

# The Inland Fisheries News

Newsletter of the Central Inland Capture Fisheries Research Institute

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## Hilsa can negotiate Farakka barrage

Tagging experiments conducted by the Estuarine Division of the Institute has established that the Indian shad, *Tenualosa ilisha*, popularly known as hilsa can negotiate Farakka barrage, setting to rest all controversies regarding the ability of this fish to ascend the 22-year old barrage. However, the studies could not confirm the presence of three sub-populations believed to be present in the river system.

Hilsa has always been an enigmatic fish not only for the fish loving people of West Bengal, but also for the scientific community. Caught from both rivers and the sea, this prized fish has always fascinated the fishermen from time immemorial. While there can not be a second opinion about hilsa's unmatched taste, just everything else about it is hotly debated. Some scientists believe in the existence of many sub-populations in the

river and some of which, they claim, can complete their life cycle within the freshwater zone without having to undertake long journeys to the sea. Nevertheless, a lucrative fishery of hilsa that existed in the middle stretch of Ganga before the mid-1970s has collapsed soon after the construction of the barrage, clearly indicating that the fish caught in the rivers belonged to the migratory stock.



*Tag being inserted into the body of hilsa before its release into the river*

The estuarine Division of CIFRI has been conducting tagging experiments to trace the migratory routes of hilsa. The interim findings are very revealing. The tagged hilsa left in the river Ganga and Padma below the barrage have been recaptured from the stretches upstream, clearly suggesting its migration across the barricade. There has been similar movement of fish downstream across the barrage. The fish from Bhagirati/Hooghly system cannot move across the barrage due to obstructions at the feeder canal outlet.

Another significant finding is the breeding of hilsa above the Farakka barrage. Some of the recaptured fish had completed its shedding of gonadal products clearly suggesting their breeding above the barrage. Farakka barrage is provided with a fish lock built for the purpose of facilitating migration of hilsa. The lock appears to be ineffective as the collapse of hilsa coincided with the commissioning of Farakka barrage. It is evident that hilsa caught in the middle stretch of Ganga during the pre-Farakka barrage days was accountable to the migratory stock of Padma and Hooghly. In the recent past, there

has been some evidence of recruitment in the upstream stretches which aroused the curiosity of many. The present findings prove beyond doubt that the breeding reported above the barrage is due to the migratory stock.

## RESEARCH HIGHLIGHTS

### Fish and prawn disease

As a part of the fish/prawn disease monitoring programme the estuarine impoundments (*bheries*) of West Bengal were surveyed. White spot disease was diagnosed in 16 *bheries* causing serious epizootics in *Penaeus monodon*. These *bheries* receiving tidal waters had organic matter in the decomposing phase. This resulted in a perceptible deterioration of the water quality as reflected by high levels of unionised ammonia (0.2 to 1.1 ppm) and high bacterial load ( $8.4 \times 10^4$  to  $1.92 \times 10^5$ ). But in three *bheries*, where the water quality was optimum mortality of *P. monodon* with WSD was not encountered. The remedial measures found effective were: i) removal of all floating and submerged organic matter, ii) application of bleaching powder @ 1 ppm, and iii) pre-treatment ponds before the ingress of tidal waters for culture into the *bheries*.

Thus, stress in *P. monodon* seems to be an important predisposing factor for white spot disease outbreak. As such, maintaining optimum water quality of culture areas is absolutely essential for controlling intensity of white spot and other diseases of prawn.

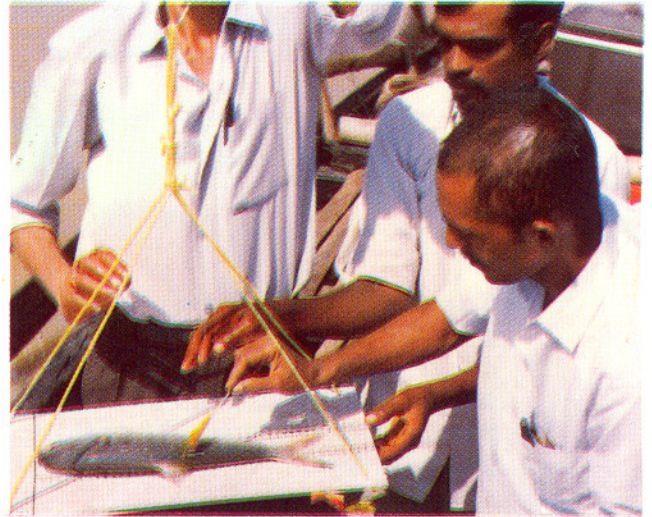
### Narmada survey

As a part of the environmental reappraisal of the major river systems of the country, the river Narmada was surveyed during 1996 covering its entire stretch from the origin at Amarkantak to Gardawara, the confluence with the sea. The study included physico-chemical characteristics of water and soil, their diurnal variations and the primary productivity. The pH was acidic in the upper stretches which gradually changed to alkaline as the river debouched from the hills to the plains. Similar increase was recorded in respect of hardness, alkalinity and primary production.

### Microbiological profile of the river Ganga

Under the environmental monitoring of the riverine ecosystem, the Institute has studied the bacterial load of the river Ganga from Haridwar (Uttar Pradesh) to Nurpur (West Bengal).

The highest total bacterial count was recorded as  $572 \times 10^4$  at Nurpur and the lowest of  $22 \times 10^3$  at Patna. This is attributed to the additional discharges being received at this site from the rivers Damodar and Rupnarayan. The general centre-wise trend for total plate count was Nurpur > Kanpur > Dakshineswar > Varanasi > Nabadwip and Haridwar > Bhagalpur > Patna. The trend indicates that even at Haridwar the bacterial load has increased. The trend of faecal coliform load was different which was the highest ( $90 \times 10^3$ ) at Kanpur. The general centre-wise trend for coliform was Kanpur > Varanasi > Dakshineswar > Haridwar > Nurpur with Patna, Bhagalpur and Nabadwip recording similar counts. It is observed from the present study that the bacterial load at Haridwar is steadily increasing, indicating the changing pattern of water quality at this reference site.



Top: Tagged hilsa being weighed before release  
(Report on page 1)

Below: Infected specimens of prawn and fish



# National Workshop on Fish and Prawn Disease Control and Quarantine Adoption

A National Workshop on Fish & Prawn disease epizootics and Quarantine adoption in India was organised on 9th October, 1996 as a part of the Golden Jubilee celebrations of CIFRI. The Workshop was inaugurated by Sri Kiranmay Nanda, Minister of Fisheries, Govt. of West Bengal, in a function presided over by Dr. P. V. Dehadrai, Deputy Director General (Fy), Indian Council of Agricultural Research. More than 50 participants representing State Governments, Universities and Research Institutes participated. The Workshop deliberated on this vital topic and came out with some useful recommendations.

The main objectives of the Workshop were to:

1. identify the major fish and prawn diseases of concern to researchers, extension functionaries and fish farmers,



2. gain knowledge on the diagnosis, etiology, epidemiology & pathogenesis of the major diseases epizootics in India,
3. enlighten the status of the existing prophylactic therapeutic & quarantine measures for control of major disease epizootics, &
4. formulate environment friendly remedial measure to tackle the disease problem & upgrade manpower development.

The Workshop spanned into 3 Technical Sessions. The first session was devoted to the resource papers presented by various experts on fish & prawn disease in India. The second session dealt with the Status papers on fish/prawn diseases. Eight such status papers were presented on different States. The fruitful deliberations by scientists, fishery managers, officials and fish farmers from various Central & State Govt. Organizations brought into focus the various aspects of fish/prawn diseases, their aetiology, epidemiology & pathogenesis. Various remedial measures presently available to tackle the disease epizootics have been critically reviewed. The following recommendations emerged from the Workshop:

1. Having recognized the importance of prevention and control of disease in fish the workshop recommends that a

national network for reporting of disease for the effective management may be organized by the nodal Ministry of Agriculture with designated Research Institutes such as, CIFRI, CIFA, CIBA & CMFRI as commodity institutes to provide research support to the network.

2. To provide help to the private fish farmers and to equip the government sector with capacity to serve and support measures for prevention and control of disease in fish as well as to ensure protection and preservation of aquatic ecosystems for aquaculture management, environment monitoring and diagnostic centres at strategic locations may be established. These centres should be provided with expertise and facilities for lending technical support for water quality and fish health management.

3. Having recognized the problems and constraints in transportation of fish species from one part of the country to other as well as importation/introduction of exotic fish/shell fish species it is necessary to formulate



Top left: Inaugural Session of the Workshop  
Top: Sri Kiranmay nanda inaugurating the Workshop

quarantine procedures for evaluation and certification of the live material with scientific facilities and expertise.

# Sri Chaturanan Mishra

## Union Minister of Agriculture

### Visits CIFRI

Workshop..... from Page ...3

The Hon'ble Union Minister of Agriculture, Sri Chaturanan Mishra paid a visit to the Institute on 12 October 1996. The Director apprised him of the activities and achievements of the Institute. The Hon'ble minister showed keen interest on the projects of the Institute and held elaborate discussions with the Director and the Scientists of the Institute on its future plan and programmes. A video film on the Institute was screened for him. Later, while addressing the staff of the Institute, he expressed his satisfaction over the performance of the Institute and asked the scientists to work hard for the cause of farming community's welfare.

The NBFGR may develop the physical facilities with collaborative support of expertise from CIFA, CIBA, CIFRI & CMFRI. The quarantine regulations may be enforced with the help of the fisheries division of the Ministry of Agriculture and the support of identified research institutes and the fishery departments of state governments.

4. Detailed protocols based on experimental evidence may be standardized for fin/shell fish biomass production in quantity and quality keeping in view the rational use of various inputs such as, feed, drugs, chemicals and water management to ensure sustainable production/productivity.

5. Having recognized the paucity of information in the understanding of cause and effect of diseases of fin/shell fishes the workshop recommends that concerted research programmes on various aspects of the subject may be undertaken by different institutes. In addition to support from research institutes under ICAR & state agricultural universities, the workshop suggests that research in universities and college laboratories may be supported by the ICAR.

Top: Sri Mishra in discussion with Dr. M. Sinha, Director CIFRI

Bottom: The Minister addressing the staff of CIFRI



Various resource and status papers presented in the Workshop have already been published by the Institute.

### Bighead in Yamuna

The bighead carp, *Aristichthys nobilis* has been reported from the river Yamuna. Director of Fisheries Haryana has disclosed this disturbing news to your editor on 8 January 1997 at Lucknow.

The exotic fish was spotted at the landing Centre Jaharsa in the District of Faridabad on 15 October 1996. A specimen weighing 4 kg was seen amidst a catch of 400 kg comprising catla, common carp, *Mystus seenghala*, rohu and mrigal.

After common carp, bighead is the second exotic fish that gained a foothold in Yamuna. The fish might have entered Yamuna from a fish farm adjoining the river. But the presence of bighead in Yamuna sends some bad signals.



# Extension Scene

## CIFRI Survey on the impact of extension

An investigation was carried out at Sunderbans to assess the effectiveness of various extension techniques, the extent of gain in knowledge in production process. Five extension methods viz. Demonstration fish farmers' day & field visit, group discussion, farmers' visit to research station and distribution of extension literature were subjected to the study. Fish farmers income increased due to increase in fish seed and table size fish production as a result of employment of various extension techniques under transfer of technology programmes. Among various extension techniques, demonstration was most effective tool to influence the fish farmers. The least effective method was found to be distribution of literature. Significant improvement of knowledge of fish farmers was observed due to various extension methods. Six major limitation which come in the way of adoption, were identified.



The following Training Courses were organised at KVK, Kakkdip during July-December, 1996.

## Training Programmes of KVK

The Krishi Vigyan Kendra conducted 88 on campus and off-campus training programmes in five disciplines viz. Fisheries, Animal Sciences, Crop Science, Horticulture and Home Science for the benefit of farming community of Sunderbans. A total of 976 trainees, mostly belonging to SC, ST & other backward communities, underwent the training course.

*Top right:* Training on pituitary gland collection

*Bottom:* Netting of fish by the trainees



Discipline	Type of course	Number of courses	Number of beneficiaries
Crop Science	<i>On campus</i>	7	40
	<i>Off campus</i>	15	254
Horticulture	<i>On campus</i>	5	30
	<i>Off campus</i>	11	150
Animal Science	<i>On campus</i>	6	20
	<i>Off campus</i>	9	122
Home Science	<i>On campus</i>	8	30
	<i>Off campus</i>	9	135
Fisheries	<i>On campus</i>	6	10
	<i>Off campus</i>	12	185
Total	-	88	976

## Staff News

### Appointments

A.K. Chakraborti, AAO	11.12.96
A. C. Biswas, Jr. Clerk	21.11.96
R.N. Tiar, SSG IV	4.12.96

### Training abroad

**Dr. K. K. Vass**, Principal Scientist, has been deputed to undergo a one month training programme on coldwater fisheries at the Department of Aquaculture, Iranian Fisheries, Tehran. Dr. Vass was relieved on 26 December 1996.

### Homecoming

**Dr. Dharendra Kumar** is back at CIFRI as Senior Scientist from 3. 9. 1996. He was on deputation to IGKV, Raipur as Professor.

**M. Karthikeyan**, Scientist rejoined on 2.12.96 at the Reservoir fisheries Division, Bangalore after successful completion of a two year Post-Graduate Programme at University of Bonn, Germany.

### Transfer

Shri B.K. Naskar Boatman	Hoshangabad to Barrackpore	19.8.96
Ms. Sukla Das, T-5	NBFR to Calcutta	3.9.96
A.K. Goswami, Driver	Kakdwip to Barrackpore	24.9.96
B.K. Bhattacharjya Scientist	Barrackpore to Guwahati	15.10.96
Kallu Singh, Assistant	Karnal to Allahabad	19.11.96
Sukumar Saha, T-5	Kakdwip to Barrackpore	20.11.96
T. Chatterjee, T-4	Maldah to Calcutta	20.11.96
B.P. Mishra, SSG-I	Kakdwip to D.-Harbour	1.10.96
T.K. Gayen, SSG-I	Kakdwip to Barrackpore	1.10.96
S. Kumar, SSG-I	Allahabad to Karnal	29.6.96
M. Anjanappa, SSG-I	Markonahalli to Bangalore	29.6.96
C. Muniappa, SSG-I	Markonahalli to Bangalore	29.6.96

### Promotions

B.L. Pandey	Scientist	to	Sc (Sr. Scale)	13.9.96
M. Kartikeyan	Scientist	to	Sc (Sr. Scale)	13.9.96
P.K. Katiha	Scientist	to	Sc (Sr. Scale)	13.9.96
Malay Kr. Das	Sr. Clerk	to	Assistant	1.10.96
S. Kumar	Sr. Clerk	to	Assistant	15.10.96
S.S. Sinha	Sr. Clerk	to	Assistant	7.11.96
Achintya Kr. De	Jr. Clerk	to	Sr. Clerk	16.11.96
Ms. S. Biswas	Jr. Clerk	to	Sr. Clerk	16.11.96
K. Rao	Jr. Clerk	to	Sr. Clerk	22.11.96
K.S. Rao	Jr. Clerk	to	Sr. Clerk	22.11.96
Tek Bahadur	SSG-III	to	SSG-IV	19.11.96

S.K. Barman	SSG-III	to	SSG-IV	26.11.96
S.N. Barman	SSG-III	to	SSG-IV	27.11.96
R.N. Tiar	SSG-III	to	SSG-I	4.12.96
Suraj Bahadur	SSG-II	to	SSG-III	18.11.96
Aghnu Sahani	SSG-II	to	SSG-III	19.11.96
S.C. Biswas	SSG-II	to	SSG-III	21.11.96
P. Seshanna	SSG-II	to	SSG-II	121.11.96
K. Kaliannan	SSG-II	to	SSG-III	23.11.96
M.V. Krishnan	SSG-II	to	SSG-III	23.11.96
A. Ramaswamy	SSG-II	to	SSG-III	23.11.96
J.N. Mallah	SSG-II	to	SSG-III	26.11.96
S. Burman	SSG-II	to	SSG-III	26.11.96
Rajendra Ram	SSG-II	to	SSG-III	29.11.96
K. Subramaniam	SSG-I	to	SSG-II	18.11.96
M.P. Das	SSG-I	to	SSG-II	19.11.96
Lal Bahadur	SSG-I	to	SSG-II	19.11.96
Anjanappa	SSG-I	to	SSG-II	20.11.96
Kuldeep Singh	SSG-I	to	SSG-II	19.11.96
K.P. Ram	SSG-I	to	SSG-II	22.11.96
S. Prasad	SSG-I	to	SSG-II	26.11.96

### Retirement

A.B. Mukherjee, Pr. Scientist	31.10.96
V.R. Desai, Pr. Scientist	31.7.96
R.K. Banerjee, Sr. Scientist	16.9.96
M.M. Neogi, Superintendent	31.10.96
R.N. Dey, T-5	31.10.96
D.D. Paudel, SSG-III	31.10.96

### Relieved

**D. K. De Sarkar**, Assistant, was relieved on 6.9.96 to join as Superintendent (Audit & Accounts) at Project Directorate of Vegetable Research, Varanasi.

## LIBRARY

### New Additions

#### Books

*Water pollution biology- A laboratory/field handbook* by Coler, R. A. And J. P. Rockwood

*Aquaculture engineering technologies for future* by The Institution of Chemical Engineers

*Freshwater fisheries management* by Templeton, R. G.

*Water and the quest for sustainable development in the Ganges Valley* by Chapman, G.P. & M. Thompson eds.

*Environmental biology of fishes* by Jobling, Malcolm.

*Biological assessment and criteria - tools for water Resource Planning and decision making* by Davis, Wayne S., T. P. Simon.

*Theory and practice of histological techniques* by Bancroft, John D., Alan Stevens, David R. Turner.

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

*River Pollution: An ecological perspective* by Haslam, S.M. Biochemistry, 4th edition. By Stryer, Lubert



*India, 1995 : A Reference Annual* by Research, Reference & Training Divn. & Published by Publications Divn., New Delhi.

*Limnology in developing countries, Vol. 1* by B. Gopal & R.G. Wetzel.

*Environmental guidelines and standards in India* by Goel, P.K. & K.P. Sharma

*Larvivorous fishes of Inland ecosystems*. Proc. of the MRC-CICFRI Workshop, New Delhi, 27-28 Sept., 1989.

*Management Information System for Agricultural Research*, by Balaguru, T., P. Manikandan Jagdeesh C. Kalla, ed.

*Protection of Aquatic Biodiversity*: Proceedings of the World Fisheries Congress, Theme 3. by Philipp, David P., John M. Epifanio, J. Ellen Marsden, Julie E. Claussen.

*Condition of the World's aquatic habitats*. Proceedings of the World Fisheries Congress, Theme 1. By Armantrout, Neil, B., Robert J. Wolotira eds.

*Conservation and sustainable use of floodplain, wetlands*. Proceedings of the Workshop on the conservation and sustainable use of floodplain wetlands. December, 1993. Calcutta - AWB Publication, No. 113, by Howes, J.R., ed.

*Bracishwater Prawn culture* by Dash, M.C. & P.N. Patnaik.

*Shrimp farming techniques, problems and solutions* by Raj, Samuel Plant ed.

*Problem of land snail pests in Agriculture (A study of the giant African snail)* by Srivasava, P.D.

*Participatory rural appraisal - methodology and applications* by Mukherjee, Neela.

*Agro-climatic regional planning in India. Vol. 1. Concept and Applications*. By Basu, D.N., G.S. Guha.

*Agro-climatic regional planning in India. Vol. 2 : Themes and case studies* by Basu, D.N., S.P. Kashyap

*Methods of analysis of soils, plants waters and fertilizers*. Tandon, H.L.S.

*Harper's biochemistry, 24th ed.* By Murray, Robert K., Daryl K. Granner, Peter A. Mayes, Victor, W. Rodwell.

*Economics of fisheries management - a critique in third world perspective* by Korakandy, R.

*Environmental and ecological biochemistry (Biochemistry and molecular biology of fishes, 5* by Hochachka, P.W. & T.P. Mommsen

*Simple methods for aquaculture : Pond construction for freshwater fish culture - Pond - farm structures and layouts* (FAO Training Series 20/2) by Coche, A.G., J.F. Muir

*A complete guide to aquarium keeping* by Biju Kumar, A. & Harishanker J. & Alappat.

*Environmental protection - a movement* by Verma, S.R., Surendra Singh, Sushil Kumar

*Growth development and natural resource conservation* by Verma, S.R.

*A manual of freshwater ecology (as aspect of fishing environment)* by Santhanam, R., P. Velayutham, & G. Jegatheesan

*Manual of methods in fish biology* by Biswas, S.P.

*Ecology and pollution of Indian lakes and reservoirs* by Mishra, P.C. & R.K. Trivedy eds.

*Ecology of freshwater organisms and insects* by Diwan, A.P. & D.K. Arora

*Environmental water & soil analysis* by P. Trivedy, P.R. & Gurdeep Raj

*Environmental water pollution and its control* by Chhatwal, G.R., et al.

*The fauna of India including Pakistan, Ceylon, Burma and Malaya. (Annelida, Polychaeta)* by Fauvel, Pierre

*Handbook freshwater molluscs of India* by Rao, N.V. Subba

*A manual of aquatic plants* by Fassett, Norman C.

*Everglades : The ecosystem and its restoration* by Davis, Steven M. & John C. Ogden

*The everglades handbook - understanding the ecosystem* by Lodge, Thomas E.

*Freshwater zooplankton of India* by Bittish, S.K.

*Protection of Aquatic biodiversity : Proceedings of the World Fisheries Congress, Theme 3.*

*Fish morphology horizon of New Research* by Dutta Munshi J.S. & Hiran M. Dutta

*Ecological studies in tropical fish communities* by Lowe-McConnell R.H.

*Comparative vertebrate endocrinology, 2nd ed.* By Bentley, P.J.

*Introduction to wildlife and fisheries. An integrated approach* by Scalet Charles G., et al.

*Introduction to water pollution biology* by Schmitz, R. J.

*Ecological Census techniques - a handbook* by Sutherland, William J. Ed.

*Ganga : A water marvel* by Shukla, A.C. & Vandana, A.

*Water treatment handbook, 6th ed. Vol. 1*, by Anon

*Vertebrate endocrinology : Fundamentals and biomedical implications Vol. 1-4 : Morphological considerations* by Pang, Peter K.T. & Martin P. Schreiber

*Attracting fish with light (FAO Training Series No. 14)*, by Benyami, M. *Determination of growth in bony fishes from otolith microstructure (FAO Fisheries Technical paper No. 322)* by Morales - Nin, Beatriz

*Geographical information systems and remote sensing in inland fisheries and aquaculture. (FAO Fisheries Technical Paper no. 318)* by Meaden, Geoffrey & J. James M. Kapetsky

*Introduction to tropical fish stock assessment Part 2 : Exercises (FAO Fisheries Technical paper 306/2)* by Sparre, Per Erik Ursin Siebren C. Venema

*A review of length-based approaches to assessing fish stocks* (FAO Fisheries Technical Paper No. 323).

*Growth and reproduction strategies of freshwater phytoplankton* by Sandgren, Craig D.

*Environmental water resources : Quality demand pollution* by Swarup, R. *Large lakes - ecological structure and function* by Tiger, Max M & Serruya, Colta eds.

*An introduction to radioimmunoassay and related techniques (5th revised edition)* by Chard, T.

*A treatise on limnology Vol IV : The Zoobenthos* by Hutchinson, & G. Evelyn.

*Yearbook of Science and the Future, 1996 (Encyclopedia Britannica*

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Ukrainian Bioch. Journal, 67 (6) 1995, 68 (1-2) 1996

## From the Editors' desk.....

Inland fish production in the country has registered an impressive increase from 0.22 million t in 1950-51 to 2.24 million t in 1995-96. This is a stupendous 10-fold increase at annual growth rate of 6.91%. Two major factors which can be considered responsible for this commendable performance of inland sub-sector are the research back-up by the R&D organization, especially the ICAR research institutes and the well-organised development thrust made by the Ministry of Agriculture. While many innovative technologies have been developed and standardised by the research Institutions, the extensive network of FFDAs and BFDAs operating in the country have made a definite impact in increasing the yield and bringing more areas under aquaculture.

On account of the aforesaid developments, at one stage it had become apparent that inland fisheries was well-poised for a quantum jump and the largest of 4.5 million t was well within the reach. But suddenly, the things have changed in the light of the new environmental concerns. It has now become imperative to examine the impact of intensive aquaculture projects very carefully before any of them are embarked. If the recent debacle in brackishwater aquaculture is any guide, all future projects on intensive aquaculture in the freshwater sector need to be taken with adequate care and only after examining all risk factors. Enhancement and culture-based fisheries of natural and man-made lakes certainly offer a softer option where yield hikes can be obtained with a lesser environmental risks and social conflicts. CIFRI's research programmes assume a special topical interest in this context.

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