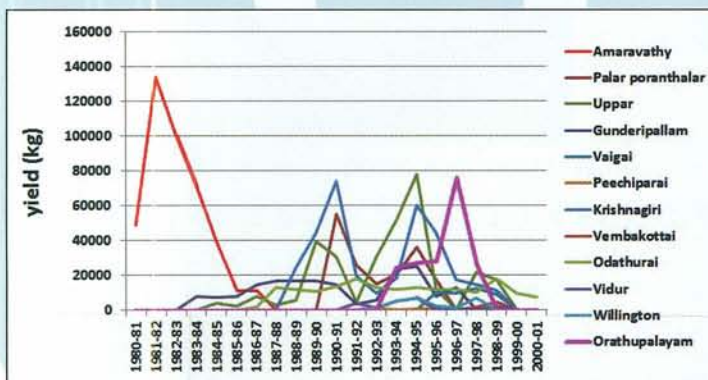
Optimum quality and quantity of water is required for survival, growth and reproduction of fishes. Due to changing rainfall pattern and increasing environmental temperature in future, availability of water might be critical for sustenance of fish in natural water bodies especially wetlands and rivers. Water stress is the situation where both quantity and quality of water available is below the physiological requirements of fish. To understand water stress in laboratory condition, major carp *Labeo rohita* were reared in different water volume and their oxygen consumption and biochemical response were monitored. The studies indicated that total dissolved oxygen in water is directly related to water volume. Oxygen consumption (mg of O₂ required /g of body weight) and muscle metabolism (RNA/ DNA) of table sized *L. rohita* was inversely related to availability of water (g of body weight of fish/L of water). The study suggests for undertaking further research in order to assess the physiological water requirement of the fish and its variation in the context of future water stress scenario.



Md. Aftabuddin, Prasun Roychowdhury and Uttam Kumar Sarkar

Tilapia fishery in Tamil Nadu reservoirs

Tilapia (*Oreochromis mossambicus*), the most preferred exotic fish of the consumers, showed fluctuating trend in the landings since introduction in freshwater reservoirs of Tamil Nadu. In the initial years, their performances were overwhelmingly good with commendable growth weighing more than 1 kg in Gunderipallam, Amaravathy and Palar – Poranthalar reservoir. In the later periods stunted growth and poor landings observed probably due to inbreeding and



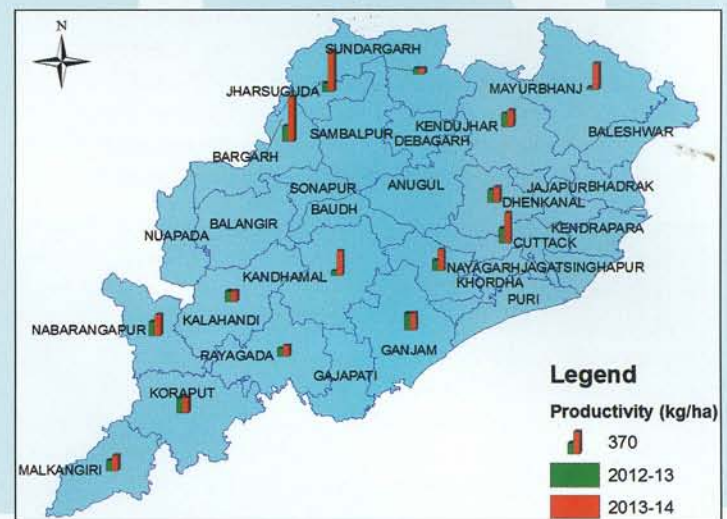
Tilapia catch over the years in different reservoirs

intensive culture based practices with heavy seed stocking. In Amaravathy reservoir with the increasing production of stocked species, tilapia production concomitantly declined. The upsurge is observed in certain years in Krishnagiri, Uppar and Palar-Poranthalar reservoirs when the stocking density decreases. Recently it is noted that the invasion of African catfish in Mettur reservoir offsets the proliferation of tilapia by preying upon their eggs and damaging the nests.

Rani Palaniswamy and S.Manoharan

Fisheries enhancement in small reservoirs of Odisha

A total of 58 small reservoirs were stocked with Indian major carp fingerlings under the SC & ST development program by the Department of Fisheries, Odisha during 2012-14. The impact of fingerling stocking was studied with the objective to quantify the change in productivity and per capita fish harvest by fishers from stocked reservoirs. The mean productivity level of small reservoirs under this program was increased from 204 kg/ha/year of fish during the 2012-13 to 323 kg/ha/year during 2013-14 with an increment of 158%. The rate of change of productivity was highest for Kukudajori, Pauncia, Kalo and Sunei reservoirs of Mayurbhanj district while the productivity status of the reservoirs of Ganjam and Kalahandi districts were remained unchanged. The average per capita fish harvest by fishers was increased from 398 kg/fisher/year during 2012-13 to 702 kg/fisher/year during 2013-14 with an increase of 176% than the preceding year. The significant change in per capita fish harvest by fishers was noticed in reservoirs of Mayurbhanj district. Almost all the reservoirs of 14 districts showed increased per capita fish harvest by fishers except Rayagada district.



D. Panda, U. K. Sarkar, Vikash Kumar and P. K. Parida

Status of reservoir fisheries in Himachal Pradesh

Himachal Pradesh has enormous potential for reservoir fisheries development with a total area of 43,616 ha with six reservoirs. Gobindsagar reservoir is one of the largest reservoirs of India built on river Sutlej. The commercial catch of Gobindsagar was dominated by the exotics like silver carp and common carp with an average productivity of 1.49 kg/ha/year. The highest contribution was made by

Hypophthalmichthys molitrix (63%) followed by *Cyprinus carpio* (19%) and *Catla catla* (10%) in the commercial landings during 2014.

Reservoir	District	Year	FRL Area (ha)
Gobindsagar	Bilaspur	1962	16,867
Pong	Kangra	1975	24,629
Pandoh	Mandi	1977	200
Chamera-I	Chamba	1994	1,500
Chamera-II	Chamba	2002	220
Chamera-III	Chamba	2012	200

Maharana Pratap Sagar (Pong Reservoir) built on river Beas is a catfish dominant reservoir with an average productivity of 23 kg/ha/year. Among catfishes *Sperata seenghala* alone contributed nearly 53% of the total catch followed by carps like *Labeo rohita* (16%) and *Cirrhinus mrigala* (13%) during 2014. The declining contribution of Indian major carp and golden mahseer (*Tor putitora*) in the commercial catches has been reported since four decades in Govindsagar and Pong reservoirs.

Chamera-I is a medium sized reservoir on river Ravi in Chamba district. Pandoh and Chamera-II & Chamera-III are small reservoirs created across the rivers Beas and Ravi respectively. The fishery of these impoundments is mainly comprised of snow trout, silver carp, common carp (mirror) and mahseer. The fish production of Chamera-I reservoir is fluctuating between 2.8 to 4.03 tonne with an average annual productivity of only 3-4 kg/ha during 2014. The fishery of these reservoirs may be enhanced further by supplementing fingerlings of cold water fishes like brown trout for development of sport fishery.

D. Panda, A. K. Das and U. K. Sarkar

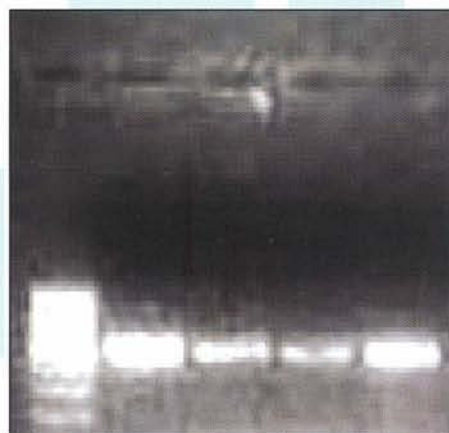
First report on *Enterocytozoon hepatopenaei* (EHP) infection in *Penaeus vannamei* in West Bengal

Enterocytozoon hepatopenaei (EHP), a microsporidian parasite has emerged as a serious pathogen reported to be associated with retarded growth in cultured *Penaeus vannamei*. Under the Networking Fish Disease Surveillance Project, the shrimp samples with clinical signs of slow growth were collected from the cultured farms, Contai-3 (N21°53.969', E087°46.806'), East Midnapur. To identify the pathogen, DNA was extracted from the hepatopancreatic tissue and PCR amplification was carried out using primers targeting the 18S rRNA gene of the EHP. The PCR yielded an expected product size of 510bp and was showing 100% homology with the EHP 18S rRNA gene sequences reported from Vietnam, Thailand, China and India. To further confirm it, the primers for nested PCR were used. The samples showed positive result in the first step and in the second step PCR. Study confirms the EHP

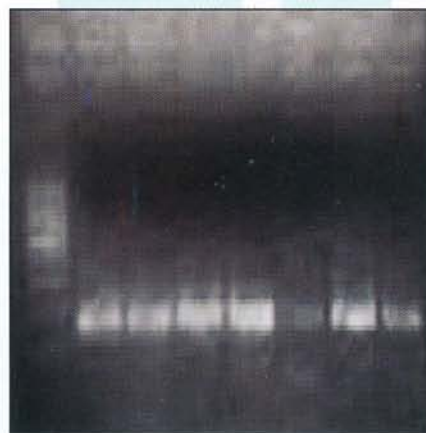
incidence in the shrimp farming of West Bengal causing the slow growth. This is the first report of the emergence of EHP infection in cultured *P. vannamei* in West Bengal, India.



Shrimp showing clinical signs of slow growth (6gm in 71days)



100bp DNA ladder ; 1-4: PCR amplification product (510 bp)



100bp DNA ladder; 1-7: Nested PCR amplification product (176bp)

B.K. Behera, A.K. Sahoo, S.K. Manna, S. Bhaumik, A.K. Jana

Pen culture in Mer beel of Assam in collaboration with AFDC Ltd., Guwahati

Raising fish fingerlings in pen enclosures has emerged as a viable option to enhance fish production from floodplain wetlands (beels) of Assam. Towards this end, pen aquaculture demonstration was undertaken in Mer beel, Nagaon district, Assam by ICAR-CIFRI RC, Guwahati under the NEH component of ICAR-CIFRI, in collaboration with AFDC Ltd., Guwahati, Assam. Four pens (each of 0.25 ha area) were constructed using net-lined bamboo screens in the beel and stocked with six fish species namely, *Labeo rohita*, *Catla catla*, *Cirrhinus mrigala*, *Ctenopharyngodon idella*, *Hypophthalmichthys molitrix* and *L. gonius*. Average individual length and weight of stocked (during August 2015) fish was 13.4 cm and 36.7 g respectively. Fishes were fed daily with formulated feed. Average weight of fish after 5 months of culture was 150.9 g recording a weight gain of 311%.



Representatives of ICAR-CIFRI, AFDC Ltd., and the lessee at the pen site of the beel

B. K. Bhattacharjya, P. Das, D. Debnath, A. K. Yadav, S. Yengkokpam, N. Sharma, K. K. Sarma and P. Gogoi

Collaborative fish stock enhancement programme initiated in Sorbhog beel, Barpeta district of Assam

Regional Centre, Guwahati in collaboration with AFDC Ltd., Guwahati, initiated fish stock enhancement programme in Sorbhog beel, Barpeta district of Assam under the NEH component of the Institute. The beel is a closed one with a water-spread area of 34 ha. With no scientific stocking of fish seed practiced, the current fish production of the beel is low (327 kg/ha/yr during 2013-14). With a view to enhancing fish production from the beel, ICAR-CIFRI Regional



Stocking of fish seed in the beel

Centre, Guwahati initiated scientific fish seed stocking in the beel by stocking fingerlings of *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* @ 3,000 nos./ha on 10th October 2015. After 3 months of stocking, the first sampling for growth of the fish was carried out. It was observed that rohu was performing well with SGR of 1.28, followed by catla (SGR 0.85) and mrigal (SGR 0.41).

B. K. Bhattacharjya, D. Debnath, P. Das, A. K. Yadav, S. Yengkokpam, N. Sharma, K. K. Sarma and P. Gogoi

Awards and Recognitions

- Dr. A. Sinha attended brainstorming session as an Expert on "Ornamental fisheries" organized by NFDB, Hyderabad on 29th February 2016. She also delivered lecture as resource person in a 10 days short course on "Recent Advances in Livestock Fish Integrated Farming System" organized by ICAR Research Complex for Eastern Region, on 11th February 2016.
- Dr. D. N. Jha received Young Scientist Associate-2016 award during "18th Indian Agricultural Scientists & Farmers Congress" organized by Bioved Research Institute of Agriculture, Technology & Sciences, Allahabad-2, held at Sringerpur, Allahabad from 20-21st February 2016.
- Dr. K.D. Joshi, Principal Scientist & Head, Allahabad Regional Centre nominated as Member of the High Power Committee constituted by Hon'ble National Green Tribunal (NGT), Principal Bench, New Delhi for Kanhar irrigation project in Sonbhadra district of U.P.



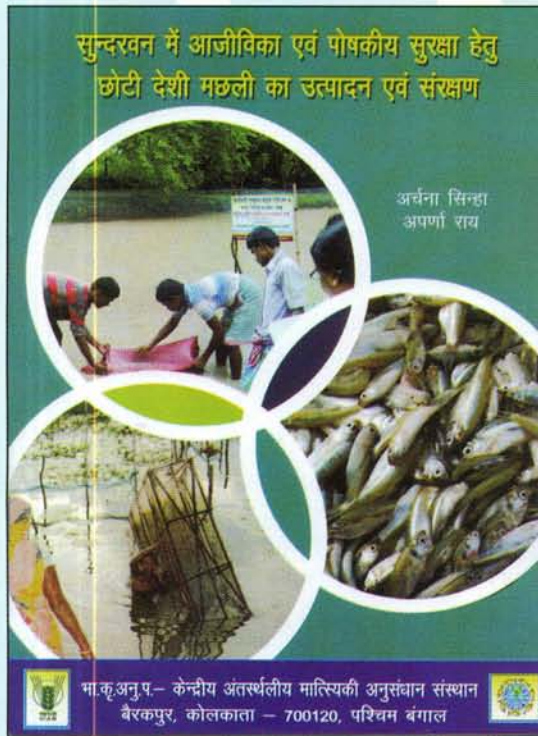
- Drs. R. K. Manna, Md. Aftabuddin, V. R. Suresh and A. P. Sharma received best presentation award for the paper "Major factors influencing species spectrum in floodplain wetlands of Assam" in the international conference on aquatic resources and sustainable management at Calcutta University, Kolkata.
- Dr. B. K. Bhattacharjya has been nominated as a member of Assam State Biodiversity Board, Guwahati. He along with Dr. Pronob Das also attended Krishi Darshan Programme of Doordarshan Kendra as Experts in Aquaculture.

Research papers

Thirty six research papers have been published by the institute during the period in different national and international journals. In addition to this, several popular articles, book chapters, leaflets, pamphlets have also been published/ released.

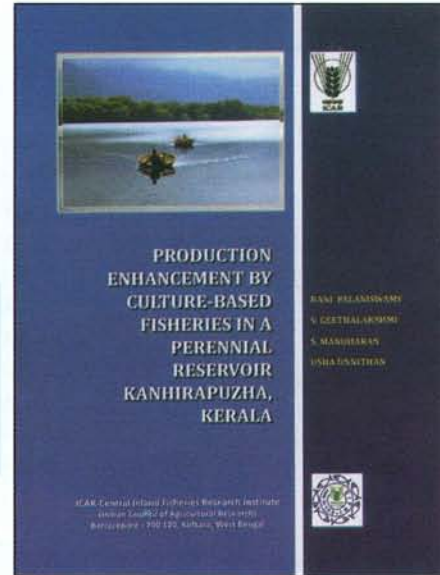
Bulletins/Special publications

सुन्दरवन में आजीविका एवं पोषकीय सुरक्षा हेतु छोटी देशी मछली का उत्पादन एवं संरक्षण



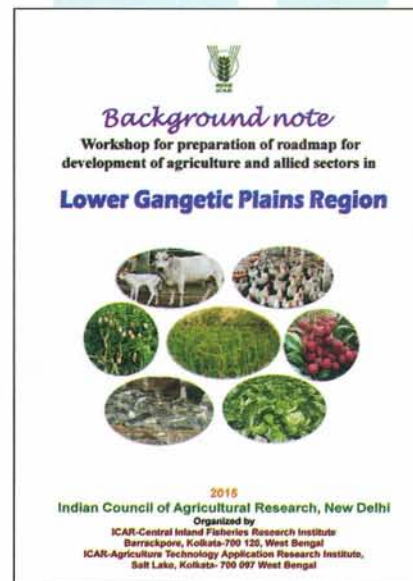
प्रस्तुत बुलेटिन डा. अर्चना सिन्हा एवं डा. अपर्णा राय के द्वारा तैयार किया है। इस बुलेटिन में दिये गये तथ्यों का सर्वेक्षण संस्थान परियोजना, "Population characteristics of small indigenous fishes (SIFs) in rivers and associated ecosystems in relation to rural livelihood and nutritional security" के अंतर्गत किया गया है। सुन्दरवन जैव विविधता से भरपूर है क्योंकि यह क्षेत्र वनस्पतियों से समृद्ध है और यहाँ मैंग्रोव तथा विविध प्रकार के वनस्पति एवं जीव पाए जाते हैं। वर्ष 2009 में भयंकर क्षतिकारक प्राकृतिक आपदा, आएला के कारण सुन्दरवन क्षेत्र, विशेषकर इसके निचले भाग में छोटी देशी मछलियों की उपलब्धता अप्रत्याशित रूप से घट गई है। इसके 60 से 70 प्रतिशत स्थानीय निवासियों के अनुसार, आएला के समय इस क्षेत्र में लवणीय जल के प्रवेश के कारण छोटी मछलियों की संख्या बहुत कम हो गई है। सुन्दरवन में कार्यरत जयगोपालपुर ग्राम विकास केन्द्र के अनुसार, रसायनिक उर्वरकों का अधिक प्रयोग तथा गत् दो से तीन दशकों से धान और सब्जियों के खेतों में कीटनाशकों एवं कीटाणुनाशकों का अधिक प्रयोग इन छोटी मछलियों की संख्या घटने का कारण बताया जा रहा है। इस बुलेटिन में सुन्दरवन क्षेत्र में उपलब्ध छोटी देशी मछलियों के बारे में विस्तृत जानकारी दी गई है जो यहां के निर्धन मछुआरों के आजीविका के लिये लाभकारी है।

Bulletin No. 192: Production enhancement by culture based fisheries in a perennial reservoir, Kaniharapuzha, Kerala



Culture-based fisheries in small reservoirs is a successful management practice and in vogue in many parts of the world including India for enhancement of fish production. An intensive investigation from 2007 to 2011 on ecology, fisheries, application of stocking and harvest strategies and fish production models in Kanhirapuzha reservoir in reservoir evolved suitable scientific management measures with ecosystem approach. The growth performances of Indian major carps, their harvesting size, appropriate gears were formulated. The optimum stocking density for catla was estimated using Lorenzen's density dependent model. This document prepared by Rani Palaniswamy, V. Geethalakshmi, S. Manoharan and Usha Unnithan would help the reservoir - fishery managers of this region to formulate the comprehensive culture-based fisheries strategies derived from the studies to enhance the total production.

Background document for regional workshop



This background document was prepared for the workshop on "Preparation of roadmap for development of agriculture and allied sectors in the Lower Gangetic Plains Region". This document, compiled by Arun Pandit *et al.* and drafted by V.R. Suresh and A.K. Singh *et al.*, contains a brief introduction about the region which comprises of West Bengal (except Darjeeling district), eastern part of Bihar and Brahmaputra valley of Assam. Following this the document deals with the

status of agriculture and allied sector including agriculture, horticulture, livestock, poultry, fisheries, aquaculture and agriculture marketing in the region, issues and problems in the sectors, needs and expectations of the farmers/ stakeholders. In the last chapter the strength and capacities of the R&D institutions and the organisational strategies were discussed to address the issues.

Trainings

Sl. No.	Name of the training	Date	Venue	Participants
1.	Fisheries resource management and aquaculture production enhancement in Assam (in collaboration with COF, CAU, Lembuccheria & DOF, Assam)	August 21-22, 2015	ICAR-CIFRI, Guwahati	55 farmers representing 26 districts of Assam
2.	Fish disease surveillance in Assam	August 26, 2015	Silchar, Assam	55 participants (Fisheries Department officials and fish farmers)
3.	मत्स्य उत्पादन बढ़ाने के उपाय	November 17, 2015	Ramnagar, Chandan Chauki, Lakhimpur-Kheri, U.P.	53 fishers
4.	Inland open water fisheries management & development	December 05, to 11, 2015	CIFRI, H.Q. Barrackpore	31 farmers from Sitamarhi, Bihar
5.	Inland open water fisheries management & development	December 26, 2015 to January 01, 2016	CIFRI, H.Q. Barrackpore	32 fishers/fish farmers from Siwan, Bihar
6.	Inland open water fisheries management & development	January 05 to 11, 2016	CIFRI, H.Q. Barrackpore	31 fishers/fish farmers from Madhubani, Bihar
7.	Inland open water fisheries management & development	January 25 to 31, 2016	CIFRI, H.Q. Barrackpore	28 fishers/fish farmers from Kishanganj, Bihar
8.	Inland open water fisheries management & development	February 05 to 11, 2016	CIFRI, H.Q. Barrackpore	30 fishers/fish farmers from Madhepura, Bihar
9.	Inland open water fisheries management & development	February 17 to 23, 2016	CIFRI, H.Q. Barrackpore	30 fishers/fish farmers from Gaya, Bihar
10.	Inland Fisheries Management	February 14 to 18, 2015	CIFRI, H.Q. Barrackpore	24 Students B.Sc. (IFish) from Begusarai, Bihar.
11.	Mobile application based on electronic data acquisition system in reservoirs	March 19, 2016	Pookote Lake, Wayanad, Kerala	60 fishermen from Karapuzha and Banasura Sagar reservoirs of Wayanad District



Mass Awareness Programme

Name of the Camp	Date	Venue	Participants
Fisheries resource management and aquaculture production enhancement in Assam (in collaboration with COF, CAU, Lembuchhera & DOF, Assam)	August 21-22, 2015	ICAR-CIFRI, Guwahati	55 farmers representing 26 districts of Assam
Fish disease surveillance in Assam	August 26, 2015	Silchar, Assam	55 participants (Department officials and fish farmers)
Safe Fishing	February, 07, 2016	Pookote Lake, Waynad	50 members of Nellarachal ST Co-operative Society, Karapuzha, waynad.
Capacity building cum Awareness programme on "Small indigenous fish for livelihood and nutritional security"	February 10, 2016	Mataiya, Anchal Patepur, Vaishali District	Farmers, Administrator, Scientist, Community residing near Matiya wetland
Awareness cum training programme on Hilsa conservation	March 14, 2016	Barendraparaghat, Bally, Howrah	100 fishers including office bearers of fishermen cooperative societies
Awareness cum training programme on Hilsa conservation	March 16, 2016	Bichulighat, Shyamnagar, N 24 Parganas	100 fishers including office bearers of fishermen cooperative societies
गंगा नदी में मत्स्य संरक्षण एवं प्रबंधन	March 21, 2016	Vindhyanchal, Mizapur district, Uttar Pradesh	More than 300 participants including fishermen, fisherwomen, vendors, school children and villagers from Madguda, Gopalpur and Shivpur



Exhibitions

Name of Programme	Venue	Period	Participated By
Confederation of Indian Industries II meeting	Burdwan, W.B.	October 8-10, 2015	CIFRI, Barrackpore
5th Agro Protech-Towards sustainable food security through "Green, Blue & White revolution" organized by ICC	Milan Mela, Kolkata	November 19-21, 2015	CIFRI, Barrackpore
Krishi Mela, Bangalore 2015	GKVK, UAS, Bangalore	November 19-22, 2015	CIFRI, Bengaluru Centre
Exhibition in connection with International Symposium on Cage Culture in Asia	Asian Fisheries Society and ICAR-CMFRI, Kochi	November 25-27, 2015	CIFRI, Bengaluru Centre
CAA5, Cochin, Kerala	Kerala	November 25-28, 2015	CIFRI, Bengaluru Centre
Sunderban Kristi Mela-O-loko Sanskriti Utsav	Kultali, Sundarban	December 20-29, 2015	CIFRI, Barrackpore
Sunderban Yuba Mela	Taldi, South 24 PGS	December 22-31, 2015	CIFRI, Barrackpore
5th Nahati Utsav	Naihati	December 24-31, 2015	CIFRI, Barrackpore

Name of Programme	Venue	Period	Participated By
Sijani Sangha, Manmohan Mela	Chhotojagulia, Barasat	January 03-10, 2016	CIFRI, Barrackpore
NESFA, CAU	Lembuchera Tripura	January 21-22, 2016	Guwahati Centre
Sunderban Lokopriya Utsav 2016	Basanti, South 24 PGS	January 23-30, 2016	CIFRI, Barrackpore
2nd International Symposium of Genomics in Aquaculture	ICAR-CIFA, Bhubaneswar	January 28-30, 2016	CIFRI, Barrackpore
National Farmers Fair and Vegetable Showcasing	ICAR-IIVR, Varanasi	January 30, 2016	CIFRI, Allahabad Centre
CMFRI Foundation Day	ICAR-CMFRI, Kochi	February 02, 2016	CIFRI Kochi Centre
Sunderban Gramin Kuthir Shilpo -O- Loko Sanskriti Utsav-16	Jaigopalpur Gram Vikash Kendra, Basanti, South 24 PGS	February 11-14, 2016	CIFRI, Barrackpore
Assam Krishi Unnayan Mela 2016	ICAR-CPCRI RC Campus, Kahikuchi	February 13-14, 2016	Guwahati Centre
International conference on Aquatic Resources and Sustainable Management	Science City, Kolkata	February 17-19, 2016	CIFRI, Barrackpore
Jhanjharpur Vigyan Saksharata Utsav-16	Jhanjharpur, Madhubani, Bihar	February 21-23, 2016	CIFRI, Barrackpore
National Seminar-cum-exhibition on 'Make in India and Rural North East: The Challenges' organized by NIRDPR, RC, Khanapara, Guwahati.	Khanapara, Guwahati	February 25-26, 2016	Guwahati Centre
Krishi Unnati Mela 2016	ICAR-IARI Main Campus, New Delhi	March 19-21, 2016	CIFRI, Allahabad Centre
Exhibition and Krishak-Vaigyanik Gosthi	ICAR-IIPR, Kanpur	March 13, 2016	CIFRI, Allahabad Centre



Superannuations

Name & Designation	Last Place of posting	Date of superannuation
Ms. Amita Chakraborty, Assistant	Barrackpore	April 30, 2015
Ms. Hemlata Halder, SSS	Barrackpore	April 30, 2015
Mr. S.L. Bairagi, Tech. Asstt.	Barrackpore	May 31, 2015
Mr. B.P. Samanta, SSS	Barrackpore	May 31, 2015
Ms. Dhanmaya, SSS	Bangalore	May 31, 2015
Mr. B.P. Mishra, SSS	Allahabad	June 30, 2015
Ms. M. Biswas, SSS	Barrackpore	June 30, 2015
Dr. B.K. Biswas, ACTO	Barrackpore	July 31, 2015
Mr. T.P. Ghosh, LDC	Barrackpore	July 31, 2015
Mr. R.K. Sardar, SSS	Barrackpore	July 31, 2015
Mr. Paras Ram, Assistant	Allahabad	Aug 31, 2015
Mr. B. Balmiki, SSS	Barrackpore	Aug 31, 2015
Mr. S. Mahendran, SSS	Bangalore	Oct 31, 2015
Mr. A.K. Barui, St. Tech. Asstt.	Barrackpore	Nov 30, 2015
Mr. U.B. Bhattacharyya, Assistant	Barrackpore	Dec 31, 2015
Mr. K.K. Dhir, UDC	Allahabad	Dec 31, 2015
Mr. Fatik Manna, ACTO	Barrackpore	Jan 31, 2016
Mr. N.K. Chaki, SSS	Barrackpore	Jan 31, 2016

Promotions

Name & Designation	Promoted to	With effect from
Mr. D.N. Jha, Scientist	Scientist with RGP ₹8000	Nov 16, 2010
Mr. Praveen Maurye, Scientist	Scientist with RGP ₹9000	Nov 16, 2013
Mr. Ganesh Chandra, Scientist	Scientist with RGP ₹9000	Nov 24, 2013
Mr. Debasis Saha	Technical Officer	July 01, 2014
Mr. D. Karunakaran, Scientist	Scientist with RGP ₹9000	Sept 01, 2014
Mr. Giridhari Pramanick	Technical Assistant	Sept 17, 2014
Mr. A.K. Barui	Technical Officer	Jan 01, 2015
Mr. S. Manoharan, ACTO	Chief Technical Officer	June 04, 2015
Mr. C.D. Parmar	Assistant	July 22, 2015
Ms. Divya Jain	Assistant	July 22, 2015
Ms. Ruma Ghosh	Assistant	Sept 01, 2015

Transfers

Name & Designation	From	To
Ms. Sibina Mol S., Scientist	ICAR- CIFRI, Barrackpore	ICAR- CIFRI RC, Bangalore
Ms. Niti Sharma	ICAR-CIFRI, Barrackpore	ICAR-CIFRI, Guwahati
Mr. Simanku Borah	ICAR-CIFRI, Barrackpore	ICAR-CIFRI, Guwahati

New Appointments

The following ARS Scientists joined CIFRI, Barrackpore during the month of October, 2015



Sh. Satish Kumar Koushlesh
Fishery Resource Management
Date of joining: 08.10.2015



Sh. Ningtoujam S. Singh
Agricultural Chemicals
Date of joining: 09.10.2015



Sh. Gulshan Kumar Sharma
Environmental Science
Date of joining: 09.10.2015

Obituary

CIFRI family mourns to the demise of two great CIFRIans.



Prof. H.P.C. Shetty (17.05.1930-11.11.2015)

Prof. Shetty started his career in CIFRI. He was the first Director of Instruction, College of Fisheries, Mangalore and Founder Chairman of Asian Fisheries Society-Indian Branch. As a part of international assignments he served as an Aquaculture Consultant to FAO, Rome and inland fisheries advisor to International Mekong Committee. He was not only known for his intellectual brilliance, leadership qualities and national contribution - but also for his rare human qualities- honesty, integrity, vibrant personality and sense of humour, and above all, his warm affection and great help to the fellow workers and friends. In recognition of his outstanding research and education in the country and internationally, Prof. Shetty was awarded the Degree of Science (Honoris Causa) by the West Bengal University of Animal and Fisheries Sciences, Kolkata. We pray for peaceful rest of his Soul.



Shri James Murmu (25.10.1969 – 28.10.2015)

Shri Murmu died in harness on October 28, 2015. He was serving as a Senior Technical Officer and was a dedicated, honest and hardworker. He was also known for his innocence and simplicity. Our sincere condolences go to Shri Murmu's family.

Seminar on Hilsa fisheries and conservation



The Society of Fishery Technologists, India and ICAR-Central Institute of Fisheries Technology, Kochi in association with the Inland Fisheries Society of India and ICAR-Central Inland Fisheries Research Institute organized National Seminar on 'Hilsa Fisheries and Conservation' at ICAR-CIFRI, Barrackpore on November 18, 2015. The Seminar provided a platform to deliberate on Hilsa conservation recommendations. Directors of ICAR-CIFT, Kochi; ICAR-CIFE, Mumbai; ICAR-CIFRI, Barrackpore and former DDG (Crop Science), ICAR were among the Dignitaries in the seminar. Dr. B. Meenakumari former DDG (Fisheries Science) received the SOFTI Award 2013 for outstanding contributions in fisheries technology. The Award carries a medallion, a citation and a cash component of ₹ 25,000.

Awareness cum Training Program on "Climate Change Impact and Adaptation Strategies for Wetland Fisheries"

This awareness cum training programme, organized under the National Initiative on Climate Resilient Agriculture (NICRA) project, was held on 9th February 2016 at ICAR-CIFRI, Barrackpore. The objective was to sensitize the fishers about impact of climate change on wetland fisheries and dissemination of mitigation and adaptation strategies to



cope up with impending threats of climate change. The programme was attended by about 60 participants including fishers from four wetlands of West Bengal, scientists and research scholars under the NICRA project. The invited speakers and experts for the programme were Dr. Utpal Bhaumik and Dr. M. K. Das the former HoDs of the institute, Dr. Shamik Das, Joint Director, Directorate of Fisheries, Government of West Bengal and Dr. M. A. Hassan, Principal Scientist, ICAR-CIFRI.

The invited guests addressed the participants and expressed their concerns about climate change and its impending threats on inland fisheries with special reference to wetlands. The important issues like problems and prospects of wetland fisheries in relation to climate change, vulnerability of wetland fisheries/fishers and their adaptive measures, State Government Schemes/packages for wetland fisheries development in West Bengal, Participatory approaches to address climate change were discussed.

Meeting with the parliamentary standing committee on agriculture

The Parliamentary Standing Committee on Agriculture, comprising the members of Lok Sabha and Rajya Sabha, under the chairmanship of Shri Hukm Deo Narayan Yadav visited Kolkata during January 12-14, 2016. The ICAR-CRIJAF and ICAR-CIFRI jointly organised the event under



the leadership of Dr. P. G. Karmakar, Director, ICAR-CRIJAF and Dr. V. R. Suresh, Director (Acting), ICAR-CIFRI. The formal meeting was held in Kolkata on 14th January, 2016. The representatives from Government of West Bengal, Indian Farmers Fertilizers Cooperative (IFFCO), Indian Council of Agricultural Research and the two organising Institutes took part in the meeting. The Committee deliberated upon the progress of research and development and issues pertaining to agriculture in the region.

RAC Meeting

The Meeting of the newly constituted Research Advisory Committee of the Institute was held at Barrackpore during 21-22 March 2016. Prof. Dr. B. Madhusoodana Kurup, Former



Vice-Chancellor, Kerala University of Fisheries and Ocean Studies, Kochi, presided over the meeting. The meeting was attended by the members of the Committee namely Prof. H. C. Joshi, Dr. N. N. Rai, Dr. G. N. Chattopadhyay, Dr. Sudhir Raizada, Dr. V. R. Suresh, Director (Acting) and Dr. S. K. Nag, Member Secretary. Inter alia, the Chairman called upon the Scientists to focus on the research for knowledge based management of inland open waters and to formulate strategic action plans and highlighted the necessity of sustainable development of inland open water fisheries. The RAC felt the need of rebuilding the depleted fish stocks in open waters, taking initiatives on habitat restoration, prioritizing taxonomic studies, assessing fish biodiversity and conservation, delineating fish diversity hot spots, accessing water resources by multi-stakeholders, abatement measures against heavy metal and pesticide pollution, monitoring and assessing impacts of the exotic fish invasion, investigating climate change impacts and mitigation and enhancing fish production from reservoirs and wetlands involving local communities.

Workshop for developing roadmap for agriculture and allied sectors in the Lower Gangetic Plains region

Indian Council of Agricultural Research organized a workshop for preparing development Road Map for agriculture and allied sectors in Lower Gangetic Plains Region (Agro-climatic Region-III) covering West Bengal (Except hilly areas), eastern part of Bihar and Brahmaputra valley of Assam at the Institute HQ, Barrackpore on 31st October, 2015. The workshop was organized under the Chairmanship of Dr. A. K. Singh, Deputy Director General (Agricultural Extension and Fisheries Science), ICAR. Dr. V.R. Suresh, Director (Acting), ICAR-CIFRI and Dr. A.K. Singh (Director), ICAR-ATARI was the Nodal Officer and Co-Nodal Officer, respectively of this workshop in which Representatives from ICAR institutes, Assistant Director General (Inland Fisheries), State Agricultural Universities, relevant State line Departments, Experts and Progressive farmers participated.

On this occasion a background note was prepared. Prof. G.



Trivedi, former Vice-Chancellor, RAU Pusa suggested farmers to adopt integrated farming system incorporating crop, horticulture, livestock, fisheries to safeguard their income. Prof. S. K. Sanyal, former Vice-Chancellor, BCKV emphasized the important role of soil and water management, seed replacement, input efficiency and climate smart technologies. Prof. C. S. Chakraborty, former Vice Chancellor, WBUAFS elaborated on importance of green fodder, animal health management including vaccination, ornamental fishes and value addition for enhancing income of farmers and livestock owners. Prof. Arun Pathak, former Director of Research, AAU, Jorhat also spoke on the occasion.

Sensitization workshop on aquatic animal diseases in Assam

The workshop was organised on October 17, 2015 at ICAR-CIFRI Regional Centre, Guwahati. The purpose of the workshop is to sensitize about the disease surveillance in Assam. The participants include Fisheries extension officers, DFDO and researchers (55 nos.). The speakers gave lectures on different diseases in aquatic animals, especially in fishes. The surveillance planning was also discussed.



DDG (F.S.) visited ICAR-CIFRI, Barrackpore

Dr. J.K. Jena, newly joined DDG, Fisheries Science, ICAR, visited the institute on February 2016. Dr. V.R. Suresh (Director-Acting) welcomed him and thanked him for his maiden visit as the DDG. Dr. Jena interacted with all the staff and offered many innovative suggestions in day to day work. Following this he had a special interaction with the Scientists and enquired about their area of working. While recalling the golden achievements of the institute, he urged all the Scientists to strive for excellence.



45th IMC meeting

The 45th Meeting of the Institute Management Committee of the ICAR-CIFRI was held at Barrackpore on February 8, 2016. The Chairman, Dr. V. R. Suresh briefed the members about activities carried out by the Institute since last meeting, in the field of research, extension, overall Institute management and linkages established with other stakeholders. The members appreciated progress of research work at the Institute and complemented the Director and Scientists.

The members expressed satisfaction over the settlement of advances and suggested to utilize overall allocation in the current financial year. It was informed that out of total 9 audit paras upto IR 2013-14, 06 numbers of audit paras have already been settled, and the reply for remaining audit paras has been submitted. During IR 2014-15 eight paras



has been added. Dr. U.K. Sarkar has been selected as one of the members of grievance committee. He delivered a presentation on the topic "Understanding climate change and inland fisheries: problem and opportunities" in the IMC meeting.

Republic Day

The institute celebrated the Republic Day with great enthusiasm and fanfare on 26th January, 2016. Dr. V.R. Suresh, Acting Director of the institute hoisted the tri-colour and paid rich tribute to the nation. He reminded that India gained freedom after a long struggle and bloodshed of the freedom fighters. Hence, preserving the unity of the nation is our sacred duty. In his speech, Dr. Suresh also presented the achievements of CIFRI during the last one year and also recalled the golden journey of CIFRI. He appealed to all the staff to work hard to keep CIFRI's flag high. He remarked that a good working atmosphere and team spirit are the key to success. All the CIFRI staff and members of the family were present on the occasion.



CIFRI Foundation Day

The CIFRI foundation day was celebrated on 17th March, 2016 with great enthusiasm and fanfare. The former staff of the institute also joined the occasion. A cultural programme was organized and all the staff including their family members enjoyed the evening.



Vigilance awareness week

The Institute observed Vigilance Awareness Week during last week of October 2015. The programme commenced on 26th October 2015 with a pledge taking ceremony by all the employee of the institute. During the week long programme several awareness activities such as cartoons and slogans writing and competition on essay writing and debate were held to sensitize CIFRI staff about the menace of corruption and how the society cripples due to corrupt environment. During the concluding programme on 30th October, the Vigilance Officer of the Institute Dr. S.K. Nag narrated the background of observing the vigilance awareness week and explained the theme of this year 'Preventive vigilance as a tool of good governance'. Director (Acting) addressed the staff of the institute on this occasion and touched upon various preventive measures which we must observe to maintain honesty, transparency and probity in public life. The guest speaker Shri B.R. Prabhakar, Deputy Superintendent of Police, CBI, Kolkata delivered a talk on 'Corruption in Government Offices and the role of proactive vigilance'. During his speech Mr. Prabhakar deliberated upon various issues of corruption and preventive measures in the government offices.



implementation of the ban period alternative livelihood may be given to the identified hilsa fishers. About 120 participants, including fishers from various districts of West Bengal, scientists of CIFRI and former HODs of CIFRI, technical and administrative staff and Research Scholars participated in the programme.

Workshop on status and conservation of fisheries of Ganga river on the occasion of World Fisheries Day

Allahabad Regional Centre organised a workshop on "Ganga Nadeekhe Matsyikee kaVartman Swarup, Ashankayen evam Samvardhan ke Upay" on occasion of World Fisheries Day on 21.11.2015. More than 100 participants including University teachers, fish farmers, fishers, fish traders, serving and retired scientists of CIFRI, researchers, & local institutions and students participated in the programme. Dr. Md. Arif, former Joint Director, Defense Research and Development Organization was the chief guest. Prof. Anita Gopesh & Dr. K.P. Singh from Allahabad University, Dr. S.P. Singh, former Head, Dr. Balbir Singh, Dr. Shree Prakash, Mr. Jaitley former scientists of CIFRI were among the distinguished participants.



World fishery day

The Institute observed World Fishery Day on 21st November 2015. An interface meeting with fishers was organized to create awareness among the young fishers on importance of aquatic environments in sustaining fisheries. Inland fishers from three districts of West Bengal were present in the meeting. The meeting were chaired by Dr. Utpal Bhaumik former HoDs of the institute.

The fishers raised several issues like habitat degradation due to pollution, siltation and developmental initiatives, over exploitation of the aquatic resources, particularly rivers estuaries and wetlands. Conservation of prized fishes like hilsa is the need of the hour. However, for successful

The National Sanitation Campaign (Swachh Bharat Abhiyan) is continued in Barrackpore as well as in all the centres. Various programmes like cleaning of streets, corridors, planting of saplings, formation of human chains, essay writing, slogan and drawing competition, invited lectures were organized by the institute. In addition to these, a village 'Sheuli' in Barrackpore was adopted for sanitation drive by the institute. The Kochi Centre organized a cleanliness drive on 2nd, 6th & 7th October, 2015 at Marine Drive, Goshree Road and Shiva Temple premises, Ernakulam. An awareness programme on Swachh Bharat Mission for hygiene and sanitation was organized at the Digri Chiring Training Centre, West Garo Hills by Guwahati centre on February 6, 2015.



Tribal Sub-Plan Activities

With the objective of enhancing fish yield from rain water fed ponds and increase income of the tribals; ICAR-CIFRI initiated activities in the tribal area of Sagar Island of Sundarban, West Bengal. Institute released 6400 numbers of Indian major carp (*C. mrigala*, *C. catla* and *L. rohita*), *L. bata* and *Puntius sarana* fingerlings in three fresh water ponds of total water area 0.29 hectare and 3100 number of fingerlings of *Rhinomugil corsula*, *liza parsia*, *Mugil cephalus* and *Mystus gulio* in two brackish water ponds of total water area 0.12 hectare in village Khansaheb Ababd of Sagar Island. The



Operation of cast net by fisher women

tribal fisherwomen along with male fishers took active part in fish seed stocking in the respective ponds. A number of tribal fishermen / women will be benefited from the programme. Water and soil samples were analysed from these ponds. Based on analyzed water and soil parameters, 100 kg of lime and 100 kg of fish feed were supplied to tribal fishers for supplementary feeding and liming in five ponds located in the village during 6th November, 2015. The tribal fisher folk were educated on various fish farming practices in general and pond management, in particular. On 10th December the fishes were harvested using cast nets and the growth in all the five ponds was assessed. Reasonable increase in growth of fishes was observed.

In the western Sundarbans, the Institute organised two days field training on "Post Stocking management of carp farming in Canals" from 4th to 5th February, 2016 at Kalitala G.P, Hingalganj Block, North 24 Parganas, West Bengal. One hundred and thirty tribal fishermen and women attended the programme. Practical demonstration and technical discussion was done on low cost manuring for natural fish food production, supplemented feeding, water quality monitoring and fish disease control. During the training period, fishing drag net (*Berjal*) was distributed to three canals (Chingrikhali-I, Chingrikhali-II and Sagunkhali) tribal fishers as input support from TSP programme. Dr. M.K.



Prophylactic measures before release of fingerlings



Water testing



Field demonstration on analysis of water quality parameters



Net distribution among tribal fishers

Bandyopadhyay, Dr. Sanjay Bhowmick and Sri Subhendu Mondal from ICAR-CIFRI organised the programme. Shri. Harosit Mondal, Forest Officer, Sh. Hamid Gazi from Jhingakhali Forest office (Sundarbans), Govt of West Bengal and Shri Shymal Mondal, Panchyat Pradhan, Kalitala Gram Panchyat were present during the programme.

Allahabad Regional Centre organised training cum awareness programme and fish feed distribution camp at Ramnagar, Chandan Chauki, Lakhimpur-Kheri on 17th November 2015. The Centre distributed 265 kg of fish fingerlings to 53 fish farmers, 10 tons each of MOC & rice bran and 5 tons of lime to 50 tribal farmers. Also monitored growth of the stocked fish seed in some of the farmer's pond.



Monitoring of growth of the fishes

The Bangalore Research Centre of the Institute organized a Mass awareness program on safe fishing using fiber glass coracles on 7th February 2016 at the premises of Pookote Lake, in Wayanad District of Kerala. On this occasion, eight

fiber glass coracles measuring 2 metres diameter and worth ₹ 10000 each were distributed to the members of Nellarachal Scheduled Tribe Fishermen society by Smt. P. K. Jayalekshmi, Minister for Tribal Development and youth welfare, Kerala State. These fishermen operate in the nearby Karapuzha Reservoir. The programme was aimed at empowerment of unemployed tribal youth of the tribal belt in the Wayanad District, of Kerala. On an earlier occasion ten fishers were distributed fishery requisites- like Gillnets and Crates in the Vanivilasasagara reservoir, Chitradurga District, Karnataka State on 4th November 2015. With the intervention of ICAR – CIFRI the fish catch has increased from 18 kg/ha to 150 kg/ha in the reservoir. These activities by ICAR-CIFRI has led to the improvement of the livelihoods of tribes in this area.



Distribution of coracles

Under the *Mera Gaon Mera Gaurav* programme every 4 Scientists adopted 5 villages for rendering technical advice for enhancing productivity and quality of output of agriculture and allied areas. The baseline survey has been completed and the Scientists have got fair idea about the agriculture of the adopted villages. A team of researchers from the Guwahati centre visited Chilabondha beel (floodplain wetland) located in Kaliabor Development Block of Nagaon district, Assam for rendering technical assistance to the beel user community. Six villages are located along the periphery of the beel, which are inhabited mostly by scheduled caste population (66.7% of the total) who are small farmers



Chilabondha beel, Nagaon district, Assam

(150 nos.). Number of medium, large and landless farmers in the villages are 20 (8.9%), 5 (2.2%) and 50 (22.2%) respectively. With the emergence of an additional livelihood option in the form of beel fisheries, the beel development committee (BDC) plans to initiate fisheries enhancements in the beel with technical support from CIFRI and in active collaboration with the Directorate of Fisheries, Govt. of Assam. The ICAR-CIFRI-DoF team worked out measures for supplementary stocking and pen aquaculture in the beel for enhancing its fish production for the inclusive benefit of the local beel user community.



Baseline survey at Zanor and Poicha villages in Vadodara

Flash Back

CIFRI @ 1970s



Dr. V.G. Jhingran



Dr. A.V. Natarajan

Following the retirement of Dr. V.G. Jhingran, Dr. A.V. Natarajan was officiating as Director of the institute since July 1979. As a major infrastructural facilities, the foundation stone of the freshwater Aquaculture Research and Training Centre, Dhauli, Orissa on 144 ha of land with 800 experimental ponds was laid by Smt. Indira Gandhi, the then Prime Minister, on January 3, 1977. During 1971-72 the provision of funds for the Institute was ₹32.75 lakh including ₹26.5 lakh under non-Plan and ₹6.25 lakh under the plan. The budget went upto ₹146 lakh (Non-Plan ₹97.92 lakh and Plan ₹48.6 lakh) during 1979-80.



This decade proved to be one of the golden periods of CIFRI. Many path breaking researches were carried out, as a result many scientists got awarded and recognized nationally and internationally. Dr. V.G. Jhingran created history in the Annals of Fishery Sciences by receiving Padma Shri on the Republic Day of 1977 for

his outstanding contribution in the field of inland fisheries. He was also awarded Dr. S.L. Hora Memorial Medal for the year 1978, the Chandrakala Hora Memorial Medal for the five-year period 1975-80. He was nominated from India to attend many international meetings. In addition to these, Dr. Hiralal Chowdhury, Dr. V.R. Pantulu, Shri M.V. Gupta, Dr. VRP Sinha were given foreign assignments. Many Scientists including Dr. VG Jhingran were appointed FAO Consultants.

CIFRI Scientists got the Rafi Ahmed Kidwai Memorial Prize twice, for the biennium 1972-73 and for the biennium 1976-77. CIFRI Film "Induced Breeding" bagged first prize under the instructional category of films awarded by the FAO at Kyoto Japan, during 1976. Dr. V. R. P. Sinha was awarded Hooker Award in 1973. He and his team were also awarded the ICAR Award for their contribution in Composite Fish culture for the biennium 1977-78.



CIFRI Scientists with ICAR Award for Team Research

The P & T Department, Government of India, released a special postage stamp of 5 paise denomination on 26th November, 1979 in the fitness of things and as a token of recognition of the pioneering work of CIFRI in the field of aquaculture.



Dr. A.V. Natarajan is receiving the stamp album

In the research front, success in the artificial fecundation of hilsa (*Hilsa ilisha*) in the Ganga near Allahabad was achieved during 1969. Hilsa hatchlings, produced through stripping in 1969 lived for more than 2 years and grew to an average length of 322 mm. For the first time in India, success was achieved in induced breeding and hatching of *Mugil cephalus* during December, 1970. Maturation and breeding through hypophysation of catla, rohu and mrigal for the second time in the same season have been achieved on several occasions. Success has been achieved in producing hybrids of the common carp, *Cyprinus carpio* and the Indian major carp, *Catla catla*, for the first time.

For the first time in the history of Karnataka, a commercial source of Mahseer fry was located at the tailend of the Bhadra reservoir. Adopting multi-species culture of Indian and exotic carps, Cuttack Research Centre made trend-setting fish production of over 9 MT/ha/yr during 1974. At farmers' field over 7.5 MT/ha/yr could be achieved. *H. molitrix* at Bhavanisagar and Gauhati sub-centres and *C. Idella* at Poona sub-centre were bred for the first time during the year 1975. Induced breeding of silver carp has been achieved at Ranchi subcentre, Bihar, for the first time in 1976. Canal breeding-a new technique for carp seed production was developed. The soundness of ecology-based management principles adopted

for Bhavanisagar reservoir is reflected by the continuing high yield from 19 kg/ha/yr in 1971 to 77 kg/ha/yr in 1977.



During 1978 the Scientists of this Institute have shown that magur and singhi fishes are capable of assimilating non-protein nitrogen from urea. *Schizothorax niger* which forms an important fishery in the Himalayan region has been bred successfully for the first time. At Pune Centre, extraordinarily high rate of production of 10.2 MT/ha/yr has been achieved which is an all time record of production from freshwater ponds in India. At Kakdwip centre, a major breakthrough has been achieved in 1978 in artificially inducing maturation and breeding of *Penaeus monodon* in brackishwater impoundment by eye-stalk ablation technique which has far reaching significance in removing the major constraints of inadequate supply of pure seed of this highly priced marine shrimp. In publications a total of 698 scientific papers were published during the decade.



Investigations on riverine and estuarine fish catch statistics shows that in the middle stretch of Ganga the estimated landings at Buxar was 23.014 MT during 1970. In the Lower stretch of Ganga the total annual landings from Sultanganj to Lalgola were estimated to be 320.42 MT in 1970. In Bramhaputra river during the year 1973, 239.2 MT of fishes were landed at Fancy Bazar and Uzan Bazar. During the period Dec 1969 to Nov 1970, a total of 9,944.0 MT of fishes were landed from the Hooghly-Matlah estuarine system. Lower Sunderbans contributed 79.1% of the total catch. The estimated landing of hilsa from the lower stretch of the Ganga river system during 1970 was recorded to be 122.45 MT.

Compiled and edited by Arun Pandit



सिफरी समाचार

अनुसंधान उपलब्धियाँ

ओडिशा के चिलिका लैगून में पहली बार इलेक्ट्रिक रे प्रजाति, नारसिन टिमलि की उपलब्धता

ओडिशा के चिलिका लैगून के मुहाने से 4 कि.मी. दूर पहली बार प्रथम बार इलेक्ट्रिक रे प्रजाति, नारसिन टिमलि की उपलब्धता को दर्ज किया गया है। यह नई प्रजाति 168 मि.मी. लम्बी एक मादा मछली है जिसे भारतीय प्राणी विज्ञान सर्वेक्षण, कोलकाता में सुरक्षित रखा गया है (वाउचर सं- जे एस आई एफ 11285/2)। इस प्रजाति के अन्य पांच नमूनों (147 से 160 मि.मी. लंबी) को चिलिका लैगून से 30 कि.मी. दूर नलबन अभयारण्य तथा 11.8 कि.मी. दूर सतपदा से पकड़ा गया जो यह बताता है कि इस क्षेत्र में यह प्रजाति पर्याप्त रूप में उपलब्ध हैं। पर अब तक इस प्रजाति संबंधी समस्त सूचनाओं का नितांत अभाव है जिसके कारण आईयूसीएन (IUCN) ने इसकी कम उपलब्धता की ओर इंगित किया है। आईयूसीएन के अनुसार, इस प्रजाति का संरक्षण एक कठिन कार्य है।

सी एम रोषिथ, आर के मान्ना, वी आर सुरेश, डी पंडा, ए पी शर्मा, ए रॉय चौधुरी, एम मुखर्जी एवं एस के बनिक

गंडक नदी में छोटी देशी मछलियों की प्रजाति विविधता, प्रचुरता एवं संरक्षण का स्तर

गंडक नदी के विभिन्न केन्द्रों, टेंग्राही, रेवा घाट तथा माहेश्वरी घाट का सर्वेक्षण कर 65 मत्स्य प्रजातियों को दर्ज किया गया। इनमें से 45 प्रजातियां छोटी देशी मछलियों की थी। इन 45 प्रजातियों को तीन वर्गों में बांटा गया; 13 प्रजातियों को आहार वर्ग में, 3 प्रजातियों को अलंकारी मछली वर्ग में तथा 29 प्रजातियों को आहार-अलंकारी मछली के वर्ग में रखा गया। शैनोन की डायवर्सिटी इंडेक्स के अनुसार, माहेश्वरी घाट में प्रजाति विविधता सबसे अधिक (2.8) थी। इसी प्रकार, यह विविधता रेवाघाट में 2.7 तथा टेंग्राही में 2.5 थी।

अर्चना सिन्हा, राजु बैठा, देबाशीष साहा एवं आशीष रॉयचौधुरी

महानदी में चिताला चिताला (हेम. 1822) की उपलब्धता

आईयूसीएन द्वारा जारी रेड लिस्ट के अनुसार, चिताला चिताला प्रजाति प्रायः विलुप्त होने के कगार पर है। इस प्रजाति की मत्स्य विविधता एवं नदीय जलप्रवाह के बीच के संबंध के अध्ययन के लिये महानदी के हीराकुड से पारादीप के बीच 450 कि.मी. क्षेत्र का अध्ययन किया गया। इस क्षेत्र में मीठाजल एवं खाराजल दोनों ही प्रकार के जलनिकाय पाये जाते हैं। मध्य और निचला क्षेत्र से सी चिताला की क्रमशः 190 मि.मी तथा 810 मि.मी. लंबी मछलियों को पकड़ा गया। इनके लिये उपयुक्त क्षेत्र के अध्ययन के लिये 17 भौतिक-रसायनिक प्राचल संबंधी जल एवं मिट्टी को लिया गया।

ए के साहू, रोहन कुमार रमण, रोषिथ सी एम, मानस एच एम, कविता कुमारी, शुभा रॉय, लियांनथुमलुइया एवं सोमा दास

नर्मदा नदी की लेबियो गोनीयस (हेमिल्टन 1822) की प्रजनन क्षमता एवं गोनेडो-सोमेटिक इंडेक्स

लेबियो गोनीयस को खुरसा, कुरची अथवा बिलजा के नाम से भी जाना जाता है। इसका प्रजनन काल जुलाई से सितम्बर होता है और इसी अवधि में ही इनका उत्पादन सबसे अधिक प्राप्त होता है। इन मछलियों की लंबाई 200 से 339 मि.मी. तथा शारीरिक भार 84.5 से 494 ग्रा. के बीच होता है तथा नर और मादा मछलियों का अनुपात 1:0.86 होता है। सबसे छोटी नर मछली 160 ग्रा. तथा मादा मछली 172.5 ग्रा. वाली पाई गई है। एल. गोनीयस की सापेक्ष प्रजनन क्षमता 28,696 से 296,860 प्रति कि.ग्रा. शारीरिक भार दर्ज की गई है। गोनेडो-सोमेटिक इंडेक्स 0.062 से 25.342 प्रतिशत होता है तथा यह सबसे अधिक जुलाई से अगस्त महीनों के बीच पाया गया।

दिबाकर भक्ता, बी के बेहरा, डब्लु ए मिती, जे के सोलंकी एवं आर के साह

गुजरात के उकाई जलाशय में लेबियो कलबसु (हेमिल्टन 1822) की स्थिति

उकाई जलाशय से वर्ष 2013-14 में लगभग 10004 टन लेबियो कलबसु प्राप्त किया गया। उत्पादन वृद्धि का प्रतिशत वर्ष 2010-11 में 4.30 तथा वर्ष 2013-14 में 8.98 दर्ज किया गया जिसका मुख्य कारण ऑटो-स्टॉकिंग है। यह मछली मुख्यतः पादपभोजी है और नदी के तल में रहती है। मानसून में ये जलाशय के ऊपरी भाग में प्रजनन करती हैं। इनकी औसत लंबाई 35.8 से.मी. तथा शारीरिक भार 503.5 ग्रा. होता है। ये सामान्यतः एक वर्ष के बाद ही परिपक्व होती हैं। नागार्जुन सागर से परिपक्व नर मछली की लंबाई 306 मि.मी. तथा मादा मछली की 371 मि.मी. दर्ज किया गया है। (संदर्भ : विन्सी एवं सुगुणन, 1981)। मेजर कार्प मछलियों में कालबसु की प्रजनन क्षमता सबसे अधिक होती है जिससे उकाई जलाशय में अधिक उत्पादन होता है।

दिबाकर भक्ता, डी एस के राव, डब्लु ए मिती, आर के साह एवं जे के सोलंकी

नर्मदा ज्वारनदमुख में मात्स्यिकी

स्टेक नेट को स्थानीय तौर पर 'कन्दारी जाल' के नाम से जाना जाता है। नर्मदा ज्वारनदमुख के मध्यवर्ती और निचले भाग में इस जाल के प्रयोग मानसून, मानसून पश्चात एवं शीत ऋतु में टेनुआलोसा इलिशा और वर्षभर झींगा मछली, सीनेड प्रजाति, मुलेट और बॉम्बे डक को पकड़ने के लिये किया जाता है। यह जाल नाइलोन के एकल फिलामेन्ट रस्सी से बना होता है। हिलसा मछलियों को पकड़ने के लिये 45 से 60 मि.मी तथा 100 से 130 मि.मी. छिद्र वाली जाल का प्रयोग किया जाता है। छोटी मछलियों को पकड़ने के लिये 10 से 40 मि. मी. छिद्र वाली जाल का प्रयोग किया जाता है। लगभग 7 से 8 दिनों तक इन कंदारी जालों को ज्वारीय जल धारा प्रवाह के अनुसार लगा दिया जाता है। इसमें 5 से 12 मछुआरों एक साथ मिलकर जाल लगाते हैं और मछली पकड़ते हैं। इन जालों की लंबाई 100 से 500 मीटर होती है तथा मछुआरों का एक दल जालों को 2 से 4 सेट लगाते हैं। हिलसा मछली का मत्स्ययन प्रयास 0.5 से 15 कि.ग्रा. प्रति नेट प्रति ज्वार तथा अन्य प्रजातियों का मत्स्ययन प्रयास 1.5 से 11 कि.ग्रा. प्रति नेट प्रति ज्वार दर्ज किया गया। नर्मदा ज्वारनदमुख के मध्यवर्ती और निचले भाग में पूरे वर्ष भर मछुआरों की आजीविका का मुख्य साधन कंदारी जाल से मछली पकड़ना है।

दिबाकर भक्ता, डब्लु ए मिती, एस के दास, आर के मान्ना एवं जे के सोलंकी

इलाहाबाद में गंगा नदी की मछलियों का लैंडिंग

संस्थान के इलाहाबाद अनुसंधान केन्द्र द्वारा वर्ष 1950 से गंगा नदी के फिश लैंडिंग आंकड़ों का संग्रहण किया जा रहा है। वर्ष 2015 में अनुमानित फिश लैंडिंग 199.53 टन था जिसमें विदेशी प्रजातियां 29.0 प्रतिशत थीं। अन्य प्रजातियां 45.29 प्रतिशत, विदेशी प्रजातियां 28.89 प्रतिशत, भारतीय मेजर कार्प 14.13 प्रतिशत तथा कैटफिश 11.69 प्रतिशत थीं। विदेशी प्रजातियों में कॉमन कार्प, तिलापिया आदि का उत्पादन पिछले वर्ष की तुलना में 1.8 प्रतिशत अधिक हुई जिसका कारण मत्स्ययन प्रयास में वृद्धि तथा नदियों में बाढ़ में कमी होना था। गत 5 वर्षों के आंकड़ों के अनुसार, भारतीय मेजर कार्प तथा कैटफिश की संख्या में कमी हुई है पर प्रति वर्ष इलाहाबाद का फिश लैंडिंग लगभग समान ही रहा है।

डी एन झा एवं जे के डी जोशी

गंगा नदी में मेस्टासेम्बेलस आरमेत्स

कांटेदार ईल मछली मीठाजल तथा खाराजल, दोनों ही प्रकार के जल निकायों में पाई जाती है। यह मछली अत्यन्त तेज गति से भ्रमण करती है तथा आमतौर पर झरनों, बलुई क्षेत्र तथा शिलाखण्डों में शीतक्षेत्र और ज्वारनदमुखों में लगभग वर्षभर पाई जाती है। सामान्यतः इनकी संख्या कुल मछलियों का 0.5 से 2.0 प्रतिशत तक होता है। एम आरमेत्स मछली मांसभक्षी होती है और इनका भोजन छोटी मछलियां (एसोडोपेरिया, चेला, गुडुसिया, बेरिलियस, सालमोफेसिया), मोलस्क

(बी बेंगालेन्सिस, सी स्ट्रिएटेला) एवं कीट (ड्रेगन फ्लाई निम्फ) आदि हैं। नर एवं मादा मछली का औसत जी एस आई 1.06 से 9.3 प्रतिशत आंका गया। इनका अंडजनन सबसे अधिक जुलाई-अक्टूबर महीने में होता है। 80 से 276 ग्रा. एवं 305 से 490 मि.मी. एम आरमेटस मछलियां 2268 से 6058 अण्डे देती हैं। प्रति ग्राम शारीरिक भार में औसत अण्डाणुओं की संख्या 26 पाई गई जबकि प्रति ग्राम अण्डाशय में औसत अण्डाणुओं की संख्या 304 पाई गई।

ए आलम, के डी जोशी एवं वैषाख जी

सुन्दरवन में केकड़ा पालन

सुन्दरवन के प्रग्रहण मात्स्यिकी क्षेत्र के 1750 वर्ग कि.मी. क्षेत्र में केकड़ों की विभिन्न प्रजातियों का पालन किया जाता है। इसके अलावा खाराजल आर्द्रक्षेत्रों में केकड़ा पालन किया जाता है। इनमें सबसे अधिक साइला सेराटा प्रजाति के केकड़े पकड़े गये हैं। सर्वेक्षण यह बताते हैं कि मछुआरें अपनी विशेष तकनीकों द्वारा केवल इसी प्रजाति के केकड़ों को ही पकड़ने में माहिर हैं पर अन्य प्रग्रहण तकनीकों के बारे में सूचनायें उपलब्ध नहीं हैं।

सुन्दरवन के ऊपरी एवं मध्य भाग में नदियों से केकड़ों को ट्राप, 'चाकजाल' द्वारा पकड़ा जाता है। यह ट्राप समान आकार की 25 से.मी. व्यास वाली बांस के दो गोलों से बनी होती है। इसमें नाइलॉन के जाल (40 मि.मी. जाल छिद्र वाले) लगे होते हैं। इस ट्राप के एक ओर के प्रवेश द्वारा के मध्य भाग में 120 मि.मी. व्यास वाली एक छोटा गोला लगा होता है जिससे केकड़े इससे भीतर आ सकें। स्थानीय तौर पर उपलब्ध कैटफिश तथा छोड़ी हुई मुर्गीपालन उत्पादों का चारा बना कर जल में फेंका जाता है। सुन्दरवन के मध्यवर्ती क्षेत्र में मोनोफिलामेंट वाली गिल जाल 'करंट जाल' से केकड़ों को पकड़ा जाता है। उनको पकड़ने के लिये चन्ना एस पी के मृत मछलियों को जाल के आस पास बांध दिया जाता है। केकड़ें जब इन मछलियों को खाने के लिये आते हैं तो जाल में अटक जाते हैं और पकड़ लिये जाते हैं।

इसी प्रकार साइला सेरेटा को विभिन्न गिर जालों जैसे, 'बिन्ती जाल', 'चौरपाता अथवा खालपाता जाल', 'छन्दी जाल/करंट जाल' आदि द्वारा पकड़ा जाता है। पर इन जालों में छोटे केकड़े भी फंस जाते हैं जिनको कोई खरीदता नहीं है। अतः ये जाल सुन्दरवन में केकड़ा उत्पादन एवं पालन के लिये क्षतिकारक हैं और इसलिये यहां केकड़ा मात्स्यिकी में ह्रास का सामना करना पड़ रहा है।

आर के मान्ना, टी निरूपदा चानु, एस के दास, शुभा राय, दीपा सुधीशन, रोषिथ सी एस एवं मानस एच एम

मोबाइल आधारित ई-डैश सिस्टम

आमतौर पर खुला जल क्षेत्रों से मत्स्य आंकड़ों का संग्रहण एक कठिन कार्य है क्योंकि इसमें बहुत सारी असुविधाओं का सामना करना पड़ता है। इस समस्या से निबटने के लिये संस्थान ने आंकड़ा संग्रहण को इलेक्ट्रॉनिक उपकरणों द्वारा एकत्र करना आरंभ कर दिया है। संस्थान के बैंगलोर केन्द्र ने केरल के वयानाद जिले में प्रशिक्षण के द्वारा मोबाइल से जलाशयी आंकड़ा संग्रहण तकनीक का परीक्षण किया। इस कार्यक्रम का उद्घाटन दिनांक 19 मार्च 2016 को वयानाद की जिला पंचायत अध्यक्ष, श्रीमती ऊषा कुमारी के द्वारा हुआ। श्रीमती ऊषा कुमारी ने संस्थान के इस प्रयास की अत्यन्त सराहना एवं प्रशंसा की तथा उन्होंने यह आशा व्यक्त किया कि भविष्य में संस्थान द्वारा वयानाद के जनजाति मछुआरों के लिये इस उन्नत ई-डैश तकनीक में प्रशिक्षण की सुविधा का प्रबंध किया जाना चाहिये। इस तकनीक में आंकड़ों का संग्रहण कम्प्यूटर में प्रत्यक्ष तौर पर हो जाता है।

एम कार्तिकेयन एवं एम फिरोज खान

कंसावती जलाशय की मत्स्य प्रजाति विविधता

पश्चिम बंगाल की कंसावती नदी पर स्थित कंसावती जलाशय 10400 हे. क्षेत्र में फैला हुआ है। विभिन्न ऋतुओं में इसमें किये गये सर्वेक्षण कार्य यह बताते हैं कि इसमें वास करने वाली अधिकतर मत्स्य प्रजातियां साइप्रिनिडा वर्ग की हैं। आईयूसीएन के अनुसार तीन प्रजातियां, ओम्पक बाइमाकुलेटस, पेरांबेसिस लेटा और ओरिफ्रोमिस नाइलोटीकस तथा मोसांम्बिकस विलुप्त होने के कगार पर हैं। इनके अलावा अधिक मछलियां सिरहिनस रेबा (35.29 प्रतिशत), ओरिफ्रोमिस नाइलोटीकस (21.17 प्रतिशत), लेबियो रोहिता (10.98 प्रतिशत), ओम्पक बिमेकुलेटस

(09.01 प्रतिशत) एवं लेबियो कलबसु (8.23 प्रतिशत) प्रजातियों की पाई गई हैं। शेनोन वेनर इंडेक्स के अनुसार जल संचरण वाले जलनिकायों में मत्स्य विविधता अधिक पाई गई और दो नई प्रजातियां, सेगुनियस सेगुलियो और बेसिलियस बेन्डेसिस को दर्ज किया गया है। इन प्रजातियों का पालन, मात्स्यिकी विकास और आजीविका के लिये अत्यन्त लाभकारी सिद्ध हो सकता है। सर्वेक्षण परिणाम इस जलाशय के संरक्षण, प्रबंधन एवं भावी अनुसंधान की दिशा में अत्यन्त ही लाभकारी हैं।

विकाश कुमार, लियानथुमलुइया, संध्या के एम, यु के सरकार, बी नस्कर एवं वाई अली

गोखुर झीलों की नितल जीवजात प्रजातियाँ

खलसी और अकाईपुर आर्द्रक्षेत्रों की पारिस्थितिकी जैसे, नितल जीवजात प्रजातियों की प्रकृति एक-दूसरे से संपूर्णतः भिन्न है। इनके जल घनत्व, गहराई, लिक नहर, मेक्रोफाइट आदि में बहुत अंतर पाया गया है। खलसी आर्द्रक्षेत्र एक खुलाक्षेत्र बील है जिसमें जल संचरण नियमित तौर पर होता रहता है जबकि अकाईपुर एक घिरा हुआ क्षेत्र है। खलसी बील में मेक्रोफाइट प्रजातियों की संख्या अधिक पाई गई। खलसी बील में जल संचरण अधिक होने से मेक्रोफाइट 65 प्रतिशत और गैस्ट्रोपोडा सबसे अधिक 98.42 प्रतिशत पाया गया। अन्य प्रजातियों का प्रतिशत जैसे बाइवैल्विया 0.36 प्रतिशत, ओलिगोकीटा 0.36 प्रतिशत एवं डिपटेरा 0.22 प्रतिशत था। इसी प्रकार, अकाईपुर बील में गैस्ट्रोपोडा 46.98 प्रतिशत, ओलिगोकीटा 41.56 प्रतिशत, डिपटेरा 11.22 प्रतिशत और बाइवैल्विया 0.24 प्रतिशत, एवं पाये गये। दोनों आर्द्रक्षेत्रों के नितल जीवजात प्रजातियों का अध्ययन यह बताते हैं कि इनका प्रबंधन तकनीक एक-दूसरे से भिन्न होना चाहिये जिससे इनमें मात्स्यिकी विकास और आजीविका के साधनों का पूरा लाभ लिया जा सके।

डी के मीणा, लियानथुमलुइया, एम ए हसन, सुभा साहा एवं बी नस्कर

जलाशयों में पिंजरा पालन

पश्चिम बंगाल के आसनसोल डिवीजन के सिधाबारी गांव माइथन जलाशय के पूर्वी तट पर स्थित है और इसकी जनसंख्या मुख्यतः जनजाति एवं उपजातियों की है। इस क्षेत्र की मिट्टी एवं अन्य प्राचल कृषि एवं जलकृषि के अनुकूल नहीं हैं। चूंकि यहां आजीविका के साधन उपलब्ध नहीं हैं इसलिये अधिकतर गांववासी कोयले की खदानों, पत्थर खदान, कोक एवं स्पांज फैक्टरी में काम करने के लिये मजबूर हैं और पास के जलाशयों से आजीविका के लिये प्रयास नहीं करते हैं। पर संस्थान ने इस दिशा में प्रयास किया और पिंजरा पालन के लिये पहल की गई है। इसके लिये संस्थान ने सिधाबारी गांव में जलाशयों में पिंजरा पालन पर तीन-दिवसीय प्रशिक्षण कार्यक्रम का आयोजन किया। महिलाओं ने पिंजरों की नियमित देख-भाल के लिये एव स्वेच्छा समिति का गठन किया। अप्रैल 2015 में संस्थान के सहयोग से गांव के जलाशयों में 8 पिंजरों की बैटरी लगाई गई और उनमें पंगेशियनोडोन हाइपोथेलमस की 45-50 ग्रा0 वाली कैटफिश को डाला गया। उनके पालन के लिये मत्स्य आहार भी दिया गया। इसके 9 महीने के बाद 16 जनवरी 2016 को इन पिंजरों से लगभग 4000 कि.ग्रा. मछली प्राप्त किया गया। इनका बाजार मूल्य लगभग 2.8 लाख था तथा इसे गांव की महिला समिति, सिधाबारी आदर्श स्वनिर्भर गोष्ठी के सुपुर्द कर दिया गया। पिंजरा पालन की इस सफलता ने गांववासियों में एक नया जोश भर दिया है और अब वे इतना सक्षम हो चुके हैं कि संस्थान के सहयोग के बिना भी पिंजरा पालन कर सकेंगे।

एम ए हसन, विकाश कुमार, डी पंडा, यु के सरकार, ए के दास, बी नस्कर एवं वाई अली

मेक्रोफाइट एवं पादपप्लवक विविधता

पश्चिम बंगाल के नदिया जिले की खलसी बील पर 317 मछुआरा परिवारों की आजीविका निर्भर करती है। मछुआरा सहकारी सोसायटी पालन तकनीकों का प्रबंधन करता है। इस क्षेत्र में गहन पालन के कारण पोशक तत्वों का संचरण होता रहता है जैसे जूट पालन ने इस क्षेत्र को जैविक तौर पर बहुत ही समृद्ध किया है। जल की गहराई कम होने तथा इसमें पोशक तत्वों के मिलने के कारण जलीय पादपों की भरमार है। मात्स्यिकी प्रबंधन को ध्यान में रखते हुये मेक्रोफाइट की पारिस्थितिकी एवं मात्स्यिकी महत्व को जाने बिना इनको इस क्षेत्र से निकाल दिया गया। मेक्रोफाइट को हटाने से पहले माइक्रोसिस्टिस

एरिगुनोसा का घनत्व 7310 से 11220 कोशिका प्रति ली० था पर इसके बाद यह 223247 कोशिका प्रति ली० हो गया। पादपलवक के घनत्व में परिवर्तन होने से इसका सीधा प्रभाव मत्स्य उत्पादन, विशेषकर भारतीय मेजर कार्प प्रजातियों के उत्पादन पर पड़ता है क्योंकि इनसे माइक्रोसिस्टिन नामक एक विशेला तत्व बाहर निकला है जिससे मछलियां मर जाती हैं।

सुमन कुमारी, एम ए हसन, यु के सरकार, लियानथुमलुइया, संध्या के एम, विकाश कुमार, मिषाल पी, वाई अली एवं बी नरकर

मेघालय के बोरो बील की मत्स्य प्रजाति विविधता

मेघालय के बोरो बील 80 हे. क्षेत्र में फैला एक बाढ़कृत आर्द्रक्षेत्र खुला बील है जो ब्रह्मपुत्र नदी की सहायक जिनजिरम नदी से जुड़ी हुई है। इसे गारो हिल्स स्वायत्त जिला परिषद् को पट्टे पर दिया गया है। रिपोर्ट अवधि के दौरान 41 जेनेरा, 20 फैमिली तथा 8 आर्डर की 65 मछलियों को दर्ज किया गया। सबसे अधिक साइप्रिनिडी वर्ग (19 प्रजाति), बैग्रीडी (6 प्रजाति) और कैनिडी (4 प्रजाति) की मछलियां पाई गईं। फिनफिश प्रजातियों में साइप्रिनिफोर्म की 22 प्रजातियां, सिलुरीफोर्म की 13 प्रजातियां और पर्सीफोर्म की 12 प्रजातियां पाई गईं। जून-जुलाई 2015 में हिल्सा मछली का छिट-पुट लैंडिंग देखा गया जो हिल्सा का नदी जिनजिरम से अभिगमन को दिखाता है।

पी दास, बी के भट्टाचार्य, ए के यादव, डी देबनाथ, सोना रेंगोकपम, के के सरमा, पी गोगोई एवं ए ककाती

असम के बाढ़कृत आर्द्रक्षेत्रों के जलवायु परिवर्तन का मत्स्य उत्पादन पर प्रभाव

वर्ष 2004 से 2013 के बीच के समय का असम के 173 बाढ़कृत आर्द्रक्षेत्रों की मत्स्य उत्पादन पर वर्षा के प्रभाव का आंकलन किया गया। इन बीलों की जिलेवार मत्स्य उपज (कि.ग्रा.) को तीन वर्गों में बांट दिया गया – समस्त बीलों की उपज दर के अनुसार, असंचयित 87 बीलों के उपज दर के अनुसार तथा संचयित 87 बीलों की उपज दर के अनुसार। इन सभी आंकड़ों का विश्लेषण लिनियर रीग्रेशन पद्धति के आधार पर किया गया। आंकड़ों के विश्लेषण से यह देखा गया है कि बारपेटा, घुबरी, करीमगंज, नलबारी, सोनितपुर, मोरीगांव और सिवसागर जिलों के मत्स्य उत्पादन में वर्षा के कारण वृद्धि हुई है। इसी प्रकार, असंचयित बीलों के मत्स्य उपज दर पर भी वर्षा का अच्छा प्रभाव पड़ा है।

बाकी के जिलों में मत्स्य उपज में उतार-चढ़ाव देखा गया पर इसका कारण बारिश के अलावा मिट्टी एवं जल की गुणवत्ता, जैव समुदाय, प्रबंधन क्षेत्र आदि था।

डी देबनाथ, ए के यादव, बी के भट्टाचार्य एवं बी जे सौद

लेबियो रोहिता की भौतिक-जैवरसायनिक प्रकृति पर जल का प्रभाव

मछलियों के उत्तम विकास, प्रजनन एवं अतिजीविता के लिये जल की प्रचुरता और गुणवत्ता दोनों ही अच्छी होना चाहिये। पर आने वाले दिनों में वर्षापात में कमी एवं तापमान में कमी के कारण मछलियों विशेषकर आर्द्रक्षेत्रों एवं नदियों की मछलियों के संपोषण पर प्रतिकूल प्रभाव पड़ सकता है। जल की गुणवत्ता के परीक्षण के लिये लेबियो रोहिता को विभिन्न जल परिमाण में रखा गया जिससे उनके ऑक्सीजन ग्रहण करने एवं उनपर जैवरसायनिक प्रभाव का आंकलन किया जा सके। अध्ययन में यह देखा गया कि जल में घुलित ऑक्सीजन की मात्रा जल के परिमाण पर निर्भर करती है। लेबियो रोहिता की बड़ी मछलियों के ऑक्सीजन ग्रहण की मात्रा (मि.ग्रा ऑक्सीजन/ग्रा. शारीरिक भार) एवं मांसपेशियों का मेटाबोलिज्म (ग्रा. शारीरिक भार/ली. जल) जल परिमाण के विपरीत होता है। अतः मछलियों के लिये अपेक्षित जल परिमाण को जानने के लिये अनुसंधान की आवश्यकता है जिससे भावी समस्याओं का निराकरण भलीभांति की जा सके।

मो० अपताबुद्दीन, प्रसून रॉयचौधुरी एवं उत्तम कुमार सरकार

तमिलनाडू के जलाशयों में तिलापिया मात्स्यिकी

विदेशी प्रजाति, तिलापिया (ओरियोक्रोमिस मोसाम्बिकस) को लोग अधिक पसंद करते हैं पर तमिलनाडू के मीठाजल जलाशयों में इसके लैंडिंग में उतार-चढ़ाव देखा गया। पालन के आरंभिक वर्षों में लैंडिंग अच्छी रही। गुंडेरीपल्लम, अमरावती तथा पलार-पोरानथलार जलाशयों से 1 कि.ग्रा. से अधिक की मछली भी पकड़ी गई है। पर कालांतर में गहन पालन एवं मत्स्य बीजों का घनत्व अधिक होने के कारण मछलियों की विकास दर में कमी आ गई। अमरावती जलाशय में अन्य

संचयित प्रजातियों का उत्पादन बढ़ने से तिलापिया के उत्पादन में कमी आ गई। इसी प्रकार कृष्णागिरी, उपार तथा पलार-पोरानथलार जलाशयों में संचयन घनत्व कम होने से तिलापिया के उत्पादन में बढ़ोतरी देखी गयी है। हाल ही में यह देखा गया है कि मेटूर जलाशय में अफ्रीकी कैटफिश प्रजातियों के प्रवेश के कारण तिलापिया के उत्पादन में कमी आई है क्योंकि ये कैटफिश प्रजातियां तिलापिया के अण्डों को खा जाती हैं तथा उनके घोंसलों को नष्ट कर देती हैं।

रानी पालानिस्वामी एवं एस मनोहरन

ओडिशा के छोटे जलाशयों में मत्स्य संवर्धन

वर्ष 2012-14 के दौरान अनुसूचित जाति/जनजाति विकास कार्यक्रम के अंतर्गत ओडिशा के मात्स्यिकी विभाग ने 58 छोटे जलाशयों में भारतीय मेजर कार्य प्रजातियों की अंगुलिकाओं का संग्रहण किया था। इस अंगुलिका संग्रहण का उद्देश्य संचयित जलाशयों के प्रति इकाई क्षेत्र के मत्स्य उत्पादन में हुये परिवर्तनों का आंकलन करना था। इस कार्यक्रम के अंतर्गत वर्ष 2012-13 में छोटे जलाशयों का औसत उत्पादन 204 कि.ग्रा./हे./प्रति वर्ष से बढ़कर वर्ष 2013-14 में 323 हो गया (लगभग 158 प्रतिशत)। उत्पादन दर सबसे अधिक मयुरभंज जिले के कुकुडाजोड़ी, पौन्सिया, कोलो और सुनेई जलाशयों में था जबकि गंजम और कालाहांडी जिलों का मत्स्य उत्पादन यथावत रहा। प्रति इकाई मत्स्य उपज 398 कि.ग्रा./हे./प्रति वर्ष (वर्ष 2012-13) से बढ़कर 702 कि.ग्रा./हे./प्रति वर्ष (वर्ष 2013-14) हो गयी (लगभग 176 प्रतिशत की वृद्धि)। रायगड़ जिले को छोड़कर लगभग सभी जिलों के मत्स्य उत्पादन में वृद्धि हुई है।

डी पंडा, यु के सरकार, विकाश कुमार एवं पी के परीदा

हिमाचल प्रदेश में जलाशय मात्स्यिकी

हिमाचल प्रदेश में छः जलाशय (कुल क्षेत्र – 43616 हे०) हैं और यहां जलाशय मात्स्यिकी की अनेक संभावनायें हैं। इनमें से सतलज नदी पर बना गोविन्दसागर जलाशय सबसे बड़ा है। इसके मत्स्य उत्पादन में विदेशी प्रजातियां जैसे सिल्वर कार्प एवं कॉमन कार्प अधिक देखा गया है (औसत उत्पादन – 149 कि.ग्रा./हे./प्रति वर्ष)। वर्ष 2014 की फिश लैंडिंग में हाइपोथलमिक्थिस मोलिट्रिक्स 63 प्रतिशत, साइप्रिनस कार्पियो 19 प्रतिशत और कतला कतला 10 प्रतिशत प्राप्त हुआ। महाराणा प्रताप सागर पर बना पोंग जलाशय की वर्ष 2014 के लैंडिंग में कैटफिश प्रजातियों की बहुलता है, औसत उत्पादन 23 कि.ग्रा./हे./प्रति वर्ष। कैटफिश में स्पेराटा सिंघाला 53 प्रतिशत, लेबियो रोहिता 16 प्रतिशत और सिरहिनस मृगला 13 प्रतिशत हुआ। पर रिपोर्ट के अनुसार, गोविन्दसागर और पोंग जलाशयों में भारतीय मेजर एवं गोल्डेन महासीर प्रजातियों की संख्या पिछले चार दशकों से घटती जा रही है।

चंबा जिले की रावी नदी पर बना चमेरा-I एक मध्यम आकार का जलाशय है। चमेरा-II और चमेरा-III छोटे जलाशय हैं। इन जलाशयों में मुख्यतः स्नोट्राउट, सिल्वर कार्प, कॉमन कार्प और महासीर प्रजातियों की बहुलता है। वर्ष 2014 में चमेरा-I जलाशय का मत्स्य उत्पादन 2.8 से 4.03 टन तथा औसत वार्षिक उत्पादन 3 से 4 कि.ग्रा. प्रति हे० के बीच रहा। इन जलाशयों में मत्स्य उत्पादन वृद्धि शीतक्षेत्र प्रजाति जैसे, ब्राउन ट्राउट के पालन द्वारा संभव हो सकेगा।

डी पंडा, ए के दास एवं यु के सरकार

पश्चिम बंगाल में पीनियस वनामी प्रजाति में ईएचपी संक्रमण पर पहली रिपोर्ट

एन्टेरोसाइटोजोन हेपाटोपिनी (ईएचपी) एक परजीवी है जिसके संक्रमण के कारण पीनियस वनामी प्रजाति की मछलियों का विकास अवरुद्ध हो जाता है। नेटवर्किंग फिश डिजीस सर्वेलेन्स परियोजना के अंतर्गत संक्रमित शिंगटी मछलियों के नमूनों को कोन्टाई, पूर्वी मिदनापुर के मत्स्य फार्मों से इकट्ठा किया गया। इस रोगजनक परजीवी की पहचान के लिये मछलियों के हेपाटोपैपक्रियोटिक उत्तकों से इनके डीएनए को लिया गया। इसके बाद इस परजीवी के 18S rRNA जीन को ध्यान में रखते हुये प्राइमर्स की सहायता से इसका पीसीआर एम्प्लिफिकेशन किया गया। इस पीसीआर तकनीक ने संक्रमण संबंधित परिणाम दिया। इसकी शत-प्रतिशत पुष्टि के लिये नेस्टेड पीसीआर तकनीक की सहायता ली गई। पहले एवं दूसरे, दोनों ही चरणों में संक्रमण की पुष्टि हुई। विश्लेषण से यह देखा गया कि पश्चिम बंगाल में शिंगटी मछलियों के अवरुद्ध अथवा धीमे विकास का कारण ईएचपी संक्रमण है और यहाँयह संक्रमण प्रथम बार देखा गया है।

बी के बेहरा, ए के साहू, एस के मन्ना, एस भौमिक एवं ए के जाना