# The Inland Fisheries News

Newsletter of the Central Inland Capture Fisheries Research Institute

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## The Backwater Fisheries of Kerala : Need for conservation


Backwaters are an invaluable inland fishery resource of the country, sustaining exceptionally high biological productivity. Being the nursery areas of several finfishes and the penaeid and non penaeid prawns, the fishery of the adjacent marine sector is very much dependant on the health of these water bodies. Investigations conducted by the scientists of Central Inland Capture Fisheries Research Institute in ten backwaters of Kerala indicated that these ecosystems are under varying degree of deterioration, and this environment as a refuge for the prized fishery is rapidly being lost due to a variety of anthropogenic reasons.


Environmental and fishery investigations were conducted in ten backwaters *viz.,* Kadinamkulam, Anchuthengu, Ashtamudi, Kayamkulam, Azhikode, Chettuva, Ponnani, Mahe, Valapattanam, and Neleswaram during 1996-99.

A panoramic view of the backwater

**The Status of the fishery :** Ninetyfour species of fish and shellfish were identified contributing to the fishery of these backwater. Of these species, 83 were fishes, 8 were prawns, and 3 were crabs. Among them 64 species are commonly reported in marine waters, thereby establishing a close relationship of the backwater fishery with that of the marine system.

Nineteen species were basically freshwater species that took a sojourn in the backwater during monsoon or immediately after the monsoon. Over fifty species regularly formed the bulk component in the back water fishery. The important species/ groups of fishes/prawns contributing to the fisheries of these backwaters are *Acanthurus* sp., *Gerres* sp., *Platycephalus indicus, Leognath*us sp., *Etroplus suratensis, Megalops cyprinoides, Arius* spp. *Ambassis* spp., *O.mossambicus, Stolephorus* sp., *S.sihama, Caranx* spp., *Lutjanus* spp., Mullets, Flat fishes, Half beaks, *M.monoceros, P.indicus, P.monodon* and other penaeids and non-penaeid prawns.

The total landings from different backwaters varied from 96.8 t in Mahe to 2898 t in the Astamudi backwater The average yield $ha^{-1}$ varied from 410 kg from the Anchuthengu backwater to 2,747.3 kg from the Azhikode estuary. From the 15,342 ha backwater covered under the survey, the average yield was 630.1 kg $ha^{-1}$ Considering that the coastal interconnected backwaters spread to over 46,000 ha, the total annual yield should exceed 30,000 tonnes.

**Fishing gear and CPUE :** Over 30 types of well differentiated gear were observed during the survey. The density of gear units (No. per $km^2$) was high ranging from 52 in Ashtamudi to 158 at Azhikode, thereby indicating high fishing pressure. The CPUE exhibited wide variation from gear to gear, but exhibited a general trend. The backwaters are being filtered with finely meshed nets *viz.* Stake nets, Chinese dip nets and the seine nets thus fishing out large quantity of small fishes. Obviously, use of an array of small meshed gill net as small as 32-38 mm, at a high density of 72 nos per $km^2$ characterizes an overfishing.

Small meshed stake nets

**Fishermen population :** The density of active fishermen per $km^2$ varied from 58 in Ashtamudi to 152 at Azhikode (Av. 73 nos per $km^2$). Based on this average density, the total fishermen directly depending on the backwater fishery is estimated at about 34,000 and the number of fisherfolk, 0.17 million. There are thousands of other fisherfolk who were engaged in secondary activities related to backwater fisheries.

**Ecodegradation :** Apart from fishing pressure, the fishery is also subjected to severe stress from the habitat loss and degradation. The backwaters are rapidly losing its water holding capacity, both depth-wise and area-wise. The mean depth of the sampling sites had an alarmingly low level of 2.05 m. Reclamation was rampant in several of these backwaters due to agricultural and construction activities or sand deposition from dredging activities. Creation of bundhs across the backwaters have either cut off large sections of the water body for paddy cultivation or reduced the water exchange between sections affecting the fish migrations. The natural deposition of silt brought in by the rivers aggravates this volume loss. The mangrove areas, which used to form nursery and breeding grounds, have been reduced to patches, measuring 1670 hectares.

Environmental assessment during the summer period presented a grim picture. Low transparency and a high turbidity were characteristic features of these water bodies. The highly stressed environment was evident as seven out of the ten water bodies recorded dissolved oxygen ranging from 1.73 to 4.57 $mgl^{-1}$ during the pre-monsoon survey. Marked depletion of dissolved oxygen leading to anoxic condition coupled with presence of sulfides was the most conspicuous observation at certain stations. The study indicated that the coconut husk retting is the most contributing factor to the organic pollution leading to the environmental deterioration.

Apart from fisheries, these water bodies are also being used for transport of men and material, mining of shells, waste disposal, tourism and recreation, and reclamation for agriculture, housing, industries and other activities. Over 200 medium and about 2000 small-scale industries are estimated to discharge effluents into these estuaries. It is reported that organic wastes to the tune of 650 t/d arising from the 14 municipal bodies are directed to them with partial or without treatment.

A view of coconut husk retting site

## Need for fishery regulation and conservation

The important regulatory measures should include a reduction in the fishing effort, mesh regulation for the stake nets and the Chinese dip nets (at least a minimum of 25 mm mesh), a ban on fishery exploitation in the vicinity of bar

mouths, strict registration and licensing of all crafts and gears; prevention of the reclamation of the backwaters for any purpose, protection of the remaining patches of mangroves, pollution monitoring and abatement measures, development of an alternate technology for coconut husk retting and *in-situ* fishery programmes like pen and cage culture to augment the yield.

Backwaters are priceless heritage of the nation for biodiversity and economic and aesthetic reasons. Therefore, the need to protect and preserve them for the posterity is imperative.

## River Yamuna – No longer a congenial habitat for fish

River Yamuna is one of the most polluted river in the country and scientists of CIFRI have been investigating the ecology and fisheries status in various stretches of the river for a number of years. The upper stretch from Yamunanagar to Panipat is of interest because here the maximum management of water resource is taking place. The evaluation of ecology and fishery of this stretch reveal that due to ecodegradation there has been a decline in fish production. During 1998-99 the total fish catch from river Yamuna in its upper stretch was 21.1 t as compared to the previous years 21.78 t. The fish catch from the canal also showed substantial decline of 2.22 t. As a result the total landing declined to 34.49 t (1998-99) from 39.27 t (1995-96). The major causes for the decline in fishery have been pin pointed as (i) water abstraction, (ii) negligible recruitment of major carps and (iii) fishing practice.

However, in the stretch of Yamuna around New Delhi, the river Hindon and their confluence at Dadri village, Kasnagaon the indications of pollution reflected by deteriorating water quality are evident. As a result the biotic communities especially fishes are under stress. The poor water quality in Yamuna near Okhla with low dissolved $O_2$ content (1.4-3.36 mg $l^{-1}$), high levels of free $CO_2$ (10.65-31.8 mg $l^{-1}$) and BOD (66.5-98.44 mg $l^{-1}$) and relatively high levels of nutrients such as nitrogen (0.92-0.98 mg $l^{-1}$) and phosphate (0.61-3.51 mg $l^{-1}$) indicates impact of organic discharge in water. The high density of plankton with greater dominance of diatoms and rotifers were observed indicating high organic load. Benthic fauna were meagre.

Toxicity studies on the fishes *R. rita* and *M. seenghala* in this stressed ecosystem showed accumulation of toxic metals(Zn, Cu, Cr, Pb, Cd) in the kidney. Gill enlargement, gross damage with hyperplasia in gill were common features from fishes sampled from Hindon and Yamuna rivers near Okhla. Kidney exhibited gross damage with disintegration of tubular epithelium. Biochemical studies revealed higher values of plasma urea nitrogen confirming renal incapacity. Enzymatic studies indicated suppression of mitochondrial respiration in fishes.

EIA studies of river Yamuna

## River Godavari – Rapid survey completed

As part of the Institute's research programme of rapid survey of Peninsular rivers Godavari river was surveyed by scientists of CIFRI for appraisal of the ecology and fisheries of this river.

View of river Godavari at Dhalegam

Migratory fishermen at Polavaram

The river has its source in the Western Ghats near Nasik and flows through the states of Maharashtra and Andhra Pradesh before joining Bay of Bengal. The survey revealed no serious habitat degradation and deterioration of water quality in its 1465 km long course. However, at centres where the river receives city sewage and municipal wastes, signs of pollution have been noticed in dry months. The presence of plankton of the group Chlorophyceae throughout the river course indicate the freshness of the environment.

The river is being exploited intensively, especially the lower and the middle stretches. The indigenous carps *L. fimbriatus* and large catfishes *M. seenghala, S. childreni, P. pangasius* and *B. bagarius* are in an over-fished state. At present fishing is mainly targeted at prawn and hilsa, the former by intensive seining and the latter by drift gill nets. Juveniles of large catfishes and miscellaneous fishes occur in the seine as by catch. Some fishermen communities wholly depend on the river for their sustenance exploiting the limited resource of the river. For conservation of the limited riverine fish resource it is essential to wean away the fishermen from river exploitation by providing alternate source of fishing. Actually the improvement of the economic condition of the fishing communities holds the key for conservation of the riverine fish stock.

## EXTENSION SCENE

### Mass awareness campaign against fin fish and shell fish seed destruction

About three lakhs populace of Sunderbans while collecting tiger shrimp seed, have been destroying billions of seeds of other varieties of fin fish and shell fish. This practice may create economic problem for local fishermen and fish consumers. To avoid serious damage to the economy and the ecology of the region, the Extension Section of the Institute has launched "Mass awareness campaigns" to educate the seed collectors to adopt suitable conservation measures. Such activities include trainings, group discussions, field days, film shows and distribution of leaflets containing conservation messages. Local bodies *viz.*, members of the panchayats have been involved to motivate the local population and to establish that the conservation programme has genuine reason to be helped. The Doordarshan Kendra and All India Radio, Calcutta have extended their support by telecasting/broadcasting the messages towards mass awareness of the people.

Fishermen being educated in the mass awareness meeting

## MEETINGS

### Research Advisory Committee

The fifth Research Advisory Committee meeting of the Institute was held at CIFRI, Barrackpore on 19 & 20 April 1999 under the Chairmanship of Prof. H.P.C. Shetty and attended by other members *viz.*, Dr. P. Das, Dr. P.C. George, Shri S. Halder and Dr. M. Sinha.

After discussion on the Action Taken Report of the last meeting, the Heads of Divisions presented the progress and achievements under various projects. After a thorough discussion on individual projects recommendations for future research programmes were formulated.


Research Advisory Committee meeting in progress

## Annual Staff Research Council Meeting

The Annual Staff Research Council meeting of the Institute, was held on 22-23 April 1999. Welcoming Dr. B.N. Singh, ADG (IFY), ICAR, Dr. M. Sinha, Director, CIFRI hoped that his presence would be valuable for fruitful evaluation of the research work. Progress achieved under all the 11 projects of the Institute was presented by respective project leaders. After elaborate deliberations future project work for 1999-2000 was decided.

## Joint Staff Council Meeting

The meeting of the Joint Staff Council of CIFRI was held on 5th May, 1999 at Barrackpore under the Chairmanship of Dr. M. Sinha, Director. The members, official side as well as the staff side attended the meeting and deliberated on the agenda.

Scientist presenting their research achievements before the Staff Research Council participants

# HUMAN RESOURCE DEVELOPMENT

## Training

The Institute organised two training programmes for University teachers, State fishery officials and research scholars *viz.*,

- Short Course Training on Aquatic Environment Impact Assessment, 5-14 January 1999.
- Short Course Training on Fish Yield Enhancement in Open Waters based on Ecological Management, 5-14 May, 1999.

✷ Dr. S. Bhatia, Scientist underwent Short Term Training Course on Polymerase Chain Reaction and Nucleic Acid Probes in Animal disease diagnosis at IVRI, Bareilly.


Dr. M. Sinha, Director delivering introductory lecture to the participants

## Awards

Dr. M. Sinha, Director, CIFRI was awarded the Hon. Fellowship Award 1999 by the Bioved Research and Communication Centre (Research Wing of Bioved Research Society), Allahabad, for the outstanding contribution made in the field of Agriculture.

Shri Vinay Kumar Pandey, Hon'ble Minister, U.P. Govt. presenting Bioved Society Fellowship to Dr. M. Sinha

## CONTRIBUTION TO THE NATIONAL DEFENCE FUND

As a gesture of solidarity with our valiant armed forces the CIFRI family gratefully pays homage to those who laid down their lives for the nation. A sum of Rs.1,06,409.00 has been donated to the **NATIONAL DEFENCE FUND.**

## SPORTS

CIFRI again kept its flag flying high by winning the 15th Inter Zonal Championship Trophy at Goa held from 14 - 17 May 1999. Mr. M. Roy received best athelete of ICAR award in this sports meet.

Shri M. Roy receiving Best Athelete of ICAR award from the Secretary, ICAR

## STAFF NEWS

### Appointment

| | |
|---|---|
| Shri Jyotirmoy Ray, Assistant | 08.04.1999 |
| Shri Somenath Banerjee, SSG-I | 04.06.1999 |
| Miss Bindu Kumari, SSG-I | 15.03.1999 |
| Shri Hemanta Das, SSG-I | 19.02.1999 |
| Shri Sukh Chand Biswas, T-1 | 29.01.1999 |

### Promotion

| | |
|---|---|
| Shri Badal Lal Singha, T-II-3 | 01.01.1995 |
| Shri S. Bahadur Tamang, T-II-3 | -do- |
| Shri N.C. Biswas, T-II-3 | -do- |
| Shri K.K. Dutta, T-II-3 | -do- |
| Shri U. K. Chatterjee, T-II-3 | -do- |
| Shri A.K. Majumder, T-II-3 | -do- |
| Shri M.C. Pal, T-II-3 | -do- |
| Shri D. Bargoyari, T-II-3 | -do- |
| Smt. Abhijita Sengupta, T-II-3 | 27.08.1995 |
| Shri S.K. Das, T-6 | 01.07.1996 |
| Shri N.K. Saha, T-I-3 | 01.07.1997 |
| Shri A. Ramaswamy, LDC | 21.12.1998 |
| Shri Ananda Biswas, SSG-III | 27.02.1999 |
| Shri K. Dharma Raju, LDC | 14.01.1999 |
| Shri A.N. Prasad, SSG-II | 08.03.1999 |
| Shri Uma Sankar Ram, SSG.II | 06.03.1999 |
| Shri P. C. Paramanick, SSG-II | 09.03.1999 |
| Shri R. Palaniswamy, SSG-III | 01.02.1999 |
| Shri S. Kalita, SSG-II | 18.01.1999 |
| Shri Suresh Kumar, SSG-II | 01.02.1999 |
| Shri P. Sahani, SSG-II | 11.02.1999 |
| Shri M. Mahadeva, SSG-III | 08.01.1999 |
| Shri K. Ninge Gowda, SSG-III | 16.01.1999 |
| Shri R. Nagaraj, SSG-II | 08.01.1999 |

### Transfer

| | |
|---|---|
| Shri A.C. Ghosh, Sr.A.O. | CIFRI, Barrackpore to ICAR, New Delhi to join as Under Secretary (Admn.) |
| Shri Kuldeep Singh, T-2 | Hoshangabad to Karnal |
| Shri Arijit Ghosh, T-1 | Allahabad to Barrackpore |
| Shri Sibu Lal Das, SSG-II | Farakka to Barrackpore |

### Retirement

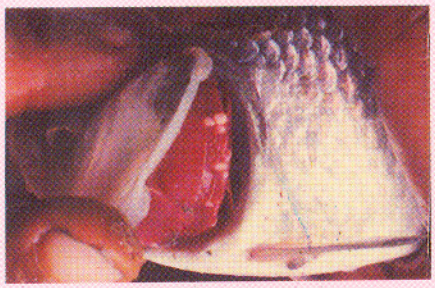
| | |
|---|---|
| Shri C. Selvaraj, Pr. Scientist | 31.05.1999 |
| Shri Jugal Kishore, SSG-III | 30.06.1999 |
| Shri R.C. Singh, T-5 | 30.06.1999 |
| Shri S.N. Burman, SSG-III | 30.06.1999 |
| Shri Biswanath Mondal, SSG-III | 31.03.1999 |

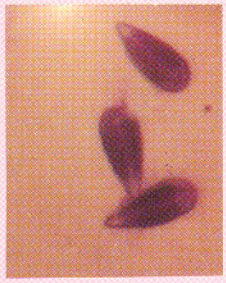
### OBITUARY

***The members of staff of CIFRI express their deep sense of sorrow at the sudden and untimely demise of Shri Pravash Chandra Pramanick, SSG-II posted at Canning whose tragic end came on 7th February 1999.***

***May the departed soul rest in peace.***

## Manage your fish health





**Disease : White gill spot disease**

***Symptoms :*** Gills of infested fishes are covered with whitish cysts of different sizes ranging between 1 mm to 4 mm. The cysts block the respiratory surface as a result fishes surface for gulping air.

***Fishes affected :*** *Catla catla, Labeo rohita* and *Cirrhinus mrigala.*

***Causative agent :*** Myxozoan pathogens - *Thelohanellus catlae, Myxobolus bengalensis, M. catlae* and *M. hosadurgensis.*

**Remedial measures :**

1. Decrease the density of fishes in ponds.
2. Treat pond with mahua oil cake and lime to destroy infective spores.
3. Bath treatment of affected fishes with 3-5% NaCl destroy the developing stages.

## LIBRARY

### New Additions (Books)

*A history of Agriculture in India,* Vol.1-4 by M.S. Randhawa

*Basic histology* by Luiz Carlos Junqueira and Ors.

*Biological Science* by Green N.P.O. & Ors.

*Encyclopaedia of Environment Pollution Planning and Conservation,* Vol. 1-6 by P.R. Trivedi

*Water quality assessments* by Deborah Chapman

*Water Pollution Control* by Richard Helmer and Ors.

*Fish Chromosome Atlas* (Special publication No.1) by A.G. Ponniah & George John

*Wetland ecology resources research and conservation* by A.B. Chaudhuri

*Fish genetics and biodiversity conservation* by A. G. Ponniah, P. Das & S.R. Verma (eds)

*Perspectives in Environment* by S.K. Agarwal and Ors. (eds.)

*Environment and health in developing countries* by Manas Chatterji & Ors.

*Encyclopaedia of world environment,* Vol. 1-5 by P.R. Trivedi

*The impact of species changes in African lakes* by Tony J. Pitcher & J.B. Hart Paul

*Conservation management of fresh water habitats* by P.S. Maitland & N.C. Morgan

*Ecology of Estuaries : anthropogenic effects* by Michael J. Kennish

*The biology of lakes and ponds* by Christer Bronmark & Ors.

*Sustainable aquaculture* by John E. Bardach

*Conservation and management of Aquatic resources* by Ashutosh Gautam (ed.)

*Biodiversity measurement and estimation* by D.L. Hawksworth (ed.)

*Biology of fishes,* 2nd ed. by Carl E. Bond

*Fisheries processing – biotechnological applications* by A.M. Martin (ed.)

*Ecology of freshwaters Man and medium past to future* by Brian Moss

*Space partition within aquatic ecosystems* by Gerard Balvay (ed.)

*Biology of farmed fish* by Kenneth D. Black and Ors.

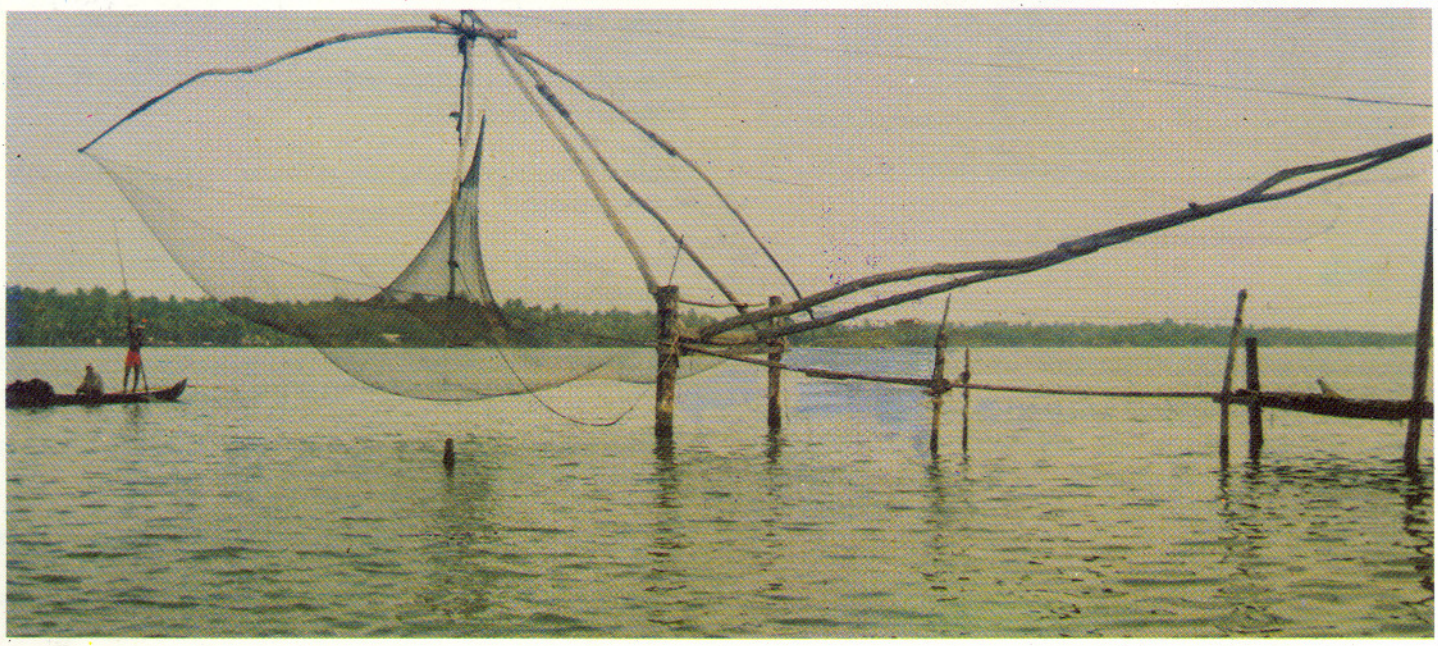
*Behavioural ecology of teleost fishes* by Jean Guy J. Godin

*Fisheries Biology assessment and management* by Michael King

*A textbook on biotechnology*, 2nd ed. by H.K. Kumar

*The new encyclopaedia Britannica*, 15th ed. Vols. 1-32

*Encyclopedia of Life Sciences*, Vols. 1-11.



A Chinese dip net operating in the backwater

## *From the Editor's desk .....*

It was once widely believed that the aquatic resources were inexhaustible gift of nature. However, with the steady decline in fish population in our natural water bodies it has been realized that these resources need to be conserved and managed properly for sustenance of our ever increasing population. Studies conducted by CIFRI in the rivers Godavari and Ganges indicate that there is an urgent need to develop a rational approach to match the fishing effort with the maximum sustainable yields of the target species or groups of fish. This invariably will render a sizeable surplus inventory of fishing crafts and gear, affecting fishermen's livelihood in these river systems. Under the circumstance successful conservation and management of these river systems will very much depend on how judiciously an alternative sustainable livelihood is provided to the affected fishermen.

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