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# CIFRI NEWS सिफरी समाचार

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

Agrisearch with a human touch

July - December, 2014:Volume - 19, No. 2

Contingency plan for less monsoon rainfall


BOBLME Hilsa Fisheries Assessment working group Meeting

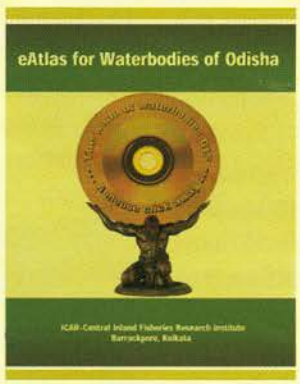
*O.pama* : The predominant sp. in winter gill net catch at Narmada estuary


Perspective plan for Fisheries development in West Bengal

Initiative for cage culture in AP Reservoirs

ICAR Eastern Zonal Sports : Dr. Sandhya K.M., the Best Women Athlete, CIFRI Football Team & Ms. Suvra Roy also won gold medals in Football & Chess, respectively

On-field training at Mython reservoir




Developed eAtlases for water bodies of Odisha

Flashback - CIFRI @1950's

: Inside :



ICAR - CENTRAL INLAND FISHERIES RESEARCH INSTITUTE
Barrackpore, Kolkata - 700 120

## Director's Column

The entire fisheries fraternity suffered a huge loss by the demise of Dr. Hiralal Chaudhuri who passed away on 12 September 2014. His long and eventful journey at CIFRI was spread over 28 years apart from several international assignments. He has been immortalized by his outstanding original research contribution in induced fish breeding which is widely regarded as the harbinger of the 'first blue revolution' in the country. The Government of India has declared 10 July as the 'National Fish Farmers' Day' commemorating the 'first induced breeding' of *Cirrhinus reba* in captivity on 10 July 1957 by Dr. Chaudhuri. May God give the great soul eternal rest and the family the strength to bear the great pain.

Less rainfall during the monsoon of this year was a national concern. CIFRI conducted several meetings and awareness camps engaging different stakeholders and made them aware regarding the impact of less rainfall on fisheries. Contingency plans have been prepared consulting the stakeholders to cope with the situations.

Resource assessment is prime importance for the policy makers and researchers. CIFRI has been able to develop the e-Atlases of water bodies of several states on GIS platform. In the current period we developed e-atlases of the water bodies of Odisha which is very much user-friendly and useful. In biotechnological research we have also shown that fish mitochondrial proteins can be used as pollution biomarkers. Whole Genome of the extremely halophilic Bacterium *Halomonas salina* strain CIFRI1 isolated from East Coast of India has been sequenced. Genetic variability in Indian Major Carp, *Cirrhinus mrigala* from Indian Rivers has been studied. In addition to this, amino acid compositions of 27 food fishes from India and their importance in clinical nutrition was studied.

In riverine ecology, the investigations showed that exotic South American sucker mouth armoured catfish, *Pterygoplichthys disjunctivus* also invaded the peninsular river, Cauvery in addition to East Kolkata wetlands. It is a matter of concern. *Posthodiplostomum* sp. infestation in *Channa striatus* in river Mahanadi was reported for the first time. Fish diversity in river Torsa along the Terai-Dooras region and fish species distribution vis-à-vis higher salinity regime in rivers of Sundarban were studied. In Bhadbhut region of Narmada estuary it was found that *Otolithoides pama* was the single species fishery in winter gill net (50-70 mm mesh size) catches.

CIFRI took initiative for cage culture in reservoirs of Andhra Pradesh during the period. Brewery waste was established as a promising low cost ingredient for feed in cage farming of *Labeo bata* in reservoirs of Eastern India. The institute joined the nation-wide campaign of *Swachh Bharat* and made sincere efforts for cleanliness in the campus and laboratories. The institute conducted several important meetings, like Hilsa advisory committee meeting, Expert review meeting of NICRA project, IMC meeting, Capacity building programme on Lorenzen Model, Workshop-cum-training on fish disease surveillance, National consultation on 'Environmental flow requirements for sustaining ecology and fisheries of rivers' *etc*. All these events were highly successful and appreciated by the participants. Apart from these events, CIFRI celebrated World Fisheries Day and workshop at Allahabad, National Fish Farmers' Day, ICAR Foundation Day, Independence Day, Vigilance Awareness Week, राजभाषा हिन्दी सप्ताह with great vigour and enthusiasm.

In ICAR zonal sports, CIFRI's performances were commendable and won several prizes including the best women athlete of the zone. In publications also we performed well. A total of 54 research papers in different national and international journals were published. In addition, 6 training manuals were published. A total of 13 training programmes, 3 mass awareness programmes have been organized in headquarters and different centres of CIFRI for different stakeholders. CIFRI technologies and achievements were showcased in 10 exhibitions in different parts of the country. Maintaining the rich tradition CIFRI's staff were awarded and honoured in different fora and occasions. A total of 9 staff got superannuated and twenty five staff were promoted to their next higher grade during this period. I appreciate their efforts and wish all of them a happy, active and healthy retired life. Any suggestions from our learned readers for further improvement the newsletter will be highly appreciated.

Barrackpore
March, 2015

A. P. Sharma

# Contingency plans for less rainfall during monsoon

Keeping in view the drought like situations in various parts of the country the institute took various steps for drought preparedness awareness programme. The scientists visited various drought prone districts and met the state department officials to chalk out contingency plans. An interaction meeting on 'Mitigation of rainfall deficit in Eastern States' was organized at Barrackpore on July 16, 2014 with the fishers/fish farmers from West Bengal, Bihar and Jharkhand who shared their views and experiences regarding shortfall of rain. The scientists rendered technical advice to the farmers to cope up with the prevailing problem of lack of sufficient availability of water in ponds, beels and reservoirs. On the other hand, fishers form Sagar Island, Sunderban shared their experience on ingress of saline water in inland water bodies like pond, canals, and creeks during high tides which have become a serious problem for them.

Interaction meeting at Barrackpore

Interaction meeting at Cuttack

Meeting at Sambalpur

Awareness Programmes were organized at Cuttack and Sambalpur in Odisha during 17 and 21 July, 2014. A total of 156 Fishermen and women (Naraj Fishermen Cooperative Society) attended the programme at Cuttack. At Sambalpur, about 50 fishers/fish farmers from Mahamudpur Fishermen Society and other society of the Hirakud Dam attended the meeting on 21 July, 2014. District Fishery Officer, Assistant Fishery Officers of the Odisha Government, Inspector of cooperatives and Secretary and Vice-president of the Fishermen Cooperative were also present in the meeting. Dr. Sanjay Bhowmick, CTO and Shri S.K. Paul, TO of CIFRI discussed various management options in the challenged scenario. After prolong interaction following suggestions were made: regulating the catch of brood fishes, controlling the inflow of polluted water, maintaining the minimum water level in deep pools located in river beds, maintaining the live gene pool of fish seeds, regulation of use of fine mesh size nets, restricting the water lifting, synchronizing the opening and closing of anicut during this season, river ranching programme after lean monsoon period, joint ventures between State Fishery Department and CIFRI, Barrackpore to conserve the fish germplasm.

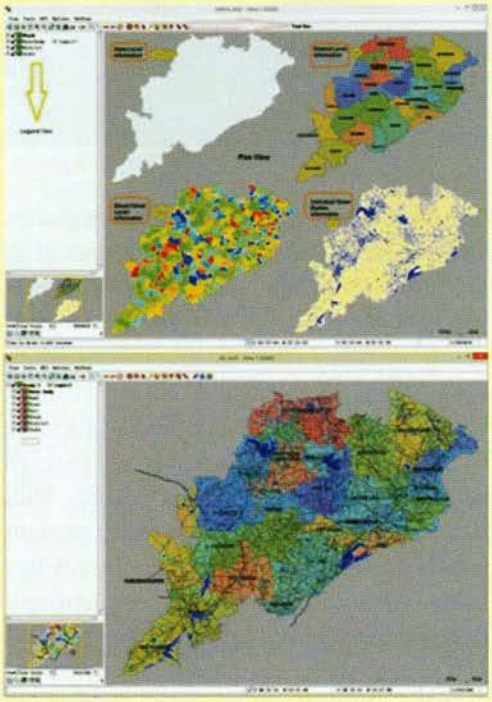
Allahabad Centre organized a drought preparedness awareness programme entitled "*Monsoon kee kamee ke paripreksha main Jheelon main Matsya Prabandhan par Gosthi*" at Sareni Jheel, Unchahar, Raebareily, Uttar Pradesh on July 22, 2014. More than 60 fish farmers, fishers, members and office bearers of fisheries society, women and villagers participated in the programme. Chief Executive Officer (Incharge), FFDA, Raebareily; Inspector, Fisheries, Raebareily were present in the Gosthi.

**Inputs from K D Joshi, Sanjay Bhowmick and S. K. Paul**

## Research Highlights

### Prepared e-ATLASES of water bodies of Odisha state

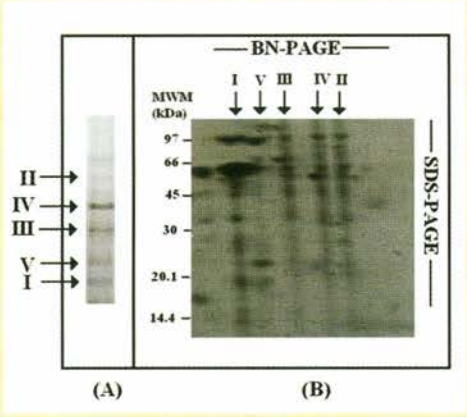
The electronics atlas of the Odisha state was developed under CSS "Strengthening of database and GIS of fisheries Sector" scheme in the TNT-MIPS environment by using vector data representing administrative boundaries of the state, districts and blocks. The water bodies of the state were extracted and delineated from satellite images generated by IRS P6 LISS III and Panchromatic sensors. It is user friendly and has a strong character of systematic display. A brief on water area, size, distribution etc. can be comprehended from a single screen display ranging from the name of state, district, block, roadways, railway tracks to the minuscule details of village name, waterbody name, area during pre and post-monsoon seasons as well as number of water bodies present in any hierarchical administrative unit. It is an useful tool for catch assessment and developing GIS based Decision Support System and will help planners to concentrate planning efforts, allocate resources and deploy man-power according to the distribution of fishery resources. Presence of communication network along with fishery resources data helps to analyze and plot a perfect location for a market as well as find an easy path for distribution of the fish produce to all social and economic sections of the population.



**S. K. Sahu and Malay Naskar**

### Fish mitochondrial proteins as pollution biomarkers: 2D BN PAGE approach

Fish gill epithelium has a dynamic ion transporting function that regulate the blood pH by complex transport and exchange mechanism of ions. The energy molecule, ATP, is generated aerobically within mitochondria *via* oxidative phosphorylation (OXPHOS) and the demand of ATP is maintained by the systematic regulation of the quantitative production of mitochondria in cell. In presence of pollutants or stressors, the oxygen demand increases in fish tissue resulting in a simultaneous increase of mitochondrial number and their oxidative function. Two Dimensional Blue Native Polyacrylamide Gel Electrophoresis (2D-BN-PAGE) developed for analysis of mitochondrial protein complexes identifies this as a valuable tool in studying the mitochondrial OXPHOS complexes of *Labeo rohita* (Rohu). By this technique, functional and enzymatically active protein complexes are separated on the gel as intact biomolecules in the first dimension, which are then separated into individual subunits in a second dimension under denaturing conditions.




**Praveen Maurye**

### Whole Genome sequencing of the extremely halophilic Bacterium *Halomonas salina* Strain CIFRI1 isolated from East Coast of India

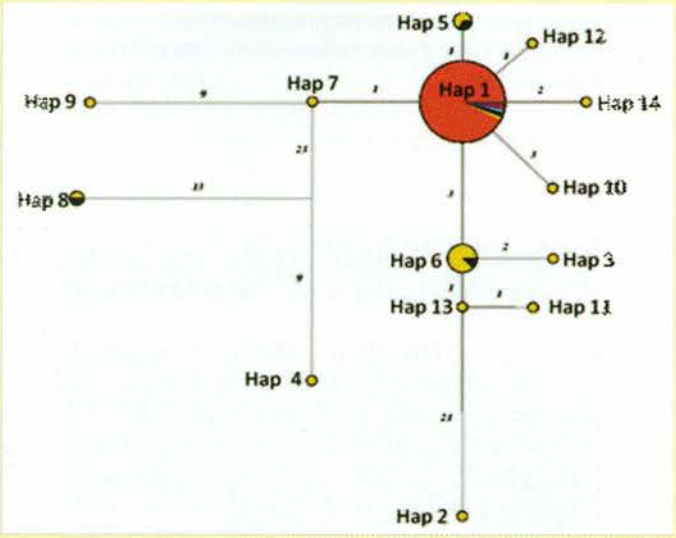
Proteins of extremely halophilic microorganisms have structure–function stability only in the presence of salt, and their enzymes require salts for activity. Characterization of halophilic and halotolerant bacteria from hypersaline environments might provide interesting insights into the evolutionary and survival mechanisms including halotolerant genes. In the present study, *Halomonas salina* Strain CIFRI1, isolated from the salt crystals in the salt pan at Digha (21°37'36.51"N, 87°31'20.23"E) along the East Coast of India, is an extremely salt stress tolerant bacterium. The 16S rRNA gene sequence of CIFRI1 is closely related to that of *Halomonas salina* based on the biochemical and BLAST result. For detailed characterization of the strain a total of 1,356,989 paired-end reads with a read length of 101bp were generated by using Hiseq 2500 (Illumina, USA). The genome annotations were performed by the NCBI Prokaryotic Genomes Annotation Pipeline, release 2013. This draft genome of *Halomonas salina* had a total of 3,450,272 bases assembled into 3,139 protein-coding loci including 62 RNA genes. The whole-genome Shotgun project has been deposited at DDBJ / EMBL / GenBank under the accession no. JOKD00000000. The version described here is JOKD00000000.1.

**B. K. Behera, D. K. Meena and A. K. Jana**

### Genetic variability in Indian Major Carp, *Cirrhinus mrigala* (Hamilton, 1822) from Indian Rivers using mitochondrial Cytochrome *b* gene

The genetic differentiation of wild population of Indian Major Carp, *Cirrhinus mrigala,* from three riverine ecosystems;

Ganges, Narmada and Brahmaputra in India was investigated applying direct sequencing analysis of mitochondrial Cytochrome *b* region. The GenBank accession numbers of the mtDNA cyto *b* sequences are KC122393-122396; JX986918-986953; JQ912098-912101; KC294355-294364; KC294340-294349; KC294365-294372; KC294352-294354; KC294375-294376 and JQ912102-912110. The



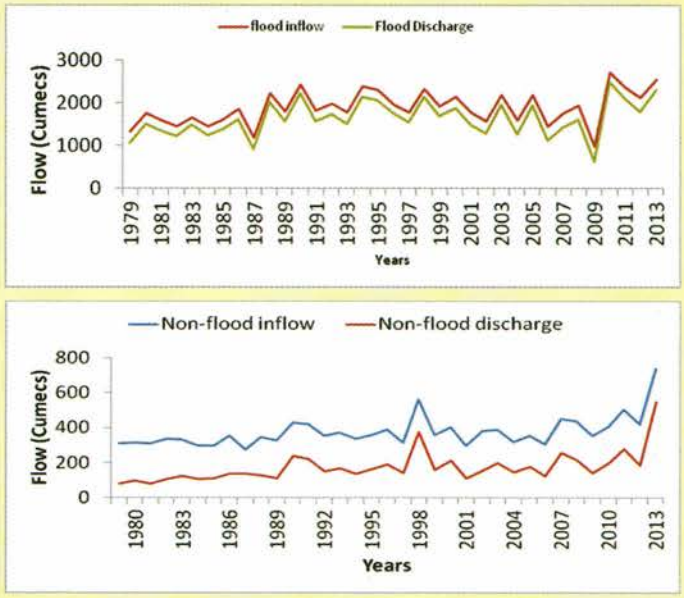

Median-joining network of haplotypes of *C. mrigala*. Each circle represents a haplotype and circle size is proportional to haplotype frequency. Numeral indicates number of mutations and mutated positions are given in bracket.

average frequencies of four nucleotides for all the 89 samples of mrigal were A: 27.13 %; T: 29.36 %; G: 14.93 %; C: 28.52 %. Nucleotide sequences of Cyto *b* region in *C. mrigala* were A + T rich (56.49 %) and transition to transversion ratio was 2.42. Sequencing of 307 bp of Cytochrome *b* gene of 89 samples of mrigal collected across the three rivers revealed 14 haplotypes with haplotype diversity ranging from 0.304-0.692 and nucleotide diversity from 0.009-0.02. The majority of variation was found within the population (96.21%) and the Fst value (0.035; P =0.147) as well as exact test of population differentiation ($P$ = 0.893) was found to be insignificant. AMOVA analysis also indicated insignificant differentiation among sub-populations.

**B. K. Behera, V. R. Suresh, A. K. Sahoo, D. Panda, D. K. Meena, P. Das, D. Bhakta, D. K. Biswas and A. K. Jana**

## Preliminary study on estimation of environmental flow in the river Ganga at Haridwar

The river Ganga, recently declared as a National River of India, traverses about 2525 km through different catchments, is a lifeline to millions of populace residing along the basin. After reaching the plains at Haridwar, the river is greatly modified by construction of Bhimgoda barrage, which diverts the river water into the upper Ganges Canal for irrigation purpose and the rest of the river is left into the main channel. Analysis of incoming and discharge water flow at the barrage during last three decades reveals adverse condition of discharge in the river downstream to the barrage particularly during lean season. The average of the monthly incoming water to the barrage during 1980-90, 1991-2000 and 2001-2010 was recorded as 652.351 ± 61.215, 809.692 ± 74.0993 and 716.402 ± 63.784 cumecs. At the same period the discharge from the barrage was 442.854 ± 60.644, 605.436 ± 72.938 and 494.764 ± 60.633 cumecs. There was little difference in the amount of inflow and discharge during peak season. But average monthly inflow and discharge during lean




Average inflow and discharge in the river during peak and lean seasons at Bhimgoda

period at barrage reveals that only meager quantity of water was discharged into the downstream of the river Ganga drastically affecting the river habitats and fisheries.

**K. D. Joshi, D. N. Jha, A. Alam and S. C. S. Das**

## Higher salinity regime vis-à-vis fish species distribution in rivers of Sundarbans

Surveys conducted in Indian part of Sundarbans revealed existence of higher salinity regime in rivers of upper and middle Sunderbans even during monsoon (September 2014) which impacted on fish species assemblage. In Durgaduani river at Sonagar, Gosaba (22° 07'54" N, 88° 47'16" E) 70 km upstream from sea mouth, salinity was recorded at 15.1 ppt. Bag net catch from the area included marine species like *Pampus argenteuses* and *Labotes surinamensis*, which was relatively uncommon earlier. Fishers' catch also included marine and brackish water fish species like *Scatophagus argus*, *Coilia ramkarati*, *Sillago sihama*, *Eleutheronema tetradactylum*, *Bregmaceros macclellandi*, *Anodontostoma chacunda*, *Thryssa purava,* etc. Overwhelming dominance of *Harpodon nehereus* (69 % by number, 73% by weight) was recorded in the bag net catch at Bidya river and Herobhanga river confluence (22° 00'38" N, 88° 44'35" E) with salinity of 13.7 ppt. Set barrier net catch at nearby areas like Pakhirala and Choto Mollakhali was dominated by various Sciaenids,

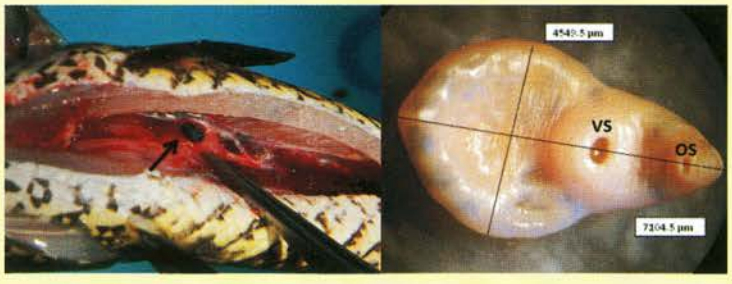
*Pampus argenteuses* *Labotes surinamensis*

Mullets and *Mystus gulio,* besides stray catches of different marine and brackish water fish species like *Lates calcarifer*, *Acanthopagrus latus*, *Epinephelus coioides*, *Polynemus paradiseus*, *Strongylura strongylura,* etc. These substantiate an increase in salinity regime in rivers of Sundarban due to lack of freshwater inflow from upstream, even prevalent during monsoon months, altering the fish species distribution in the area.

**R. K. Manna, Suvra Roy, S. K. Das, Roshith C. M., Manas H.M. and Deepa Sudheesan**

## First report of *Posthodiplostomum* sp. infestation in *Channa striatus* in river Mahanadi

During a hydro-ichthyological study of the Mahanadi river, *Channa striatus* infested with *Posthodiplostomum* sp. was recorded for the first time. Fish samples were collected through the experimental fishing from the Mahanadi river (21°20'86.6"N; 83°54'94.7"E) with fluctuating water discharge and rocky bottom covered with dense growth of filamentous algae (*Spirogyra* sp., *Phormidium* sp.). Of the nine fish species examined *Anguilla bengalensis, Labeo calbasu, Notopterus notopterus, Puntius sarana, Labeo rohita, Catla catla, Tor mahanadicus, Labeo dyocheilus* and *Channa striatus,* only *Channa striatus* showed 76.9% infestation by the *Posthodiplostomum* sp. These parasites with 7.104 mm length and 4.549 mm width were mostly present in the form of black cysts in the muscle and swim bladder. The parasite is reported as pathogenic to fish with symptoms of emaciation and pathological changes in muscle, cartilage, kidney and liver. Further it becomes fatal for the people of raw fish eating habits. *Posthodiplostomum* sp. (Diplostomatidae) is a digenean trematode parasitizing different fish species but occurring most frequently in the family Cyprinidae. The record of this parasite in *Channa striatus* from river Mahanadi indicated its extended parasitism in family Channidae.




Cyst of *Posthodiplostomum* sp. in muscular layer of swim bladder of *Channa striatus*

**A. K. Sahoo, Soma Das Sarkar, Roshith C. M., Ashis Roy Chowdhury, Amoy K. Barui, Abhijita Sengupta and Debasis Saha**

## *Otolithoides pama* (Hamilton, 1822), the predominant species in winter gill net catch from Narmada estuary

*Otolithoides pama* (Hamilton, 1822), a sciaenid under perciformes and commonly known as Pama, forms the predominant species caught in winter gill net (50-70 mm mesh size) from Bhadbhut region of Narmada estuary (Latitude: 21° 40' 873", Longitude: 72° 50' 717"). The species forms an important fishery resource in Narmada estuary and caught throughout the year using gill/bag net. The specimens recorded were within the length ranges of 17.9 to 32 cm. The catch per unit effort (CPUE) was recorded as 300-450 kg/boat/haul. This is a carnivore and feeds both on sub surface and benthic organisms. The main food items were prawns (47.5%), fishes (29.0%) and others (23.5%).

**Dibakar Bhakta, S. K. Das and R. K. Sah**

## CIFRI cage culture technology in Indian reservoirs: a potential tool for second blue revolution

The cage culture technology developed by CIFRI for inland water bodies made revolution in fish production in Indian reservoirs. A single change in the package from indigenous carp to exotic catfish is considered as the turning point in fresh water cage farming in the country. Introduction of omnivorous, fast growing exotic species *Pangasius hypophthalmus* as an ideal freshwater candidate fish for high density cage culture in Indian reservoirs has changed the dimension of reservoir fisheries management in the country. Demonstration of cage culture technology a couple of years ago has led to its wide adoption by the fishers of the Chandil reservoir, Jharkhand. Low cost cages, made of locally available bamboo was installed in the reservoirs for demonstrating carp seed production that caught the attention of the state fisheries officials of Jharkhand. Considering the benefits and advantages of cage farming in yield enhancement and employment generation, the department of fisheries facilitated and promoted the adoption of this technology.

More than 460 batteries of cages of both GI and HDPE modular are now under intensive operation benefitting more than 430 families and 480 of such batteries have been planned for the years to come. The patronage of State Fisheries Department, local demand and acceptability of the new species

and timely availability of financial support from NFDB has made this revolution a reality. Using locally manufactured floating feed containing maize, MOC and soybean as the major feed ingredients, the average production recorded in cages from the reservoirs ranged between 30-35kg/$m^3$ equivalent to 300-350 t/ha.m. Cage culture has become a common scenario in the reservoirs of many states especially in Chhattisgarh and Jharkhand. This inland open water fisheries enhancement technology has the potential to meet the country's protein need and employment requirement for displaced populace.

**M. A. Hassan, A. K. Das, Vikash Kumar, Md. Aftabuddin D. K. Meena, Mishal P. and A. Pandit**

## First time record of South American sucker mouth armoured catfish, *Pterygoplichthys disjunctivus* in River Cauvery

*Pterygoplichthys* popularly known as "sucker catfish" belonging to family Loricariidae is native to South and Central America. Loricariids with 10 or more dorsal fin rays belong to the genus *Pterygoplichthys*. The fish is traded as an ornamental fish in Karnataka. This fish has been recorded by CIFRI in East Kolkata Wetlands in 2007 and in River Gomti by NBFGR in 2009 . However there are no earlier reports on

the occurrence of *P. disjunctivus* in River Cauvery. The source from where this non-native catfish intruded in to the Cauvery river system was not known. Based on morphometric and meristic characters the species specimen were identified. The captured specimens ranged in size from 273 to 383 mm total length and 150-325 g in weight. They are air breathers and able to survive even in anoxic waters. These catfishes feed by grazing or scraping, removing large quantities of periphyton. Invasion of this river by cat fish necessitates urgent investigation on the likely impact of these invasion on the endemic fish fauna of river Cauvery.

**Preetha Panikkar, D. S. Krishna Rao and T. D. Jagdeesh**

## Ecology and fisheries of an open beel of Assam

A field survey was conducted in Maguri-Motapong beel located in Tinsukia district of Assam to assess its ecology and fisheries. The beel is an open one having connection with the Dibru river and has a water-spread area of 642 ha. The beel was managed under capture fisheries norms with occasional supplementary stocking. The macrophytes in the beel was sparse (approx. 5%) mainly consisting of *Eichhornia crassipes*. Water quality parameters (pH: 6.5-7.1, alkalinity: 23-29 mg/l, free $CO_2$: 1-5 mg/l, DO: 4.0-5.6 mg/l) were favourable for fish production. The phytoplankton density in the beel was moderate (196 Nos./l). Bacillariophyceae comprising mostly of *Nitzschia*, *Melosira*, *Fragilaria* and *Diatomia* formed 75% of phytoplankton population with Chlorophyceae (*Eudorina* and *Volvox*) forming the rest. The beel has considerable water depth of up to 7.62 meters. Its fishery was dominated by indigenous *Labeo gonius* followed by *Wallago attu*, *L. rohita* and *Sperata seenghala*. Other fish species caught from the beel were *Sperata aor*, *Chitala chitala*, *L. calbasu*, *Cirrhinus reba*, *L. bata*, *Channa* spp., *Notopterus notopterus*, *Clarias magur*, small prawns (*Macrobrachium* spp.), *Amblypharyngodon mola* and the exotic silver carp, common carp, grass carp and *Oreochromis niloticus*.

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

## Comparative livelihood of fishers of deep-stocked and shallow-unstocked beels in Assam

Livelihood analysis of fishers from two beels of Darrang district of Assam viz., Mailhata Deeplinga (deep-stocked) and Gathia (shallow-unstocked) was carried out. Mailhata Deeplinga is a seasonally open beel with water depth of 3-4 m and is managed under stock enhancement regime, whereas Gathia is a seasonally open beel with water depth of less than 3 m and managed under capture fisheries regime. The annual income of the fisher households of deep-stocked beel from fishery was estimated to be in the range of Rs. 75,000 to Rs. 85,000. From a family one or two persons was engaged in fishing and the annual employment generation from fishery was estimated at 160-180 mandays. In case of shallow-unstocked beel, the annual income generated from fisheries by the fisher household was estimated to be Rs. 60,000 to Rs. 70,000. Generally one person from the household was reported to be engaged in fishing. However, during the period of non-availability of alternate sources of employment, more than one person in a family was engaged in fishing. The annual employment generation from fishery was found to be 110-130 mandays in this beel. Thus, the management practice of stock enhancement in deep beel yielded higher livelihood from fishery to the fishermen in terms of employment.

**S. N. Goswami, B. K. Bhattacharjya, K. K. Sarma and A. Kakati**

## Brewery waste - a promising low cost ingredient for feed in cage farming of *Labeo bata* in reservoirs of Eastern India

In order to reduce the cost of fish feed, an attempt was made to replace completely the expensive soybean meal with nutrient rich and economic brewery waste for minor carp *Labeo bata*. A feeding trial of 60 days using floating feeds incorporating brewery waste as a source of protein soybean meal based diet containing same amount of protein and energy for comparison, was conducted in a tropical reservoir Maithon, Jharkhand, India. The efficiency of the diets was tested in terms of survival and a number of growth parameters. The study revealed that survival, weight gain and growth parameters (feed intake,

Table - Survival rate (%), Live weight gain (%), SGR (% day$^{-1}$), FCR, PER and ANPU of *Labeo bata* fingerlings fed experimental diets for 60 days

| Parameter | T1 | T2 |
|---|---|---|
| Survival % | 65.00±0.03 | 66.00±0.04 |
| Live weight gain % | 96.05±8.07 | 112±9.80 |
| SGR | 1.92±0.14 | 2.18±0.15 |
| FCR | 2.47±0.24 | 2.18±0.22 |
| PER | 1.45±0.14 | 1.61±0.15 |
| ANPU | 20.31±1.99 | 20.01±2.12 |

Values are means ± SE of three replicates.

utilization and carcass proximate composition) did not differ significantly ($p > 0.05$) despite complete replacement of soybean meal by brewer's waste. However, the cost estimate of diet preparation revealed marked reduction of feed cost of Rs. 9.18 per kg (33.18%) in the test diet as compared to the reference diet. The study suggests that soybean meal could be fully replaced economically with brewer's waste, without any adverse effect on survivability of the caged fish.

**M. A. Hassan, Md. Aftabuddin, D.K. Meena and Mishal P.**

## Initiatives of cage culture in reservoirs of Andhra Pradesh

CIFRI takes initiatives for cage cultures in the reservoirs of Andhra Pradesh. A field survey was made in the reservoirs situated in districts of Guntur (Prakasam barrage), East Godavari (Yeluru and Surampalem) and West Godavari (Kovvada Kaluva and Yerrakalava) to identify suitable reservoirs for cage culture operation. The Officers of the state Fisheries Department facilitated visits. Feasibility of cage culture in reservoirs was discussed in a meeting on 31 October 2014 with Dr. D. S. Krishna Rao, CIFRI and Principal Secretary (AH & Fy), Commissioner of Fisheries and

Director of Fisheries of the state. The state department suggested for low cost cages using locally available materials like bamboo and plastic drums. The small, sheltered Surampalem reservoir, leased to a tribal society, was identified for the installation of cages. The reservoir is near to Rajahmundry and has around 6.0 m of water even in summer. It was decided that CIFRI would train the officers and fishers associated with this reservoir in cage culture and would help in fabrication and installation of the cages.

**D. S. Krishna Rao**

## Fish diversity in river Torsa along the Terai-Dooars region of West Bengal

Torsa is a perennial river of Terai-Dooars region of West Bengal. It originates from the Chumbi Valley in Tibet, China and meets with Kaljani at Balarampur, India and then flows into Bangladesh by the name of Kaljani where it finally meets with Brahmaputra. Surveys conducted in 100 km stretch from Madarihaat to Balarampur, India recorded 25 fish species belonging to 16 genera. Of these, *Barilius bendelisis*, *B. shacra*, *Puntius sarana*, *P. chonchonius*, *P. ticto*, *Aspidoparia morar*, *Cirrhinus reba*, *Mystus cavasius*, *M. tengara*, *Labeo bata*, *Glossogobius giuris*, *Rita rita*, *Rhinomugil corsula* and *Xenentodon cancila* were the common forms. *Aspidoparia morar*, locally called as *Boroli* is the most dominant in catches and is highly relished by the local community. It fetches good

*Aspidoparia morar*

*Tor putitora*

market price (Rs. 400-600/kg) in the Dooars region of West Bengal. The survey also revealed presence of *Tor putitora*, the endangered species. The resource needs further studies on fisheries as well as conservation status.

**Archana Sinha, S.K. Das, Aparna Roy, Kavita Kumari, Suvra Roy, Raju Baitha, Abhijita Sengupta and Deepak K. Biswas**

## Amino acid compositions of 27 food fishes from India and their importance in clinical nutrition

Fish is an important dietary source of quality animal proteins and play important role in human nutrition. Amino acids are important biomolecules which regulate key metabolic pathways and serve as precursors for synthesis of biologically important substances and are building blocks of proteins. Important nutritional information on crude protein content and amino acid compositions of 27 important food fishes from different habitats have been generated under the Outreach Project on "Nutrient profiling and evaluation of fish as a dietary component". The information generated has been documented (Mohanty *et al.* 2014. Journal of Amino Acids, Volume 2014, Article ID 269797, 7 pages, http://dx.doi.org/10.1155/2014/269797) and have also been uploaded in database (http://www.cifri.ernet.in/outreach).

The analysis showed that, in general, the cold water species are rich in lysine and aspartic acid, marine fishes in leucine, small indigenous fishes in histidine, and the carps and catfishes in

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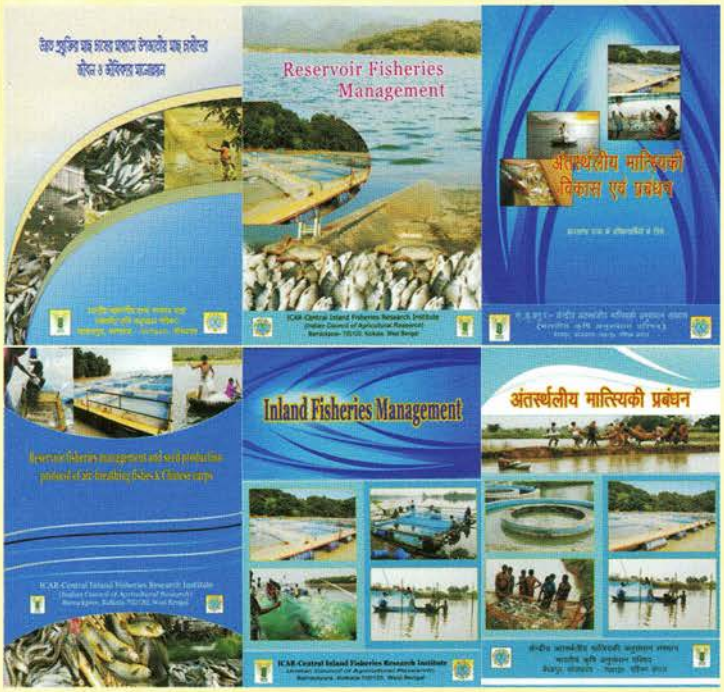
## Training manuals




- Debnath, D. and S. Yengkokpam. Training manual on 'Principles and practices in fisheries and aquaculture'. p. 109.
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- Sinha, A., S. K. Das, A. Roy and A. K. Das. 2014. উন্নত প্রজাতির মাছ চাষের মাধ্যমে উপজাতীয় মাছ চাষীদের জীবন ও জীবিকার মানোন্নয়ন. Training Manual 3. 43p.
- Das, A. K and A. P. Sharma. 2014. Enclosure (Cage & Pen) culture in inland open waters for producing fingerlings & table fish. Training Manual: 3. 126p
- Das, A. K. and A. P. Sharma. 2014. Reservoir fisheries management. Training Manual: 4.
- Das, A. K. and A. P. Sharma. 2014 Reservoir fisheries management and seed production protocol of air-breathing fishes and Chinese carps. Training Manual:5, 236p.

The manual encompasses present scenario of world and Indian fisheries and aquaculture, concepts and principles of fisheries management, technologies or package-of-practices on fish seed production, induced breeding, composite and integrated fish culture, fish nutrition & feed formulation, aquatic animal diseases & their management, classification of wetlands, pen and cage aquaculture technologies for enhancing fish production from reservoirs, wetlands, fish processing technology, livelihood improvement, basic concepts of fisheries statistics, breeding and rearing of ornamental fishes, fish marketing channels and scope for livelihood improvement of fisherfolk. Practical topics included collection, preservation and analysis of plankton, periphyton and benthos, soil & water quality analysis and proximate analysis of fish & fish feeds which will be of great use to the students, extension functionaries, trainers and scientists as well.

## Awards/Recognitions

**Prof. A. P. Sharma**, Director, ICAR-Central Inland Fisheries Research Institute, Barrackpore, was awarded with AEB Honour-2014 by the Academy of Environmental Biology on October 10, 2014.

**Dr. K. D. Joshi** was nominated as an Expert Member in 77th and 80th Expert Appraisal Committee Meetings for Environmental Clearance of Hydro-electric projects of M.O.E.F from 16-17th September 2014 and 11-12 Dec'14, respectively at Indira Paryavaran Bhawan, Jorbagh, New Delhi.

**Dr. B. K. Bhattacharjya** was chosen as a panelist for sub-theme Inland and Ornamental fisheries in the NAAS Silver Jubilee National Symposium on 'Indian Fisheries and Aquaculture: 25 years of achievements and way forward' organized by ICAR-CIFE, Mumbai during 21-22 October, 2014.

**Sh. Absar Alam**, Scientist was awarded Ph. D. Degree in the discipline of Aquaculture by the C.I.F.E, Mumbai on topic "Studies on the life history traits of the *Oreochromis niloticus* (Linnaeus, 1758) in the river Yamuna at Allahabad' on August14, 2014.

## Mass Awarness Programmes

| Name of the Camp | Date | Venue | Participants |
|---|---|---|---|
| Awareness camp on effect and preparedness of less monsoon rainfall | July 17 and 25, 2014 | Jhanor, Bharuch, Singhrot, Vadodara District | 43 and 27 number active fish farmers |
| Importance of fisheries as alternative livelihood option | September 2, 2014 | Sri Ramkrishna Mission, Bamunmura, 24 Parganas (N) | Villagers Bamunmura, 24 Parganas (N) |
| Reservoir fish stocking | September 29, 2014 | Karapuzha reservoir, Wayanad, Kerala | Fishers of Karapuzha reservoir |

## Superannuations

| Name & Designation | Last Place of posting | Date of superannuation |
|---|---|---|
| Shri S. K. Tikader, Assistant | CIFRI, Barrackpore | 31.07.2014 |
| Shri Balkishan Balmiki, SSS | CIFRI, Barrackpore | 31.07.2014. |
| Shri N. K. Das, SSS | CIFRI, Barrackpore | 31.07.2014 |
| Shri K. Kumar, SSS | CIFRI, Barrackpore | 30.09.2014 |
| Shri M. C. Pal, TO | CIFRI, Barrackpore | 30.09.2014 |
| Sk. Mansur Ali, SSS | CIFRI, Barrackpore | 30.09.2014 |
| Shri Debesh Choudhury, Assistant | CIFRI, Guwahati | 31.10.2014 |
| Shri A. K. De, AAO | CIFRI, Barrackpore | 30.11.2014 |
| Smt. Bulbul Mallick, AAO | CIFRI, Barrackpore | 31.12.2014 |

## Transfer

| Name & Designation | From | To |
|---|---|---|
| Shri Bipul Chandra Roy | CIARI, Port Blair | CIFRI, Guwahati Centre |
| Ms. V. L. Ramya, Scientist | CIFRI, Barrackpore | CIFRI, Bangalore Centre |
| Ms. Thankam Teresa Paul, Scientist | CIFRI, Bangalore Centre | CIFRI, Kochi Research Centre |
| Shri G. S. Gawate, SSS | CIFRI, Vadodara Centre | CIFRI, Barrackpore |

## Trainings

| Sl. No. | Name of the training | Date | Venue | Participants |
|---|---|---|---|---|
| 1 | Inland open water fisheries management & development | July 14 - 15, 2014 | CIFRI, Barackpore | 21 farmers from Sagar Island, West Bengal (TSP) |
| 2 | Livelihood improvement through fishery | August 28, 2014 | Sri Sri Beri Gopalpur RamKrishna Mission | 52 tribal beel fishers of Beri Gopal Pur area, 24 Paraganas (N), West Bengal |
| 3 | Assessment of metal and pesticide contamination in fish and shellfish under CIFRI-CDA-ICZM Consultancy Project | September 8 - 19, 2014 | CIFRI, Barrackpore | 7 project staff |
| 4 | Inland open water fisheries management & development | October 16 - 18, 2014 | CIFRI, Barackpore | 18 farmers from Kishanganj, Bihar (ATMA) |
| 5 | NFDB Sponsored training on 'Cage & Pen culture in inland open waters for producing fingerlings and table fish' | November 11 - 15, 2014 | CIFRI, Barackpore | 29 fisher/fish farmers from Telangana (Batch - I) |
| 6 | Inland open water fisheries management & development | November 17 - 21, 2014 | CIFRI, Barackpore | 24 fishers from Madhubani, Bihar (ATMA) |
| 7 | Reservoir fisheries management and seed production protocol of air-breathing & Chinese carps | November 19 - 28, 2014 | CIFRI, Barackpore | 5 fishery officials from Kerala |
| 8 | Beel fisheries development | November 26-28, 2014 | Alipurduar, West Bengal | 60 beel fishers of West Bengal |
| 9 | Inland open water fisheries management & development | December 01 - 05, 2014 | CIFRI, Barackpore | 21 fishers from Saharsha, Bihar (ATMA) |
| 10 | Professional development programme for students of CIFE, Kolkata Centre | December 5-11, 2014. | CIFRI, Guwahati | 3 student trainees of ICAR-CIFE, Kolkata Centre. |
| 11 | NFDB Sponsored training on 'Reservoir Fisheries Management' | December 09 - 13, 2014 | CIFRI, Barackpore | 29 fisher/fish farmers from Telangana State (Batch - II) |
| 12 | Principles and practices in fisheries and aquaculture | December 15-21, 2014 | CIFRI, Guwahati Centre | 24 B.Sc. students of Cachar College, Silchar |
| 13 | Inland Fisheries Management | December 21-30, 2014 | CIFRI, Barackpore | 23 participants of P. K. Memorial College,Dhanbad |






## Exhibitions

| Name of Programme | Venue | Period | Participated By |
|---|---|---|---|
| Central Calcutta Science & Cultural Organization for Youth (18th National Exhibition) | Amarabati Maidan, Kolkata | September 3-7, 2014 | CIFRI, Barrackpore |
| 34th Annual Session of the Academy of Environmental Biology | G. B. Pant University of Agriculture & Technology, Panthnagar | October 10-12, 2014 | CIFRI, Allahabad Centre |
| National Conference on "Challenges for Sustainability of Natural Resources and Environment with emphasis on Aquatic Ecosystem for Livelihood | College of Fisheries, G. B. Pant University of Agriculture & Technology, Pantnagar | November 10-12, 2014. | CIFRI, Allahabad Centre |
| 10th Indian Fisheries and Aquaculture Forum and 5th Global Symposium in Aquaculture and Fisheries | NBFGR, Lucknow | November 12-15, 2014 | CIFRI, Allahabad Centre |
| Krishimela 2014 | GKVK campus in Bangalore | November 19-21, 2014 | CIFRI, Bangalore Centre |
| 2nd International symposium on marine ecosystem challenges & opportunities | Bangalore | December 2-5, 2014 | CIFRI, Bangalore Centre |
| 26th Krishi Shilpa-O- Banijya Mela | Chandipur, Purba Mednipur, West Bengal | December 6-10, 2014 | CIFRI, Barrackpore |
| National workshop on 'Mahseer in India: Resources, captive breeding, propagation, policies and issues' organised by ICAR-DCFR, Bhimtal | Khanapara, Guwahati | December 22-23, 2014 | CIFRI, Guwahati Centre |
| Sunderban *Yuba Mela* | Taldi M.C. High School, West Bengal | December 22-31, 2014 | CIFRI, Barrackpore |
| Alikaranbarh Seva Sangha (Bajarpor Gramin Pradarsani 'O' Silpo Mela) | Alikaranbarh, Purba Medinipur, West Bengal | December 26-31, 2014 | CIFRI, Barrackpore |


## Promotions

| Name | Promoted to | With effect from |
|---|---|---|
| *Scientific staff* | | |
| Dr.(Mrs.) Preetha Panikkar | Sr. Scientist with RGP ₹ 9000/ - | 30.06.2008 |
| Shri P. Maurye | Scientist with RGP ₹ 8000/- | 16.11.2010 |
| Shri Ganesh Chandra | Scientist with RGP ₹ 8000/- | 24.11.2010 |
| Dr. B. M. Pandit | Sr. Scientist with RGP ₹ 8000/- | 27.01.2011 |
| Shri S. K. Sahu | Scientist with RGP ₹ 8000/- | 25.02.2011 |
| Shri D. Karunakaran | Scientist with RGP ₹ 8000/- | 01.09.2011 |
| Dr. (Mrs.) Sona Yengkokpam | Scientist with RGP ₹ 7000/- | 07.01.2012 |
| Dr. Dipesh Debnath | Scientist with RGP ₹ 7000/- | 26.02.2012 |
| Dr. R. K. Manna | Sr. Scientist with RGP ₹ 9000/- | 19.07.2012 |
| Dr. A. K. Sahoo | Scientist with RGP ₹ 7000/ - | 10.02.2013 |
| Dr. Aparna Roy | Scientist with RGP ₹ 7000/- | 23.06.2013 |


Sharma and Scientists from the CIFRI Headquarter, Regional Centers and Stations including the Heads of Divisions, Heads /In-charges of Regional Centers/Stations attended the meeting. During the three days meeting, scientists presented their achievements and proposed new projects which were critically discussed and suggestions prescribed. Prof. Sharma elaborated the importance of documentation and desired that each and every achievement should be documented so that the same can be verified. He requested the scientists to come out with status papers and policy papers for efficient management of our mandated natural fisheries resources. He emphasized on the need of developing expertise and excellence in flagship research and emerging researchable issues by capacity building of existing scientific and technical manpower. On the last day Scientist-administration interface meeting was also held to forge better coordination between researchers and administration.

## Institute Management Committee meeting

The 43rd Meeting of the Institute Management Committee of the CIFRI was held at Barrackpore on August 18, 2014. The meeting was attended by the members, viz. Prof. A. P.


Sharma, Dr. V. S. Chandrasekharan, CIBA; Dr. (Mrs.) Kanta Das Mahapatra, CIFA; Dr. S. Samanta, CIFRI; Shri Gauranga Ghosh, CIARI and Shri Navin Kumar Jha, CIFRI. The members expressed satisfaction over the action taken by the Institute on the recommendations of the 42nd meeting of the Committee and settlement of advances and suggested improvement in expenditure in the current financial year. It was informed that out of 16 audit paras upto IR 2012-13, 9 audit paras have already been settled. The IMC complemented the Institute Management for getting ISO certification and praised for completion of remodeling/renovation work of Trainee's Hostel. The Chairman briefed the members on the achievements made in the research, training, extension and consultancy work of the Institute and the publications brought out by the Institute. Category-wise training gaps, constraints and future needs for current year and next 5 years for enhancing efficiency and performance of an individual as well as for success of the organization were presented.

## Workshop on 'Preparation of perspective plan for fisheries development in West Bengal'


A workshop was conducted on preparation of perspective plan for fisheries development of West Bengal on August, 30, 2014 at Barrackpore. The Department of fisheries, Government of West Bengal was represented by Sh. C. Dutta who gave a brief presentation on fisheries resources of west Bengal and their potential. He also discussed the activities and initiatives of west Bengal government. Head/Incharges and Scientists of different ICAR fisheries research Institutes/centres namely Dr. M. P. Remesan, CIFT, Kochi; Dr. P. P. Chakraborty, CIFA, Rahara; Dr. B. K. Mahapatra, CIFE Kolkata; Dr. T. K. Ghosal, CIBA, Kakdwip; Dr. Debajit Sharma DCFR, Bhimtal; Dr. S. Ghosh, CMFRI, Vishakhapatnam; Dr. U. K. Sarkar, NBFGR, Lucknow and Dr. P. Chatterjee KVK, Nimpith attended the meeting and put their remarks. Heads of Divisions and incharges of different sections of CIFRI were also present on the occasion.

## Capacity building programme on Lorenzen Model

The institute organized a 'Capacity building programme on application of population model with emphasis on Lorenzen model, in culture-based fisheries management' during September 01-03, 2014 at CIFRI, Barrackpore. A total of 15 scientists from CIFRI headquarters and regional centres viz., Allahabad and Guwahati participated in the programme. Dr. J. Jayasankar, Principal Scientist, CMFRI and Dr. (Mrs) J.

Geethalaxmi, Principal Scientist, CIFT, Cochin and Dr. Rani Palaniswamy, Principal Scientist, CIFRI, Kochi Centre shared their expertise on the subject to develop capacity of participants through theory classes and practical exercises. The application of Lorenzen's model to address the issues of density dependent growth and size dependent mortality in culture based fisheries system was the main focus of the 3 day's deliberation. A Software ENHANCE FISH developed by Lorenzen's laboratory, Florida University, USA was introduced to the participants.

## Workshop-cum-training on fish disease surveillance


A workshop-cum training programme on 'fish disease surveillance' was organized at CIFRI, Barrackpore on September, 18, 2014. The programme was chaired by Dr. B. P. Mohanty, Head, Fishery Resource and Environment Management Division, CIFRI, Barrackpore. All the project workers, including Principal Investigator Dr. B. K. Behera participated in the meeting.

## National consultation on 'Environmental flow requirements for sustaining ecology and fisheries of rivers'

A national consultation on 'Environmental flow requirements for sustaining ecology and fisheries of rivers' was organized on October 16, 2014 at CIFRI, Barrackpore. The consultation was chaired by Dr. Brij Gopal and Dr. K. K. Vass. The external experts on the consultation were Dr. M. Sinha, Dr. V. V. Sugunan, P. Nautiyal, Dr. B. P. Das, Dr. Barat Junjhunwala, Dr. Suresh Babu, Dr. Nitin Kaushal and Dr. M. K. Das. The institute Scientists also joined the programme. The Consultation was aimed to bring more clarity in conceptualization, parameterization and approach to


estimation and prescription of flow requirements for fish and its ecosystems, besides deliberating on current and future research needs by bringing together experts, thinkers, scientists and students in an interactive platform.

## World Fisheries Day and workshop at Allahabad

Allahabad Regional Centre of CIFRI celebrated World Fisheries Day on Nov 21, 2014. To commemorate the occasion a workshop was organised on"*Ganga Nadee kee Bahumulya Matsya Prajatiyan: Sanrakshyan evam Samvardhan kee Awashyakta*". The workshop aimed at highlighting the importance of fish diversity of the Ganga river and to sensitise the fishers, fish traders, fish farmers and N.G.O.s of Allahabad about the situation.

Dr. I. C. Agrawal, former Director, Motilal Nehru Institute of Technology, Allahabad and Chief Guest on the occassion, highlighted about maintaining water quality of the river by using various treatment plants along the river course. Dr. K. D. Joshi, Head of the Regional Centre explained the ecology and fisheries of the river Ganga in relation to multiple stressors; pen culture in the region and studies related to

climate changes. Dr. K.W. Warsi, Deputy Director, Fisheries, Allahabad and Dr. Gyanendra Singh, ADF also informed the participants about various governmental schemes. An exhibition was also organised on the occasion. More than 125 participants including fish farmers, fishers, fish traders, officials of state fisheries department, serving and retired scientists of CIFRI, researchers, representatives of N. G. O. and local institutions and students participated in the programme.

### Hilsa Assessment Working Group meeting under BOBLME (FAO)


The institute organized the BOBLME (FAO) Hilsa Assessment Working Group meeting during November 26-28, 2014. A total of nineteen delegates from Bangladesh, India, Italy and Myanmar participated in the meeting to discuss various issues pertaining to hilsa fisheries in Bay of Bengal (BOB) region. Discussion on the progress of the BOBLME (FAO) funded project on "Quantitative stock assessment of Hilsa in the Bay of Bengal region" was also held. Prof. A. P. Sharma inaugurated the three days meeting and emphasized the formulation of an integrated management plan for hilsa by the participant countries for the BOB region. Dr. D. Panda, Scientist and Principal Investigator of the BOBLME hilsa project had given a detailed outline of the progress of hilsa research carried out under this program.


## Events

### ICAR Foundation Day

Foundation Day of ICAR and National Fish Farmers Day was celebrated on July 16, 2014. Sri Chandranath Sinha, Minister in Charge, Department of Fisheries, Government of West Bengal graced the occasion as Chief Guest. Dr. Pradeep Majumder, Advisor (Agriculture) to Chief Minister, West Bengal; Prof. C. S. Chakrobarty,Vice Chancellor, West Bengal University of Animal and Fishery Sciences, Kolkata; Swami Aghoratmananda Jee, In-charge, Shibananda Dham, Barasat; Smt. Malabika Jha, IAS, Director, Dept. of Fisheries, Government of West Bengal also graced the occasion as Guests of Honour. Around 60 fishers/fish farmers from different states of India participated in the programme. An interaction meeting on 'Mitigation of rainfall deficit in Eastern States' was also organized with the fishers/fish farmers from W. B., Bihar, Jharkhand who shared their views and experiences regarding shortfall of rain. The scientists rendered technical advice to the fishers to cope up with the prevailing problem of lack of sufficient availability of water in ponds, beels and reservoirs. Fishermen from Bihar, Jharkhand and Chhatishgarh were awarded for their outstanding contribution in inland fisheries development in the country. On this occasion a training manual in Hindi language *'Antasthaliya Matisiki Prabandhan'* and another in Bengali language on 'Livelihood improvement of tribal farmers through improved fishery technology' was released for the fish farming community.

### Independence Day

Like every year CIFRI celebrated the Independence Day with

## CIFRI conducted ASRB Examinations

CIFRI conducted important national level examinations for the Kolkata centre of ASRB. During the last six months it conducted the ARS (Prelim) & NET (September 22-28, 2014); Asstt Director, O.L. (22.11.2014); AO & FAO examination (23.11.2014) and ARS, Mains (28.12.2014). The first examination was conducted on-line mode for which the facilities are available at the institute itself. The last two examinations were conducted at the Army Public School, and Bholananda National Vidyalaya, Barrackpore. Dr. S. Samanta was the coordinator for all the examinations except the Agricultural Research Service (Mains) which Dr. Arun Pandit supervised. Dr. D. Nag, Director of NIRJAFT was the observer for these examinations. All the examinations were conducted successfully and peacefully and ASRB officials appreciated the efforts of CIFRI.

## Tribal Sub-plan programme

In continuation of the efforts to uplift the livelihood of tribal fishers, CIFRI took various efforts during the period July-December, 2014. The institute organized two days training programme encompassing various aspects of fish farming during July 14-15, 2014 at Sagar Island. The local communities were motivated to contribute positively towards the sustainable management of coastal ecosystem.

In an another programme the institute stocked Indian major carp seed in canals of western Sundarban to restore the stock after the super cyclone *Ila* along with livelihood support to the dependent tribal fishers. IMC seed were released in six canals of total water area of 22.1 hectare at Bali Gram Panchyat-I, Gosaba Block and Kalitala Gram Panchyat, Hingalganj Block. The tribal fisher women along with male fishers took active part in fish seed stocking in the respective canals. The programme envisaged to benefit 1200 tribal fishermen / women. The institute researchers gave field training for post stocking management practices to the tribal beneficiaries during the month of December, 2014.

An off-campus training programme was organized for the tribal fishers/fish farmers to make awareness about improved fishery technologies with a focus on beel fisheries development for enhancing their livelihood at Berigopalpur, 24 Parganas (N), West Bengal on August 28, 2014 in collaboration with Sri Sri Ramkrishna Ashrama, Berigopalpur. Fifty two fishers joined the training programme in which Dr. A. K Das, Dr. Aparna Roy, Dr. Sanjay Bhawmik, Mr. Sujit Chowdhury participated. A field demonstration was also made on fish culture in pen.

Allahabad centre of CIFRI had undertaken TSP programme in Paliya tehsil of Lakhimpur-Kheri district in Uttar Pradesh which is located in *terai* region. The Chandan Chouki area of Paliya tehsil spread over an area of about 300 $km^2$ near international Indo-Nepal border in close vicinity of Dudhwa National Park and 99% of its inhabitants are *Tharu* tribals. The tribal area is blessed with plenty of water resources including about 90 ponds of different sizes, rivers, tributaries and wetlands. Besides fish farming, most of the tribals are also engaged in fishing activities in the nearby Mohana and Sharda rivers and associated wetlands. After successful completion of training and demonstration, quality 430 kg IMC and exotic carps fingerlings were distributed to 86 *Tharu* fish farmers and were stocked in their ponds. Also distributed 20 quintal fish feed (MOC and rice bran) to 40 needy tribal farmers. The tribals are evincing keen interest in various fisheries related developmental activities being undertaken by CIFRI.

# Flash back

## CIFRI @ 1950s

With the growing food scarcity in the country both during and after the world war II the need was felt for organizing fishery research on an-all India basis for harnessing all cultivable waters in the country for fish production which gives birth to Central Inland Fisheries Research Station (CIFRS) in March, 1947. Although post partition financial and other stringencies in the country made it impossible to have minimum trained staff and equipment till about middle of 1949 when the office and laboratories of the research station were established in temporary hutments of the Defense department in and outside of the Calcutta Corporations water works at Palta near Barrackpore. Since then the institute crossed many milestones and assumed a significant place in the field of inland fisheries research and training in India.

In the beginning, the fish and fisheries research of the CIFRS was organized under three sections, viz., Pond Culture (Cuttack), Riverine and Lacustrine (Allahabad) and the Estuarine (Calcutta). The head quarters was temporarily shifted from Barrackpore to old mint buildings of Calcutta in 1953 to facilitate the construction work at Barrackpore. The permanent buildings at Barrackpore were formally declared open by Dr. B. C. Roy, the Chief Minister of W. B. on 17.06.1959. Sh. M.V. Krishnappa, Union Deputy Minister of Agriculture presided over the occasion. The research station was built on an area of about 13 acres of land and the main lab buildings have a floor area of 15000 sq ft excluding corridors and verandahs. 51 residential quarters have also been built. The new buildings have been constructed at a total cost of about Rs.13 lakhs. Since then the infrastructure of the institute grows from strength to strength. Research units for Chilika, Hilsa fisheries, Statistics, Lacustrine fisheries and Tilapia have been sanctioned during the year 1955-56. A paddy-cum-fish culture unit, a weed control unit and a research unit to study the role of soil composition in fish ponds have also been added at Cuttack subsequently. Different survey centres have been established during 1956-57 for investigations on


fisheries and fish population of Hooghly, Matlah and Mahanadi estuaries. An additional pond culture unit at Jayasagar (Assam) and the Krishna Godavari and Narmada, Tapti Fisheries Research Unit were established in 1957-58.

Lacustrine unit which was established in Aug 1956 shifted to Tungabhadra reservoir site at Hospet in the next year. An exploratory fishing and research vessel specially designed for operation in the Sundarbans was received in the year 1958-59.

The overall incharge of the research station was known as the Chief Research Officer (CRO) and Dr. T.J. Job was the founder CRO who led CIFRS upto November, 1951. Dr. H. Srinivasa Rao followed him. He relinquished office during Aug, 1954 and Dr. B.S. Bhimachar assumed charge of the post. He was at

Dr. T. J. Job Dr. H. Srinivasa Rao Dr. B. S. Bhimachar

the helm upto 1966 and many path breaking achievements were made during his tenure. He played a lead role in the Committee on Standardization of the names of fishes and fishing subjects. During 1956-57 major emphasis was put to strengthen the human resources. As a result, a post of Research Officer (RO) (Sr. scale), 6 posts of ROs (Jr. Scale), 9 posts of Asstt. Research Officers (ARO), and two posts of Research Asstts (RA) (Selection grade), in addition to 80 class III and class IV posts were sanctioned during the year. Subsequently 8 new AROs were appointed during the year 1959-60.

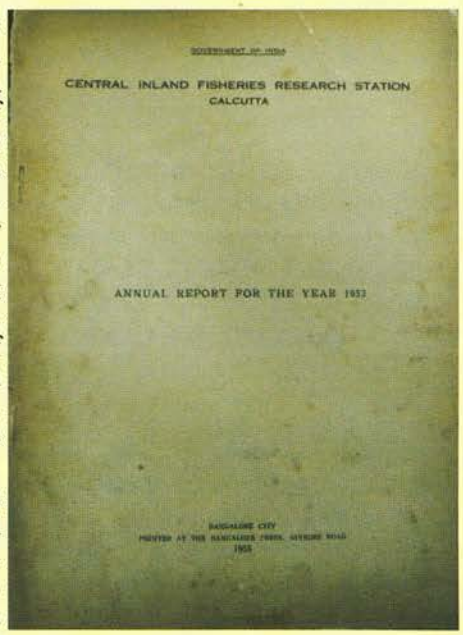
Studies on suitability of exotic fish *Tilapia mossambica,* economic methods of control of noxious weeds, observations on the breeding and fecundity of major carps, culture of fish in paddy fields, and role of soil composition in fish production, improving methods of fish transport were some of the important investigations carried out at Cuttack Centre during fifties. The institute made it possible to induce some of the Indian carps to breed in confined waters by injection of pituitary gland hormones in 1957-58. The successful breeding of major carps induced by injection of pituitary gland hormones under the leadership of Sh. Hiralal Chowdhury, ARO is an epoch making breakthrough in the annals of Indian inland fisheries research which not only ensured supply of quality fish seed but also produced various strains of any particular species by selective breeding.

Significant research time was devoted to study the migratory habits, biological characteristics, food habits of Hilsa and other mullets. Riverine and Lacustrine section surveyed the fish and fisheries, hydrobiological conditions and biology of commercially important fishes of major rivers and estuaries of the country. A sampling survey scheme to estimate total catches and catch per unit effort in the estuaries was successfully conducted for the first time in 1956-57. A detailed study of the fishery of Sundarbans along with intensive environmental investigations was also carried out for the first time. The catch database indicated that a total of about 511 MT

of fish were estimated to have been landed at Sadiapur, Allahabad in 1956. Hilsa accounted for 59.4% of annual catches followed by major carps 32.5% and Cat fishes 17.7%. During 1959-60 the daily catch of Ganga ranged from 1071kg in Aug to 3047kg during July. A total of 3838MT of fish has been estimated to have been obtained from chilika lake during 1958 among which Prawns contributed 30.42% followed by mullets 20.97%, clupeids 16.39% and cat fishes 10.46%.

Detailed investigations on the fish and fisheries of the Tungabhadra reservoir have been initiated in 1957-58. Inventory of all the fishing villages located along 920 miles stretch of the Ganga from Bulandsahr to Lalgolaghat has been completed as also a 500 miles of Jamuna from Agra to Allahabad in 1957-58. The total quantity of fish caught in the Hooghly estuary was estimated to be 1947 metric tones during 1956 which included Hilsa 60%, prawns and shrimps 45.4%. Report of the inventory of lacustrine fishery in India was completed in 1957-58. A water pollution unit has been established to study the effects of industrial wastes on fish and fisheries in the polluted portion of the river sone at Dehri during 1953. Studies on the toxicity thresholds of over 36 chemicals likely to be present in different industrial wastes have been made in 1957-58.

In publication front, inspite of the financial and infrastructural constraints the research staff could publish 49 scientific papers upto 1953. The 'Hand book on fish culture' has been prepared during 1952-53. From 1953 to 1959-60 the institute published a total of 110 scientific papers in addition to the final report of the committee on standardization of names of fishes and fishing subjects to Government. The institute organized the first all India Fisheries Exhibition at Cuttack with collaboration with Fisheries Department of Orissa and Central Marine Fisheries Research Station in 1955-56. A total of 12 sessions of the inland fisheries training course were conducted upto 1959-60 and a refresher course on fish culture was conducted during 1958-59. Trainees from different states of India and foreign countries like Burma, Thailand, Philippines came.




The CIFRI stalwarts got several awards and recognitions. Shri K. H. Alikunhi, was awarded with Chandrakala Hora Memorial Medal for the year 1954 by the National Institute of Sciences of India. He was deputed as a special instructor at the third international inland fisheries training centre at Indonesia under the auspices of FAO of UN during 1955-56. Dr. Bhimachar, represented Govt. of India at the 8th session of the Indo-Pacific Fisheries Council at Colombo from 4th to 22nd Dec, 1958. Dignitaries from Mexico, Germany, USA, China, Japan, Burma, Uganda, Thailand, Malaya, FAO, Trinidad, Egypt, Rome, Hawaii visited the institute. The institute research officers were deputed to many countries for training and other purposes like: Dr. Jones, USA (1953), Dr. Hiralal Chowdhury, USA (1954), Sh. S.J. Karamchandani, USA (1956-57), Sh. A David, Canada (six months) Dr. T. V. R. Pillay, USA (1957-58), Sh K. H. Alikunhi, Japan (1959-60) and Dr. V. T. Pantulu, Canada.

Compiling & Editing
**Dr. Arun Pandit**

## Obituary

**Dr. Hiralal Chowdhury (21.11.1921 to 12.09.2014)**

Prof. (Dr.) Hiralal Choudhury got the success of induced breeding in IMC for the first time on July 10, 1957. This is an epoch making event in the fisheries sector in India which paves the way for blue revolution. To commemorate this great achievement the Government declared July 10 as National Fish Farmers' Day since 2001. Recognizing his illustrious career a string of honours/awards were conferred on him. Gamma-Sigma-Delta award by Auburn University, Chandrakala Hora Gold Medal, Rafi Ahmed Kidwai Award, and DSc from CIFE, Mumbai are some of the awards. He is known as an excellent teacher, glorious scientist, a true human being and a visionary and was rightly called as father of induced breeding. This great soul departed us on September 12, 2014. We pray God almighty for his soul to rest in peace and let the family members get strength and courage to bear this irreparable loss.

# अनुसंधान उपलब्धियाँ

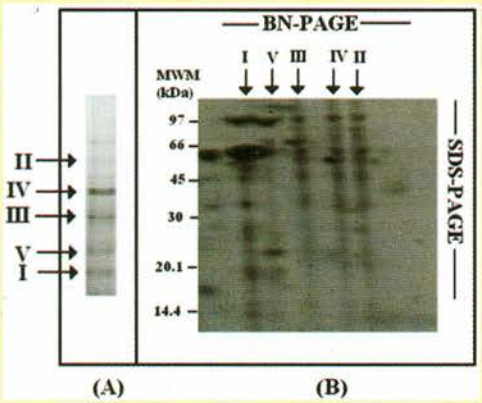
## ओडिशा राज्य के जल निकायों के लिये ई–एटलस

केन्द्रीय सेक्टर योजना के अंतर्गत "मात्स्यिकी क्षेत्र में जी आई एस एवं डेटाबेस का सशक्तीकरण" परियोजना हेतु ओडिशा राज्य के लिये डिजीटल मैप का विकास किया गया। इन मैप में राज्य के जिलों एवं अंचलों के सीमाक्षेत्रों को टी एन टी–मिप्स के आधार पर दिखाया गया है। इस मैप में IRSP6 LISS III एवं पैनक्रोमेटिक संवेदकों द्वारा प्राप्त मात्स्यिकी संसाधन क्षेत्रों को जल निकायों से चिन्हित किया गया है तथा सड़क परिवहन एवं रेलमार्गों को भी दिखाया गया है। इन मैपों का उपयोग अत्यन्त ही सरल है। एक ही चित्र में जलक्षेत्र, उनका विस्तार

एवं अन्य महत्वपूर्ण सूचनायें केवल एक स्क्रिन से ही प्राप्त हो जाती हैं और इन सूचनाओं की सहायता से जी आई एस प्रणाली के आधार पर मात्स्यिकी योजनाओं का विकास कर सकते हैं।

**एस के साहु एवं मलय नस्कर**

## मछली के माइटोकोन्ड्रियल प्रोटीन का प्रदूषण जैवसूचकों के रूप में प्रयोग करना – 2D BN PAGE एप्रोच




मछली के गिल एपिथेलियम का कार्य आयनों का स्थानांतरण करना है। आयनों के स्थानांतरण एवं विनिमय से रक्त का पी एच नियंत्रित होता है। ए टी पी, जिसे ऊर्जा कण कहते हैं, ऑक्सीडेटिव फॉस्फोरिलेशन प्रक्रिया (OXPHOS) के माध्यम से माइटोकोन्ड्रिया के भीतर पैदा होता है। कोशिका में माइटोकोन्ड्रिया के व्यवस्थित नियमन ए टी पी के अपेक्षित स्तर को बनाये रखता है। प्रदूषकों एवं इसके कारकों के कारण मछलियों की कोशिकाओं में ऑक्सीजन की मांग बढ़ जाती है जिसके फलस्वरूप माइटोकॉन्ड्रिया एवं इसकी ऑक्सीकरण की प्रक्रिया भी अधिक होने लगती है। माइटोकॉन्ड्रियल प्रोटीन विश्लेषण के लिये विकसित नीले रंग वाली द्विआयामी पॉलिक्रिलेमाइड जेल इलेक्ट्रोफोरेसिस प्रक्रिया (2D-BN-PAGE) लोबियो रोहिता (रोहू) प्रजाति के माइटोकॉन्ड्रियल ऑक्सफोस के अध्ययन के लिये एक महत्वपूर्ण उपकरण है। इस तकनीक से क्रियाशील एवं एन्जायम वाले सक्रिय प्रोटीन को अलग–अलग किया जाता है।

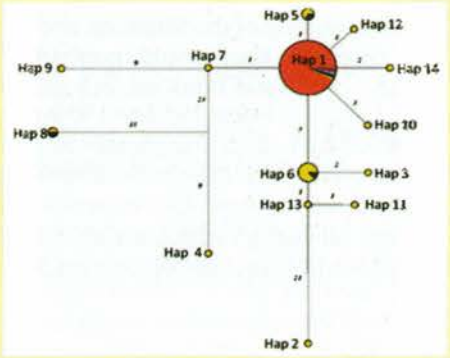
**प्रवीण मौर्य**

## तीव्रता वाली हेलोफिलिक बैक्टीरियम, हेलोमोनास सेलिना एस पी स्ट्रेन का संपूर्ण जीनोम सिक्वेसिंग

हेलोफिलिक सूक्ष्मजीवी के प्रोटीन के कार्यों में स्थिरता केवल लवण और एन्जायम के कारण आती है तथा हेलोफिलिक एवं हेलोटोलरेन्ट बैक्टीरिया के विशिष्टीकरण से हेलोटोलेरेन्ट जीन के विकास उवं उत्तरजीविता के कार्यों के बारे में विशेष जानकारी प्राप्त होती है। प्रस्तुत अध्ययन में हेलोमोनास सेलिना एस पी स्ट्रेन सिफरी1 को लवण क्रिस्टल से अलग किया गया। इस प्रक्रिया को ट्राप्टिक सोया ब्रोथ से किया गया जिसमें 2 प्रतिशत सोडियम क्लोराइड था एवं पी एच मान 7.3±0.2 रखा गया। सिफरी1 का 16S rRNA जीन सिक्वेसिंग हेलोमोनास सेलिना से संबंधित होता है। जीनोम की व्याख्या NCBI प्रोकेरियोटिक जीनोम एनोटेशन 2013 के द्वारा की गई है। जीनोम शोटगन परियोजना को DDBJ / EMBL / जीनबैंक, एक्शेसन नं. JOKD00000000 में जमा कर दिया गया है।

**बी के बेहरा, डी. के मीणा एवं ए. के. जेना**

## अलग–अलग नदीय तंत्रों से प्राप्त भारतीय मेजर कार्प, सिरहिनस मृगला (हैमिल्टन, 1822) प्रजाति के मछलियों का माइटोकॉन्ड्रियल साइटोक्रोम बी जीन द्वारा तुलनात्मक अध्ययन




देश के तीन प्रमुख नदीय तंत्रों, गंगा, नर्मदा और ब्रह्मपुत्र से भारतीय मेजर कार्प, सिरहिनस मृगला (हैमिल्टन, 1822) प्रजाति के मछलियों को एकत्र किया गया तथा इनकी अनुवांशिक पृथकता का तुलनात्मक अध्ययन माइटोकॉन्ड्रियल साइटोक्रोम बी जीन के सीधे सिक्वेसिंग द्वारा किया गया। mtDNA साइटोक्रोम बी सिक्वेंस का जीन बैंक एक्सेशन नं. है – KC122393-122396; JX986918-986953; JQ912098-912101; KC294355-294364; KC294340-294349; KC294365-294372; KC294352-294354; KC294375-294376 और JQ912102-912110। मृगल के 89 नमूनों के चार न्युक्लियोटाइड की औसत नियमितता थी – ए : 27.13 प्रतिशत; टी : 29.36 प्रतिशत; जी : 14.93 प्रतिशत; एवं सी : 28.52 प्रतिशत। सी मृगला के साइटो बी रिजिअन का न्युक्लियोटाइड सिक्वेंसन A+T rich (56.49 %) और ट्रान्जीशन से ट्रान्सवर्शन का अनुपात 2.42 था। मृगला के 89 नमूनों से यह पता चलता है कि हैपलोटाइप और हैपलोटाइप विविधता 0.304–0.692 एवं न्युक्लियोटाइड विविधता 0.009–0.02 था।

**बी के बेहरा, वी. आर. सुरेश, ए. के साहू, डी. पंडा, डी. के मीणा, पी. दास, डी. भक्ता, डी. के. बिस्वास एवं ए. के. जेना**