

# The Inland Fisheries News

Newsletter of the Central Inland Capture Fisheries Research Institute

Volume 2

July - December 1997

Number 2

## Rapid Survey of River Mahanadi

**Scientists of CIFRI conducted a rapid survey of river Mahanadi for the first time during 1995-1996 from its origin at Pharsiya to its estuarine mouth at Paradip to assess the status of fisheries and environment.**

The study revealed that the drainage area of 1,41,589 sq.km is distributed mainly in Madhya Pradesh (53%) and Orissa (46.3%), leaving negligible stretches in Bihar (0.5%) and Maharashtra (0.2%). The upstream river course is split repeatedly by boulders and sand-bars, either to end up in blind courses or to rejoin the main flow. The lower stretch exhibits scanty muddy basin and mostly sandy bed. Most of the distributories suffer from inadequate headwater flow and become weed-chocked readily. Twelve deep-pools and nine reservoirs above Hirakud Dam provide ample shelter to the fishes and offer some scope for fishing. Such a deep-pool above Kamaldihi, serving as a fish sanctuary, is presumed to be the largest in Asia.

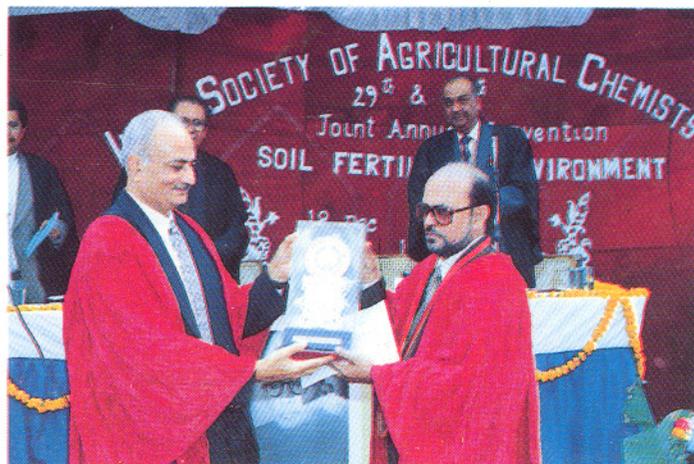


**Weed chocked Alaka distributory of river Mahanadi**

Aided by an annual rainfall of 1000-1500 mm, the discharge rate assumes a height of 44,740 cumecs as the river descends from an altitude of 300 m to MSL during its 857 km run.

[contd. page 2 col.1](#)

### Dr. M. Sinha, Director, CIFRI conferred PARAM KRISHI VAIGYANIK AWARD



Dr. Maniranjan Sinha, Director, CIFRI, was honoured with the prestigious **Param Krishi Vaigyanik Award** 1996-97 at the 30th Annual Session of Indian Society of Agricultural Chemists held at Sheila Dhar Institute of Soil Science (University of Allahabad) during December 18-20, 1997 besides the **Fellowship** of the Society. Dr. Sinha was conferred this award for his outstanding contributions in inland fisheries research in the country. The award carries a cash prize of Rs.10,000.00, a gold medal, a memento and a citation. The award is given after every four years to a distinguished scientist of international repute in Agriculture/Soils and Agricultural Chemistry/Fisheries.

The survey revealed existence of 78, 24 and 110 fish species in the upper, middle and lower stretches respectively, indicating a rosy picture of fish biodiversity. Fish landings are at an optimal level. Average upstream catch (25-100 kg day<sup>-1</sup> centre<sup>-1</sup>) comprises mainly catfishes (40%) and minnows (35%). Catch at Sonapur (248 kg day<sup>-1</sup>) is higher than the average catch of the middle stretch (36 to 122 kg day<sup>-1</sup> centre<sup>-1</sup>), because carps are the prime contributors. The fish yields of the lower zone are 50-250 kg day<sup>-1</sup> site<sup>-1</sup> at freshwater stretch up to Mundah barrage, 400-600 kg day<sup>-1</sup> in the stretch between Mundah barrage and Cuttack barrage and 10-750 kg ha<sup>-1</sup> site<sup>-1</sup> in the estuarine stretch. Due to availability of coastal fishes in the estuarine zone the yield at Paradip touches nearly 18-32 t day<sup>-1</sup> in winter months.



Prawn dominance in the catch from Nuna river at Barpal

Biotic ecosystem of the river is moderately congenial. The plankton and benthos densities being 40-1562 u l<sup>-1</sup> and 18-2117 u m<sup>-2</sup> and primary productivity ranging from 185.6 to 1200.5 mg C m<sup>-3</sup> day<sup>-1</sup>. Among abiotic features the ranges of water temperature, DO, pH, nitrates, phosphates, etc. are within the optimum range but the salinity in the estuary is quite low (0.036-3.64 ppt). Specific conductivities at places are quite high (>6000 μmhos). Though the neutral river bed soil favours the ecosystem, the low organic C content (0.29-

0.86%) is a constraint and the high sand content (70-100%) is a hindrance for the productivity. However, the sandy river bed is supporting the growth of prawn fishery and at places the landing is dominated by ten species of prawns.

### Malaria control fish *Gambusia affinis* abundance in Markonahalli Reservoir

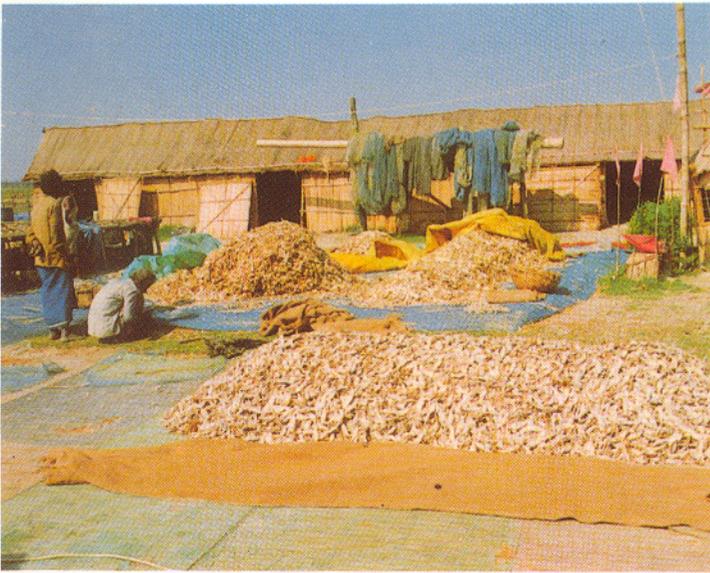
Scientists of CIFRI, while conducting investigations on the ecology and fisheries of Markonahalli reservoir have encountered *Gambusia affinis* in large numbers in small-meshed drag nets operated in the reservoir to assess the populations of weed fishes and pre-recruits of commercial fishes. The catches were overwhelmed by *Gambusia* forming 90-99% in different months. Others species encountered were *Oxygaster clupeioides*, *Puntius ticto*, *P. sophore*, *Rasbora daniconius*, *Chanda nama* and *C. ranga*.

The remarkable dominance of *Gambusia* in Markonahalli reservoir can be attributed to favourable conditions in the reservoir with large tracts of submerged aquatic weeds providing forage organisms and protection from predators. Other factors are overwhelming presence of females in the population, live-bearing character of the fish with each female bringing out several broods in a year and hardy nature withstanding all types of unfavourable conditions.

There is positive evidence to establish that *Gambusia* has adversely affected the species diversity of Markonahalli reservoir. Available indications are - (i) while in perennial tanks of Karnataka as many as 68 species of fish are recorded, in Markonahalli reservoir only 24 indigenous species occur, (ii) *Aplocheilichthys panchas* and *Oryzias melastigma*, the species closely related to *Gambusia* are conspicuous by their absence in the reservoir, though they occur in other water bodies of Karnataka, and (iii) the cyprinid species which generally dominate in inland waters in terms of number of species and abundance are just represented by 12 species only in Markonahalli. The poor species diversity with scarcity of carp minnows is attributed to the predominance of *Gambusia* population competing for food and space. Though direct evidence is wanting, the failure of *Cyprinus carpio* to naturalise in the reservoir in spite of favourable conditions available for its breeding, and the meagre abundance of weed fishes, could probably be traced to the predatory habits of *Gambusia* which is reported to prey on the eggs and larvae of fishes.

## Winter Bagnet Fishery of the Hooghly Estuary - An economic evaluation

Contrary to subsistence character of riverine fisheries of freshwater zone, winter migratory fishery of Hooghly estuary seems to be a highly remunerative activity as is revealed by fishing operations witnessed during the year 1994-95, 95-96 and 1996-97. Appropriate linkages between average CPUE and catch sound a note of caution that high levels of commercial exploitation may not be sustainable in the long run. The entry of more fishing units lured by past trends of profitability may ultimately result in diminishing returns or increasing costs.



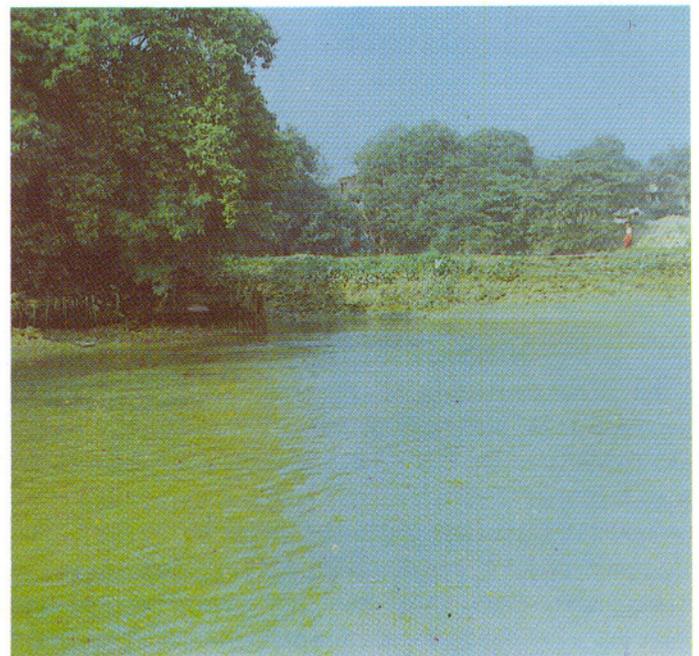
Winter bagnet fishes being dried

Being an owner operator production relationship wage paid employment is more stable in winter fishery compared to their counter parts engaged in rivers whose income is uncertain due to violent fluctuations in fish production. There has been a discernible trend towards increased employment from 4,548 fishermen in 1993-94 to 6,248 fishermen in 1996-97, the wage rate being Rs.4,517/- per fisherman for a period of three months. Winter fisheries being highly labour intensive activity wage component in recent years has been roughly 75 to 78% of total costs. With increased entry of more fishing units employment prospects may improve but much will depend upon the productivity level. Further, mechanisation of this sector has so far not displaced manpower but accelerating pace of mechanisation and upgradation of gear technology may adversely affect in near future the prospects for additional employment.

## Industrial effluents endangering fish life in river Hooghly

*In situ* bioassay tests conducted in river Hooghly at Rishra on the mixed effluents emanating from ICI and other industries showed that the effluents cause 100% mortality to spawn and fry of carps within 30 to 45 minutes and 70 to 90 minutes respectively at outfall and 90 minutes and 190 to 240 minutes of exposure period below 1 km of discharge point. The river water above out fall, during low tide was safe since no mortality in exposed fish occurred till 300 minutes of exposure. The toxic effect of the effluent was extended to above out fall region during high tide when 60% of the spawn and 30 to 41.2% of the fry died within 225 minutes and 105-220 minutes respectively at a distance of 200 metres from the effluent discharge point.

The water quality showed that the high specific conductance due to the high concentrations of magnesium, phosphate, nitrate, calcium, etc. coupled with comparatively low pH are detrimental to the early life stages of the fish. Further, the data indicate that the river stretch near the discharge point covering a length of 1.2 km or more remains unhealthy for the fishes throughout the year.



Industrial discharge causing fatal effect on fish life

## EXTENSION SCENE

### Social Audit Committee visits KVK, Kakdwip



Committee members witnessing net weaving by women participants of KVK programmes

A high-powered Social Audit Committee constituted by the ICAR consisting of the members Dr. S.N. Jha, Ex-Director, A.D.B., Shri Ambika Prasad, MLA, Dr. A.N. Sukhla, ADG (KVK) and Dr. S.S. Ghosh, Zonal Coordinator Zone II visited Institutes' Krishi Vigyan Kendra, Kakdwip and one of its adopted village at Mundapara on December 3, 1997. They went round the KVK and discussed with the scientists and the farmers present there. In the field they were shown round the village and a netting-demonstration exhibiting achievements in fish seed production, table size fish production and prawn production was arranged. They were highly impressed by the achievements in the diffusion of technologies on betelvine, RIR chicks rearing and integrated fish farming. 80% of the population of the village are tribal.

## Extension training at KVK during July- December 1997

Sl. No.	Discipline	No of courses		Beneficiaries	
		On campus	Off campus	On campus	Off campus
1	Fishery	5	7	50	214
2	Agronomy	5	6	50	158
3	Horticulture	5	6	50	134
4	Animal Sciences	5	6	50	129
5	Home Science	5	6	50	156

## HUMAN RESOURCE DEVELOPMENT

CIFRI conducted a short term training programme on *Statistical Methods for Fisheries Data Collection in Open Water Ecosystems* from November 17-22, 1997 for the benefit of scientific and technical personnel engaged in fisheries data collection in the country. This training was imparted to 17 participants representing various State Directorates of Fisheries, Agricultural Universities and ICAR Institutes. The various topics covered during the programme included :

- 1 Basic Statistical Methods used in Inland Fisheries.
- 2 Application of sampling techniques in the estimation of inland fish catch.



Trainees participating in the discussion session

- 3 Methodology for collection and estimation of fish statistics from reservoirs and lakes.
- 4 Data collection methodology for estimation of fish production from estuaries and lagoons.
- 5 Collection and estimation of fish catch in the state of West Bengal.

## ICAR Zonal Sports Meet



### Manage your fish health

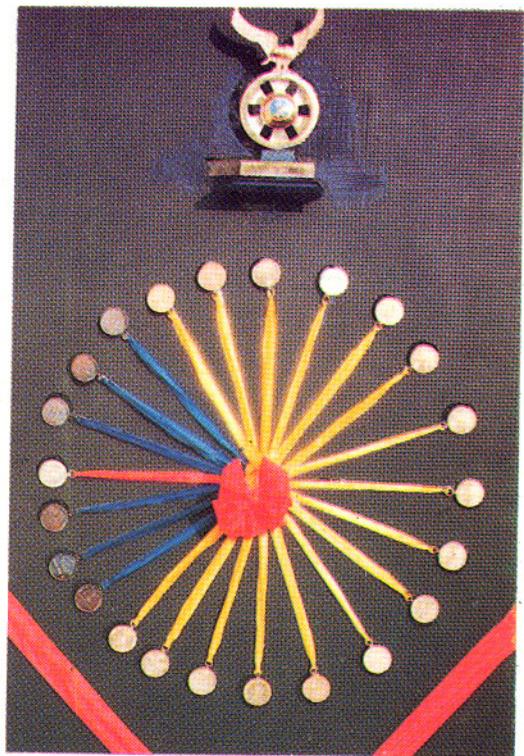
Disease : Trichodiniasis

Symptoms : Fishes have sluggish movement. The normally red gills are coated with a creamish layer of mucus.

Causative agent : Beautiful looking urceolariid ciliates viz. *Trichodina nigra*, *T. reticulata*, *Tripartiella bulbosa*, *T. obtusa*, *T. copiosa*, *Paratrichodina indica*.

Treatment :

- \* Improve water quality
- \* Keep optimum stocking density
- \* Apply  $\text{KMnO}_4$  @ 4 mg l<sup>-1</sup> in pond or
- \* Formalin @ 25 ml l<sup>-1</sup> in pond
- \* Apply bath treatment with NaCl @ 2-3% or
- \* Formaline @ 100 ml l<sup>-1</sup> with aeration.



CIFRI sports contingent came out with flying colours in the ICAR Sports Meet (Zone 1) held at IISR, Lucknow from 15-19 December 1997. The Institute contingent of only six sportsmen bagged 16 gold, 1 silver and 6 bronze medals.

## Staff News

### Fellowship

Dr. K. Chandra, Senior Scientist, CIFRI was awarded **Fellowship of Indian Society of Agricultural Chemists (F.I.S.A.C.)** at the 30th Annual Session of the Society held at Sheila Dhar Institute of Soil Science (University of Allahabad) on December 18, 1997.

### Ph.D.

Shri D.S. Krishna Rao, Senior Scientist, Reservoir Division of CIFRI, Bangalore has been awarded the Degree of Doctor of Philosophy in November 1997 by the Bangalore University for his research thesis entitled **Zooplankton Dynamics and Production in a Tropical Man-made lake.**

### Appointment

Shri P. Muraleedharan	Junior Clerk	14.07.1997
Shri M.V. Krishnan	T-1(Driver)	15.07.1997
Shri Binod Kumar Sahani	SSG-I	09.09.1997
Ms. Divya Agarwal	Junior Clerk	11.09.1997

### Promotion

Shri Sita, SSG-II	SSG-III	15.11.1997
Shri Om Prakash, SSG-II	SSG-III	01.12.1997
Shri Munnilal Mallah, SSG-II	SSG-III	25.11.1997

### Advance Increment

Shri S.K. Biswas, T-I-3	Two	01.01.1997
-------------------------	-----	------------

## Transfer

Dr. M.A. Khan, Sr.Scientist	Allahabad to Barrackpore
Dr. V.V. Sugunan,-do-	Barrackpore to Guwahati
Dr. D.N. Singh, -do-	Allahabad to Bangalore
Dr. V. Pathak, -do-	Guwahati to Allahabad
Dr. H.P. Singh, -do-	Allahabad to Malda
Shri R.N. Misra, -do-	CMFRI, Cochin to CIFRI, Barrackpore (Inter-institutional transfer)
Dr. Archan Kanti Das, Scientist	Barrackpore to Bangalore
Shri G.P. Sharma,FA O	Barrackpore to CARI, Port Blair
Shri Soumitra Roy, T-4	NRCCF, Bhimtal to CIFRI, Barrackpore (Inter-institutional transfer)
Shri J. Khalko, SSG-IV	Tawa Reservoir to Hoshangabad
Shri G.C. Burman, Jr. Clerk	Malda to Salt Lake
Shri Keshaw Prasad, Supdt.	Barrackpore to Allahabad
Shri D. Borgoyary, Driver	Guwahati to Barrackpore
Shri Munnilal Mallah, Driver	Karnal to Allahabad

## Retirement

Dr. V.R.P. Sinha, Principal Scientist	02.01.1997
Shri Ch. Gopalakrishnayya, -do-	28.02.1997
Shri Ravish Chandra, -do-	28.02.1997
Shri G.C. Laha, Senior Scientist	31.08.1997
Shri M.M. Bagchi,-do-	31.10.1997
Shri S. Paul,-do-	31.10.1997
Shri Ram Chandra, T-5	28.02.1997
Shri B.C. Bhattacharyya, Superintendent	28.02.1997
Shri M.C. Raikwar, Sr. Gestetner Operator	31.01.1997
Shri H.K. Routh, T-2	31.07.1997
Shri K.L. Das, T-I-3	31.07.1997
Shri S.K. Das, SSG-III	31.07.1997
Shri Budh Prakash, SSG-III	30.06.1997

## LIBRARY

### New Additions

#### Books

*Baseline studies of biodiversity : The fish resources of Western Indonesia* by Panly, D. and P. Martosubroto  
*Indian feed fishes : Biochemical composition (Papers)* by Gopakumar, K. ed.

*Fish production in irrigation canals - a review* (FAO Fisheries Technical Paper No.317) by Redding, Theresa A and Alex B. Midlen

*Introduction to fisheries management advantages difficulties and mechanisms* (FAO Fisheries Technical paper No.224), by Troadec., J.P.

*An introduction to economics of fisheries management* (FAO Fisheries Technical paper No.226) by Mackenzie, W.C.

*Status of fish stocks and fisheries of thirteen medium-sized African reservoirs* (FAO CIFA Technical paper No.26) by Knaap, Martin Vander

*Introduction of Local area network* by Thomas, Robert M.  
*Environmentally Sound Water Management* by Thanh, N.C. and Asit K. Biswas

*Ecology of river Narmada* by Unni, K. Sankaran  
*Advances in Water Resources Technology* by Tsakiris, G.ed.

*Handbook of Ecotoxicology, vol.1* by Calow, Peter ed.

*The Estuary as a filter* by Kennedy, Victor S.

*Coastal and Estuarine Sediment Dynamics* by Dyer

*Biomonitoring of trace aquatic contaminants* by Phillips, David J.H. and Philip S. Rainbow

*Economics of fisheries management - A critique in third world perspective* by Korakandy, Ramakrishnan

*CRC handbook of Natural pesticides : Methods Vol. II. Isolation and Identification* by Mandava, N. Bhushan ed.

*Economics of Fisheries (a case study of Andhra Pradesh)* by Rao, N. Subba

*Tropical ecosystems - ecology and management* by Singh, K.P. and J.S. Singh

*Impact of plant biotechnology on horticulture* by Prasad, Surendra and L.K. Pareek

*Some facets of biodiversity* by Kohli, R.K., N. Jerath and D. Batish

*Crop protection agents from nature : Natural products and analogues* by Copping, Leonard G.

*Toxicology of aquatic pollution, physiological cellular and molecular approaches* by Taylor, E.W.

*Limnological analysis 2nd ed.* by Wetzel, Robert G. And Gene E. Likens

*Wetlands and Coastal zone regulation and compliance* by Silverberg, Steven and Mark S. Dennison

*Eutrophication of freshwaters* by Harper, David

*The complete aquarium encyclopedia of tropical freshwater fish* by Ramshorst, J.D. Van Managing Ed.

*Fisheries biology, assessment and management* by King, Michael

*Wetlands characteristics and boundaries* by Anon

*Experimental toxicology the basic issues, 2nd ed.* by Anderson, Diana and D.M. Conning

*Global development and the environment series* by Richard M. Auty and Robert B. Potter (Series eds), Chapman, G.P. and M. Thompson

- Immunology methods manual : The comprehensive source book of techniques*, Vol. 1 by Lefkovits, Ivan ed.
- Immunology methods manual : The comprehensive source book of techniques*, Vol.2 by Lefkovits, Ivan ed.
- Immunology methods manual : The comprehensive source book of techniques*, Vol.3 by Lefkovits, Ivan ed.
- Immunology methods manual : The comprehensive source book of techniques*, Vol.4 by Lefkovits, Ivan ed.
- Basic ecology* by Odeem, Eugene P.
- The fish immune system : Organism, Pathogen and Environment* by Iwama, George
- Tropical freshwater wetlands : guide to current knowledge and sustainable management* by Roggeri, Henri
- Fisheries conservation and management* by Ross, Michael R.
- Fish immunology (Diseases of fishes series)* by Anderson, Douglas P.
- Fish ecotoxicology and ecophysiology*. Proceedings of an International Symposium, Heidelberg, September, 1991 by Braunbeek, T., W. Hanke and H. Segner
- Molecular genetics in fisheries* by Carvalho, Gary R. And Tony J. Pitcher
- Stock assessment in inland fisheries* by Cowx, I.G.
- Conservation of endangered freshwater fish in Europe* by Kirchhofer, A. and D. Hefti
- Diseases of Fishes Book 3 : The prevention and treatment of diseases of warmwater fishes under subtropical conditions with special emphasis on intensive fish farming* by Snieszko, S.F. and Herbert R. Axelord
- Diseases of fishes Book 6 : Fungal diseases of fishes* (by Gordon A. Neish) by Snieszko Stanislas F. and Herbert R. Axelord
- Diseases of fishes Book 5 : Environmental stress and fish diseases* (by Gary A. Wedemeyer Fred P. Meyer and Lynnwood Smith) by Snieszko Stanislas F. And Herbert R. Axelord
- Water resources and reservoir engineering : Proceedings of the 7th conference of the British Dam Society held at the University of Stirling, 24-27 June, 1992* by Pair, Noel M.J. Andrew Charles and Susan Walker
- Water Pollution Biology (A laboratory/field handbook)* by Coler, Robert A. and John P. Rockwood
- Conservation of tidal marshes* by Daiber, Franklin C.
- Microbial enzymes in aquatic environments* by Chrost, Ryszard J. ed.
- Integrated environmental management handbook* by O'callaghan, Paul W.
- Fish Swimming* by Videler, John J.
- A text book of fish, fisheries and technology*, 2nd ed. by Biswas, K.P.
- Management of aquatic ecosystems* by Agrawal, V.P., B.N. Desai, S.A.H. Abidi
- Economics of Fisheries* by Joshi, Mahesh, V.
- Recent advances in fish ecology, limnology and eco-conservation, Vol.IV* by Nath, Surendra
- Harvesting aquatic resources* by Biswas, K.P.
- Economics of fisheries management - A critique in third world perspective* by Korakandy, Ramakrishnan
- Limnology of thermal springs* by Saha, S.K.
- Aquaculture Project formulation* (FAO Fisheries Technical paper No.316) by Insull, David and Colin E. Nash
- Aquaculture systems and practices : A selected review* by Baluyut, Elvira A.
- Flowing water fish culture* by Soderberg, Richard W.
- Acidification of freshwater ecosystems (implications for the future)* by Steinberg, C.E.W. and R.F. Wright
- Research studies in Agricultural Extension in India 1957-1993* by R.K. Samanta, M.V. Prasad and T. Vanisri
- Handbook of wetland management* by Brij Gopal
- SWOT analysis of National Agricultural Research Project* by Venkateswarlu, K., Jagadeesh, C. Kalla
- Cage aquaculture*, 2nd ed. By Beveridge, C.
- River biota : Diversity and dynamics* by Petts Geoffrey & Peter Calow
- Fisheries management in crisis* by Crean, Kevin & David Symes
- Introduction to the practice of fishery science* (Revised ed.) by Royce, William F.
- River flows and channel forms* (selected extracts from the rivers handbook) by Petts Geoffrey & Peter Calow
- Fish and prawn diseases in India - Diagnosis and control* by Manas K. Das & R.K. Das
- River restoration selected extracts from the rivers handbook* by Petts, Geoffrey & Peter Calow eds.
- Global warming - implications for freshwater and marine fish* by Wood, C.M. & D.G. MC. Donald
- Handbook for Aquarium fish hobbyists* by Devaraj, K.V.
- Fauna of Chilka lake Wetland Ecosystem Series. I* by Zoological Survey of India
- Hooghly Matla Estuary West Bengal (Estuarine Ecosystem Series Part.II)* by Zoological Survey of India
- Proceedings of the second workshop on scientific results of FORV Sagar Sampada* by Pillai, V.K., SAH Abidi, V. Ravindran, K.K. Balachandran, Vikram V. Agadi
- Applied management for research Institutes, Vol.I* by Singh, R.K., Jyotsana Shrivastava
- Ecological degradation around Gulf of Khambhat, Gujarat - A Status Report* by Anon
- Ecoregions of Gujarat* by Patel, P.P.
- Biological diversity of Gujarat - Current knowledge* by Anon

**Fish and Prawn Disease in India  
- Diagnosis and Control**

by  
**Das, Manas Kr. and Das, R.K. 1997**

The first comprehensive text on fish and prawn disease in India. The book begins with the water quality and its management in relation to fish/prawn health and then details the various aspects of diagnosis and control of fish/prawn disease caused by virus, bacteria, fungus, protozoa, helminth and crustacea in separate chapters. A chapter is devoted to Epizootic ulcerative syndrome. The laboratory methods for diagnosis of various pathogens and diseases are dealt at length. The book concludes with a chapter on the strategy for disease monitoring and quarantine adoption in India. It is a well written book with beautiful photographs in colour and illustrative line drawing. A valuable text for all involved in fish/prawn health. Hard bound, 160 pages, 20 colour plates and 27 illustration.  
Price - Rs.500.00 US\$ 25

**Order form**

Please book \_\_\_ copy/copies of the book on "Fish and prawn disease in India - Diagnosis and control" published by the Inland Fisheries Society of India. A sum of Rs. \_\_\_ US \$ \_\_\_ (including required postal charges) is sent by MO/DD (No..... Dated ..... payable at SBI, Barrackpore) to/in favour of the Secretary, IFSI for despatching the material in Registered Parcel.

\_\_\_\_\_  
Signature

Mailing address : The Secretary, Inland Fisheries Society of India,  
Co. Central Inland Capture Fisheries Research Institute, Barrackpore-  
743101, West Bengal, India.

**TRAINING GALORE AT THE INSTITUTE**

Course Title	Period of Training
Aquatic biodiversity	February 1998
Environmental impact assessment and biomonitoring of inland waters	March 1998
Fish disease diagnosis and control	May 1998
Pen culture techniques	July 1998
Extension methodologies for open water fisheries resources	September 1998
Computer applications in inland fisheries management	November 1998
Advanced analytical instrumentation	December 1998

- ☛ Venue : CIFRI, Barrackpore
- ☛ Total No. Of participants : Ten for each course
- ☛ Course Fee per participant per course : Rs.1,00.00
- ☛ Duration of course : 3 to 10 days each depending on the subject

**For more details, please contact :**

**The Director  
Central Inland Capture Fisheries Research Institute  
(I.C.A.R.), Barrackpore - 743101, West Bengal**

**From the Editors' desk .....**

Now a days a lot of fish culturists come to the Institute with queries regarding the culture and disease problems of *Clarias gariepinus* and *Aristichthys nobilis*. Unfortunately, these exotic species have been imported and are being cultured extensively in West Bengal and other states without the sanction of competent authority.

This brings into focus two important problems viz., (a) the compatibility of these imported species with indigenous fishes as well as the new ecosystem and (b) the importation of exotic fish pathogens. Indications are already pointing towards deleterious effects on the indigenous fishes and the ecosystems due to the introductions. Very recently the Government of India based on the recommendations of the National Committee to Oversee and Regulate Introduction of Exotic Aquatic Species in Indian Waters has advised all States/UTs to immediately destroy the hatcheries as well as the existing stock of these fishes in India. Thus, an urgent need has arisen to regulate the import of culture and ornamental fishes in India. The right step in this direction is to establish fish quarantine units supported by legislation that would ensure compulsory implementation of appropriate procedure for import and export of live fish from outside and within India.

Published by : Dr. M. Sinha, Director, Central Inland Capture Fisheries Research Institute, Barrackpore - 743101, West Bengal  
 Edited by : Dr. Manas Kr. Das Assisted by : Sarvashri H. Chaklader, P. Dasgupta & P.K. Ghosh  
 Printed at : M/S. Toparts Private Ltd., 8/2, Dr. Biresh Guha Street, Calcutta-700017