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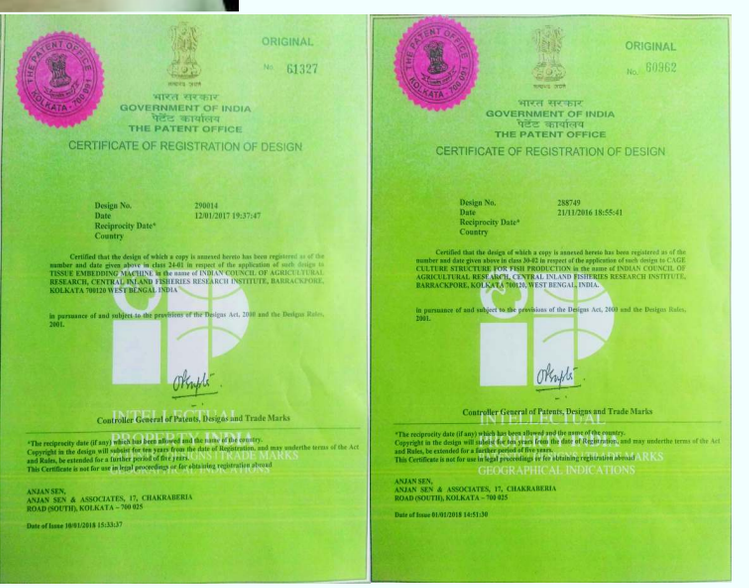
CIFRI NEWS सिफरी समाचार

Shri Radhamohan Singh, Hon'ble Union Minister of Agriculture and Farmer's Welfare, Govt. of India distributing certificates among the fishers in the valedictory ceremony of three days off-campus training programme on "Wetland fisheries development through participatory technological interventions" during 06-08 October 2017 at KVK, Piprakothi, Motihari, East Champaran, Bihar

Celebrating 72nd Foundation Day of the Institute



The institute acquired certificates on registration of design by the Indian Patent Office, Kolkata for 'Cage culture structure for fish production' (Registration Design No. 288749) and 'Tissue embedding machine" (Registration Design No. 290014). In view of the grant of registration, the copyright of the design will stay for ten years from the date of registration.

Inside

ICAR-CENTRAL INLAND FISHERIES RESEARCH INSTITUTE
(An ISO 9001 : 2008 Certified Organisation)
Barrackpore, Kolkata - 700 120
Phone : 91-033-25921190/2592 1191
Fax : 91-033-25920388; E-mail : director.cifri@icar.gov.in; www.cifri.res.in

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About ICAR-CIFRI

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

Director's Column

The year-long celebration of the Platinum Jubilee of the institute was concluded on 17th March by celebrating the 72nd Foundation Day. We have organized several programmes to commemorate the occasion in a befitting manner. International workshop in bioinformatics, lecture by eminent personalities, workshop in Hindi, brain storming on fisheries of Ganga River and cage culture are some of the notable examples.

It is a matter of pride that the institute obtained two registration certificates from the Indian Patent Office, Kolkata for 'Cage culture structure for fish production' (Registration Design No. 288749) and 'Tissue embedding machine" (Registration Design No. 290014). I congratulate the associated staff and hope that more such achievements will be coming to us. A couple of MoUs have been signed for conducting collaborative research and development works. Interesting studies have been conducted during this period on fishing gears, fish biology, dead rives, model based study in estuary, canal fisheries at Sundarbans, cage culture, arsenic in food chain, anti-microbial compound residues etc. Externally funded project has been sanctioned. Other 4 externally funded projects have started functioning in 4 wetlands of Bihar. A couple of ranching programmes have been organized towards restoration of depleting IMC stock in the Ganga River.

We successfully organized FAO-CIFRI workshop on fish passage design. The interface meeting involving Kolkata-based ICAR institute/centres was also a huge success in which potential areas of collaboration were discussed. The review meeting of vigilance officers, administrative officers, finance and account officers of 19 ICAR Institutes of Eastern and North Eastern region was also held at the institute. Several of our staff were awarded and recognized in different fora, I congratulate all of them. I welcome three newly joined scientists and wish them all the best. I also congratulate the staff who got promotion and cleared their probations. Any suggestions from the learned readers to improve the quality of the Newsletter is welcome.

B. K. Das
Director

June, 2018

Publication Team

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FAO/ICAR-CIFRI workshop

The Institute in collaboration with FAO organized a workshop on "Fish passage design at cross-river obstacles – experience from different countries, with potential relevance to India", at the institute HQs, Barrackpore during 29 November-01December 2017. The workshop brought together a multidisciplinary panel of experts working at different international organizations such as the Food and Agriculture Organization of the United Nations (FAO, Rome), Hydraulic Engineering and Environment (Germany) and the University of Natural Resources and Life Sciences (Austria). Officials from PSUs including NHPC, SJVNL, ARUP, officials from State Water Resource Department, Gujarat, Central Water Commision, Ministry of Water Resources (MoWR) and Ministry of Environment, Forest and Climate Change (MoEFCC) also attended the workshop. Diverse aspects related to fish passes, viz., the current scenario of fish pass facilities around the globe, status of fish pass in India, behaviour of migratory fish species, fish pass design and efficacy of fish pass were discussed.

Dr. B. K. Das, Director ICAR-CIFRI emphasized that fish passes are of immense importance for the restoration of free passage for fish and other aquatic species in rivers as such devices are often the only way to make it possible for aquatic fauna to pass obstacles that block their up-river journey. Dr. Gerd Marmulla, Fishery Resource Officer, Food and Agricultural Organisation remarked that long distance migration is lifeline of many fish species for their physiological requirement like spawning, breeding, seasonal habitat change and related activities. Dr. B. P. Das, Former Engineer-in- Chief of Government of Odisha, FAO expert Consultant gave history of the fish passes and cited various examples of fish passes in different parts of world.

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Research highlights

First record of bull shark (*Carcharhinus leucas*) from the Mahanadi estuarine system

The bull shark, *Carcharhinus leucas* (Valenciennes, 1839) belonging to the order Carcharhiniformes, was recorded from the Devi estuary (a distributary of River Mahanadi) near Nuagarh area (20^0 01$^{'}$ 07.79" N; 86^{0}19' 54.28" E). It has been revealed from the previous literature that, among the elasmobranchs, only two species of rays (*Dasyatis zugei* and *Himantura walga*) were reported from the Mahanadi estuarine system. The bull sharks are known for their ability to tolerate lowered salinity levels which makes them capable of ascending the estuaries and even freshwater reaches of rivers. These elusive sharks have been frequently recorded from the Chilika lagoon and are known to reside in deeper pools within the lagoon for more than 6 months. Our report is the first record of bull shark (*C. leucas*) from the Mahanadi estuarine system.

C. M. Roshith, A. K. Sahoo, S. K. Koushlesh and Vikas Kumar

Ragi (*Eleusine coracana*) balls as effective baits for angling mahseer in river Cauvery

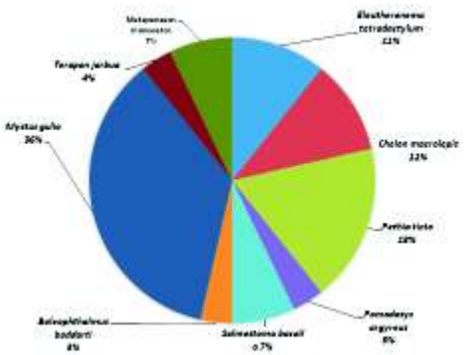
River Cauvery is a natural habitat of the "Mighty Mahseers", the *Tor Khudree* (Deccan Mahseer) and *T. musullah* (Humpback Mahseer). It is one of the hardest fighting game fish and attracts anglers from different parts of the world. During field survey a traditional method of preparing effective angling baits for mahseers was observed at Valnoor in Kodagu district of Karnataka. Ragi or finger millet (*Eleusine coracana*), the staple millet of Karnataka, is used for preparing baits for angling mahseers. Along River Cauvery, it is being used for angling mahseers in the upper stretches. The bait is prepared by mixing one kilogram of ragi (millet) flour with a pinch of cumin (optional) and water. It is made into small balls of about 3 cm in diameter. It is boiled in water for 20 minutes to make it rubbery in consistency. It is then kneaded properly and made into larger balls of about 6 cm diameter, which are wrapped around the angling hooks. About17 to 20 such bait balls can be made from one kg of ragi flour.

Boiled and kneaded ragi ready for use

Sibina Mol S., R. K. Manna, Shravan Kumar Sharma, C. M. Roshith, M. E. Vijaykumar, V. R. Suresh and B. K. Das

Bisalakhi canal, Sagar Island – A potential resource for fisheries development

Bisalakhi canal in Krishnanagar Village of Sagar Island, S. 24 Parganas, West Bengal. is an irrigation canal contributing water to paddy and horticulture crops in the region. Around 100 families depend on agriculture and 200 on fisheries (Hoogly estuary and in Bay of Bengal), while of these around 100 families depended on subsistence fishery on the canal. Rain water is the main source of fresh water in the canal. Water quality study shows wide variation in salinity of the canal. The pH of surface water was recorded 7.5 ± 0.1. D.O. (6.10 ± 0.2 mg/l) was favourable for good production in the canal. Total alkalinity was observed in a productive range 130 ± 21 mg/l during the study period. Nutrients like nitrate did not vary in high range. A total of 62 species of phytoplankton belong to 54 genera were recorded during the study period. The quantitative abundance of phytoplankton found to be ranged from 2.98 x 10^3 to 8.61 x 10^3 cells L^{-1} while that of zooplankton found to be ranged from 221 to 829 ind.L^{-1}. In



Fish species compositions during monsoon season

monsoon a total of 28 specimens collected under 6 orders, 8 families and 9 species. A total of 18 (SIFs 12 nos. and Non SIFs 6 nos.) fin-fish species under 10 families were recorded during post monsoon sampling. Two species (one penaeid and one non-penaeid) of prawns were recorded contributing 8.6 % of the total catch. Seasonal diversity observed highest during post-monsoon (15 species) season. Analysis of catch structure revealed the dominance of family Cyprinidae (88%) followed by Polynemidae, Ambassidae and Channidae, Anabantidae, Mugilidae and Bagridae during monsoon. But, SIFs were found to be the major component of fish catch of Bishalakhi canal (76% of total catch) during post monsoon period. So, adopting culture based practices through viable technical intervention on this resource enables to support a leading share in total fish production and livelihood support of rural people.

Fish catch from Bishalakhi canal during post monsoon period

Archana Sinha, Pranab Gogoi, Tasso Tayang, Mitesh H. Ramteke, Aparna Roy and S.K. Das

Mahajal fishing along the lower stretches of river Tapti

Extensive fishing using Mahajal was observed along the lower stretches of river Tapti, although the use of Mahajal is banned due to overexploitation of juvenile fishes. Mahajal is a type of dragnet operated from the shore and the gear is set in water using a small boat. The gear is having very small mesh size net, attached with a head rope made of HDPE and foot rope made of coir. The sizable portion of the landing includes the juvenile fishes like minor carps, cat fishes, hilsa (in ukai), prawn and other targeted fishes include *Chanda nama, Amblypharyngodon mola* etc. The regulation in the use of Mahajal is challenging as it is a subsistence fishing method, which contributed to the livelihood of a large number poor fishermen in the area. Proper awareness, generation of alternative livelihood etc. is necessary to create a control over this indiscriminate fishing operation which negatively impact the ecosystem.

The Mahajal- in operation

Vaisakh G., S. P. Kamble, W. M. Anand and J. K. Solanki

Deterioration of water quality of Siang River

The river Yarlung Psangpo, which flows down Tibetan plateau is known as Siang after entering into Arunachal Pradesh in India. Siang meets river Brahmaputra in Assam. During October 2017, report suggested that its water turned black. Subsiquently a scientific team visited the upper (Puging and Yingkiong), middle (Boleng and Komsing) and lower (Pasighat and Oiramghat) stretches of the river in December, 2017. The team found that the water transparency was < 4.0 cm across stretches and turbidity ranged from 258 – 405 NTU against the permissible range of < 10 NTU as per ISI and CPCB. The current study showed considerable higher turbidity (as stated) indicting an unnatural high particle load in the water compare to the observation made during 2014 (92.1 - 99.8). Water pH was observed to range from 6.82 to 7.60; TDS was in the range of 150 - 268 mgl^{-1} and specific conductivity ranged from 254 - 415 µS/cm. The surface water DO was found to be within permissible limit (8.7 – 10.21 mgl^{-1}) owing to high flow velocity. A thick layer of sediment has accumulated over

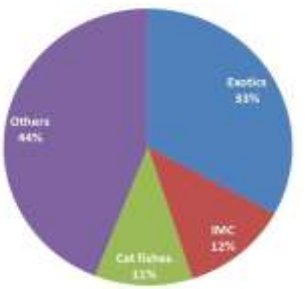
Confluence of Siang river and its tributary Siyom at Komsing. The muddy water of Siang is visible.

stretches of river bed, which was noticed in all sampling stations. The unnatural muddy and sticky suspended particles contributed to high turbidity of river water which can create an alarming situation. High turbidity of river water impaired the photosynthetic activity and hinders the growth of primary producers. Very low abundance (55 - 936 cellsl^{-1}) of phytoplankton was recorded. Although, a number of reports have come out with views of natural causes and anthropogenic activities behind this phenomenon, conclusive evidence to concrete facts to support those are still lacking. It is imperative to know the root cause of this problem to sustain the aquatic diversity and river dependent livelihoods in Arunachal Pradesh and Assam.

Pranab Gogoi, Simanku Borah, Amulya Kakati, B. K. Bhattacharjya, S. K. Das, N. Samarendra Singh and V. R. Suresh

Fish landing at Allahabad stretch of the Ganga

Fish landing from Allahabad stretch of the Ganga River was estimated at 174.125 t during 2017. There is an increase of 2.10% in catch with respect to previous year. IMC and cat fishes contribute 12 and 11%, respectively, where as the exotic fishes took a share of 33%.



Share of species in total landing

R.S. Shrivastava, D.N. Jha, A. Alam, Rahul Das, J. Kumar, S. C. S. Das and V. R. Thakur

Techno-economic feasibility of fisheries development in dead rivers of Odisha

A rapid investigation was carried out in five dead rivers of Odisha (as indicated by Department of Fisheries, Odisha), for the techno-economic feasibility study of fisheries/aquaculture development. The five rivers were – Chhinda and Paika in Cuttack district, Alaka, Balia and Kathajodi (Hansua) in Jagatsinghpur district. Most of the rivers have lost their longitudinal connectivity, therefore resulting in alterations in river channel and hydro-ecological regime, together adversely affecting the indigenous fish populations and riverine fisheries dependent on these resources. Of the five rivers, two rivers are already being intensively used for aquaculture with the help of SHGs and individual entrepreneurs. Though a few of the farmers are following scientific methods of aquaculture, there is need to introduce new methodologies and new species under aquaculture practices. While, for other three river systems the team suggested for Culture Based Fisheries, as water remains more than six months in the year. Development of fisheries and aquaculture ventures in the dead rivers has potential to generate the systems economically productive and to curb the encroachment issues.


CIFRI team with state fisheries officials in the riverbed of Paika

B. K. Das, S. K. Das, A. K. Sahoo, Sajina A. M., Roshith C. M. and Vikas Kumar

Investigated algal bloom in Chaliyar river, Kerala

In the recent time due to the algal bloom in Chaliyar river, Malappuram district, Kerala the water pumping from this river was suspended temporarily. The Water Authority of Kerala had consulted ICAR-CIFRI for a detailed study. Preliminary analysis confirmed the dominance of blue-green algae, *Anabaena* sp.

T. T. Paul, Usha Unnithan, Deepa Sudheesan and S. Manoharan

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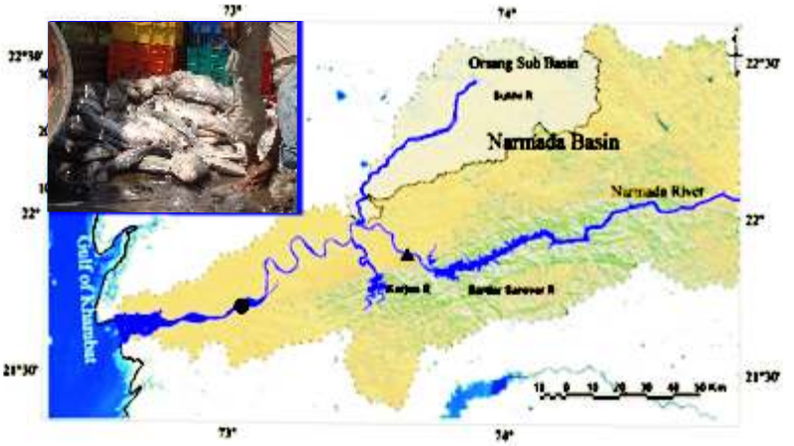
Impact of river flood level on commercial fisheries: Model based case study in Narmada river estuary system

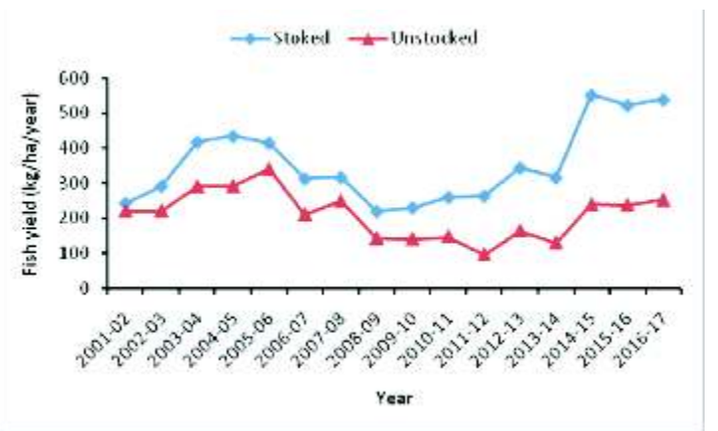


Map of the Narmada River-estuary systems (Black triangle represents the Hydrological site for measuring water level and sediment load; black circle represents the hydrological sites at Bharuch for measuring water level ; inset : Hilsa catch at the Narmada River-estuary)

Interaction of migratory fishes with other species in multispecies commercial fisheries under the influence of river hydrology of river estuary system is investigated. Commercial fisheries of the downstream, which constitutes river-estuary system, are dominated by Prawn (*Macrobrachium rosenbergii*), Mullets (*Rhinomugil corsula, Mugil cephalus, Planiliza macrolepis* and *Planiliza parsia*), Bombay duck (*Harpadon nehereus*), Boal (*Wallago attu*) and Hilsa (*Tenualosa ilisha*). Dynamic Factor Analysis (DFA) modelling approach was carried out for time series model development and Akaike Information criterion (AIC) for model selection. The averages (± standard deviation) of catches of Hilsa, Prawn, Mullets, Bombay duck and Boal were observed as 6169.3 ± 4168.35 (mt), 862.2 ± 521.84(mt), 1012.3 ± 541.09(mt), 382.31 ± 356.14 (mt) and 558.78 ± 398.0 (mt), respectively. The average AFLB was found 7.85 (± 2.10) meter. Results showed that AFLB has had the significant positive influence (0.035, $p < 0.05$) on the Hilsa catch and the significant negative effect on prawn (-0.44, $p < 0.05$), Bombay duck (-0.24, $p < 0.05$) and Boal (-0.22, $p < 0.05$) catches respectively. The Mullets catch insignificantly influenced by AFLB (0.04, $p > 0.05$). Hence, annual flood level at Bharuch plays an important role on commercial fisheries in Narmada river-estuary system.

R. K. Raman, Malay Naskar, Ganesh Chandra, S. K. Sahu and B. K. Das

Decadal changes in fish yield rates in floodplain wetlands (beels) of Assam



Weighted average fish yield of stocked and unstocked beels

Data on fish production in 183 floodplain wetlands (beels) under the administrative control of Assam Fisheries Development Corporation (AFDC) Ltd., Guwahati were collected and analysed over the past 16 years (2001-02 to 206-17). Among the beels 96 were unstocked and 87 were stocked. Earlier the ICAR-CIFRI estimated the average fish yield rate from selected beels of Assam (23 no.) at 172.9 kg $ha^{-1}yr^{-1}$ during 1996-98; supplementary stocking was not practised in any of these beels during that period. The weighted average fish yield rates from unstocked beels increased to 254.3 kg $ha^{-1}yr^{-1}$ in 2016-17. A significant positive correlation ($r = 0.73$, $p < 0.05$) was observed between annual average fish yield rates and rainfall. During high flood years (e.g., 2004-06), aquaculture ponds were submerged, thereby washing down pond reared fishes to the nearby beels. This resulted in passive supplementary stocking in most unstocked beels and caused an increase in their fish yield. The compound growth rate of fish yield in unstocked beels was 0.9% during the period from 2001-02 to 2016-17.

On the other hand, the weighted average fish yield rate of stocked beels was 243.9 kg $ha^{-1}yr^{-1}$ in 2001-02, which was only 9.8% higher than that of unstocked beels. However, the weighted average fish yield rates increased to 539.1 kg $ha^{-1}yr^{-1}$ in 2016-17, which was more than double that from the unstocked beels in that year. The compound growth rate of fish yield in stocked beels was 4.7% during the period from 2001-02 to 2016-17. The enhancement of fish production due to supplementary stocking has not been uniform across the beels.

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

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Comparative study on catch and diversity of fishes in seasonally open and a closed beels of Assam

Fish yield rates, catch and diversity were studied in two beels- Samaguri (seasonally open) and Sibasthan Patukolong (closed) of Nagaon district, Assam. Study showed that the average fish yield rate was higher in Samaguri beel (698 kg $ha^{-1}yr^{-1}$) than that in Sibasthan beel (483 kg $ha^{-1}yr^{-1}$) in spite of similar supplementary stocking practices followed apparently because of better macrophyte management and habitat regimes. Stocked fishes contributed to 55% of the total catch in Samaguri beel, whereas it was 70 % in Sibasthan beel. Among the indigenous/ natural fishes, the Indian river shad (*Gudusia chapra*) alone contributed 35% of the total catch in Samaguri beel whereas small catfishes (*Mystus* spp.) contributed 10% of the total catch in Sibasthan beel. Higher fin-fish diversity (53 Nos.) was recorded in the seasonally open beel (Samaguri) than that in the closed one (Sibasthan) (42 Nos.) apparently because of riverine input in the former. *Nandus nandus, Mastacembelus armatus* and *Ompak pabda*, which were not recorded by CIFRI during 1996-2002, reappeared in Samaguri beel apparently because of their ingress from river Brahmaputra during a very high flood in August, 2017.

Pronob Das, B. K. Bhattacharjya, A. K. Yadav, N. Sharma, S. Borah, K. K. Sarma, A. Kakati, N. S. Singh and S. Yengkokpam

Arsenic contamination in Brahmaputra river basin: a case study in Morigaon district of Assam, India

Brahmaputra and Barak basins of north-eastern region of India are among the most Arsenic prone zones of India. In Assam, 29.12 lakh people are under the high risk of Arsenic poisoning. A study was carried out to examine the Arsenic contamination in Mayang block of Morigaon district of Assam. A total of twenty seven samples were collected from different water sources (i.e. river, wetlands, ponds, tubewells and ringwells). As per the permissible limit formulated by the World Health Organization (10 ppb), 46.7% of the groundwater samples (17 No.), were Arsenic contaminated. The highest Arsenic content (51 ppb) was found in the groundwater of Gagalmarikacharigaon, the area near to the bank of River Brahmaputra. In surface water (i.e. wetlands and river) the total Arsenic content was found to be within permissible limit of 10 ppb (WHO) and 50 ppb (BIS) respectively. The study indicates that Arsenic in groundwater makes possibilities to accumulate in the open water system causing harmful effects to

Water collection sources from Mayang block, Morigaon, Assam

Niti Sharma, B. P. Mohanty, B. K. Bhattacharjya, K. K. Sarma, A. Kakati and B. K. Das

Fisheries and production status of Patratu reservoir, Jharkhand

Assessment of fish diversity and production status of Patratu, a small reservoir (980ha) of Ramgarh district, Jharkhand (23^0 61'50.93'' N, $85^0$29'18.59'' E) has been carried out seasonally. The reservoir is mainly fed by the river Nalkari. The livelihood of about 200 fishermen, registered under three cooperative societies is dependent upon this reservoir. Fisheries enhancement is carried out in this reservoir by stocking Indian Major carps (15lakh). During the study, a total of 33 fish species was recorded and

the catch was mainly constituted by IMCs (56%) with *Labeo rohita* as dominant species. Maximum values of species richness and diversity were observed during monsoon season. Main fishing gear was gill net and the CPUE was maximum during monsoon 350 g / 100m^2/hr for gill nets. Average fish yield was about 104 kg/ha/yr and fish production potential (kg/ha/yr) estimated at 240 kg/ha/year based on net primary productivity (plankton based) which indicates scope to increase the production through appropriate stocking strategies and improved management practices.

K. M. Sandhya, U. K. Sarkar, P. Mishal, G. Karnatak, L. Lianthuamluaia, S. Kumari, P.Majhi and T.Tayung

Patratu reservoir

Jhupi: a traditional and eco-friendly fish aggregating device for catching prawn in reservoirs

Jhupi is an eco-friendly and highly efficient indigenous fish-aggregating device used by fisher community in Panchet reservoir, Jharkhand for catching prawn and small fish species that are available in the reservoir. It is made of locally available khajoor and Palash leaves using nylon twine, and sickle. Around 25-30 small pieces are required to make one *jhupi*. Small pieces of khajur leaves is tied with the help of nylon twine at one end to make a conical structure of 100-120cm diameter. It is prominently operated during winter and summer when the water level goes down. *Jhupi* is conditioned in the reservoir water for 3-4 days for growth of biofilm. Suitable operating depth for jhupi is 10-12 feet. At a time, 100-300 *jhupi* are place together at a distance of 15-20ft in row supported by bamboo pole. Harvesting is done after interval of 3-4 days of operation with the help of push net or scissors net. On an average around 250 grams of live prawn are caught from each jhupi along with small fishes and molluscs.

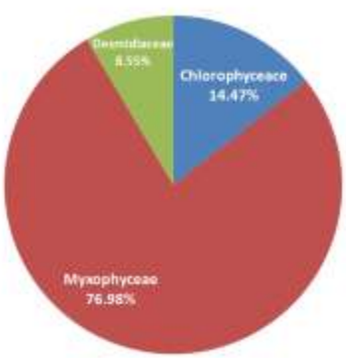
Jhupi made of Khajoor leaves

Gunjan Karnatak, U. K. Sarkar, Tasso Tayung, A.K. Bera, Sandhya KM, Suman Kumari and Lianthumluaia

Mangalam Reservoir – A promising resource for fishery enhancement in Kerala

A study was conducted in Mangalam reservoir in the Palakkad district of Kerala in 2017-18. The Carlson's trophic status index (TSI) based on hydro-ecological indicators such as phosphate, chlorophyll and Secchi disc depth was estimated at 52.72 for the reservoir. Based on the index (TSI), it was inferred that the reservoir system is eutrophic in condition which indicated a productive waterbody. The findings were confirmed by the predominance of Myxophyceae to the tune of 76.97 % in the planktonic composition round the year.

Further, the estimated production potential of the reservoir was estimated at 285kg/ha/yr against the average production from the system of 76.13kg/ha/yr. The estimated gap between production potential and average production is nearly 73% of the production potential of the reservoir. Similarly the maximum CPUE was also estimated at 11.875 kg / ha/year against the average annual CPUE of 0.105 kg/ha/year. The study clearly explains the need for appropriate management measures to enhance the production from the system on a sustainable basis.



Phytoplanktonic composition in Mangalam reservoir

Thankam Theresa Paul, Usha Unnithan and S. Manoharan

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Cage culture in Pong reservoir of Himachal Pradesh- A Success story

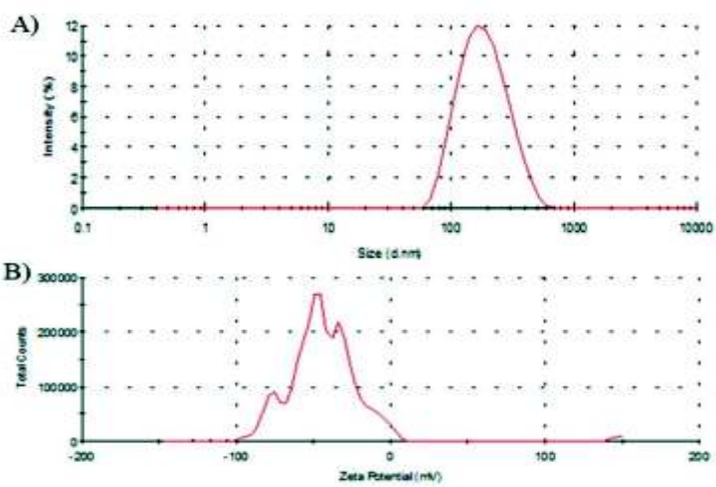
Cage culture in Pong Reservoir

Cage culture is considered as a potential tool for achieving 2nd blue revolution in the country due to higher production from lesser volume of water. ICAR-CIFRI has initiated the demonstration of cage culture technology in H.P. reservoirs during 2016 in collaboration with Department of Fisheries (DoF), Govt. of H.P with the aim of enhancing fish production and productivity in Pong reservoir which is a high altitude large reservoir with low productivity. Under cage culture demonstration program 45.81tonnes of *P. hypophthalmus* production was achieved from 24 HDPE cages (6m × 4m × 4m). The average Pangas production achieved per cage was 1.9 tonnes. Out of total 24 cages, > 2 tonnes/ cage of Pangas production was achieved in 12 cages. Hence, cage culture in Pong reservoir, showed considerable success of Pangas production, which clearly indicate that there is huge potential and scope of Pangas cage farming in reservoir. Moreover, with better cultural management practices like stocking in right time with right seed size (≥5g), thinning of stock on regular basis, fed with quality feed, proper disease monitoring, harvest in right time etc. can increase the production to higher level. Promoting Pangas cage farming in the reservoir can play important roles in increasing fish production, ensuring food and nutritional security, employment generation and livelihoods to thousands of fisher folk/ local people residing adjacent to the reservoir. However, some of the issues need to be considered such as proper marketing channels, processing facilities and value addition of product for making Pangas cage farming more viable and profitable in this fragile ecoregion.

Tasso Tayung, A. K Das, Mitesh H. Ramteke, B. K. Das and U. K. Sarkar

Pesticidal nanoproducts

Pesticide containing nanoproducts were developed in the institute through a sequential design of synthesis. The developed nanoproducts showed comparable physiochemical properties with commercial product. The size of nanoproducts was estimated using Dynamic Light Scattering Instrument and the size found to be ranged from 100-200 nm. The zeta potential of the developed nanoprodcuts was found to be ranged from - 42.4 to - 53 mV. Bioefficacy of the developed nanoproducts was tested against aquatic fish predatory back swimmer insect (*Notonecta* sp.) and it was found that developed nanoproduct had lower LC_{50} value (0.00355 mg/L) as compared to commercial product (0.02 mg/L).

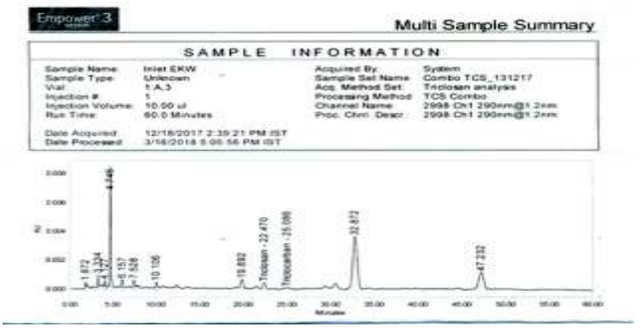


Size (A) & Zeta potential(B) distribution of developed nanoproduct

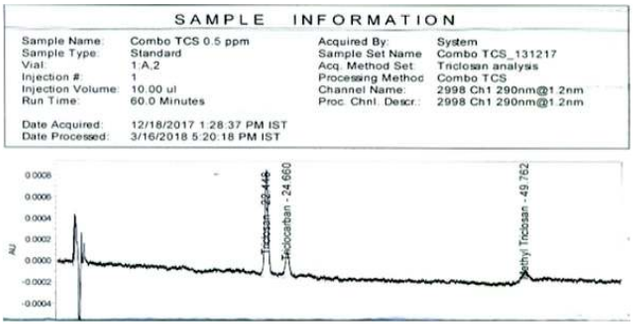
D. J. Sarkar, A. K. Bera, B. K. Behera and B. K. Das

Triclosan and Triclocarban: the anti-microbial compounds used in personal care products detected in sewage fed aquaculture system of East Kolkata Wetland

Triclosan [TCS, 5-chloro-2-(2,4-dichlorophenoxy)-phenol] and Triclocarban (TCC, 3,4,4'-trichlorocarbanilide) are antibacterial compounds commonly added in different personal care products like soaps, detergents, toiletries, disinfectants, toothpastes, cosmetics etc. at range of 0.1-1% (w/w). Although these compounds are quite safe at the level at which they are used in different products, but are highly toxic to aquatic organisms, particularly microalgae, crustaceans and fish. TCS is also reported to have



TCS & TCC in water sample



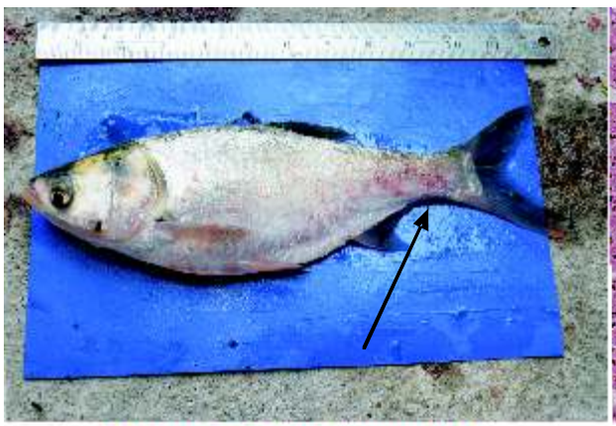
TCS & TCC in standards

endocrine disruptive properties. Both TCS and TCC have been detected in water and fish from Jhagrasisa wetland of East Kolkata. In water, the level of TCS was 0.02 - 0.241 µg/l indicating that it exceeded the predicted no effect concentration of TCS (0.05 µg/l). TCC concentration (0.109-0.95 µg/l) was comparatively higher than that of TCS. In muscle tissue of fishes such as *Gibelion catla*, *Cyprinus carpio*, *Hypophthalmichthys molitrix* and *Cirrhinus mrigala* TCS and TCC were recorded at levels 0.014-0.058 and 0.241 – 0.545 mg/kg respectively. Similarly in fish tissues too, the level of TCC was higher than that of TCS. However, methyl-TCS, one of the metabolite of TCS was not found in any sample. Keeping in view the acceptable daily intake (ADI) of TCS i.e. 50 µg/kg body wt the present level of TCS detected in fish would not pose any health hazard to the consumers.

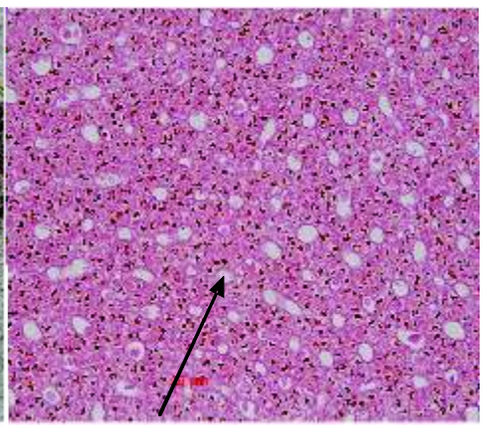
Subir K. Nag, Soma Das Sarkar, Kavita Kumari and Md. Aftabuddin

Investigation on Silver Carp mortality at Khalsi beel, Kolkata, West Bengal

Silver carp (*Hypophthalmichthys molitrix*) mortality in the Khalsi beel (22°59' 36.24"N 88°38' 34.87"E), a floofplain wetland in Nadia district, West Bengal was reported during April 2017. Planktonic organisms are the main source of food for the cultured fishes besides submerged macrophytes. The beel was stocked with Indian Major Carps and Minor Carps. The external signs of the affected fish included behavioural changes, loss of pigmentation in the body, loss of scales, haemorragic spots on the surface and ventral parts of the body.



Silver carp with body haemorrhages



Hepatocyte vacuolation in Silver carp liver infected with A.hydrophila

Bacterial sequencing (BLASTN) revealed the confirmation of Aeromonas hydrophila (Accession number: MG686235) from the liver of the infected fish. The analysis of water quality parameters showed moderately high level of conductivity (307 µS/cm), total dissolved solids (153 mg/l) and free CO_2 (6.1 mg/l during night) indicating the eutrophic status of the water body. In addition, among the planktonic group, the level of Cyanophyceae load (including Microcystis aeruginosa) was also high (7019-8923 uL^{-1}) during the monitoring period. The liver tissue showed hepatocyte vacuolation and mealomacrophage aggregation. Stress related factors mainly included the sudden change in temperature favouring the multiplication of pathogenic bacteria and thus affecting the sensitive species like Silver carp in the culture system.

Tanuja Abdulla, Vikas Kumar, R. K. Manna, A. K. Bera, Suman Kumari, B. K. Behera and B. K. Das

Nutritional composition of food fishes and their importance in providing food and nutritional security

Fish is a healthy food, rich in quality animal proteins, polyunsaturated fatty acids especially the (ω)-3 eicosapentaenoic acid and docosahexaenoic acid and micronutrients. However, nutritional information on fish is necessary for utilization of fish in achieving nutritional security and will be helpful in prioritizing species for aquaculture. Therefore, detailed nutritional composition of selected fishes from India was reported and a database was developed (http: // www. cifri. res.in/nutrifishin /index.php) with the food data generated. This review explore the implications of such nutritional information in consumer guidance, dietary counselling, food-policy planning and prioritization of species for aquaculture to fight hunger, malnutrition and micronutrient deficiency; ultimately contributing to food and nutritional security.

B. P. Mohanty, A. Mahanty, S. Ganguly, T. Mitra and D. Karunakaran

Nutrigenomic studies on hilsa to evaluate flesh quality attributes and genes associated with fatty acid metabolism from the rivers Hooghly and Padma

Tenualosa ilisha, rich in oils, enjoys high consumer preference in the South Asian countries owing to its unique flavour and culinary properties. This study reported different flesh quality attributes of hilsa in terms of nutritive value, pH, water holding capacity and expression of genes associated with fatty acid metabolism and flesh quality. Additionally, comparative studies on the flesh quality attributes in hilsa from rivers Hooghly and Padma were also reported. The protein content, essential amino acid and functional amino acids were significantly higher in Hooghly hilsa ($P < 0.05$). The predominance of umami taste and sweet taste amino acids in hilsa from both the rivers could be the contributing factors to its unique flavour.

The concentration of flavouring fatty acids like saturated fatty acids and omega (ω)-3 polyunsaturated fatty acids were significantly higher in Hooghly hilsa ($P < 0.05$). Among the genes associated with fatty acid metabolism studied, expression of some genes was significantly higher in Padma hilsa ($P < 0.05$), however, comparative gene expression profiling of flesh quality genes showed similar levels of expression in hilsa from both the rivers ($P < 0.05$). It was concluded that Hooghly hilsa (medium size category, 500-700 g size) is superior in terms of oil content, (ω)-3 PUFAs EPA and DHA and essential amino acids than Padma hilsa; however, the expression profile of genes associated with flesh quality were found to be similar.

S. Ganguly, A. Mahanty, T. Mitra, S. Mohanty, B. K. Das and B. P. Mohanty

Modelling per capita income of fishers

Fisheries of the Bhagirathi-Hooghly stretch of the Ganga river provide livelihood and daily sustenance to a sizeable population of fishers. The present study is an attempt to model the per capita income of the fishers along the stretch. Data were collected by personally interviewing the fishermen using open ended survey schedules during 2016 covering a total of 500 fishers from 32 sampling sites of 560 km stretch from Sagar to Farakka in West Bengal. Multi-stage stratified random sampling design was adopted to select the fishermen from all the three stretches. The socioeconomic variables viz. total family members (TFM), age of respondent (AR), Education level of the respondent (ER), Age square and Simpson Index of income diversification were used to develop a generalised linear model (GLM). The response variable is per capita income (PCI) and remaining were independent variables. Model estimate showed that all the independent variables have significant ($p < 0.05$) effect on per capita income. The SI (0.165), age (0.167) and education level (0.0245) have positive impact indicating that per capita income got influenced positively by income diversification, experience of the fishers and higher education. On the other hand TFM (-0.211) and age square has (-0.0008) has negative influence on PCI. After certain years, age exerts negative influence on the per capita income The R square of the model was observed to be 0.44 which shows the fitting of the model.

Arun Pandit, Rohan K. Raman, Anjana Ekka, S. Samanta, B. K. Das and L. Chakraborty

Externally funded project sanctioned

- Four externally funded projects on fisheries development in floodplain wetlands of East Champaran district of Bihar have been sanctioned by the Union Ministry. These projects are being executed by the institute with administrative support of line departments of Bihar involving direct participation of the local community. These projects will enhance the livelihood of fishers of the four wetlands, namely Kararia, Sirsa, Majharia and Rulhi and enhance their income and employment through empowerment of communities. The project also aims at refinement of site specific fisheries enhancement technology through stakeholders' participatory fisheries management model (co-management) in a sustainable manner.

- Another externally funded project entitled 'Up-scaling of climate-friendly pen aquaculture technology for improved livelihoods, employment generation and enhanced income of wetland fishers of North-eastern India' with a budget of Rs. 87.882 lakh has been sanctioned by the National Mission on Himalayan Studies, MoEF, Almora. The project will be executed by the institute in collaboration with Directorate of Fisheries, Govt. of Manipur, Meghalaya, and Arunachal Pradesh. Objectives of the project includes refining and upscaling of pen aquaculture technology and assessing impact of this technology on livelihood and family income of the target fishers including women.

Activities under NEH

Rearing of *Labeo bata* in CIFRI-GI Cages as a winter crop in Samaguri beel, Assam

A series of ICAR-CIFRI GI-cages (cage size 5 x 5 x 2m^3) were installed in Samuguribeel, Nagaon district of Assam. During the winter months, fish reared in enclosures were usually affected with diseases and had low survival in addition to low growth rates. In the present experiment *Labeo bata* was selected as it is hardy species and has high demand in local market. The cages were stocked with fingerlings at five stocking densities i.e., 25 (S1), 50 (S2), 75 (S3), 100 (S4) and 150 fingerlings / m^3 (S5) in triplicates on 25 Sept. 2017. The average length and weight of the stocked fish was 8.2 cm and 4.82 g, respectively. Fishes were fed with pelleted feed containing 30.04% CP @ 5% body weight. Plastic tray (2 no. in each cage) with sinker attached was used for feeding. Results from the present study indicated that the survival was high (ranging from 85.5-94.07%) during the rearing period. The growth performance parameters such as body weight, specific growth rate and weight gain percent was found to be significantly higher in the lowest stocking density group, followed by those stocked at 50 and 75 fingerlings / m^3 and lowest in the highest stocking density group.

GI cages installed in Samaguribeel; inset : *Labeo bata*

Technology demonstrated

Field demonstration of Electronic Data Acquisition System (e-DAS) in Jharkhand reservoirs

Collection of fish catch data from reservoirs is difficult since these water bodies are innumerable, geographically wide-spread, have inaccessible fish landing centres, requirement of high manpower and budget. To overcome these, ICAR-CIFRI has developed an Electronic Data Acquisition System (e-DAS) to capture fish catch data from reservoirs (through SMS from mobile phones) directly into a database in the computer system and successfully demonstrated in selected peninsular reservoirs. In the recent times a demonstration programme has been conducted at Patratu dam, Ramgarh, Jharkhand on 06 Dec 2017. The e-DAS application was installed in the mobile phones of key fishers identified from four major fishing villages and trained on recording and transmission of species wise fish catch on regular basis through e-DAS.

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Formalin detection kit demonstrated

Consumption of formalin adulterated food can cause stomach pain, vomiting etc. in the short run. It is also a potential inducing chemical for cancer int he long run. Hence formalin adulteration in fish is a serious issue and its detection is important. ICAR-CIFRI has developed a formalin detection kit "CIFLIN". Dr. B. K. Das and Dr. B. P. Mohanty, ICAR - CIFRI and Mr. J. B. Dash, Addl. Director, Directorate of Fisheries, Odisha inaugurated the hands on demonstration on detection of formalin adulteration in fish for the state fisheries officials of Odisha at Directorate of Fisheries, Cuttack on 29 January 2018. The formaldehyde detection kit was also demonstrated at National Conclave on Scientific Co-operations, FSSAI, New Delhi, on 05 Feb 2018.

Demonstration of Climate Resilient Pen Systems (CRPS)

A novel programme was launched under NICRA project on developing model wetlands for increasing the adaptive capacity and livelihood security of fishers and restoration of indigenous fishes. In this connection, Climate Resilient Pen Systems (CRPS) for fish raising was demonstrated in Mathura and Bhomra beels of West Bengal, 47-Morakolong beel of Assam and in Vembanad lake of Kerala. The regionally important fish and shellfish species being evaluated in CRPS are *Amblypharyngodon mola, Labeo bata, Puntius sarana, Nandus nandus, Ompok pabda, Gudusia chapra, Catla catla, Labeo rohita, Cirrhinus mrigala, Etroplus suratensis, Macrobrachium rosenbergii* and *Villoritacy prinoides.* CRPS shall open a new avenue for conservation based rearing and ranching of SIFs within the same wetland – may be viewed as an 'insurance' for both wetland fishers and SIFs facing adversities of climatic variability.

Memorandum of Understanding (MoU) signed

MoU with M/s Matsya Maai

A MoU was signed between the ICAR-CIFRI and M/s Matsya Maai, Nagpur for technical guidance on CIFRI evolved Cage Culture in Reservoir of Maharashtra. A two year MoU was signed on 20 Dec 2017 by The Director of ICAR-CIFRI and The Commissioner of Fisheries, Govt. of Telangana (Dr. C. Suvarna) in presence of Dr. M.V. Gupta, world food prize laureate. As per the MoU, the ICAR-CIFRI will provide the technical inputs, advisories including the deployment of CIFRI model cages and diversified high value species mix for cage culture. MoUs were also signed with Fishermen's Co-operative Societies for demonstration of Climate Resilient Pen Systems strategies in selected beels of West Bengal and Assam.

MoU with DoF, Telangana

Ranching programme for restoration of fish stock in River Ganga

The prized fishes of River Ganga like Rohu (*Labeo rohita*), Catla (*Catla catla*), Mrigel (*Cirrhinus mrigala*) and Kalbasu (*Labeo calbasu*), commonly known as Indian Major Carp (IMC), have declined sharply from 43.50 % few years back, to only 1.48% in recent times in the annual catch. In this

Ranching at Balagarh

context, a series of ranching programmes of Indian Major Carps was organized by the institute. On 03 November 2017 around 60,000 seeds of Indian Major Carp was ranched at Milan Dwip, Balagarh, Dist-Hooghly, West Bengal. Dr. B.K. Das, Director and Mr. Ashim Majhi, Member of Legislative Assembly (Balagarh Constituency), West Bengal were present on the occasion.

Awareness programme at Balagarh

Ranching at Varanasi

The Allahabad centre of the Institute arranged a ranching progrmmae under the NMCG on 11 November 2017 at Dasaswamedh Ghat, Varanasi, Uttar Pradesh. Five thousand advanced fingerlings of IMCs were released in River Ganga. Dr. R. S. Shrivastava, Head of the Allahabad Centre of the Institute and important guests from different organizations like, Banaras Hindu University, UP College, Kashi Vidya Peeth, Fisheries Dept., Uttar Pradesh and eminent retired scientists of CIFRI were also present on this occasion. Again, on the occasion of World Fishery day, a total of 20,000 Indian major carp seed has been released in river Ganga at Daspara Ghat, Barrackpore under NMCG project.

Ranching at Nabadwip ghat

On 21 Jan 2018 ranching of 50,000 seed of Indian Major Carps in river Ganga was done at Nabadwip, West Bengal. Fishes namely Rohu (*Labeo rohita*), Catla (*Catla catla*), Mrigel (*Cirrhinus mrigala*) and Kalbasu (*Labeo calbasu*) were ranched. Awareness-cum-interaction meeting was also conducted at the venue. FEO, Nabadwip block, Assistant Fishery Officer, local MLA, local Councilor and around 100 local fishermen and their family members were present on the occasion.

Ranching at Barrackpore

In addition to these, the Allahabad Centre organized another three ranching cum awareness programmes in the river Ganga in Allahabad under the CIFRI-NMCG programme, on 01 August, 2017 at a place close to Narayani Ashram; on 05 December, 2017 at Sringerpur and on 27 March 2018 at Fatepurghat.

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Trainings

Farmers Training

The institute conducted 14 on campus training programmes for fishers/fish farmers on Inland open water fisheries management & development at Barrackpore Hqs. The details are given below :

Sl. No.	Date	Participants
1.	02-08 Oct 2017	23 (22+1) from Lakhisarai, Bihar (DoF)
2.	03-09 Nov 2017	29 (28+1) from Sheikhpura, Bihar (DoF)
3.	13-15 Nov 2017	19 (18+1) from Gangarampur, Dinajpur
4.	15-19 Nov 2017	30 (27+3) from Balasore, Odisha
5.	15-21 Dec 2017	29 (28+1) from Buxar, Bihar (DoF)
6.	23-29 Dec 2017	30 (29+1) from Sitamarhi, Bihar (DoF)
7.	02-08 Jan 2018	27 (26+1) from Munger, Bihar (DoF)
8.	12-18 Jan 2018	25 (24+1) from Jamui, Bihar (DoF)
9.	06-12 Feb 2018	31 (30+1) from Khagaria, Bihar (DoF)
10.	16-22 Feb 2018	26 (25+1) from Begusarai, Bihar
11.	23 Feb to 01 March 2018	31 (30+1) from Bhagalpur, Bihar (DoF)
12.	06-12 March 2018	31 (30+1) from Lakhisarai , Bihar (DoF)
13.	23-29 March 2018	30 (29+1) from Sheohar, Bihar
14	31 March to 04 April 2018	21 (20+1) from ATMA, Kumargram Block, Alipurduar

- The Institute organized a three days off-campus training programme on “Wetland fisheries development through participatory technological interventions” during 06-08 October 2017 at KVK, Piprakothi, Motihari, East Champaran, Bihar. The objective of this training programme was to create awareness about the NFDB sponsored projects in Rulhi, Sirsa, Kararia and Majharia maun for fisheries development. Hon'ble Union Minister of Agriculture and Farmer's welfare Shri Radhamohan Singh was present in the valedictory ceremony.

- Allahabad Centre organized 2 training programmes on Integrated fisheries management and wetland conservation for 45 Tribal fishers/fish farmers each of Bundelkhand region, MP under TSP during 14-16 Dec 2017 and 21-23 Feb, 2018, respectively.

- Guwahati Centre organized a training programme on Scientific fishery management of floodplain wetlands (beels) on 18-19 Dec 2017 in which Twenty nine field staff and two beel managers of AFDC Ltd., Guwahati participated.

Officer’s Training

Sl. No.	Name of the training	Date	Participants	Venue
1.	Inland Fisheries Management	25-27 Oct 2017	6 Officials from DoF, Kerala	Barrackpore Hqs.

Off-campus training at Motihari

Training programme at Guwahati

Trainees from Lakhisarai, Bihar

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Exhibitions

Sl. No.	Date	Particulars	Place
1.	16 Oct 2017	'World Food Day' organised by Orissa Krushak Samaj	Bhubaneswar
2.	15-19 Nov 2017	'*Sabuje Sabala Melay Sunderban*' organised by Sunderban Dream	Gosaba, South 24 PGS, W. B.
3.	21-24 Nov 2017	'11th Indian Fisheries & Aquaculture Forum' (11th IFAF) organised by Asian Fisheries Society Indian Branch (AFSIB) & ICAR-CIFT, Cochin, Kerala	ICAR-CIFT, Cochin, Kerala
4.	07-10 Dec 2017	Aqua Goa Mega Fish Festival	SAG Ground, Directorate of Fisheries, Panjim, Goa
5.	14-17 Dec 2017	*Bajarpore Gramin Pradarshani-O-Mela* organised by Alukaranbarh Seba Sangha	Purba Medinipur.
6.	20-29 Dec 2017	*Sundarban Krishi Mela -O-Loko Sanskrti Utsav* organised by Kultali Milan Tirtha Society	Kultali, South 24 PGS, W. B.
7.	22-31 Dec 2017	*Sundarban Yuba Mela'* organised by Taldi Bahurupee Sangha	Taldi, South 24 PGS, W. B.
8.	24-31 Dec 2017	Naihati Utsav – 2017 organised by Naihati Utsav Welfare Samity	Naihati Railway Ground
9.	15-17 Jan 2018	2nd International Symposium on Societal Applications in fisheries & Aquaculture using Remote Sensing Imagery' organised by ICAR-CMFRI	ICAR-CMFRI, Kochi, Kerala
10.	07-14 Jan 2018	*Monomohan Mela O Lokosanskriti Utsav* organised by Srijani Sanstha	Chotojagulia, North 24 PGS, W. B.
11.	12-13 Jan 2018	'1st Farm Innovation Congress (FIC-2018) & National Conference on Innovative Farming for Food & Livelihood Security in Changing Climate' organised by Innovative Farming & Society for Advancement of Agricultural Innovations	BCKV, Mohanpur
12.	7-12 Feb 2018	'Babpur Utsav' organised by Suchana Welfare Trust	Babpur, North 24 PGS, W. B.
13.	12-14 Feb 2018	'4th International Conference on Environment and Ecology (ICEE)' organised by department of Zoology, Gauhati University	Gauhati University Ground, Assam
14.	12-14 Feb 2018	6th AGRO PROTECH 2018	Science City, Kolkata, W. B.
15.	19-20 Feb 2018	"Interface programme on Doubling farmers' income through arecanut based cropping system and Field day on cocoa"	ICAR-CPCRI Regional Centre, Kahikuchi, Assam
16.	24 March 2018	'Kishan Mela-cum-Technology Demonstration' organised by ICAR-IVRI, ERS Kolkata	ICAR-NDRI, ERS Kalyani Campus, Kalyani, W. B.




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Exposure / Educational Visits

Sl. No.	Particulars of visitors	Date of visit
1.	33 B.F.Sc. Students & One Teacher In-charge from TNFU, Tuticorin	18 Nov 2017
2.	33 B.F.Sc. Students from Mangalore Fisheries College, Karnataka.	27 Nov 2017
3.	38 B.F.Sc. (3rd yr) Students from Ratnagiri	04 Dec 2017
4.	25 Officials (Fishery Assistants) of Govt. Tripura	23 Dec 2017
5.	12 B.F. Sc. Students from Faculty of Fishery Sciences, WBUAFS, Kolkata	27 Dec 2017
6.	10 B.Sc. (Hons.)Students from Karimgunj, Assam	28 Dec 2017
7.	21 B. F. Sc. Students from CoF, Kamdhenu University, Chhattishgarh	01 Jan 2018
8.	12 B.F. Sc.(4th Yr) Students from CoF, GADVASU, Ludhi ana, Punjab	01 Jan 2018
9.	13 B.F.Sc. (4th yr) Students from Nagpur College	03 Feb 2018
10.	15 M.Sc. Zoology Students & 3 Teacher In-Charges from Uday Pratap Autonomus College, Varanasi	13 Feb 2018
11.	18 students (M.Sc. Zoology with special paper on fishery) and 2 Teachers from Raja Narendralal Khan Women's College, Midnapore, West Bengal visited ICAR-CIFRI Regional Centre, Guwahati	17 Feb 2018
12.	63 farmers from ATMA Katwa, Purba Medinipur	27 Feb 2018
13.	10 B.Sc. Students from Sonamukhi College, Bankura	09 Mar 2018
14.	6 Students & One Teacher In-Charge from Pandu College, Assam	16 Mar 2018
15	46 Students & 4 Teacher In-Charges from Panagad College, Kerala	24 Mar 2018

Students of GADVASU, Ludhiana, Punjab


Students of Pandu College at Guwahati RRC

Mass awareness camps

List of awareness camps organized are given below:

- 'Hilsa conservation and Restoration of Hilsa Juveniles' at Fresurgunj on 12 Oct 2017.
- 'Fisheries development in Sundarbans including canal fisheries' at '*Sabuje Sabala Melay Sundarban*' Amtoli, Gosaba, Sundarbans, South 24 Parganas on 16-17 Nov 2017. Another two campaigns were organized on 18 Feb 2018 and 19 Feb 2018 at Amtoli and Kalitala of Sundarbans, respectively.
- Pollution monitoring and Management in river Kathajodi-Devi in collaboration with Utsharga, an Odisha based NGO at Sikhar Ghat, Naugaon, Jagatsinghpur, Odisha, 19 November, 2017

- Two mass awareness programs in the month of December 2017 and February 2018 to educate the Tribes of Bundelkhand region depending upon Loni wetland for their livelihood and food security were undertaken to eradicate poverty.

- Fisheries development in Sundarbans at Kultali, Sundarbans, South 24 Parganas on 28 Dec 2017.

- 'Big Fish Production in West Bengal' during *Mati Utsav*, Burdwan on 04 Jan 2018. Also awareness campaign for the tribal fishers of Burdwan in regard to canal fisheries development adjacent to ATC, DoAg, West Bengal, Burdwan in Baluka Khal. Another camp was organized on 'Fisheries development in Burdwan district' in Krishi Mela, Purba Burdwan on 17 Jan 2018.

- 'Wise-use of recommended chemicals in fish drying process' in the coastal belt of Namkhana & Fresergunj of South 24 PGS, West Bengal on 18-19 Jan 2018.

- 'Conservation of Ganga fisheries' at Maghmela ground, Sangam, Allahabad on 20 Jan 2018. Another camp on same area was organized at Nabadwip, Nadia, West Bengal on 21 Jan 2018.

- 'Impact of climatic variability on fish and wetland ecosystem' at Nidaya Ghat, Kobla wetland (Purbasthali, Burdwan district, West Bengal on 21 January 2018.

- 'Fisheries development with special reference to floodplain wetlands and pen culture' at Mathura Beel, North 24 Parganas on 02 Feb 2018.

- 'Fisheries development including shrimp farming' at Bengal Aqua Expo, Nachinda, Contai, Purba Medinipur, West Bengal on 05 Feb 2018.Another two camps were organized at Haldia, Sutahata Block, Purba Medinipur, West Bengal on 05 Feb 2018 and 12 Feb 2018.

- Two campaigns were organized on 'Fisheries development' at Ariala and Ula, North 24 Parganas, W.B. on 06 Feb and 07 Feb 2018, respectively.

- 'Fisheries development of wetlands' on 08 February, 2018 at Kol tribe dominated area in Rewa district of M.P under TSP.

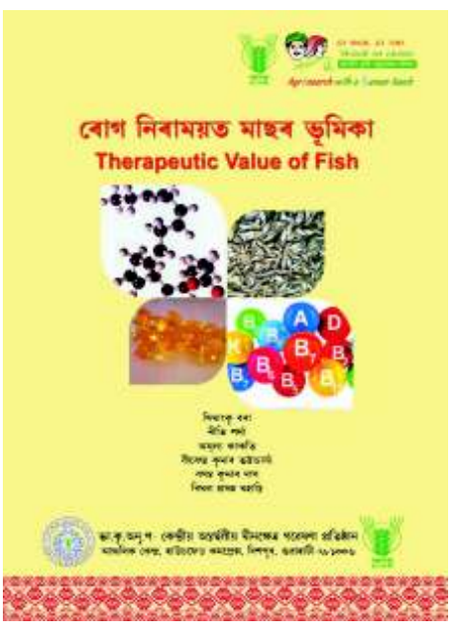
- Acute Hepatopancreatic Necrosis Disease" (AHPND)/ Early Mortality Syndrome (EMS) at Hasnabad, North 24 Parganas, West Bengal in collaboration with Department of Fisheries, Govt. of West Bengal and West Bengal University of Animal and Fisheries Sciences (WBUAFS) on 03 March 2018.

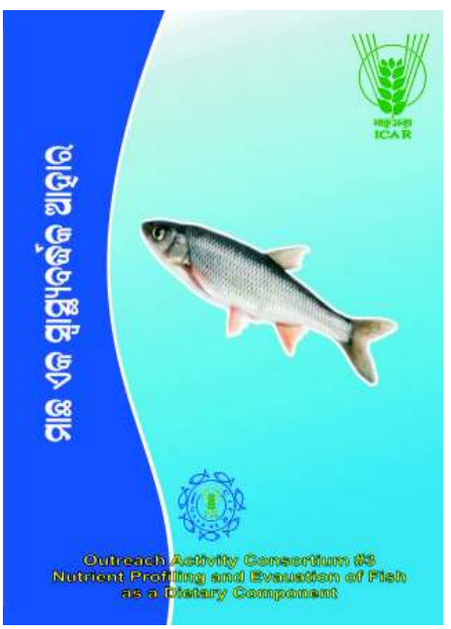
Book/bulletin published

Sarkar et al. 2018. Success stories: Synthesis from Project NICRA (ICAR-CIFRI) Outputs during Phase-1 (2012-17. ICAR-CIFRI, Barrackpore. Pp 20, ISSN: 0970-616X

A quantum of research pertaining to climate change in major river basins, impact of changing climate on gonadal maturation, breeding and spawn availability in inland open waters, assessment of thermal tolerance of species, carbon sequestration potential of wetlands and vulnerability assessment framework etc. was carried out in Phase 1 (2012-2017). The significant outputs and achievements of this activities have been compiled in this document. The booklet encompasses useful information on climate change and associated impacts on inland fisheries, its mitigation and adaptation strategies which may be useful for policy makers, farmers and researchers.

Bulletins on fish as health food





These two bulletins are the translated version of the earlier published 'Therapeutic value of fish' by the Institute.

Staff Corner

Appointment

Ms. Tanushree Bera, Scientist, Soil Sc.
Joined on 15 Oct 2017

Ms. J. Canciyal, Scientist, FRM,
Joined on 16 Oct 2017

Dr. Monika Gupta, Scientist, Aquaculture,
Joined on 16 Oct 2017

Promotions

Sl. No.	Name & Designation	Promoted to	With effect from
1	Shri Bablu Kumar Naskar, Sr. Technician	Technical Assistant	02 April 2013
2	Dr. Ajay Saha, Scientist	Promoted to RGP Rs. 7000/-	27 April 2015
3	Dr. Asit Kumar Bera, Sr. Scientist	Principal Scientist	01 Jan 2017
4	Mrs. Usha Unnithan, Technical Officer	Sr. Technical Officer	24 June 2017

MACP

Sl. No.	Name and designation	Benefits granted	With effect from
1.	Mr. N. Deka, SSS	3rd MACP with grade pay of Rs. 2400/-Level-4	09 Sept 2017
2.	Mr. M. L. Sarkar, SSS	3rd MACP with grade pay of Rs. 2400/-Level-4	20 Nov 2017
3.	Mr. B. K. Sahani, SSS	2nd MACP with grade pay of Rs. 2000/-/Level-3	09 Nov 2017
4.	Ms. G. Vinoda Laxmi, Pvt. Secretary	3rd MACP with grade pay of Rs. 4800/-/Level-8	14 Dec 2017

Probation clearance

Sl. No.	Name of the Scientists	Discipline	Date of completion of Probationary period
1.	Mrs. V. L. Ramya	Fish Genetics & Breeding	31 Dec 2015
2.	Dr. Pranaya Kumar Parida	Fisheries Resource Management	31 Dec 2016
3.	Shri Vaisakh G.	Fisheries Resource Management	31 Dec 2016
4.	Ms. Sibina Mol S.	Fisheries Resource Management	31 Dec 2016
5.	Ms. Niti Sharma	Fish Genetics & Breeding	31 Dec 2016
6.	Shri Jeetendra Kumar	Fisheries Resource Management	31 Dec 2016
7.	Shri Simanku Borah	Fisheries Resource Management	31 Dec 2016
8.	Shri Wakambam Anand Meetei	Fisheries Resource Management	31 Dec 2016
9.	Ms. Thangjam Nirupada Chanu	Fisheries Resource Management	31 Dec 2016
10.	Shri N. Samarendra Singh	Agricultural Chemicals	30 June 2017
11.	Shri Satish Kumar Koushlesh	Fisheries Resource Management	30 June 2017

Transfer

Sl. No.	Name & Designation	From	To
1.	Shri Navin Kumar Jha, Administrative Officer	ICAR-CIFRI, Barrackpore	ICAR-NIRJAFT, Kokata
2.	Shri Kamlesh Kumar, SSS	ICAR-CIFRI, Barrackpore	ICAR-CIFRI, Allahabad

Superannuations

Sl. No.	Name & Designation	Last Place of posting	Date of superannuation
1.	Shri Biswanath Bose, Sr. Technician	Barrackpore	30 Nov 2017
2.	Shri Mahadeo Panika, SSS	Allahabad	31 Dec 2017
3.	Shri Sudama Basfore, SSS	Guwahati	31 March 2018
4.	Shri Swapan Gayen, SSS	Barrackpore	31 March 2018

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Recreation club activities

Annual sports

The recreation club of the institute organized annual sports for the staff during 17-18 Jan 2018. The event was inaugurated by the Director who encouraged all the staff for regular sports activities to remain sound in physical and mental health. The institute staff joined the sports with great enthusiasm and energy. Different events were organized for men and women. Team events like cricket, volleyball and tug-of-war draw a thick crowd.

Free health check-up for the institute staff on 23 Dec 2017

Celebration of new year's day on 01 Jan 2018

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Awards and recognitions

Dr. B. K. Das, Director, was conferred with *Krishak Gaurav* award and Dr. B. P. Mohanty, Head FREM Division and Dr. A. K. Das, Principal Scientist were conferred with *Krishak Bandhu* Awards by the Odisha Krishak Samaj on the occasion of World Food Day on 16 October 2017. Dr. Mohanty also received the Life Time Achievement Award in Biochemistry at 3rd Annual Research Meet by the Venus International Foundation, Chennai on 11 Nov 2017. He has also delivered invited lectures on various topics in different fora at Bhubaneswar, Tirupati, Pune and Balasore. He also served as a Member, 15th Institute Management Committee of the ICAR-National Research Centre on Pig, Rani, Guwahati.

Dr. B. K. Das receiving *Krishak Gaurav* award

Dr. Mohanty receiving Life Time Achievement Award

Dr. B. K. Bhattacharjya served as a Member, Extension Advisory Committee for College of Fisheries, CAU, Lembucherra. He also acted as a Member, State Fish Seed Certification and Accreditation Committee and Member, Technical Expert Committee of Assam Fisheries Development Corporation Ltd., Guwahati.

Dr. U. K. Sarkar served as a Member of the Institute Management Committee (IMC) of the ICAR-NBFGR, Lucknow. He has also delivered guest lecture at Haringhata Degree College in the workshop on "Impact of climatic change on inland fisheries".

Drs. Dipesh Debnath and Pronob Das served as Panellist in Doordarshan Kendra, Guwahati to discuss the prospects of inland fisheries and aquaculture in NE and Aquaculture and Fish Health in a Live-in phone programme, respectively. Dr. Aparna Roy was conferred with Shri J. V. K. Dixitlu award for outstanding work in fisheries extension/communication at 11th Indian Fisheries and Aquaculture Forum held at Kochi on 22-24 November 2017.

Sh. Dibakar Bhakta bagged the best oral presentation award at 1st Innovative Science Congress, 2018 and National Conference on "Innovative farming for food and livelihood security in changing climate" held at FACC, BCKV, Kalyani during 12-13 Jan 2018.

The Institute's scientists bagged various prizes in M. C. Nandeesha Photo Competition in GAF under the auspices of 11th Indian Fisheries & Aquaculture Forum held at Kochi during 21-24 November 2017

The photograph entitled "Women's participation in fish harvesting (from aquaculture pond, Tripura, India)" - by Shri Vikash Kumar won 1st Prize

The photograph entitled "Equal Contributor : Catching fish using gillnet from a river in Indian Sundarbans" - by Dr. R. K. Manna won 2nd Prize

The photograph by Ms. Suvra Roy entitled "Women participate in sorting and grading of fishes after Catch (from coastal region of Sundarbans)was highly commended

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Dr. Arun Pandit

Mrs. K. Sucheta Majumdar

Dr. K. M. Sandhya


TT Team of CIFRI


Gold in Javelin throw

The title of his paper was 'Impact of short term starvation on growth compensation and muscle composition in fingerlings of *Oreochromis niloticus* (Linnaeus, 1758)'.

Drs. B.P. Mohanty, S. Samanta, A. K. Das, Arun Pandit (Principal Scientists); Dr. Aparna Roy, Sh. H.S. Swain, Sh. D.K. Meena (Scientists); Sh. Sudipto Gupta (AAO), Ms. Poushali Roy (AAO) were awarded CIFRI Platinum Jubilee Awards and appreciation certificates for their outstanding contributions in institute building activities, research and extension.

Sh. D. K. Meena was awarded best oral presentation in National conference on empowerment of rural community through aquaculture during 09 to 10 Feb 2018 held at College of Fisheries Ratnagiri. He was awarded Fellowship of Society of Fisheries and Lab Science in 11th IFAF held at Cochin during 21 to 24 November 2017.

Dr. Sandhya K. M. was awarded the best women athlete in ICAR Eastern Zonal sports tournament 2017 at ICAR complex Patna. She won a total of 3 medals including 2 gold & 1 silver. CIFRI contingent also won gold in table tennis and javelin throw and bronze in women shotput in the tournament. In the Inter Zonal tournament held at ICAR-NAARM, Hyderabad, Dr. Sandhya K. M. again made CIFRI proud by winning 2 bronze medals in 100m race and high jump.

Meetings

Workshop on 'Hilsa breeding and management: Way forward'

ICAR-NASF Workshop on "Hilsa breeding and management: Way forward" was held at the institute Hqs., Barrackpore on 24-26 Oct, 2017. The workshop was inaugurated by Dr. Panjab Singh, Former Secretary, DARE & DG ICAR. The achievements of the project were discussed in details and way forward were formulated. Dr B. K. Das, Director of the institute; Dr P. K. Agarwal, ADG, NASF; Dr. S. Raizada ADG, Inland Fisheries and Dr. V. R. Suresh were among the dignitaries attended the meeting.

Mid-term Regional Committee meeting

The institute organized mid-term review meeting of Regional Committee (Region II) on 13 November, 2017 at Barrackpore. The ICAR Region II, comprises the States of Andhra Pradesh, Telangana, Odisha, West Bengal and Union Territory of Andaman & Nicobar Islands. This meeting was conducted to review the progress of the action taken reports of the 23rd meeting held at ICAR-NAARM, Hyderabad on 24-25 June 2016. Dr. J. K Jena, Deputy Director General (Fisheries Sc; Animal Sc.) chaired the meeting. A total 26 ICAR-Institutes/RRCs, eight universities participated

in the meeting. Representatives from the State Departments of West Bengal, Telangana, Odisha, Andaman and Nicobar Island were also present in the meeting.

Stakeholder meeting on 'Validation of pen culture as a climate resilient technology for beel fishers'

This stakeholder meeting under NICRA project was organized by the Guwahati Regional Centre of the institute in collaboration with Assam Fisheries Development Corporation Ltd. (AFDC) at 47-Morakolong beel, Morigaon district, Assam on 16 November 2017. In the meeting Dr. U. K. Sarkar, Principal Investigator, NICRA project emphasized on judicious utilization of the vast beel fisheries resources of the state by adopting scientific methods of fisheries enhancement to substantially enhance fish production and income generation under the changing climate. Dr. B. K. Bhattacharjya, Incharge of the Guwahati Centre emphasized on the need of adoption of pen culture as a climate resilient production system for increasing adaptive capacity of the fishers. The field officials of AFDC Ltd., fishermen of the beel including the President and Secretary of the Fishers' Cooperative Society also attended the meeting.

Stakeholders in the meeting

Workshop on 'Strategies on fish disease prevention in Assam'

This workshop was organized by ICAR-CIFRI Regional Centre, Guwahati in collaboration with Assam Fisheries Development Corporation (AFDC) Ltd., Guwahati under the All India Network Project on Fish Health on 18 December 2017 at Guwahati. The main objective of this workshop was to generate awareness about various fish diseases in Assam and their control measures. The workshop was graced by Shri S. K. Das, ACS, Managing Director; Shri P. K. Hazarika, Technical Manager, Dr. Dhruba Jyoti Sarma, Liaison Officer, Mr. D. Pame from AFDC Ltd., Guwahati; Dr. B. K. Bhattacharjya, Head (Acting), ICAR-CIFRI Regional Centre, Guwahati; Dr. S. K. Manna, Principal Scientist & PI, All India Network Project on Fish Health, scientists and technical officers of the centre. A total of 30 field assistants from AFDC Ltd. participated in the workshop.

Dr. S. K. Manna, Principal Scientist & PI addressing the gathering

Sensitization workshop on 'Climate resilient technologies developed by ICAR-CIFRI for beels'

Guwahati regional centre of the institute conducted this workshop at 47-Morakolong beel, Morigaon district, Assam on 09 Jan 2018 under the NICRA project for validation of pen culture as a climate resilient technology for beel fisheries. Five pens of 10 m x 10 m area were installed in the beel periphery and stocked with small indigenous fishes such as Amblypharyngodon mola and Gudusia chapra along with IMCs *Catla catla, Labeo rohita* and *Cirrhinus mrigala*. Dr. B. K. Bhattacharjya, Head (Acting), of Guwahati RRC, Dr. U. K. Sarkar, PI of NICRA project; Dr. S. Borthakur, Mr. Bipul Phukan, AAU, Raha; Shri Hemanta Baruah, DGM,

Sensitization workshop at 47-Morakolong beel

NABARD, Morigaon; Scientists of Guwahati RRC; President, Secretary and more than 30 active members of the co-operative society participated in the programme. Another sensitization workshop and demonstration of Climate Resilient Pen Systems (CRPS) for fish raising was organized at Mathura Beel, Kachrapara, North 24 Parganas, West Bengal on 02 Feb 2018 on the occasion of World Wetland day.

Community based knowledge sharing meeting at Sagar Island under *Mera Gaon Mera Gaurav*

A meeting was arranged on 15 Feb 2018 at Swami Vivakanad Cultural Youth Society, Krishnnagar, Sagar Island to discuss the agricultural problems under Mera gaon mera gaurav programme. A total of 200 people from the adopted 5 villages attended the meeting. The farmers shared their experiences on different aspects of agriculture, horticulture and fish culture. Availability of quality fish seed in time was found to be a major problem. As the Island is not connected with roads, the cost of bringing seed for stocking the ponds is very expensive. Establishment of fish hatchery was the demand of the group. Some common diseases and their treatments were also discussed. The women fishers demanded training on ornamental fish culture. Literature on nutrient value of small indigenous fish to incorporate in daily diet, pen culture in open water, success story of canal culture during TSP at Khansaebar Abad village were distributed.

Launched programme on model wetland development for livelihood security and restoration of indigenous fishes

A programme was launched on developing model wetland for livelihood security and restoration of indigenous fishes under NICRA project on 16 February 2018 at Bhomra Beel, Haringhata, West Bengal. State fishery official, fishers and other stakeholders also present on the occasion. Dr. U. K. Sarkar Principal Investigator, NICRA remarked that through climate resilient technologies and adaptation strategies the fishers can cope up with adverse impact of climatic variability. Dr. B. K. Das, Director suggested for creating value chain for local level processing and marketing of fish to ensure higher returns. He inaugurated the Climate Resilient Pen Culture System in Bhomra Beel and released fish seed of IMCs, Puti, Folui, Singhi and Pabda, in the pens. The demonstration of the technology aims to serve as a model wetland for this region. On the occasion, a fishers-scientist interaction meet was also organized. The institute also signed a MoU with BFCS Ltd. for pen culture demonstration in Bhomra beel.

Interface meeting of ICAR institutes/centres

The institute organized one-day interface meeting for developing multi-disciplinary approach in project formulations and innovations in agriculture and allied sectors involving all the Kolkata-based ICAR-Institutes/Centres on 17 February 2018 at the institute Hqs., Barrackpore. Nine ICAR-Institutes viz. ICAR-CRIJAF, ICAR- NIRJAFT, ICAR-IVRI regional centre, NDRI ERS regional centre, ICAR-CIFE Kolkata Centre, ICAR-CSSRI Canning centre, ICAR-CIFA Kalyani Centre, ICAR-CIBA,

Kakdwip Research Centre, ICAR- NBSS & LUP , Regional Centre, Kolkata and five KVKs viz. KVK, Burdwan, KVK, Ashoknagar, KVK, Nilganj, KVK, Hooghly, KVK, Sasyashamala, participated in the interface meeting. Dr. A. E Eknath, Former DG, NACA graced the occasion as the Chief Guest. Dr. A.E Eknath told that, it is an excellent opportunity for the researchers as experts from almost all subjects are present in the meeting. An open house discussion was held to deliberate on various issues related to networking in disadvantageous areas through Tribal Sub Plan (TSP); smart village concept; in Mera Gaon Mera Gaurav (MGMG) programme; sharing lab facilities, sharing knowledge etc.

Research Advisory Committee meeting

The Meeting of the Research Advisory Committee of the Institute was held at Barrackpore during 05-06 March 2018. Prof. Dr. B. Madhusoodana Kurup, Former Vice-Chancellor, Kerala University of Fisheries and Ocean Studies, Kochi, presided over the meeting. The Chairman urged 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 advocated for action oriented research and research for societal gain and livelihood improvement.

Workshop on "Biodiversity of River Ganga and its conservation for sustainable fisheries"

The institute organized this workshop on 15 March 2018 at its HQs, Barrackpore under the '*Namami Gange*' programme. The workshop is a part of the series of activities to commemorate the Platinum Jubilee year of the institute. As a part of the programme 50,000 Rohu, Catla, Mrigal fingerlings have been ranched in the river at Barrackpore towards restoring the prized Major Carp fisheries in the Ganga river. The workshop was chaired by Dr. J. K. Jena, the DDG (Fishery Science), ICAR. Dr. Jena urged for immediate integrated approach to clean the river system and restore the fisheries. Padmashree Prof. Ravindra Kumar Sinha, Hon'ble VC of Nalanda Open University was the chief guest in the inauguration. He said that proper policy and suitable action are necessary to restore the river Ganga. Dr. Sandeep Behera (Biodiversity consultant, NMCG); Prof. Amalesh Choudhury, Ecologist; Dr. B. K. Das, Director, CIFRI were among the other dignitaries attended the workshop. More than 150 eminent scientists, professors and delegates from different states of the country joined in discussion.

Brain storming on cage culture

In the series of events for commemorating the platinum jubilee celebrations, the institute organized a brainstorming session on "Cage culture in inland open waters" on 16 March 2018 at Barrackpore. Officials from Public Sector Undertakings (NHPC, NEPCCO), Entrepreneurs (ABIS, GROWELL, GARWARE, SHALIMAR, AQUATICA etc), progressive farmers, State Fisheries Departments, Universities, NGOs and different Water Resource Departments attended the meeting. Mr. M. S. Dhakad, MD, MP Fisheries Federation was the Chief Guest and Dr. N. P. Singh, Director, ICAR-NIASM, Baramati and Madhumita Mukherjee, Additional Director, Department of Fisheries, Government of West Bengal were the Guests of

honour. In his remarks, Dr. B. K. Das, Director gave an overview of status of cage culture in inland open waters of India and highlighted the role of ICAR-CIFRI in pioneering and developing the cage culture technology.

Mr. M. S. Dhakad highlighted the potential of cage culture in achieving the second blue revolution in the country. He stressed upon making cage culture technology economically feasible and viable for small scale farmers of the country.

A series of publications on cage culture were released on this occasion. A Farmers-Entrepreneurs- Scientist Interface meet was also organised where progressive cage farmers from Odisha and Jharkhand shared their experiences.

Institute Research Committee Meeting

The Institute Research Committee Meeting 2017-18 was held at the Institute headquarters during 18-20 March 2018. Dr. B. K Das, Director chaired the meeting in which all the Scientists of the institute participated. The Chairman encouraged the scientists to be innovative in their approaches and stressed that the research should have relevance to the farmers, policy makers and other stakeholders. An interface meeting among Scientists and Administrative staff was also held and different issues were discussed. Following this individual scientists presented their research and other achievements made during 2017-18. Dr. B. K. Behera, Principal Scientist presented the work done at RMIT University, Australia under foreign deputation.

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Events

Vigilance awareness week

Vigilance awareness through Gram sabha

The Vigilance Awareness Week-2017 with the theme "My Vision – Corruption Free India" was observed at the Institute during 30 October – 04 November, 2017. On the first day, Integrity pledge was administered by the Director to the staff members of the institute. The celebration was marked by competition on slogans/posters, essay writing etc. Students of Class XI and XII from different schools participated in essay writing, cartoon and poster drawing competitions. On 02 Nov 2017 the staff of the institute formed a human chain symbolising togetherness in fighting corruption. A road march and a gram sabha were also organised in Ariala village at Barasat-1 block of North 24 Parganas district for awareness generation on corruption. Shri K. Jayaraman, IPS and Director of Swami Vivekananda State police Academy (SVSPA), West Bengal was the Chief Guest of the concluding ceremony.

Vigilance officers meeting

The Review meeting of Vigilance Officers, Administrative Officers and Finance and Account Officers of 19 ICAR Institutes of Eastern and North Eastern region was held at the Institute headquarters, Barrackpore on 10 October 2017. Additional Secretary, DARE and Secretary, ICAR Shri Chhabilendra Roul presided over the meeting. Sh. Rajan Agrawal, Director, DARE and Chief Vigilance Officer, ICAR; Sh. V. P. Kotyal, Director Works; Sh S. K. Sinha, Under Secretary Vigilance, senior officials of CPWD from Eastern region were present in the meeting. The pending Audit paras, purchase of major equipments and proprietory items and Institute vigilance matters were the focal points for discussion.

Quami Ekta (National integration) week

The staff members of ICAR-CIFRI, Barrackpore observed Quami Ekta (National integration) Week during 19-25 November 2017. A pledge on the theme of secularism, anti communalism and non-violence was taken by all the staff members on 19 November under the guidance of the Dr. B. K. Das, Director of the institute. An awareness meeting was organised on 22 November in order to foster and reinforce the spirit of communal harmony and national integration. Displaying relevant posters in different locations, the Institute observed Communal harmony Flag Day on 24 November. A fund raising campaign was also organized on the occasion for support of the orphan or destitute children. Concluding programme was organised on 25 November.

World fisheries day

The institute celebrated world fisheries day at its Hqs, Barrackpore on 21 November 2017. the celebration was started by ranching 20,000 Indian major carp seed in the River Ganga at Daspara Ghat, Barrackpore under ICAR-CIFRI- NMCG project. The ranching program was followed by an in-house program in which Local fishers were sensitized about the various factors behind declining fish biodiversity as well as total fish catch from river Ganga. The fishers pledged their active cooperation towards success of river ranching program for

restoration of fishery of Indian major carps in Barrackpore stretch of River Ganga. Dr. B. K. Das, Director, Dr. D. K. De, renowned expert in hilsa fisheries, Dr. Utpal Bhaumik, former HoD of the institute, Dr. M. L. Bhaumik, noted aquaculturist also spoke on many issues on sustainable fishery and fishers livelihood.

Agricultural education day

The institute celebrated 'Agricultural education day' during 03-05 December 2017 to highlight the importance of agricultural education in nation building. Agricultural Education Day is celebrated all over the country in the memory of our first agriculture minister Dr Rajendra Prasad. Dr. H. S. Sen, Former Director of ICAR-CRIJAF, Barrackore, was the Chief Guest of the programme. About fifty students of B.Sc. (Industrial Fish and Fisheries) from APC College, New Barrackpore participated in the programme of Agricultural Education Day. Lectures followed by laboratory, field visits and demonstrations were organized for them. On 04 December, thirty students from the College of Fisheries, Ratnagiri visited the institute. In his address, Dr. B. K Das, Director emphasized on the need of quality agricultural education to serve the farming community of the country.

World soil day

The institute celebrated 'World soil day' on 05 December 2017 to generate awareness among the farmers on importance of soil in our life. The theme of this year's World soil day was 'Caring for the planet starts from the ground'. Dr. H. S. Sen, former Director of ICAR-CRIJAF, Barrackore, and an eminent Soil Scientist chaired the programme as Chief Guest. He highlighted soil as the main resource for sustainable agricultural production and the problems associated with maintenance of soil fertility and soil health. He emphasized that increasing production calls for caring for soil health. Fifty farmers from Barasat Block–I, West Bengal attended the programme and soil health cards were distributed to the farmers.

World Wetland Day

A sensitization workshop and demonstration of Climate Resilient Pen Systems (CRPS) for fish raising were organized at Mathura Beel, Kachrapara, North 24 Parganas, West Bengal on 02 Feb 2018 on the occasion of World Wetland day. Dr. Bipul Kumar Das, Dean, CoF, WBUAFS graced the occasion as Chief Guest and the programme was attended by more than 200 fishers of Kanchrapara Refugee Fishermen's Co-operative Society, Ltd (KRFCS). Officials of Department of Fisheries, Scientists and other staff of NICRA project were also present. Dr. B. K. Das, Director inaugurated the model CRPS in Mathura Beel and released fish seed of IMCs, Labeo bata, A. mola, Puntious and Gudusia chapra in the pens. On the occasion ICAR-CIFRI signed a MoU with KRFCS Ltd. for demonstration of climate resilient adaptation strategies in Mathura beel.

World fishery day

Students visiting institute facilities

Distribution of soil health cards

Celebration of World Wetland Day

Republic day

The institute celebrated the republic Day with great enthusiasm and fanfare on 26th January, 2018. Dr. B. K. Das, Director of the institute hoisted the tri-colour and paid rich tribute to the nation. In his speech, the Director recounted the achievements of CIFRI during the last one year and also recalled the golden journey of CIFRI. 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. Activities under Swachh Bharat Abhiyan was organized in the campus.

Director is addressing the staff on Republic Day, 26 Jan. 2018 at the institute headquarters

International women's day

International Women's Day was celebrated at the institute Hqs, Barrackpore on 08 March 2018. Dr. V.R. Suresh, Director-in- charge, Heads of Divisions, Chairperson, Women Cell, Member Secretary-Women Cell and Member Secretary-Women Complaint Cell spoke about the importance of International Women's Day and the role of women especially in fisheries sector. A brain storming session on 'Women in fisheries' was organized in which all the staff of the institute actively participated and discussed various issues like safety, drudgery reduction, cleanliness, improving knowledge and skills, participation in development of fisheries policies and decision making etc.

International women's day

CIFRI foundation day

The Institute celebrated the 72nd Foundation Day on 17 March 2018 at its Hqs. Barrackpore. The celebration was the culmination of year-long platinum jubilee celebrations of the institute. Dr. D. D. Patra, Vice Chancellor, Bidhan Chandra Krishi Vishwavidyalaya graced the occasion as Chief Guest. Dr. N. P. Singh, Director, ICAR-NIASM, Baramati; Dr. P. Das, Former Director, ICAR-NBFGR, Lucknow; Dr. M. Mukherjee, Additional Director, DOF, West Bengal; Shri Saumyajit Das, MD, SFDC, West Bengal; and Shri Malay Ghosh, Chairman of North Barrackpopre Municipality graced the occasion as Guests of Honour. Retired and current staff of the institute, state department officials, 100 fish farmers, fisherwomen and entrepreneurs from West Bengal, Jharkhand and Odisha were also present.

Various conferences, workshops, seminars and ranching programme in river Ganga, and brainstorming session on different aspects of inland fisheries were organized during the year to commemorate the platinum jubilee year. On this momentous occasion, two Memoranda of Understanding were signed between the institute and M/s M. R. Aquatech, Bhubaneshwar for 5 year manufacturing license of two CIFRI technologies namely CIFRI PEN HDPE and CIFRI CAGEGROW feed. The audience also watched the live speech of Hon'ble Prime Minister Shri Narendra Modi from Krishi Unnati Mela 2018 at IARI Mela Ground. Progressive fishers and fish farmers of West Bengal, Odisha and Jharkhand were felicitated for their contribution in the development of inland fisheries in India. Meritorious wards of the staff and some institute staff were also felicitated for their excellent contributions.

Institute foundation day

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Director (P), ICAR and researcher from Norway visited the institute

Director (P), Sh. Sujit K. Mitra interacting with the Scientists

Visitors from NOFIMA, Norway

Tribal Sub-plan activities

The institute has been undertaking several activities for livelihood improvement of marginalized tribal population across the states under TSP. The TSP activities were undertaken in 9 districts and 11 locations in West Bengal, Odisha, Kerala, Madhya Pradesh and Assam during this period in which in-house trainings, off-campus trainings, awareness camps cum scientist-fish farmer/fishers interface programme and inputs like fishing implements, fish feed and lime were distributed.

On 26 October 2017 a team of dignitaries comprising of Dr. Panjab Singh, Former DG, ICAR; Dr. S. Raizada, ADG, Inland Fisheries, ICAR; Dr. P. K. Agarwal, ADG, NASF, ICAR; Dr. R. T. Patil, Former Director, ICAR-CIPHET; Dr. R. Tuli, Former Director ICAR-IISS; Dr. C. L. Acharya, Former Director, ICAR-NBRI and Dr. B. K. Das, Director, IACR-CIFRI visited the TSP site of Sagar Islands and interacted with tribal fishers. They also distributed fishing nets to the tribal fishers.

Awareness camp at Sagar

Awareness camp at Amtoli

Two mass awareness camps on “Fish farming in unutilized canals through community based culture fisheries”were organized involving 600 tribal fishers in Amtoli village, Gosaba, Sunderban on 18 Feb 2018 and for 150 tribal fishers in Kalitala Village, Hingalganj, Sunderban on 19 Feb 2018 . Dr. A. E. Eknath, Former DG, NACA; Dr. Dilip Kumar, Former VC, ICAR-CIFE; Dr. V. R. Chitranshi, Former ADG (inland Fisheries), ICAR; Dr. B. C. Jha, former HoD, ICAR-CIFRI and Dr. B. K. Das, Director, ICAR-CIFRI interacted with the tribal fishers during the mass awareness programmes.

Distribution of fish feed at Gardanmari

Distribution of coracles at Kalo reservoir

Fish feeds were distributed among the tribal fishers of Kalitala, Sagar Island, Gardanamri, Burdwan, Purulia for different types of resources viz., canals, ponds, wetlands, check dams etc. Fishing nets were also provided to the fishers of Gradanmari wetlands. In Kalo reservoir, Mayurbahnj, Odisha, eight coracles were distributed to the tribal fishers.

The Kochi Research Station sensitized the tribal fishers for fisheries management in small reservoirs in Palakkad, Kerala. Allahabad centre has built capacity of the tribal fishers for the Loni wetland management and the raising the fingerling in pens as stocking material for wetland. Fishing nets were also distributed to them.

Awareness at Malampuzha reservoir

Training for tribal fishers at Allahabad

The Guwahati regional centre sensitized the tribal fishers of Goalpara district on the aspects of fisheries development in the derelict water bodies in collaboration with Rubber Board, Zonal Office, Guwahati.

Awarness Programme at Goalpara

Literature published for TSP Activities

Media coverage of TSP Activities

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CIFRI NEWS
सिफरी समाचार

Glimpses of *Swachh Bharat* activities during Oct 2017 to March 2018

Swachhta Hi Seva Pakhwara at Barrackpore

Director, ICAR-CIFRI handing over cleaning materials and *Swachh Bharat* uniforms to the members of Milan Dwip Development Society, Balagarh, West Bengal

Swachhta activity on Republic Day at ICAR-CIFRI, Barrckpore campus

Swachhta abhiyaan at Mangalavanam Bird Sanctuary, Kochi, Kerala

Cleaning Activity by Allahabad staff

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CIFRI NEWS
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Cleanliness activities around Samaguribeel, Nagaon district,Assam

Staff members of Vadodara centre in *Swachhta* activities

Awareness among school children in Manchanbele Village by the Bengaluru staff

Cleaning campaigning at Kolkata Research Station

FISH FACT

The year 2022 was declared as International Year of Artisanal Fisheries and Aquaculture

Affirming the urgent need of raising public and government awareness of the importance of implementing specific public policies and programmes to promote artisanal fisheries and aquaculture in a sustainable manner, with particular attention to the most vulnerable rural areas; the year 2022 has been declared as "International Year of Artisanal Fisheries and Aquaculture".

Source:

http ://www.fao.org/3/a-mr951e.pdf

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vuqla/kku miyfC/k;k¡

Ekgkunh Tokjune[k e| cy 'kkd eNyh ¼*dkjdfjul Y;|dkl*½ dk iFke ckj n[kk tkuk

cy 'kkd eNyh ¼*dkjdfjul Y;dkl*½ dk egkunh d noh Tokjune[k e iFke ckj nt fd;k x;k gA yxHkx 840 fe0eh0 ych bl eNyh dk lenh egku l 12 fd0eh0 nj fxy tky }kjk idMk x;kA vcrd d iklr lpukvk d vulkj] egkunh e vcrd doy nk itkfr;k] nfIvkfrl txb vkj fgekurjk okyxk dk n[kk x;k gA cy 'kkd eNyh de yo.kh; ty e Hkh thfor jg ldrh g ftll bl ehBk ty fudk;k e Hkh ikb tk ldrh gA fpfydk yxu e bl itkfr dk vdlj n[kk tkrk gA ; fpfydk yxu d xgjkb e 6 eghu l vf/kd jgr gA egkunh Tokjune[k e bl itkfr dh mifLFkfr iFke ckj n[kh xb gA

lh ,e jkf'kFk] ,- d- lkg] ,l d dk"ky 'k vkj fodkl dekj

dkojh unh e| egklhj f'kdkj dl fy;|jkxh lcu| xkyl &,d mi;kxh pkjk

dkojh unh e egklhj dh cMh itkfr;k ¼Mighty Mahseers½] Vkj [knjh ¼Deccan Mahseer½ rFkk Vh e lkyk ¼Humpback Mahseer½ ikb tkrh gA ; itkfr;kyMkd iofRr dh gkrh g blfy; fo'o0;kih rkj ij c'kh vkj dkV l eNyh idMu okyk e ; itkfr;k vf/kd ipfyr gkrh gA dukVd d dkMkx ftyd lo{k.k e egklhj eNfy;k dk idMu d fy; jkxh lcu pkjk dk ipyu vf/kd n[kk x;kA dukVd e jkxh vukt dk vf/kd [kk;k tkrk gA gkykfd egklhj eNfy;k dk idMu e thor ddM] e<d] df=e inkFk vkfn dk i;kx fd;k tkrk jgk g ij vklkuh l miyC/k gku d dkj.k lcl vf/kd jkxh lcu pkj (*Eleusine coracana*) dk vf/kd i;kx gkrk gA bl pkj dk jkxh dk vkVk rFkk pVdh Hkj thjk vkj ikuh dk ,d lkFk xFkdj bll xkyk¼3 l-eh- 0;kl½ cuk;k tkrk gA bld ckn bu xkyk dk 20 feuV rd mckyk tkrk g ftll ; jcM d leku gk tk;A bld ckn bl fQj l mckyk tkrk g rFkk blld cM xky ¼6 l-eh- 0;kl½ cuk; tkr g ftUg c'kh gd d pkjk rjQ yxk fn;k tkrk gA ,d fd-xk- jkxh d vkV l ,l yxHkx 17 l 20 xky cur gA pfd egklhj eNyh dk vk[kV of'od rkj ij cgr ipfyr g g blfy; jkxh d fy; ,l xkyk dk cuku dh fof/k fyf[kr :Ik l miyC/k gkuk vko';d gA

flfcuk ekyl] jtu dekj eUuk] Jo.k dekj 'kek] lh- ,e- jkf'kFk] ,e- b- fot;dekj] oh vkj- lj'k ,o fc- d- nkl

rkIrh unh dl fupyl Hkkx e| egkIty }kjk eRL;;u

rkIrh unh e egkIty l cM ieku ij eNfy;k dk idMk tkrk g ftlle r:.k eNfy;k dk f'kdkj Hkh gk tkrk gA blfy; egkIty }kjk eRL;;u ij jkd yxkb xb gA egkIty ,d idkj dk fx;j tky gkrk g ftld fNn cgr gh NkV] ePNjnkuh tl gkr gA bu tkyk l idMh xb eNfy;k ¼ekbuj dki] dVfQ'k] fgylk] *pUnk ukek] ,fECyQfjxkMku ekyk*½ dk idMu d rjr ckn vFkok bUg l[kk dj cpk tkrk gA pfd bl tky dk vf/kdrj fu/ku eNvkj thfodk fuogu d fy; eNyh idMu d fy; bLreky djr g vr% bld i;kx ij jkd yxku l mudh vkthfodk [krj e iM ldrh gA vr% bl fn'kk e mfpr tkx:drk rFkk vk; miktu d odfYid mik;k ij dk;Z djuk pkfg; ftll ifjr= dh lj{kk vkj eNfy;k d v/kk/kq/k f'kdkj dk jkdk tk ldA

o"kk [k th] ,l ih dkcy] Mh HkDrk] MCy vkun fefr ,o t d lkydh

fl;kx unh dl ty xq.koRrk e| gkl

fl;kx unh frCcr l gkdj v:.kkpy in'k e cgrh gA vle e ;g cãi= unh l feyrh gA vDVcj 2017 e bl unh dk ikuh dkyk gk x;k FkkA bld fy; lLFkku d xokgkVh dUn d oKkfudk u unh d Åijh ¼ifxx vkj f;xfd;kx½] e/; ¼ckyx vkj dkeflx½ vkj fupy {k=k ¼ikLlh?kkV vkj vkjke?kkV½ dk nkjk fd;kA lo{k.k e ty dh ikjnf'krk 4-0 l-eh- l de rFkk xnykiu 258 l 405 ,uVh;w n[kk x;k g tcfd vkb ,l vkb vkj lhih lhch d vulkj fu/kkfjr Lrj l 10 ,uVh;w l de gA 'khr dky e ty dk xnykiu Lrj vkj Hkh vf/kd ik;k x;kA oreku v/;;u e Hkh ty dk xnykiu fu/kkfjr Lrj l vf/kd ik;k x;kA ty dk ih,p 6-82 l 7-60] dy ?kfyr Bkl rRo 150&268 fe-xk- ifr yh0] fof'k"V pkydrk 254&415 µS/cm nt fd;k x;kA ty dk

ox vf/kd gku d dkj.k i"B ty dk ?kfyr vkDlhtu vuer Lrj ¼8-7&10-21 fe-xk ifr yh0½ d vuqkj ik;k x;kA lHkh lEifyx dUnk dk ryNV teko vf/kd ik;k x;kA ty e dhpM vkj fpifpi rRo vf/kd gku d dkj.k ty dh ikjnf'krk de gk tkrh g ftll idk'k l'y'k.k ugh gk ikrk vkj ey mRikndk dk fodkl ckf/kr gkrh gA fjikV vof/k d le; iknilyodk dk ?kuRo cgr de n[kk x;k ftldk dkj.k ikdfrd ?kVuk; ,o ekuo tfur dk; crk;k tkrk g ij bldh li.krh if"V vcrd ugh dh xb gA vr% v:.kkpy in'k vkj vle e ty; fofo/krk rFkk eNvkjk dh vkthfodk lc/kh leL;kvk d funku d fy; v/;;u vko';d gA

iuo xkxkb] f'kekx ckjkg] veY; ddkrh] ch d HkVVkpk;] ,l d nkl] ,u lejUn flg ,o oh- vkj- lj'k

o"k 2017 dh nkjku bykgkckn esa fQ'k yfMx

xxk unh d bykgkckn unh {k= l o"k 2017 d nkjku 174-125 Vu eNyh dk idMk x;kA xr o"k dh ryuk e bl o"k yxHkx 2-10 ifr'kr vf/kd eNyh dk mRiknu fd;k x;kA ble bf.M;u etj dki vkj dVfQ'k dk ifr'kr Øe'k% 12 vkj 11 rFkk fon'kh itkfr;k 33 ifr'kr nt dh xbA

vkj- ,l- JhokLrc] fM- ,u- >k] ,- vkye] jkgy nkl] t- dekj] ,l- fl- ,l- nkl ,o oh- vkj- Bkdj

vkfM'kk dh fuf"Ø; ufn;k esa ekfRL;dh fodkl grq rduhdh v/;;u

ekfRL;dh foHkkx] vkfM'kk ljdkj d vuqkj vkfM'kk d ikp fuf"Ø; gk xb ufn;k e ekfRL;dh@ tydf"k fodkl d fy; budk v/;;u fd;k x;kA bue dVd fty dh nk ufn;k] fNUnk vkj ikbdk rFkk txrflgij fty d rhu ufn;k] vykdk] ckfy;k vkj dkBtkMh dk fy; x;k gA bu ufn;k dk lid len vFkok vU; ufn;k l VVu d dkj.k budk tyekx vkfn ifjoru gvk gA bll bu ufn;k dh n'kh itkfr;k dh l[;k ?kuRo de gk x;k g rFkk unh; ekfRL;dh dk gkl gvk gA loiFke] unh d mnxe {k=] e/; Hkkx]lxe vkj volku LFky dk lEifyx {k= d rkj ij puk x;kA lo{k.k dk mnn'; unh; ljpuk] bldh iokg {k= rFkk to fofo/krk dk v/;;u djuk FkkA bu ikp ufn;k e l nk ufn;k e Lo;loh lLFkk; ,o futh dEiuh xgu eNyh ikyu djr gA gkykfd dN fdlku oKkfud i)fr;k }kjk eNyh ikyu dj jg g ij bl fn'kk e ub i.kkfy;k vkj ub itkfr;k dk ykuk vko';d gA vU; rhu ufn;k e ikyu vk/kkfjr eRL; ikyu d fy; l>ko fn;k x;k g D;kfd ; ufn;k o"k e N% eghu l vf/kd ty l Hkjh jgrh gA vr% fuf"Ø; ufn;k e eRL; ikyu eNvkjk d vkfFkd ykHk d lkFk vfrØe.k dh leL;k dk Hkh [kre dj ldrk gA

fc- d- nkl] ,l d nkl] ,d lkg] lftuk ,,e] jkf'kFk lh ,e vkj fodkl dekj

djy dh pfy;kj unh esa 'kokyk dk mxuk

djy d pfy;kj unh e 'kokyk d vf/kd mxu d dkj.k ble ty dk ckgj fudkyuk vLFkk;h rkj ij :d x;k gA bld fy; djy d ty vf/kdj.k u lLFkku d dkfPp vul/kku dUn dk foLrr rkj ij ty fo'y"k.k d fy; vkxg fd;k gA ikjfHkd fo'y"k.k l ;g irk pyrk g fd ty{k= e 'kokyk ¼Cyanobacteria½ dk teko vf/kd gk x;k gA

fV- fV- iy] m"kk mfUuFku] nhik lfn'kku vkj ,l- eukgju

uenk unh esa ck<+ dh ty dk 0;kolkf;d ekfRL;dh ij iHkko & ,d v/;;u

uenk unh d tyiokg ,o vfHkxeu dju okyh rFkk vU; itkfr;k dh 0;kolkf;d ekfRL;dh d chp d lc/k dk ,d v/;;u fd;k x;k gA ble ;g n[kk x;k g fd fupyh {k= e >hxk eNyh ¼*Macrobrachium rosenbergii*½] eyV itkfr;k ¼*Rhinomugil corsula, Mugil cephalus, Planiliza macrolepis* vkj *Planiliza parsia*½] ckEc Md ¼*Harpadon nehereus*½] ckvky ¼*Wallago attu*½ vkj fgylk itkfr;k ¼*Tenualosa ilisha*½ dh ipjrk gA o"k 1991&2013 d nkjku bu itkfr;k d okf"kd mit vkdMk dk ekfRL;d foHkkx] HkMp ftyk] xtjkr ljdkj u miyC/k djk;k gA

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vle d|ck<dr vkn{k=k d| eRL; mit e| ifjorru

vle d 183 ck<dr vkn{k= vle ekfRL;dh fodkl fuxe d v/khu gA bu ck<dr vkn{k=k dh o"k 2011&02 rFkk 2016&17 d vkdMk dk fo'y"k.k fd;k x;k gA bue l 96 vlpf;r chy rFkk 87 lpf;r chy gA lLFkku d fjikV d vulkj] o"k 1996&98 e 23 chyk dk vklr mit nj 172-9 fd-xk- ifr g- ifr o"k Fkk vkj bue vfrfjDr lp;u ugh dh xb gA o"k 2016&17 e vlpf;r chyk dk vklr eRL; mit nj 254-3 fd-xk- ifr g- ifr o"k vkdk x;k ij ;g vkdMk fLFkj ugh cfYd ckfj'k rFkk ck< d dkj.k ?kVrh&c<rk jgk gA o"k 2004&06 emPp ck< d le; ik[kj ijh rjg l Mc x; Fk blfy; ik[kj dh eNfy;k dk iyk;u ikl d chy {k=k e gk x;kA bld dkj.k vlpf;r chyk e vfrfjDr lp;u d dkj.k eRL; mit e of) gbA o"k 2001&02 l 2016&17 d nkjku l;kftr eRL; mit nj 0-9 ifr'kr FkkA

blh idkj lpf;r chyk e o"k 2001&02 l vklr eRL; mit nj 243-9 fd-xk- ifr g- ifr o"k Fkk tk vlpf;r chy l 9-8 ifr'kr vf/kd FkkA ij o"k 2016&17 e vklr eRL; mit nj e 539-1 fd-xk- ifr g- ifr o"k dh of) n[kh xb tk tk vlpf;r chy l nxuk FkhA o"k 2001&02 l 2016&17 d nkjku l;kftr eRL; mit nj 4-7 ifr'kr FkkA ij vfrfjDr lp;u okyh chyk d eRl; mRiknu e le:irk ugh fn[kkb nh ft ldk dkj.k oKkfud i)fr;k dk i;kx ugh djuk rFkk lp;u nj fu/kkfjr lhek l de ;k vf/kd gkuk] l;f;r eNfy;k dk nljh chyk e iyk;u rFkk lVhd ic/ku mik;k dh deh crk;k x;kA A

ch- d- HkVVkpk;] ,- d ;kno] ih nkl] ,l ckjkg] Mh ncukFk] ,l ;xdkie] ,u ljek vkj fc- d- nkl

cãi= unh e| vkl|fud in"k.k

cãi= vkj cjkd unh dk iokRrj {k= vkl|fud in"k.k l xflr n[kk x;k g vkj ;g lcl vf/kd vkl|fud iHkkfor {k= crk;k x;k g ft l yxHkx 29-12 yk[k ykx iHkkfor g; gA bld fy; ekjhxko d e;kx Cykd dk v/;;u d;k x;kA dy 27 ueuk dk fofHkUu ty{k=k] unh] ik[kj] V;coy vkfn l ,d= dj fo'y"k.k fd;k x;kA fo'o LokLF; lxBu ¼fu/kkfjr ek=k] 10 ihihch½ d vulkj] Hkkety e 46-7 ifr'kr vkl|fud dh ek=k ikb xbA lcl vf/kd xxyefjdkpkfjxko e vkl|fud 51 ihihch ik;k x;kA i"Bty e vkl|fud dh ek=k fu/kkfjr Lrj l de ik;kA ;g n[kk x;k g fd Hkkety e mifLFkr vkl|fud rRok dk [kyk ty fudk;k e feyu l tyh; thok ij gkfudkjd iHkko iMrk gA

uhfr ljek] fc- fi- ekgkfUr] ch- d HkVVkpk;] d- d- ljek] ,ddkrh vkj fc- d- nkl

>kj[kM d| i=kr| tyk'k; dh ekfRL;dh ,oa mRiknu dh fLFkfr

>kj[kM d i=kr tyk'k; dh ekfRL;dh ,o mRiknu dh fLFkfr dk v/;;u fd;kA bl tyk'k; ij rhu lgdkjh lfefe;k l ithdr yxHkx 200 eNvkjk dh vkthfodk fuHkj djrh gA bl tyk'k;e ekfRL;dh lo)u d vrxr etj dki d vxfydkvk dk lp;u fd;k x;kA v/;;u d nkjku] dy 33 eRL; itkfr;k dk nt fd;k x;k ftue lcl vf/kd yfc;k jkfgrk eNfy;k dh l[;k FkhA ekulu d lke; itkfr;k dk ?kuRo ,o mudh fofo/krk dk n[kk x;kA ;gk lcl vf/kd fx;j tky dk i;kx gkrk g rFkk ekulu d le; eRL;;u ifr bdkb 350 xk- ifr 100 ox eh- ifr ?kVk nt fd;k x;kA vklr eRL; mit 104 fd-xk ifr g- ifr o"k rFkk lHkkfor mRiknu 240 fd-xk ifr g- ifr o"k vkdk x;kA ey mRiknu lyodk d vk/kkj ij fd;k x;k g vkj ;g ifjek.k ikIr gvk g fd lVhd lp;u ,o ic/ku rduhdk l mRiknu e of) dh tk ldrh gA

d ,e l/;kj ;d ljdkj] ih fe"kkyk] th dukVd] ,y fy;ku] ,l dekjh] ih ek>h vkj Mh rk;x

Tkyk'k;k e| ikjifjd ,oa i;koj.k&mUe[k >|ih midj.k }kjk >hxk eNyh idMuk

eNyh idMu d ;= lkeU;r ikdfrd vFkok df=e rRok l cu gkr g ftug ty{k= d LrEHk e vFkok rjr g; yxk;k tkrk g ftl l bll eNfy;k@tyh; tho budh rjQ vkdf"kr gkA bl fn'kk e ikpr d eNvkjk u >hxk vkj NkVh eNfy;k dk idMu d fy; *>ih* midj.k cuk;k gA bl lk:koi.kkUe[k oLrqvk l cuk:k tkrk gA eNfv:k ble 'ki.k vu] Hkk tu rFkk ituu d fv: vkdi Ni tkrh gA >ih [kti rFkk ivkl d iRrk vki

नाइलोन के धागे से बना होता है। इसके लिये 25 से 30 खजूर के पत्तों को नाइलोन के धागे से एक साथ बांध दिया जाता है। इसका आकार शंकु के समान होता है

¼0;kl 100 ls 120 l-eh-½ Abl de tyeyxk;k tkrk g] 'khr vFkok xh"e dky eA >ih dk 3 ls 4 fnuk rd ikuh e 10 ls 12 QhV uhp j[k fn;k tkrk gA yxHkx 100 ls 300 >ih dk 15 ls 20 QhV d vrjky ij ck/k d yVB dh enn l yxk fn;k tkrk gA blds ckn 3 ls 4 fnuk d ckn eNfy;k dk tky l idMk tkrk gA ifr >ih l yxHkx 25o xke >hxk eNyh dk NkVh eNfy;k vkj ekyLd d lkFk idMk tkrk gA thor >hxk eNyh dk 250 :0 ifr fd-xk- cpk tkrk gA

xtu dukVd] ;d ljdkj] rkIk rk;x] ,- d- cjk] d ,e l/;k] ,l dekjh vkj ,y fy;ku

djy dk exyye tyk'k; & ekfRL;dh lo/kku dk ,d lHkkfor lk/ku

o"k 2017&18 e dkylu d VkfQd LVVl bMDl d vuIkj djy d exye dk v/;;u fd;k x;kA ;g n[kk x;k g fd blds ik"kd rRo ipj ek=k e miyC/k g ftlls eRL; mRiknu e lgk;rk feyxhA ekbDlkQkbVlh dh miyC/krk 76-97 ifr'kr ik;k x;k gA tyk'k; dh mRiknu lHkkouk 285 fd-xk- ifr g- ifr o"k rFkk vkIr mRiknu 76-13 fd-xk- ifr g- ifr o"k nt fd;k x;kA vkIr mRiknu ,o lHkkfor mRiknu e 73 ifr'kr dk vrj ik;k x;k gA blh idkj vf/kdre ifr bdkbZ eRL;;u i;kl 11-875 fd-xk- ifr g- ifr o"k g tcfd vkIr ifr bdkbZ eRL;;u i;kl 0-105 fd-xk- ifr g- ifr o"k vkdk x;k gA vr% vfpr ic/ku mik;k l bl tyk'k; e nh?kdkfyd mRiknu of) dh tk ldrh gA

Fkxe Fkj lk iky] Å"kk mfUuFku vkj ,l eukgju

fgekpy in'k dh tyk'k;ka e fiitj e eNyh ikyu & ,d lQy i;kl

n'k e nljh uhy Økfr dh lQyrk dk vk/kkj fiitj e eNyh ikyu dk le>k tk jgk gA lLFkku }kjk fodflr fiitj e eNyh ikyu rduhd dk fgekpy in'k d tyk'k;k e ekfRL;dh foHkkx] fgekpy in'k ljdkj }kjk o"k 2016 e vkjHk fd;k x;k ftldk y{; eRL; mRiknu ,o mRikndrk nkuk dk fodflr djuk FkkA bld fy; ikx tyk'k; e ih gkbiksFkyelk dk 24 ,pMhihbZ fitjk e lp;u fd;k x;k rFkk bll 45-81 Vu eNyh dk mRiknu gvkA vkIr mRiknu 1-9 Vu FkkA dy 24 fitjk e ls 12 fitjk e mRiknu 2 Vu l Hkh vf/kd gvkA vr% fgekpy in'k e fitj e eNyh ikyu ,d lQy rduhd lkfcr gvk gA

rkIk rk;x] ,- d- nkl] fer'k ,p jkeVd] fc- d- nkl vkj ;- d ljdkj

uuk mRikn ;Dr dhVuk'kd dk fodkl

lLFkku }kjk uuk mRikn ;Dr dhVuk'kd dk fodkl fd;k x;k gA ,l uuk mRikn e Hkkfrd&jlk;fud x.kk dh ipjrk gkrh gAbu mRiknk dk vkdkj 100 l 200 nm d chp ik;k x;k gA bl mRikn dh thVk lHkkouk &42-4 l &53 mV ik;k x;kA bldh ck;k,fQdlh dk tyh; eNfy;k d Hk{kh cdfLoej bl DV ij ijh{k.k fd;k x;k vkj ;g n[kk x;k fd 0;kolkf;d rkj ij fodflr mRikn dh ryuk e lLFkku }kjk fodflr uuk mRikn dk eku de ¼0.00355 mg/L½ gA

Mh t ljdkj] ,- d cjk] ch d cgjk vkj] fc- d- nkl

bLV dkydkrk oVyS.M e VkbDyklu vkj VkbDykdkcu dk ik;k tkuk

VkbDyklu vkj VkbDykdkcuekuo }kjk i;kx dh tku oky mRikn tl lkcu] diM /kku d fMtUV]fQukby] lkUn; ilk/kuk vkfn e ik;k tkrk gA gkykfd ckgjh mi;kx d fy; ; inkFk ljf{kr g ij tyh; thok tl l{e vyxh] ØLVf'k;k vkj eNfy;k d fy; gkfudkjd gA VkbDyklu d ckj e ;g Hkh dgk tkrk g fd blls vr%lkoh ifØ;k ckf/kr gkrh gA ; nkuk rRo bLV dkydkrk d >xjfl;k oVy.Md ty vkj eNfy;k e ik; x;A ty e VkbDyklu dk Lrj 0-02 l 0-241 g/l rFkk bldh lkUnrk 0-05g/l ikb xbA fxcfy;u dryk] lkbfiul dkfi;k] gkbikFkyefDFkl ekfyfVDl vkj सिरोहिनस मृगलों में ट्राईक्लोसिन और ट्राईक्लोकोबेन क्रमशः 0.014–0.058 तथा 0.241 से 0.545 मि.ग्रा. प्रति कि.ग्रा. पाये गये। इसी प्रकार मछलियों के उत्तकों में भी

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; nkuk rRo fu/kkfjr Lrj l vf/kd ik; x;A ij fdlh Hkh ty vFkok eNyh d ueu e eFkkby VkbDykLu ugh ik;k x;kA VkbDykLu dk ifr fnu 50 g/kg [kku l LokLF; ij dkb ifrdy iHkko ugh iMrk gA

Lkchj ukx] lkek nkl] ljdkj] dforv dekjh vkj ekO v¶rkcnnhu

if'pe cxky d [kkyl chy e flyoj dki eNfy;k dh mRrjthfork dk lo{k.k

if'pe cxky d [kkyl chye viy 2017 e flyoj dki eNfy;kd cM ieku e eju dh fjikV ikIr gbA yxHkx 62 g0 e Qy bl chy e o"k Hkj ty jgrk g rFkk ;g lyodk vkj tyeXu eØkQkbV l Hkjij gA bl chy e eth vkJ ekbuj itkfr;k dk lp;u fd;k tkrk gA eNfy;k d eju l eRL; mRiknu dk Hkh cgr {kfr igph gA iHkkfor eNfy;k d 0;ogkj e ifjoru] 'kjhj ij /kCc] i[k dk fxjuk rFkk Ropkij ?kko tl y{k.k ik; x;A bu eNfy;k dk ijh{k.k fd;k x;kA budk cDVhfj;y flDofLx e bud yhoj e ,jkekxuk l gkbMkfQyk thok.k ik;k x;kA ty d ueuk e pkydrk ½307 μS/cm½] dy ?kfyr Bkl rRo ½153 mg/l½ vkj eDr dkcuMkbvkDlkbM ½jkf= d le; 6.1 mg/l½ dk Lrj vf/kd ik;k x;kA ;g ty{ke e ik'kd rRok dh vf/kdrk dk crkrk gA blh idkj lyod ox e lkbukQkblh Hkh vf/kd ½7019-8923 uL⁻¹½ ik;k x;kA ty d rkieku e vpkud ifjoru l thok.kvk dk idki c<rk g vkj bldk gkfudkjd iHkko flyoj dki tlh lonh eNfy;k ij vf/.kd iMrk gA

ru tk vCnYyk] fodkl dekj] vkj d ekUuk] , d cjk] leu dekjh ch d cgjk vkj fc- d- nkl

[kk| ,o ik"k.k lj{kk e eNfy;k e mifLFkr ik"kd rRok dk egRo

eNyh ,d LokLF;o)d vkgkj g tk x.kdkjh tr ikVhu vkj ikfylpjVM QVh ,flM l le) gkrh gA ij bu eNfy;k e mifLFkr ik"kd rRok dk i lkj gkuk pkfg;A bl fn'kk e ,d MVkcl r;kj fd;k x;k g tk lLFkku d oclkbV ij miyC/k g ½http://www.cifri.res.in/nutrifishin/index.php½A bldk fo'y"k.k eNyh [kku okyk d fy; fn'kk&fun'k] vkgkj lc/kh l>ko] [kk| uhfr dh ;ktuk ,o fuek.k vkj tydf"k gr tyh; itkfr;k d p;u vkfn e lgk;rk djxkA blls Hkk[kejh] dik"k.k] l{eik"kd rRok dh deh vkfn leL;kvk d funku l [kk| vkJ ik"k.k lj{kk l'kDr gkxhA

ch- ih ekgkfUr] , egkfUr] , l xkxyh] Vh fe=k vkj Mh d : .kkdj.k

gxyh vkj inek unh dh fgylk eNyh dkU;fVf tukfed v/; ;u

fgylk i tkfr] *Vuvkyks/k bfy'kk* o lk ;Dr deNyh g rFkk nf{k.k ,f'k;kb n'kk e viu lLokn vkj vkgkj x.kk d fy; cgr ipfyr gA bl v/; ;u e fgylk eNyh d ik"kd x.kk] bl e QVh ,flM dh ipjrk vkfn dk v/; ;u fd;k x;k gA lkFk gh] gxyh vkj inek unh d fgylk eNfy;k dk ryukRed fo'y"k.k fd;k x;k gA gxyh unh dh fgylk eNyh e ryukRed rkj ij ikVhu] vehuk ,flM vkfn dh ek=k vf/kd ikb xbA lLokn e nkuk gh ufn;k dh eNfy;k leku ikb xbA gxyh unh dh fgylk eNyh e QVh lflM vkj vkexk ikfylpjVM QVj ,flM vf/kd ikb xbA v/; ;u e ;g ik;k x;k fd gxyh unh dh gylk e inel unh dh fgylk l ryukRed rkj ij lHkh ik"kd rRo vf/kd gA

, l xkxyh], egkfUr]Vh fe=k] , l ekgkfUr] fc- d nkl vkjch- ih ekgkfUr

eNvkjk d ifr bdkb vk; vkdyu gr| ekMy rl;kj djuk

xxk unh d Hkkxhjfkh&gxyh {k= eNvkjk d vkthfodk d fy; ,d egRoi.k lkr gA oreku v/; ;u e eNvkjk d ifr bdkb vk; dk vkdyu djuk gA bld fy; o"k 2016 e if'pe cxky d lkxj l QjDdk {k= d 32 lfEifyx dUnk e 500 eNvkjk d lkFk ckrphr dk vkdMK dk lxg fd;k x;kA bu vkdMk e eNvkjk d ikfjokfjd lnL;k dh l[;k] mudh vk;] mudh 'k{kf.kd Lrj] vkfn dk fy;k x;k gA

v:.k ifMr] ikou ipa] vrqk ,Ddk] ,l- Hkêkpk;Z] fc d nkl vkj ,u ndorh