

केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान  
CENTRAL INLAND CAPTURE FISHERIES RESEARCH INSTITUTE



ANNUAL REPORT

वार्षिक प्रतिवेदन

1995-96



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केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान  
(भारतीय कृषि अनुसंधान परिषद्)  
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**CENTRAL INLAND CAPTURE FISHERIES RESEARCH INSTITUTE**  
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)  
**Barrackpore 743 101 West Bengal INDIA**

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## **Dr. M. Sinha, the new Director of CIFRI**



Dr. Maniranjan Sinha has taken over as the Director, Central Inland Capture Fisheries Research Institute on 29th March, 1996. Born on 2nd April 1942, Dr. Sinha had his early education at Gorakhpur and Allahabad Universities from where he obtained Masters Degree in Zoology and Fish & Fisheries in 1961 and Proficiency Certificate in French in 1970. In 1961 he joined CIFRI where he built his distinguished career in inland fisheries spanning 35 years. Dr. Sinha is widely recognised as an expert in riverine and estuarine fisheries where he has made indelible mark through his outstanding contributions.

Dr. Sinha started his career in the Freshwater Fish Culture Division at Cuttack and then moved over to the Riverine Division of CIFRI at Allahabad and participated in the pioneering research effort of the Institute in riverine spawn prospecting and fishery biology. He has also served the National Bureau of Fish Genetic Resources and the North Eastern Council, Shillong. As Fisheries Adviser to NEC, Dr. Sinha spearheaded the fisheries development activities of the region for four years from 1988 to 1992. At CIFRI, he has held many important positions in Estuarine Fisheries, Extension, Operational Research Project and Beel Fisheries Divisions.

As Coordinator Beel Fisheries during 1986-1987, Dr. Sinha was responsible for planning guidance and execution of all research projects related to floodplain lakes at CIFRI. He also has experience in fish culture and breeding for a



protracted period of 13 years. He has the distinction of successfully breeding 4 species of inland fishes for the first time in the country. Dr. Sinha's other contributions include genetic variations in populations through cytogenetic and electrophoretic evaluation of economic species. He has also worked on cryopreservation of spermatozoa and sex reversal in fishes.

While heading the Estuarine Division of CIFRI, Dr. Sinha was instrumental in formulation and guidance of all research project programmes of the Division covering Hooghly-Matlah and Narmada estuarine systems. He provided able leadership to the trail blazing research on biology, production dynamics and migratory habits of hilsa on account of which the country is now poised for formulating strategies for recovering the lost hilsa fisheries of the Ganga.

Dr. Sinha has acted as member of State Fisheries Planning Committees of seven north eastern states of the country and programme Co-Director of short-term training programmes for fisheries officials of north-eastern states. He is examiner of Graduate, Post Graduate, M. Phil. and Ph. D. programmes of various Universities.

Dr. Sinha is a founder member of Asian Fisheries Society and a life member of its Indian Chapter. He has been conferred the Honorary Fellowship of the Inland Fisheries Society of India in 1994. An important landmark in his career is the ***Kheti puraskar*** of the ICAR, which was awarded to him for the biennium 1986-87. Dr. Sinha has published 31 research papers in national and international journals, apart from numerous book chapters, bulletins, popular articles and extension pamphlets.

By assuming the stewardship of CIFRI from Dr. V. R. P. Sinha, the acting Director CIFRI on 29.3.1996 Dr. Sinha has joined the galaxy of distinguished scientists such as Dr. B. S. Bhimachar, Dr. V. G. Jhingran, Dr. A. V. Natarajan, Dr. A. G. Jhingran and Dr. S. P. Ayyar.

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**CENTRAL INLAND CAPTURE FISHERIES RESEARCH INSTITUTE**  
**(Indian Council of Agricultural Research)**  
**BARRACKPORE, WEST BENGAL**

## **BRIEF HISTORY**

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The Government of India, in a memorandum brought out in 1943, stressed the need for having a separate central department in the best interest of the development of fisheries resources of the country. This memorandum was later endorsed by the Fisheries Sub-Committee of the Central Government Policy Committee on Agriculture, Forestry and Fisheries. Based on this, the Central Inland Fisheries Research Station was formally established on 17 March, 1947 in Calcutta under the Ministry of Food and Agriculture, Government of India. From the modest beginning as an interim scheme, the organisation has since grown to the status of a premier research institution in the field of inland fisheries in the country. By the year 1959, the Station acquired its status as Central Inland Fisheries Research Institute (CIFRI) and moved to its own buildings at Barrackpore, West Bengal. Since 1967, the Institute is under the administrative fold of Indian Council of Agricultural Research (ICAR).

The main objectives of the Institute were to conduct investigations for a proper appraisal of inland fisheries resources of the country and to evolve suitable methods for their conservation and optimum utilization. While fulfilling the above objectives, the Institute directed its research efforts towards understanding the ecology and production functions of inland water bodies available in the country like the river systems, lakes, ponds, tanks, reservoirs and floodplain wetlands. These studies have unravelled the complex trophic structure and functions *vis-a-vis* the environmental variables in different aquatic ecosystems.

During the early 1970s, the Institute expanded its activities by initiating various All India Coordinated Research Projects; such as **Composite fish Culture and fish seed production, Airbreathing fish culture, Ecology and fisheries management of freshwater reservoirs** and **Brackishwater fish farming**.

The Institute has the distinction of evolving and popularising technologies on fish seed prospecting from rivers; fish seed transportation; induced breeding and nursery management of carps; bundh breeding of Chinese carps; composite fish culture; aquatic weed control; air-breathing fish culture; integrated fish farming; sewage fed fish culture; fisheries management of small reservoirs; brackishwater fish farming and farming of edible snails. The country has witnessed a phenomenal increase in



production of inland fish (0.22 million t in 1950-51 to 2.1 million t in 1994-95) and fish seed (409 million in 1973-74 to 14,500 million in 1994-95), which can be mainly attributed to the above technologies.

At the beginning of Seventh Five Year Plan three Institutes (Central Institute of Freshwater Aquaculture, Central Institute of Brackishwater Aquaculture and National Research Centre on Coldwater Fisheries) were carved out from this Institute and the parent Institute was rechristened as Central Inland Capture Fisheries Research Institute with effect from 1.4.1987. Under the changed set up, the CIFRI is entrusted with the responsibility to conduct research on open water bodies where the fisheries management norms are closely associated with environmental monitoring and conservation.

## MANDATE

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The CIFRI has presently the mandate to :

1. study fish population dynamics of exploitable inland water bodies exceeding 10 ha in water area;
2. evolve management systems for optimising fish production from such water bodies;
3. investigate causes/effects and remedies of their degradation/pollution and provide research support for mitigation/conservation of such resources;
4. study the impact of river valley projects on the fisheries of the basins concerned and evolve strategies for their management;
5. act as a national data centre on inland fisheries; and
6. conduct training and provide extension/consultancy services.

## ORGANISATION

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In tune with the above mandate, the research activities of CIFRI have been organised under seven Divisions, corresponding to the major fishery resources and other research needs of the country related to fisheries development.

The **Riverine Division**, with its headquarters at Allahabad, strives to develop systems for effective management of the vast riverine fisheries resources of the country with adequate emphasis on the conservation of riverine environment. The research projects under the Division cover the rivers Ganga, Brahmaputra, Mahanadi and Narmada and their important tributaries.



The **Reservoir Division** is based at Bangalore with centres in Tamil Nadu, Andhra Pradesh and Madhya Pradesh. The investigations being carried out at the Division are aimed at developing management norms for optimising fish yield from large, medium and small reservoirs of the country.

The Barrackpore -based **Estuarine Division**, presently works on the Hooghly-Matlah and Narmada Estuarine systems. The effluents from a number of industrial units, agricultural wastes, municipal wastes etc. make the Hooghly estuary one of the most polluted stretches of the Ganga river system which is being investigated by the Division. Biotic and abiotic features of estuarine tributaries and mangroves of Sunderban region area also being studied.

The **Environmental Monitoring and Fish Health Protection Division**, stationed at Barrackpore, is mandated to monitor the man-made changes in the riverine, reservoir and estuarine ecosystems and to evolve suitable amelioration measures. Experiments are also being carried out in the laboratory condition to substantiate the findings from natural resources. The studies under the Division include collection of basic information on habitat variables, impact identification through known indicators and biodiversity, screening of toxicants in controlled conditions, microbiological studies to ascertain organic load in aquatic environment and fish health diagnostics and control. Development of mitigating action plan for ecosystem restoration is also the given responsibility of this Division.

The **Floodplain Wetlands Division** has its headquarters at Barrackpore. The ecodynamics of wetlands spread over the floodplains of Ganga- Brahmaputra basins are being studied in order to evolve management norms for their sustainable development. The wetlands associated with the floodplains of Ganga and Brahmaputra rivers are not only unique in their rich biodiversity, but they also constitute an important fishery resource in the states of Bihar, West Bengal and Assam. The Division carries out research on the ecosystem processes and fish productivity from this resource with special attention on protection of biodiversity and environment-friendly development technologies.

The **Resource Assessment Division** is located at Barrackpore and conducts research aiming at creating a database on the fish stocks and fishery resources. The Division is geared up to develop various population models that can lead to scientific exploitation of inland fisheries resources.

The **Hilsa Division** is located at Maldah, West Bengal. The main aim of the Division is to carry out research on biology, life habits and behaviour of hilsa, leading to development of measures for the recovery of its fishery in the depleted stretches of the river Ganga.

The Institute's research activities have been organised under 19 research projects which are operated from the Headquarters at Barrackpore, 11 Research Centres, 6 Survey Centres and a Krishi Vigyan Kendra covering 10 states of the country. The distribution of research and survey centres and different sections are shown in the organisation chart (Appendix - III).



## **IMPORTANT ACHIEVEMENTS**

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### **New light on breeding and larval growth of hilsa**

The Indian shad, *Tenualosa ilisha* (Ham.), is an important anadromous fish ascending the river Hooghly and constituting an important fishery in the estuarine stretch of the river. Recent studies conducted by the Central Inland Capture Fisheries Research Institute throw new light on the spawning pattern of the fish and its seed distribution in different centres of the estuary. Some perceptible changes are discernible in the distribution of the fish's breeding ground within the estuarine zone. It has become evident from the studies that the area of distribution of hilsa seed in the estuary during post-Farakka barrage period has increased in comparison to pre-Farakka barrage period. This change is largely attributed to the increased discharge of freshwater into the estuary during the post-Farakka period. The higher rate of freshwater discharge through the barrage has significantly reduced the salinity downstream, converting the earlier gradient zone into an almost freshwater one, a condition more conducive for spawning of hilsa. The spawn appears in the freshwater zones of the estuary mainly from October and it continues up to May or June. The freshwater stretch of the estuary also acts as the nursery ground for the hilsa spawn.

The studies also revealed a faster growth rate of juvenile hilsa during the post-Farakka barrage period, in comparison with the pre-Farakka period. Thus, Hooghly estuary has become more congenial to spawning as well as larval growth of hilsa, after the construction of Farakka barrage.

### **Fish population studies in Hooghly-Matlah estuarine system**

Studies based on the analytical models on the population dynamics of *Pama pama* from the Hooghly-Matlah estuarine system show that this species is overexploited. The study suggests that there should be 59% reduction in the fishing effort to get sustainable yield during the years to come. It also suggests that any increase in the fishing pressure will result in further reduction in catch per unit effort thereby leading the fishery to an uneconomical level. Similar trend has also been observed in winter bagnet fishery of this estuary where even with increased total landing there was decrease in CPUE, indicating that more effort was being put in than the resource can sustain.

### **Rich production of giant freshwater prawn *M. rosenbergii* in pens during summer**

Possibility of summer culture of giant freshwater prawn, *Macrobrachium rosenbergii* in pens was explored in the Bhomra beel of Nadia district, West Bengal. Experiments were conducted in three bamboo pens of 0.026 ha, each. Prestocking management measures like cleaning macrophytes and unwanted fauna and liming @ 500 kg/ha were taken. Seven days after liming, assorted healthy hatchery raised prawn juveniles (60-75 mm/0.5 gm) were released into the pen @ 40,000/ha. In addition to the natural food the juvenile prawns were provided with a daily ration of (4-10% of body weight) artificial feed (40% protein) in trays during morning and evening hours.



# RESEARCH

**Pen culture of freshwater prawn, *Macrobrachium rosenbergi* was undertaken in a private wetland at Noderkhali (West Bengal)**



**Prawn seed being released into the pen by  
Shri Amal Datta, Member of Parliament**

**A part of the harvest from the pen**





**Fisheries of Hooghly estuary**



Catch from Saptamukhi estuary at Bhagabatpur

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Drying of Bombay duck, *Harpodon nehereus*  
at Frazerganj





## Environmental monitoring



Heated effluents from a thermal power station being discharged into the river Hooghly at Titagarh, 24 Parganas (N), West Bengal.

Waste from a rice mill finds its way to the river Mahanadi



**Prawn seed collection from Hooghly estuary**

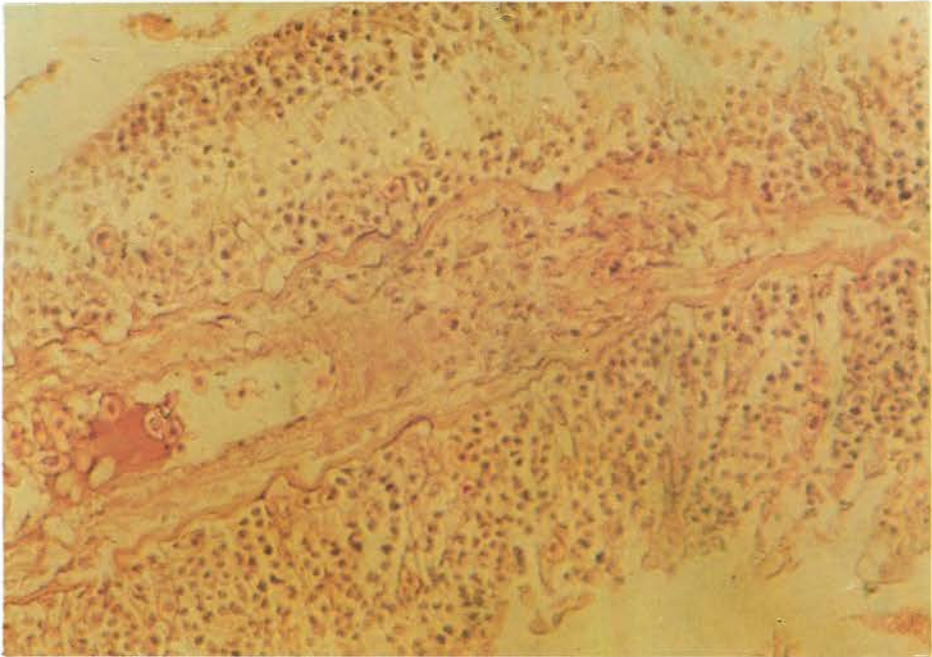


Large-scale collection of prawn juveniles from Hooghly estuary is a cause of concern



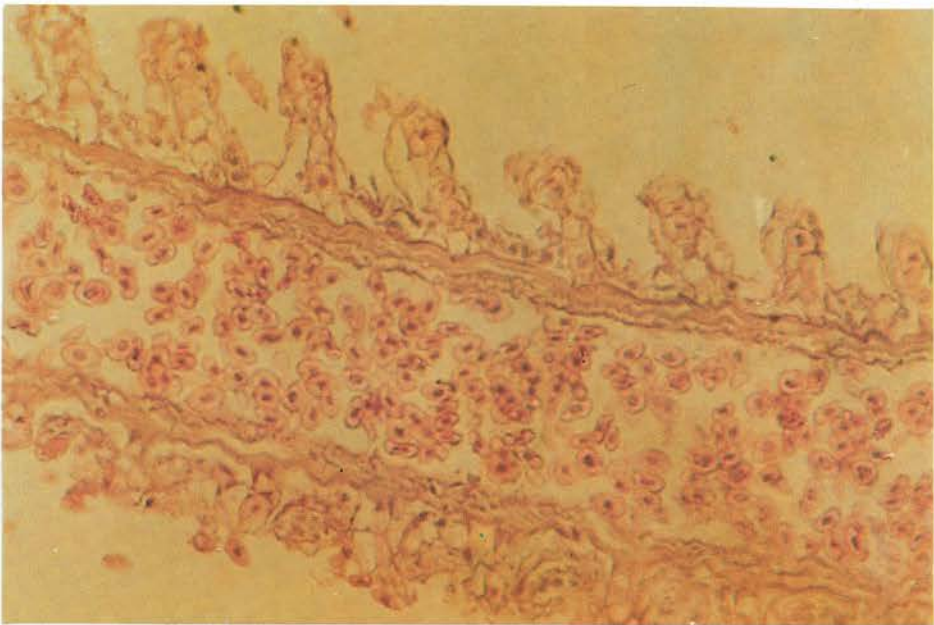


**Impact of environmental stress on *Rita rita* at cellular level**



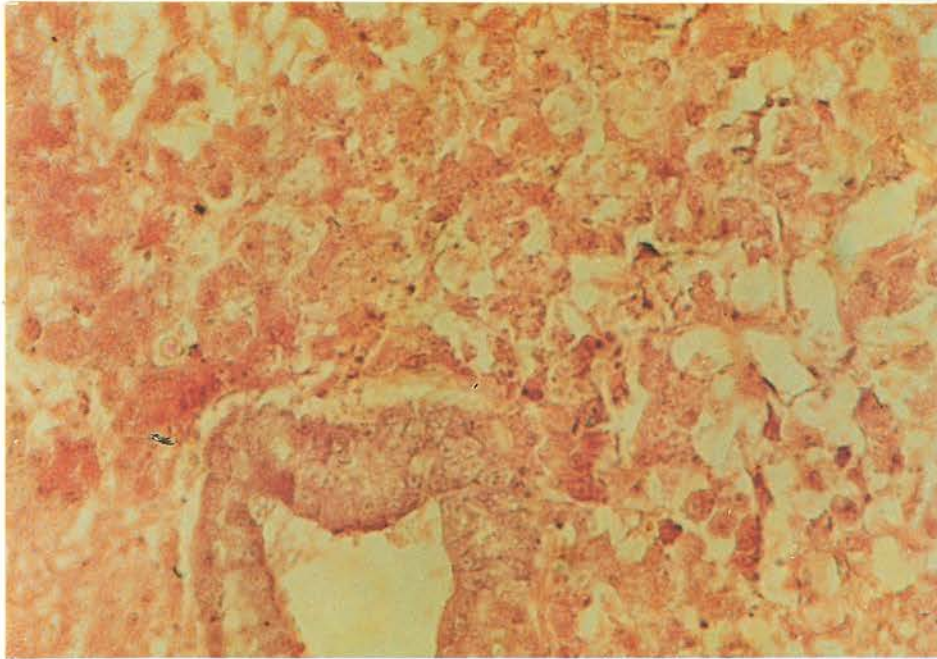
Hyperplasia in primary gill lamellae

Degeneration of lamellar filaments



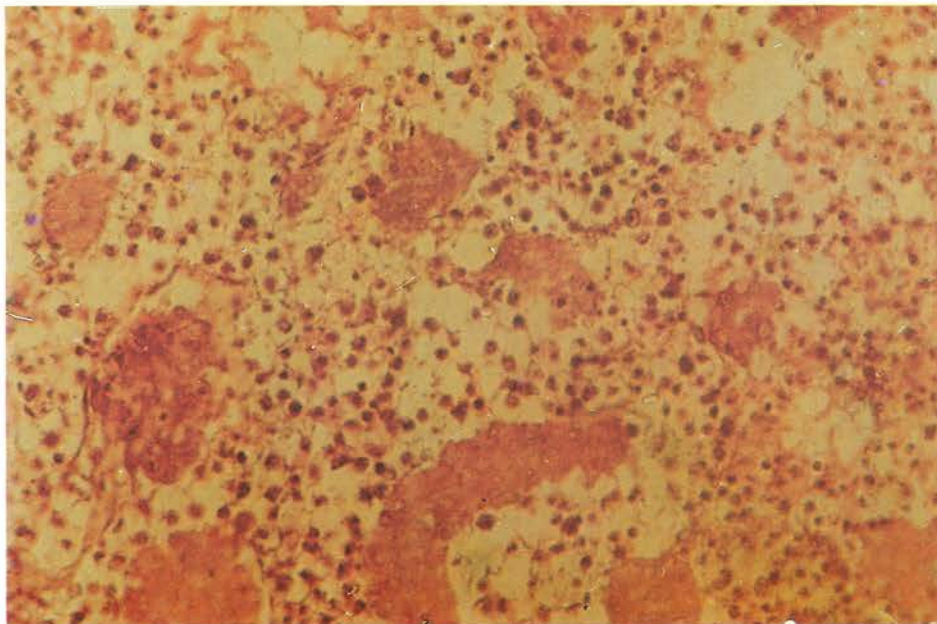


**Impact of environmental stress on *Rita rita* at cellular level**



Evacuation of hepatic cells

Deformities in nephral structure



The prawns attained an average weight of 20 g in 70 days of rearing period, giving an estimated production of 640 kg ha<sup>-1</sup> for this period though ecologically stressed conditions such as, low water depth (70-90 cm), high water temperature (32°-36°C) and heavy infestation of macrophytes prevailed during the period.

### **Impact of thermal discharge on aquatic life (fish)**

The experiments conducted on thermal tolerance of different life stages of fishes revealed that at embryonic stage, *Catla catla* depicted high thermal sensitivity. It registered a declining thermal tolerance ranging from 170 minutes to 4 minutes when exposed to a thermal range of 38°C to 43°C. Further, it was observed that between 40°C to 42°C the larval development stopped and the ova gradually turned opaque, subsequently the egg shell ruptured resulting in death of embryo at 43°C. On the otherhand at 38°C and 39°C, even though the development and hatching was quicker but the hatchlings succumbed to thermal stress in due course, indicating a carry over impact of stress. In comparison, 38°C to 40°C temperature was critical for fry when 100% mortality occurred within a span of 120-50 minutes. But, at higher temperatures of 41°C and 43°C, the tolerance period declined to 20 minutes and 1 minute, respectively. It appears that thermal impact was marginally faster on fry than at embryonic level, may be egg shell offers some resistance against higher temperature for longer period.

### **Prawn disease epizootics**

An investigation conducted by the Central Inland Capture Fisheries Research Institute, Barrackpore at Haroa, West Bengal has brought to focus new facts about the prawn disease epizootics in the state.

*Penaeus monodon* was the most affected species and the percentage of infection was estimated at 52%. The main symptom was the appearance of white spots on the carapace which gradually spread to other parts of the exoskeleton. The affected prawns also developed reddish pink colour before their death. *Epistylis* sp. was found to be a probable pathogen which was detected in gills and body surface of 20% of the infected prawns.

Bacterial studies conducted in affected water and haemolymph of infected prawn, led to the isolation of *Vibrio* sp. in a low intensity.



### Environmental parameters associated with the epizootic:

Location	pH	Alkalinity (ppm)	Hardness (ppm)	NH <sub>3</sub> (Unionised) (ppm)	Salinity (ppt)	Bacterial load
Agamura	8.3	127	1800	0.1	9.02	8.4x10 <sup>3</sup>
Beel Samity	8.5	126	3000	0.5	10.25	1.92x10 <sup>5</sup>
Kathore	8.6	127	2800	0.3	6.4	-
Tripley	9.0	147	3200	0.2	7.0	-
Matigada	8.6	125	3000	1.1	9.0	-

The affected areas were high in ionised ammonia levels and bacterial load, leading to stress to fish, predisposing it to disease outbreak.

The remedial measures suggested to farmers were :

1. Removal of all floating and submerged organic matter to avoid accumulation of free ammonia.
2. Stopping of water exchange in the infected *bheris* to avoid spread of disease.
3. Application of lime (Ca CO<sub>3</sub>) @ of 200 kg/ha and application of bleaching powder @ 1 ppm after one week.
4. Incorporation of biological treatment pond in the traditional culture *bheris* to improve water quality of tidal water impregnated with sewage.

### Seed raising of *Macrobrachium rosenbergii*

A backyard model hatchery for seed raising of *Macrobrachium rosenbergii* has been designed and fabricated at CIFRI, Barrackpore. This low cost family-operated model has the potential for large scale adoption in the rural areas generating rural employment and income.



Berried specimens of *M. rosenbergii* (40-45g) were collected from ponds of Nadia District and kept in a plastic pool containing freshwater. The prawns were fed with snail meat and watched closely for development of eggs. Gravid females with grey coloured eggs were transferred to hatching tanks containing artificial seawater of 12-133 ppt salinity after gradual acclimatization. Hatchlings (zoeae) were reared in plastic tanks (1.0 x 0.8 x 0.7m) with artificial seawater having a salinity of 12-133 ppt. The stocking density of hatchlings was 50 per litre. Feeding of larvae started on 3rd day after hatching when the mouth opened and yolk is absorbed. Artemia larvae (nauplii) were used during 3rd to 12th days of rearing and powdered egg was added from 13th day onwards.

The growth of larvae under water temperature 26-30.5 °C, water salinity of 11-13ppt and DO 5.0 - 7.0 ppt was 3.4 - 3.5 mm (total length) after 21 days of hatching.

### **On Farm Research on Pen Culture of giant freshwater prawn at Sunderbans**

An "on farm research" programme on pen culture of giant freshwater prawn has been initiated in a 0.3 ha water area at Nodakhali, in Sunderbans. The pen is installed in a wetland receiving tidal water from Hooghly estuary. Juveniles of giant freshwater prawn *Macrobrachium rosenbergii* of an average weight of 9.85 g were stocked @ 40,000 nos. per hectare. Initial growth rates showed encouraging results.

## **IMPORTANT EVENTS**

### **Visits**

#### **Union Agriculture Minister visits CIFRI**

Dr. Balram Jakhar, Hon'ble Minister for Agriculture, Government of India, visited the Institute on 23.7.1995. The Minister was accompanied by Mr. G. S. Sahni, Secretary ICAR. Dr. V. R. P. Sinha, Director briefed the Hon'ble Minister about the activities of the Institute. Dr. Jakhar during his discussion with the Director and scientists of the Institute expressed his satisfaction on various work programmes. Later, addressing the staff of the Institute, the Hon'ble Minister stressed the need for identifying the research problems that are directly related to the problems faced by the farmers of the country.

### **Members of Parliament visit CIFRI**

The study group II of Parliamentary Standing Committee on Agriculture consisting of 11 Members of Parliament and 5 Officers of Lok Sabha Secretariat headed by Shri Nitish Kumar, M. P. visited the Institute on 10th October 1995. The Group was given a warm welcome at the Institute and taken around the laboratories to apprise them of the ongoing research. The Members reviewed various Research activities of the Institute and expressed their satisfaction. They also expressed the view that sustained research support and constant monitoring of aquatic environment will go a long way in inland fishery development. The Study Group evinced keen interest in various technologies developed by the Institute viz. Composite fish culture, Seed production, Prawn culture etc. Shri Nitish Kumar, M. P., addressed the members of staff of the Institute at the auditorium.

### **ODA team visits the Institute**

A three member ODA team visited the Institute in connection with formulation of Development projects for the floodplain wetlands of West Bengal. Dr. Paul Balogun, ODA consultant, Dr. Mick Blowsield, Sociologist, NRI, Chatham and Dr. Chris Price, Fisheries Advisor, University of Stirling went around various laboratories and held discussions with the scientists. The visit was sponsored by the British Council Division, Calcutta.

### **Important Meetings**

#### **Management Committee Meetings**

The Management Committee of the Central Inland Capture Fisheries Research Institute met on 18th July, 1995 at the Central Library of Barrackpore under the Chairmanship of the Director. Eight members of the Committee attended the meeting including the Assistant Director General (Fisheries), ICAR, New Delhi. The Committee lent its approval to the condemnation of the two vehicles and decided to procure two new vehicles in replacement. The Committee also accorded sanction for payment of Rs. 63,809/- to the Government of Karnataka towards the purchase of land at Bangalore for establishment of Reservoir Division of CIFRI. The proposal for purchase of equipment was also approved by the Committee.

The second and third meetings of the Management Committee were held on 16th October 1995 and 27th January 1996 respectively. Various management issues were discussed and decisions arrived at in these meetings.



## **Research Advisory Committee Meeting of the Institute**

The First Meeting of the Research Advisory Committee of the Institute was held on 24th July, 1995 at Barrackpore. The meeting, chaired by Dr. K. V. Devaraj was attended by Dr. N.C. Dutta, Dr. A.R. Khudabaksh, Mr. M.L. Joshi, Dr. V.R.P. Sinha, Dr. M. Sinha as Member Secretary and Dr. K.K. Vass and Sri R.A. Gupta were as special invitees were also present.

The Research Advisory Committee examined the ongoing research projects and made many suggestions for its improvement. They include evaluation of carrying capacity of riverine ecosystems, studies on catchment ecology of reservoirs and nutrient dynamics of floodplain wetlands and creation of public awareness about conservation and management of aquatic resources.

## **Meeting of ICAR Regional Committee No. II**

The Meeting of ICAR Regional Committee No.II was conducted in the Library Hall of the Central Inland Capture Fisheries Research Institute, Barrackpore on 20-21 November, 1995 under the Chairmanship of Dr. R.S. Paroda, Director General, ICAR. The inaugural session was presided over by Mrs. Anwara Taimur, Hon'ble Minister of Agriculture, Assam, while the Hon'ble Minister of Agriculture, West Bengal, Shri Nihar Ranjan Bose was the Chief Guest. The two day deliberations were attended by 56 delegates representing the States of West Bengal, Assam, Agricultural Universities and ICAR Institutes. Apart from the Vice-Chancellors of Assam Agricultural University, Bidhan Chandra Krishi Vishwavidyalaya, and West Bengal University of Animal Science and Fisheries, several DDGs, ADGs along with a number of special invitees attended the meeting. Priority areas in agriculture, animal sciences and fisheries were identified.

## **Meeting of the High Power Committee of ICAR held at CIFRI**

A meeting of the high power committee of ICAR was held at CIFRI on February 20, 1996 to interact with scientists of the ICAR Institutes, Bidhan Chandra Krishi Viswavidyalaya and Non-Government Organisations located near Calcutta. Thirtynine delegates from the said organisations participated in the meeting. The discussion in the meeting centred around the following points:

- i) Mechanism of formulation of research agenda
- ii) Mechanism of testing and adaptation of research results
- iii) Mechanism of technology assessment and refinement to suit the requirement of client system



## MEETINGS



A team of Members of Parliament led by Shri Nitish Kumar, visited the Institute on 10th October 1995. The MPs are talking to the Director



13th meeting of the ICAR Regional Committee No. II was held at CIFRI, Barrackpore on 20-21 November, 1995. The Inaugural Session was chaired by Mrs. Anwara Taimur, Hon'ble Minister of Agriculture, Assam (second from right). Dr. R.S. Paroda, Director General, ICAR (second from left) and Shri Amal Datta, Member of Parliament (right)



# MEETINGS

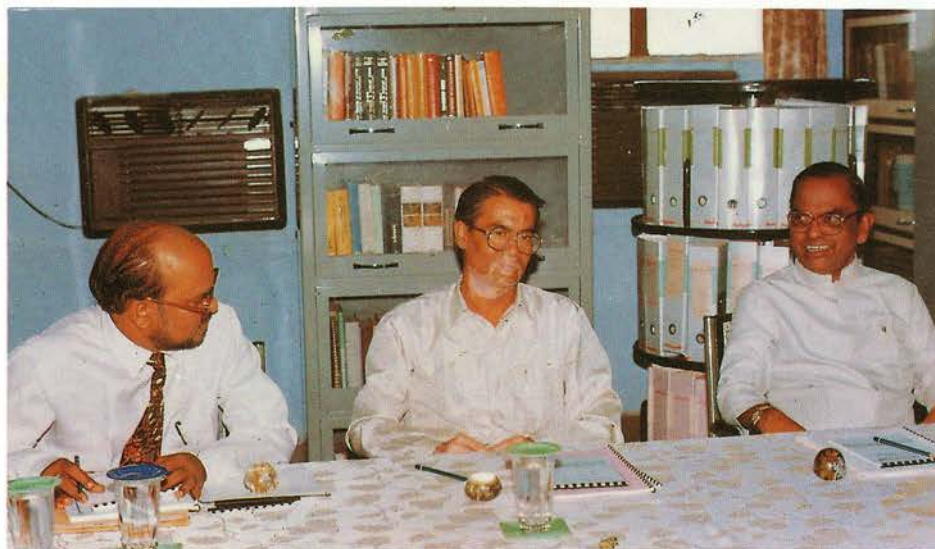
## Research Advisory Committee Meeting

The first meeting of Research Advisory Committee (RAC) of the Institute was held at Barrackpore on 24th July 1995



The RAC Meeting was chaired by Dr. K.V. Devaraj (top).

Dr. M. Sinha, Dr. A.R. Khudabaksh and  
Mr. M.L. Joshi attending RAC meeting (below).



## **COLLABORATIONS**

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### **National :**

The work programme under the Reservoir Division in Karnataka, Tamil Nadu, Andhra Pradesh and Madhya Pradesh could be implemented successfully, on account of active cooperation received from the respective State Fisheries Departments.

The Institute continued its collaboration with the Ganga Project Directorate, British Council Division, Ministry of Environment and the National Thermal Power Corporation in various consultancy and sponsored projects.

## **MANPOWER DEVELOPMENT**

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### **Training/Fellowship overseas**

Mr. M. Karthikeyan, Scientist was granted extension for completion of post-graduate course at University of Bonn, Germany for a period of one year with effect from 1.10.1995.

Mr. U. Bhaumik, Senior Scientist was deputed for International training course "Fisheries Extension Methodology" organised at SEAFDEC, Bangkok, Thailand, during October 25 to December 8, 1995.

### **Training Inland**

Dr. D.K. Kaushal, Senior Scientist participated in the XXVIth short-term course on "Use of Computer in Agricultural Research" from 1-15 April 1995 at IASRI, New Delhi.

Dr. K. Chandra, Senior Scientist participated in the course on "Computer application in Agricultural Research" from July 11-22, 1995 at NAARM, Hyderabad.

Dr. K.K. Vass and Shri R.A. Gupta, Principal Scientists participated in Computer Data communication and Networking programme sponsored by ICAR at New Delhi from 4-8th December 1995.

Dr. B.C. Jha, Senior Scientist, Shri A.C. Ghosh, Sr. Adm. Officer and Shri G.P. Sharma, Finance & Accounts Officer participated in Computer training programme on E-mail sponsored by ICAR, New Delhi, from 26-29 December 1995.



## **HONOURS AWARDS**

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- |   |   |   |  |
|---|---|---|--|
| 1 | Congress of Zoology Gold Medal 1995                     | - | Dr.V.R.P. Sinha  |
| 2 | ICAR Team Award for outstanding research                | - | Mrs. G.K. Vinci,<br>Dr. V.V. Sugunan<br>& Dr. V.K. Unnithan  |
| 3 | Fellowship of Inland Fisheries Society of India         | - | Dr. M. Sinha,<br>Dr. K.K. Vass,<br>Dr. V.V. Sugunan,<br>Mrs. G.K. Vinci,<br>Dr.M.K. Mukhopadhyaya,<br>Dr. M.K. Das,<br>Dr. D.K. De,<br>Mr. M.M. Bagchi and<br>Dr. D. Nath. |
| 4 | Fellowship of the Bioved Research Society,<br>Allahabad | - | Dr. Balbir Singh.  |

## **TRANSFER OF TECHNOLOGY**

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### **Training courses in different aspects of fisheries**

#### **Short-term training course on Prawn farming**

A ten-day training course on Prawn farming was organised by CIFRI at Barrackpore during 6-16 June, 1995 for the Extension functionaries of the Department of Fisheries, Government of West Bengal which was participated by 26 trainees. The course covered all aspects of brackishwater and freshwater prawn farming through theoretical as well as practical methods. Field visits also were arranged. The training was organised under the frontline extension programme for the immediate transfer of this technology to the users at the grassroot level.

### **Lab to Land Programme**

During the period under report frontline demonstration on Lab to Land Programme was implemented in 12 villages adopting 100 farm families by Krishi Vigyan Kendra of the Institute. The Kendra was engaged towards transfer of technologies relating to multiple disciplines depending on the local need and available resources. The dissemination of various technologies in fish culture and crop production has brought out a radical change in yield rate which has even more than doubled in the case of fish

culture as well as field crops. The Kendra has transferred different appropriate technologies to practising farmers and farmwomen covering five disciplines, viz. Fisheries, Crop production, Horticulture, Animal science and Home science. The details of beneficiaries under LLP are given in the following Table.

Sl. No.	Name of technology	No. of beneficiaries	
		Adoption	Diffusion
1	Composite fish culture	80	172
2	Freshwater prawn culture	18	80
3	Paddy cum prawn culture	12	50
4	Pest management in betelvine	20	140
5	Seed treatment in betelvine	10	80
6	HYV Tomato production	20	120
7	Mushroom cultivation	20	20
8	Pickle preparation	10	100

### Major activities of the KVK, Kakdwip

A large number of Farm Science Clubs were established at the grassroot level to help disseminate improved methods of crop production, fin and shell fish production, integrated farming system etc.

Rural melas (exhibition) were organised with Charts, Posters, Blown up photographs and live specimens to create awareness about modern farming system among the rural masses.

Other extension activities undertaken were as below :

		Nos.	Beneficiaries
1	Field days/Fish Farmers' days	12	1217
2	Kisan mela/Rural Fair	2	3000
3	Ex-trainees Sammelan	4	160
4	Formation of Farm Science Club	5	370
5	Mass Media coverage	3	

### LIBRARY AND DOCUMENTATION SERVICE

The CIFRI has provided services to a variety of users including researchers, university professors, officials, students and entrepreneurs. The library added 96 books, and 65 miscellaneous publications to its collection and subscribed 27 foreign and 52 Indian journals during the year. The Library has now a total holding of 7,249 books, 4,240 reprints, 937 maps and 3,176 miscellaneous publications.



The Institute continued free mailing of its publications to various research organizations, universities, entrepreneurs and farmers to keep them abreast with the latest developments in fisheries research. As a part of resource sharing, it lent out 23 publications to other libraries on inter-library loan. The total expenditure incurred by the library during the year was Rs.10,60,885.00.

The section maintained active DTP, photography and reprography services to cater to the needs of the Institute. Photographs, reprints and photocopies were supplied to the scientists of the Institute as well as other research institutions and universities free of cost. The section also maintained a duplicating (cyclostyling) and binding unit to serve various units of the Institute.

### **Technical reports**

More than 17 technical reports pertaining to progress of research activities of the Institute were compiled. Research publications of CIFRI scientists were scrutinised before publication in various journals. Technical queries regarding the activities of the Institute from various quarters of the country and abroad were attended to by the section. Participation of scientists in seminars, symposia, conferences etc. was monitored by the section.

### **Research Project Files**

Annual progress reports of all the research projects and the contribution made by individual scientists are being maintained in the Primary Project files and Scientists' Files. Monitoring of Research progress through RPF I, II and III, Activity Milestones; and Monthly, Quarterly and Annual reports were some of the major responsibilities of the Section.

### **Publications**

The following departmental publications were brought out by CIFRI during the year April 1995 to March 1996 :

- 1 Annual Reports for the year 1992-93, 1993-94 and 1994-95
- 2 CIFRI Brochure
- 3 Report of Quinquennial Review Team 1986-1991
- 4 A manual for Farmers on Shrimp Disease Diagnosis and Control

## CONFERENCE, SYMPOSIA, ETC.

The following are the important Meetings/Workshop organised by the Institute during 1995-96.

- Staff Research Council Meeting of CIFRI, 19-20 May 1995
- Half Yearly Staff Research Council Meeting of CIFRI, 23 December 1995
- Management Committee meetings of CIFRI, 18 July 1995, 16 October 1995, and 27 January 1996
- Study Group II of Parliamentary Standing Committee visit/meeting, 10 October 1995
- Research Advisory Committee meeting, 24 July 1995
- ICAR Regional Committee No. II meeting, 20-21 November, 1995
- ICAR High Power Committee meeting, 20 February 1996

The scientists of the Institute participated in various conferences/symposia/seminars and meetings held during April 1995 to March 1996 wherein they presented their research findings and exchanged views with the delegates. List of scientists who participated/presented papers in such gatherings is furnished below :

Conferences/Symposia/ Seminars, etc.	Papers presented	Authors/Participants
Seminar on National environment policy and its implications, held at Golpark, Calcutta on 5th & 6th June 1995	Environmental policy and sustainable development	K.K. Vass
International Seminar on Natural Resources Management and their linkages with farming systems, organised by the Department of Social Science, Dr. Y.S. Parmar University of Horticulture and Forestry, Solan (H.P.) held during 8-9 June 1995	The status and sustainability of fisheries resource use in Himachal Pradesh	Pradeep K. Katiha, Y.S. Negi & S.C. Tewari



Conferences/Symposia/ Seminars, etc.	Papers presented	Authors/Participants
Workshop on Assessment of Faunal Diversity held at Zoological Survey of India, Calcutta from 12-19 June 1995 under South Asia Cooperative Environment Programme	-	A.K. Ghosh
Seminar on Conservation of Mahseer fish at Lonavala (Maharashtra), held during 4-5 August 1995	-	V.R. Desai
IXth All India Congress of Zoology held at Zoology Dept., Burdwan University from 26-28 September 1995	Fish biology and aquaculture	M. Sinha
-do-	Environmental science and pollution	K.K. Vass
-do-	Ecodegradation of the riverine stretch of Damodar in Burdwan under changed land use pattern	R.K. Banerjee, P.K. Pandit, M.K. Mukhopadhyay, H.C. Karmakar & S.K. Chatterjee
-do-	Toxicity and mutagenesis - a review	K. Chandra
-do-	Fish parasitic disease and their control in India - a review	M.K. Das
-do-	Naturally occurring steroids and steroid-like substances affecting fish	Ansuman Hajra
National seminar on Makhana Farming, Madhubani, Bihar October 1995	Makhana-cum-fish culture in North Bihar	A.K. Lal

Conferences/Symposia/ Seminars, etc.	Papers presented	Authors/Participants
National Seminar on 'Challenges & opportunities of Research and Development in Coastal Agriculture' at Bhubaneswar on 4-7 December 1995	Spawning behaviour and growth of juvenile hilsa in the Hooghly estuary in post-Farakka barrage period.	D.K. De, & M. Sinha
-do-	Raising of freshwater giant prawn, <i>Macrobrachium rosenbergii</i> (De Mann) in low saline sewage-fed coastal wetland - an experimental study	M. Sinha, P.K. Chakraborty, A. Ghosh & R.K. Das
-do-	Recent trends of coastal zone management and their impact on the mangrove ecosystem of the Sunderbans in West Bengal	K.R. Naskar
-do-	Investigations of specific nutrient status of twentyfive major elements of mangroves of the Sunderbans, West Bengal	Dolan Champa Ghosh G.N. Chattopadhyay, A.K. Ghosh & K.R. Naskar
-do-	Ecological studies on the halophytic algal flora of the Sunderbans mangrove ecosystem, West Bengal and its impact in estuarine fish and fisheries	Goutam Chandra Thakur, Sovan Bhuia, D.C. Ghosh, A.K. Ghosh & K.R. Naskar
-do-	A review of shell fish and finfish species from the brackishwater fisheries of the Sunderbans and their impact on the mangrove ecology	Tanushree Bose, Tuhin Kumar Baguli, A.K. Ghosh & K.R. Naskar



Conferences/Symposia/ Seminars, etc.	Papers presented	Authors/Participants
National Seminar on Technological Advancements in Fisheries and its Impact on Rural Development, organised by the Department of Industrial Fisheries, University of Cochin, Kochi during 6-8 December 1995	-	V.K. Unnithan
65th Annual Session of the National Academy of Sciences (Dr. B.P. Pal Memorial Lecture), held on 10-11 January 1996	-	All Scientists of Allahabad Centre
Workshop on Reservoir Fisheries Development in Madhya Pradesh at Bhopal on 22-23 January 1996	-	V.R. Desai
World Aquaculture, 96. Annual Conference of the World Aquaculture Society, Thailand Dept. of Fisheries and Chulabhorn Research Institute, held from 30th January to 2nd February 1996	A review on the status of carp culture in India	V.R.P. Sinha
National Symposium on Prospects and Problems of Technology Transfer and Rural Reality organised by Bioved Research Society, Allahabad on 17-18 February 1996	Changing scenario of riverine fisheries at Lalgola : A case study	Ravish Chandra R.K. Tyagi & A.R. Chowdhury
-do-	Technological development towards management of small reservoirs - A case study of Bagla reservoir	M.A. Khan, H.P. Singh, R.K. Dwivedi, D.N. Singh & R.K. Tyagi

Conferences/Symposia/ Seminars, etc.	Papers presented	Authors/Participants
National Symposium on Prospects and Problems of Technology Transfer and Rural Reality organised by Bioved Research Society, Allahabad on 17-18 February 1996	Technology for fish culture in pens in a polluted channel of river Ganga at Bhagalpur	A.K. Lal & S. Sarkar
-do-	Crafts and gears used in tank fisheries of Uttar Pradesh	Balbir Singh
Workshop on Eco-oriented approach in development of fisheries in Pong Reservoir, held at Himachal Pradesh on 23 February 1996	Impact of emergence of Pong Reservoir on the fishery of Beas River system in H.P.	V.K. Sharma
Indian Science Congress Seminar held on 28 February 1996	Science and technology for achieving food, economic and health security	S. Samanta
XIX Indian Social Science Congress, "People of India", Indian Academy of Social Sciences, India, held on 11-14 March, 1996 at Allahabad		P.K. Katiha
XIth Annual International Conference on 'Sustainable Development and Environment' held at Calcutta, organised by National Environmental Science Academy in Collaboration with Viswa Bharati University, from 15-17 March 1996	Impact of engineering structures on fish and fisheries in Hooghly estuarine system	M. Sinha & D.K. De



Conferences/Symposia/ Seminars, etc.	Papers presented	Authors/Participants
XIth Annual International Conference on 'Sustainable Development and Environment' held at Calcutta, organised by National Environmental Science Academy in Collaboration with Viswa Bharati University, from 15-17 March 1996	Changes in biotic communities in Sunderbans as a result of man-made interventions	M. Sinha, A. Hajra, P.K. Pandit
-do-	The relevance of conventional economic concepts vis-a-vis Environmental concerns	S. Paul
-do-	Changing scenario of fish and fisheries of River Yamuna	D.N. Mishra & Usha Moza
-do-	Changing trends in primary production and water quality and their bearing on fish yields in Hooghly-Matlah estuary	D. Nath, M.M. Bagchi & R.K. Banerjee
-do-	Chilka - now and then	R.K. Banerjee, P.K. Pandit & M. Sinha
-do-	Fish Disease Epizootics In India : It's relation with water quality and stress in the ecosystem	M.K. Das, & R.K. Das
-do-	Fish yield optimisation in West Bengal	M.K. Mukhopadhyay, G.K. Vinci & Krishna Mitra
-do-	Role of Aquatic weeds in lake management and eutrophication control	B.C. Jha
-do-	<i>In Situ</i> cellular and physiological changes in fishes subject to toxic hazards in the river Ganga	K.K. Vass, K. Mitra M.K. Mukhopadhyay A. Hajra

Conferences/Symposia/ Seminars, etc.	Papers presented	Authors/Participants
XIth Annual International Conference on 'Sustainable Development and Environment' held at Calcutta, organised by National Environmental Science Academy in Collaboration with Viswa Bharati University, from 15-17 March 1996	Impact of environmental changes on the biological and chemical characteristics of the river Ganga, Yamuna and Damodar	K.K. Vass, M.M. Bagchi H.P.Singh, Balbir Singh U. Moza, K. Chandra, R.K. Banerjee and P.K. Pandit
-do-	Role of extension in arousing mass awareness and public participation in fish conservation movement	U. Bhoumik & S.K. Saha

## VISITORS

A large number of distinguished personalities including national leaders visited the Institute's Headquarters and its different centres during 1995-96. This include Hon'ble Dr. Balram Jakhar, Union Agriculture Minister, Hon'ble Sri Nitish Kumar, M.P. (Lok Sabha) and Chairman, Standing Committee on Agriculture.

Dr. Paul Balogun, ODA Consultant, London

Dr. Somnath Bandopadhyay, Ecologist, Gujarat Ecology Commission, Government of Gujarat, Vadodara

Dr. Mick Blowsfield, Sociologist, Natural Resources Institute, Chatham

Ms. Sunita Kumari, Manager (Forest Ecology), Gujarat Ecology Commission, Government of Gujarat, Vadodara

Mr. R.P. Tuli, Director of Fisheries (Retired), Madhya Pradesh.

Mr. Rawna Lal Sailo, I.A.S., Commissioner of Fisheries, Govt. of Tamil Nadu and Chairman-cum-Managing Director, Tamil Nadu Fisheries Development Corporation Ltd., Madras.



Mr. A. Sreenivasan, Joint Director of Fisheries (Retired) , Govt. of Tamil Nadu.

Mr. V. Natarajan, General Manager, Tamil Nadu Fisheries Development Corporation Ltd., Madras.

Dr. R.S.Paroda, Director-General, Indian Council of Agricultural Research, New Delhi.

Dr. Chris Price, Fisheries Advisor, University of Stirling, U.K.

Dr. P.V. Dehadrai, Dy Director General (Fy), Indian Council of Agricultural Research, New Delhi.

Dr. P. Das, Director, National Bureau of Fish Genetics Resources, Lucknow, U.P.

Dr. B.K. Dwivedi, Secretary, Bioved Society, Allahabad

Prof. Krishan Swarup, Emeritus Scientist, Allahabad

Prof. H.R.Singh, Head, Dept. of Zoology, Allahabad University, Allahabad.

Dr. P.K. Mondal, Reader, Dept. of Zoology, Allahabad University, Allahabad.

Prof. M.C. Chattopadhyay, Dept. of Chemistry, Allahabad University, Allahabad.

Mr. K.D. Pandey, Director, U.P. Fisheries, Lucknow.

Mr. B.L. Jaiswar, Chief Executive Officer, FFDA, Allahabad

Dr. G.Y. Keshavappa, Agricultural University, Bangalore.

Mr. K.L. Verma, Director Welfare (Retd.) , Indian Council of Agricultural Research, New Delhi.

Dr. R.B. Laal, Principal, Allahabad Agricultural Institute, Allahabad.

Dr. Ram Lal, Reader, Allahabad Agricultural Institute, Allahabad.

Dr. A. Chaturvedi, Dept. of Statistics, University of Allahabad.

Dr. G.S. Pandey, Dept. of Statistics, University of Allahabad.

Prof. K.K. Zaad, Dept. of Mathematics, University of Allahabad.

Mr. U.S. Tewari, Director, Allahabad Museum, Allahabad.

Dr. R. Singh, Agro-Economic Research Centre, University of Allahabad, Allahabad.

Mr. M. Ranadhir, Director (Acting), Central Institute of Freshwater Aquaculture, Bhubaneswar, Orissa.

# VISITORS

## **Dr. Balam Jakhar, visits CIFRI**

Dr. Balam Jakhar, Hon'ble Minister for Agriculture, Government of India, visited the Institute on 23rd July 1995



The Hon'ble Minister being received at the Institute



# VISITORS



Dr. Jakhar at the aquarium of the Institute. Dr. V.R.P. Sinha (left), Mr. G.S. Sahni, Secretary, ICAR (second from left) and Dr. M. Sinha (right) are also seen



The Hon'ble Minister talking to Mr. R.K. Das, Senior Scientist of the Institute

Dr. S. Ayyappan, Director, Central Institute of Freshwater Aquaculture,  
Bhubaneswar, Orissa.

Mr. E.J. Raselam, Additional Director, Dept. of Fisheries, Government of Kerala,  
Trivandrum.

Mr. Radhakrishnan, Jt. Director, Dept. of Fisheries, Government of Kerala,  
Trivandrum.

Mr. Mohandas Dy Director, Dept. of Fisheries, Govt. of Kerala, Alappuzha.

Dr. Baljeet Saran, Director of Haryana Fisheries, Chandigarh.

Mr. Dharambir Bharati, CEO, FFDA, Karna, Haryana.

Mr. Malcolm Winsbyl, Vancouver, Canada.

## **FINANCE**

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### **For the year 1995-96 (Rs. in lakhs)**

	B.E. 1995-96	R.E. 1995-96	Actual Expenditure 1995-96
Plan :	150.00	120.00	120.00
Non-Plan :	338.50	351.00	351.00
<b>Total :</b>	<b>488.50</b>	<b>471.00</b>	<b>471.00</b>



**CENTRE-WISE LIST OF ONGOING PROJECTS 1992-93**

BARRACKPORE	:	FC/B/11 BF/B/3 BF/A/21 AN/A/16	FC/B/12 BF/B/11 AN/A/15	FC/A/4 BF/B/12 BF/A/22
ALLAHABAD	:	FC/B/11	FC/B/12	
ALAPPUZHA	:	FC/B/13		
BANGALORE	:	FC/A/7		
CALCUTTA	:	FC/B/11	BF/B/10	FC/B/12
COIMBATORE	:	FC/A/19		
CANNING	:	BF/B/3		
DIAMOND HARBOUR	:	BF/B/3		
ELURU	:	FC/A/23		
FARAKKA	:	BF/A/22		
HOSHANGABAD	:	FC/A/7	FC/B/12	
GUWAHATI	:	FC/B/14		
KARNAL	:	FC/B/10	FC/B/11	
LALGOLA	:	FC/B/12		
MALDAH	:	FC/B/12	BF/A/22	
ULUBERIA	:	BF/B/3		
VADODARA	:	BF/B/9		

## PROGRESS OF RESEARCH

**PROJECT** : FC/B/10

### ECOLOGY AND FISHERY STATUS OF UPPER STRETCH OF RIVER YAMUNA AND ASSOCIATED CANAL

**Personnel** : D. N. Mishra, D. K. Kaushal, V. R. Chitranshi,  
(Mrs.) Usha Moza, K. Chandra, V. K. Sharma,  
S. K. Srivastava, S. Kumar

**Dutration** : 1995- 1999

**Location** : Karnal, Haryana

#### Work accomplished

The study was conducted in 170 km stretch of river Yamuna from Dakpather to Panipat and 100 km stretch of Western Yamuna Canal from Yamunanagar to Panipat. Along this stretch, river harbours complete fresh zone from Dakpather to Hathnikund. Hathnikund onwards, the river is subjected mainly to i) agricultural run off along both the banks and ii) water abstraction in the form of Tajewallah barrage at Tajewallah above Yamunanagar and as such the river is divided into 3 parts : (i) Main river-passing in between border of U.P. and Harayana, (ii) Western Yamuna Canal passing through Haryana, and (iii) Eastern Yamuna Canal passing through Western U. P. mainly.

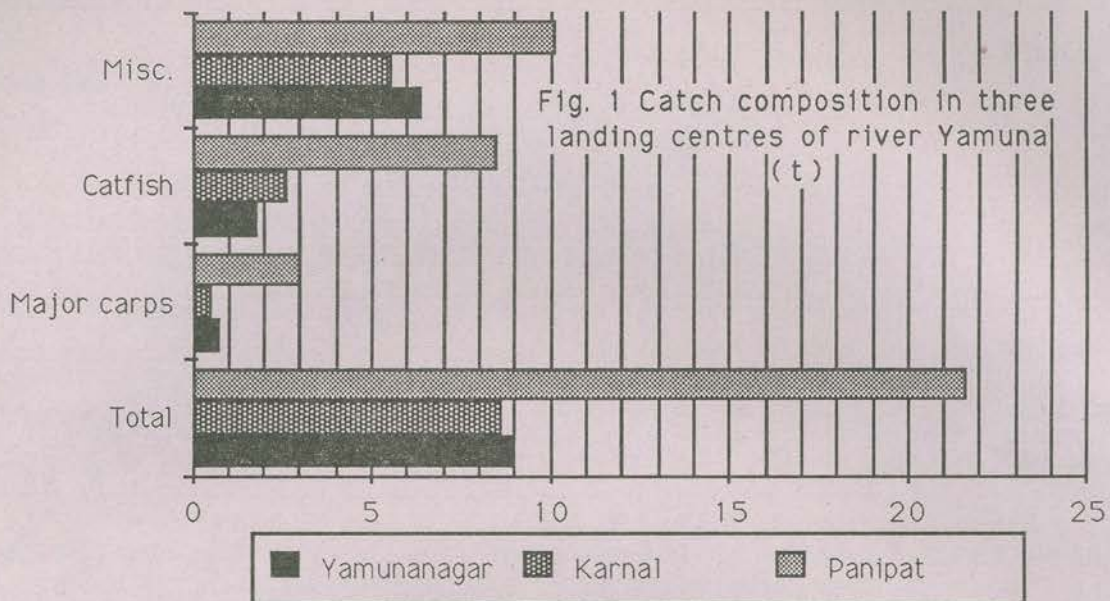
#### Species-wise fish catch composition

The centre-wise catch and species composition are given in Table 1. & Fig. 1.

**Table 1. Centre-wise estimated fish landing from River Yamuna, for the year 1995-96**

Species	Yamunanagar		Karnal		Panipat		Total	
	t	%	t	%	t	%	t	%
<i>C. Mrigala</i>	0.23	30.67	0.20	39.22	0.66	21.93	1.09	25.53
<i>C. catla</i>	0.11	14.66	0.08	15.69	0.97	32.22	1.16	27.17
<i>L. rohita</i>	0.10	13.33	0.10	19.60	1.14	37.87	1.34	31.38
<i>L. calbasu</i>	0.31	41.34	0.13	25.49	0.24	7.98	0.68	15.92
<i>M. aor</i>	0.11	6.01	0.05	1.91	0.97	11.40	1.13	8.72
<i>M. seenghala</i>	0.59	32.24	1.27	48.47	3.24	38.07	5.10	39.35
<i>W. attu</i>	1.13	61.75	1.30	49.62	4.30	50.53	6.73	51.93
Misc. group	4.38	48.77	4.57	52.71	9.35	43.25	18.30	46.60
<i>Tor spp.</i>	1.60	17.83	0.05	0.58	0.12	0.56	1.77	4.51
<i>C. carpio</i>	0.40	4.45	0.92	10.61	0.60	2.78	1.92	4.89
<i>H. molitrix</i>	0.02	0.22	-	-	0.03	0.13	0.05	0.13
<b>Total</b>	<b>8.98</b>	<b>22.88</b>	<b>8.67</b>	<b>22.07</b>	<b>21.62</b>	<b>55.05</b>	<b>39.27</b>	





From Table 1 it is found that the Panipat stretch is more productive with a catch of 55.05%, followed by Yamunanagar (22.88%) and Karnal (22.07%).

### Fish fauna

The observation on the faunistic survey from Hathnikund to Panipat and the fish landing at Yamunanagar, Karnal and Panipat fish markets showed the presence of 63 fish species belonging to 4 orders, 14 families and 35 genera.

**Physico-chemical characters:** This aspect was studied in detail.

### Primary productivity

The gross carbon production in river Yamuna was comparatively higher at Panipat ranging between 50.0-141.67 mgC/m<sup>3</sup>/4 hrs. Lowest gross carbon production was recorded at Dakpathar (43.75-66.67 mgC/m<sup>3</sup>/4 hrs.), the fresh zone of the river Yamuna. The annual respiration values ranged from 24.59 mgC/m<sup>3</sup>/4 hrs. (Dakpathar) to 58.3 mgC/m<sup>3</sup>/4 hrs (Panipat).

## Biotic components

The standing crop of plankton in Yamuna was estimated at 354 organisms/l and was dominated by Bacillariophyceae (49.29%), Chlorophyceae (22.44%), Myxophyceae (19.27%), Dinophyceae (3.81%), rotifers (3.20%) cladocerans (1.30%) and copepods (0.67%).

In Western Yamuna canal at Yamunanagar, the plankton count varied from 500 organisms/l at AOF to 529 organisms/l at OF. At Karnal, the average plankton abundance was almost similar in Western Yamuna Canal and Sutlej Yamuna Link

The seasonal periphyton production in river Yamuna showed decreasing trend from Hathnikund (1366 organisms  $\text{cm}^{-2}$ ) to Panipat (750 organisms  $\text{cm}^{-2}$ ) during monsoon.

Macrophytes were not recorded in the river Yamuna at sampling sites located at Yamunanagar, Karnal and Panipat centres. However, meagre quantity of *Spirodella* sp. and *Eichhornia crassipes* were recorded in the Western Yamuna Canal at Karnal and Panipat sampling centres.

During post monsoon the benthic population showed increasing trend from 33 organisms/ $\text{m}^2$  at Kalanor to 144 organisms/ $\text{m}^2$  at Panipat through 11 organisms/ $\text{m}^2$  at Karnal.

## Spawn prospecting

Spawn prospecting investigations were carried out at Jadoli near Karnal for a period of 20 days. During the period of observations two spawn spurts were encountered and spawn availability coincided with receding phase of flood.

A total of 140 ml of spawn (70,000 hatchlings) were collected. The average catch per net per hour ranged from 2.08 to 3.95 ml and 1.25 to 2.50 ml in 1st and 2nd spurt respectively. The average percentage of major carp, minor carp and miscellaneous group in the total spawn catch were 32.3%, 44.7% and 23.0% respectively.



<b>PROJECT</b>	:	<b>FC/B/11</b>
		<b>ENVIRONMENTAL IMPACT ASSESSMENT IN RIVERINE ECOSYSTEMS.</b>
<b>Personnel</b>	:	K. K. Vass, M. M. Bagchi, M. K. Mukhopadhyay, (Mrs.) K. Mitra, K. Chandra, B. C. Jha, (Mrs.) Usha Moza, H. P. Singh, Balbir Singh, R. K. Banerjee, D. K. Kaushal, H. C. Karmakar, P. K. Pandit.
<b>Dutration</b>	:	1991-1998
<b>Location</b>	:	Barrackpore, Allahabad, Karnal

Water quality parameters indicated that in case of river Yamuna, the low level of oxygen at most of the centres resulted in very high BOD which ranged between 24.5 to 98.4 mg/l. This indicated that the system had far exceeded the prescribed level for this important parameter. In comparison the values were 8-9 times low in the river Ganga. These alarming changes in water quality were due to combined impact of point and nonpoint discharge and reduction in river water flow pattern.

The toxicant contamination in riverine water indicated zinc to range between (0.03-0.23 ppm), copper (0.01-0.17 pm); cadmium (0.005-0.07 ppm) and lead (0.03-0.08 ppm). Significant difference in concentration levels of various toxicants was recorded from different centres. The sediment accumulation of these toxicants on an average was 200-700 times more than that recorded in ambient water while accumulation in fish tissues was many thousand times more.

At the highly stressed centres maximum accumulation of lead (1286 ppm) was recorded in kidney of test fish followed by zinc (432 ppm). The accumulation was more in carnivores than in other varieties of fishes.

The toxicant accumulation in biotic communities especially in the test fish resulted in slow histological damage in various tissue organs. In high metal stressed zones organ damage was more than 50%. The gills showed extreme hyperplasia in secondary filaments with frequent clubbing of entire lamellae. Significant histological damage was noted in kidney and liver also. These changes resulted in abnormal physiological and biochemical responses in test fishes.

**PROJECT** : **FC/B/12**

**INVESTIGATION ON ECOLOGY, BIODIVERSITY AND PRODUCTION RELATIONSHIP IN RIVERS GANGA (INCLUDING TRIBUTARIES RAMGANGA AND GOMTI) MAHANADI (INCLUDING CHILKA LAKE) AND NARMADA.**

**Personnel** : **Allahabad** :- Ravish Chandra, G. K. Bhatnagar (up to Sept. '95), R. S. Panwar, S. N. Mehrotra (up to Aug. '95), H. P. Singh, D. N. Singh, Balbir Singh, M. A. Khan, A. K. Laal, P. N. Jaitly, R. K. Tyagi, Sree Prakash, B. K. Singh (w. e. f. 19.6.95), R. K. Dwivedi, R. N. Seth (on study leave), P. K. Katiha, N. K. Srivastava, Ram Chandra, B. D. Saroj, R. C. Singh, L. R. Mahavar, Ramji Tiwari, J. P. Mishra, P. Rajani, H. C. Banik, Kalpana Srivastava (w. e. f. 4.10.'95).

**Barrackpore**:- M. Sinha, P. K. Chakraborti, D. Nath, B. C. Jha, A. K. Das, D. K. De, K. Chandra, N. N. Majumdar.

**Malda**:- A. Ghosh, T. Chatterjee

**Calcutta**:- R. K. Banerjee, P. K. Pandit, S. K. Chatterjee.

**Guwahati**:- V. Pathak, Alok Sarkar.

**Hoshangabad**:- N. P. Srivastava, K. K. Agarwal,

**Vadodara**:- S. N. Singh, R. C. Mandi.

**Duration** : 1994-1995

**Location** : Allahabad, Barrackpore

### **Subproject a**

#### **RIVER RAMGANGA**

Physico-chemical and biological parameters of R. Ramganga exhibited polluted condition. Nature of pollutants at various sites were as follows:

Moradabad : Jigar Colony, Bridge ghat (city sewage waste);  
Rampur : Gularia (Pulp and Paper Mill effluents);  
Bareilly : Bajian (Rubber and Sugar Factory waste);



All these sites were badly polluted as evidenced by anoxic condition in June and hypoxic condition in monsoon and winter. Similarly, concentration of other abiotic parameters were *viz* Alkalinity: 300-540 mg l<sup>-1</sup>, Chloride: 120-130 mg l<sup>-1</sup>, NO<sub>3</sub>: more than 0.22 mg l<sup>-1</sup> and Phosphate: above 0.38 mg l<sup>-1</sup>. Heavy metals *viz*; zinc, arsenic and chromium were in higher concentration. Primary productivity was also erratic. Generally amongst algae diatoms were dominant followed by Chlorophyceae but in winter myxophycean algae were in abundance.

Bottom biota diversity was lesser in polluted sites and higher in unpolluted sites, mostly dominated by chironomus larvae.

## RIVER GOMTI

River Gomti from Haidernala, Lucknow to Jaunpur was lesser polluted all through except Bajrang ghat OF which was polluted due to discharge of city sewage and slaughter house waste. Heavy infestation of macrophytes in the stretch play vital role in the autocleaning process of river.

High percentage of Chlorophyceae and Bacillariophyceae was observed at all centres except OFs. Low density of Myxophyceae at these centres indicated pollutional stress.

Decrease in density of Chlorophyceae and gradual rise in density of Myxophyceae which are able to survive pollutional stress at OF centres were observed. Presence of *Oscillatoria* spp, *Spirulina* sp. and *Nostoc* sp. indicated the degradation of water quality. Some diatoms *viz* *Nitzschia palea*, *Navicula obliqua*, *N. cuspidata* and *Synedra ulna* were also dominated at these centres which indicated them to be pollution tolerant species. Presence of bacterium *Zoogloea ramigera* and *Sphaerotilus* sp. also indicated the stress. Poor representation of zooplankton as a whole and presence of *Brachionus angularis*, *B. rubens*, nematode and chironomus larvae also indicated the same. Periphytic and bottom biotal community structure revealed higher diversity all through the above stretch except at OF zone of Bajrang ghat.

## Fishery

Fish landings from wholesale and retail fish markets were collected from Bareilly centre on River Ram Ganga and Lucknow and Jaunpur on River Gomti. At all the places the major carps and catfishes were dominated by lower size groups and no major carp juveniles were recorded. As compared to preceding year the fishery at Bareilly and Lucknow showed marked increase (around 2.3 times). The increase was recorded for almost all the species. Jaunpur centre did not reflect much variation over the preceding year (Table 1).

**Table 1. Fish landings at different centres (in tonnes)**

Centre	Bareilly	Lucknow	Jaunpur
<b>Species</b>			
<i>C. mrigala</i>	4.21	1.95	0.39
<i>C. catla</i>	1.97	0.21	0.02
<i>L. rohita</i>	0.87	1.44	0.09
<i>L. calbasu</i>	0.66	2.22	0.20
<b>Major carps</b>	<b>7.71</b>	<b>5.82</b>	<b>0.70</b>
<i>M. aor</i>	2.65	6.70	1.20
<i>M. seenghala</i>	3.12	6.06	2.01
<i>W. attu</i>	4.49	2.97	0.05
<b>Catfishes</b>	<b>10.26</b>	<b>15.73</b>	<b>3.26</b>
Others	28.67	20.49	5.35
<b>Total</b>	<b>46.64</b>	<b>42.02</b>	<b>9.31</b>

### **Economics of riverine capture fisheries operations**

#### *River Ramganga*

The analysis of information gathered at wholesale and retail fish markets at Bareilly indicated marketing channel of Fisherman- Wholesaler - Retailer - Consumer and consumer preferences for carps over other fishes. Carps received better wholesale (Rs. 34.29) and retail (Rs. 44.14) prices as compared to catfishes (Rs. 30.42 and Rs. 39.38), and other species (Rs. 20.28 and Rs. 29.22), with an overall whole sale and retail prices of Rs. 28.97 and Rs. 37.10 respectively for riverine catch. *C. garua* fetched the maximum wholesale price (Rs. 43.50), while highest retail price was for *C. catla* (Rs. 50).



### *River Gomti*

Two centres, namely Lucknow and Jaunpur were chosen at river Gomti for the present study. Different marketing channels were studied at these centres. At Lucknow the marketing channel was similar to Bareilly, but at Jaunpur there were two channels, namely, Fishermen - Retailer - Consumer and Fishermen - Consumer.

The prices of various fish categories from river Gomti also followed the similar pattern to that of the other rivers with highest wholesale and retail prices for carps at Rs. 34.37 and Rs. 45.63 respectively followed by catfishes at Rs. 32.64 and Rs. 43.98 and other species Rs. 23.70 and Rs. 37.69. For overall riverine catch these prices were Rs. 31.16 and Rs. 42.59. The prices at Jaunpur were much lower than Lucknow due to smaller marketing channel.

### **River survey**

Survey of rivers Narmada, Ganga and Mahanadi (including Chilka lake) in respect of their fisheries and environment has been initiated from their origin to sea mouth under the sub-project b, c and d of this project. One campaign in each of the rivers could be completed during the year under report which has given interesting informations. However, detailed results would be reported on completion of the other two campaigns in each river planned during 1996-97.

<b>PROJECT</b>	:	<b>FC/B/13</b>
		<b>ECOLOGY AND FISHERIES INVESTIGATIONS IN VEMBANAD LAKE FOR EVALUATING CHANGES IN TIME SCALE.</b>
<b>Personnel</b>	:	V. K. Unnithan, S. Bijoy Nandan, C. K. Vava
<b>Dutration</b>	:	1993-97
<b>Location</b>	:	Alappuzha

The ecological investigations at 12 stations in the sector of the lake south of Thanneermukkom salinity barrier was continued during the year. The thrust was on the study of the biodiversity of the system, its spatio-temporal variations and assessment of the water and soil qualities.

## Water quality

Seventeen parameters were studied during the year covering both surface and bottom segments. The water was characterised by low level of alkalinity moderate levels of transparency, dissolved oxygen, free carbon dioxide, hydrogen sulphide, COD, and sulphates. Water was acidic to slightly alkaline. Salinity recorded wide variations depending on the season and proximity to the barrier. The TDS and conductivity also fluctuated widely, closely following the salinity pattern. Silicates, available phosphorus and nitrate nitrogen had trace to moderate values. Compared to the prebarrage period, the Sector recorded a drastic decline in salinity.

## Soil characteristics

Depending on the mean values, the bottom sediment was chiefly composed of coarse and fine sand (40.7%), followed by clay (31.1%) and silt (20.9%). The soil pH was characteristically acidic, the values recorded being between 3.8 and 7.1. The sediment at stations away from the barrage had a near to neutral pH. The sediment was rich in organic carbon (av. 2.30%) and calcium carbonate content (av. 5.35%). Trace to moderate values of nutrients were recorded.

The details of phytoplankton, zooplankton and benthic fauna are given in Table 1. Blue greens were dominant (73.1%) at the Station where urban sewage was deposited.

**Table 1. Composition of biota in the freshwater sector of the lake**

Phytoplankton		Zooplankton		Benthic fauna	
Group	%	Group	%	Group	%
Chlorophyceae	37.6	Tintinnidae	2.6	Oligochaeta	2.9
Myxophyceae	30.3	Rotifera	28.3	Polychaeta	25.7
Chrysophyceae	1.2	Cladocera	14.7	Amphipoda	31.1
Desmidiaceae	23.2	Copepoda	21.2	Chironomid larvae	9.6
Bacillariophyceae	7.8	Copepod nauplii	27.6	Other insects & insect larvae	1.4
		Others	5.6	Gastropoda	22.0
				Bivalvia	4.2
				Others	3.2
Total density (nos/m <sup>3</sup> )	34,162		8,660		4743



### Primary productivity

Primary productivity studies were conducted at both surface and bottom strata. The values were:

	Gross productivity	Net productivity
	(mgC/m <sup>3</sup> /day)	
Premonsoon season	1.01	0.55
Monsoon season	0.43	0.52
Post monsoon season	1.17	1.12
Mean	0.87	0.73

### Pesticide residue analysis

Water, sediment, freshwater prawn and the clam *Villorita cyprinoides* were collected from the ecosystem and analysed for their pesticide accumulation levels. BHC level was detected in water to the extent of 0.048 to 0.152 ug/l and in sediment to the extent of 0.0006 to 0.0127 ug/g. Endosulphan and DDT were below detection level. Freshwater prawn did not record any pesticide residue while the clam had endosulfan @ 0.366 ug/g in their tissue. The analyses were conducted during the post monsoon phase.

**PROJECT** : **FC/B/14**

**ECOLOGY AND EVALUATION OF PRODUCTIVITY  
RELATIONSHIPS IN THE RIVER BRAHMAPUTRA WITH  
SPECIAL EMPHASIS ON ITS TRIBUTARIES.**

**Personnel** : V. Pathak, M. Choudhury, Alok Sarkar,  
B. K. Biswas

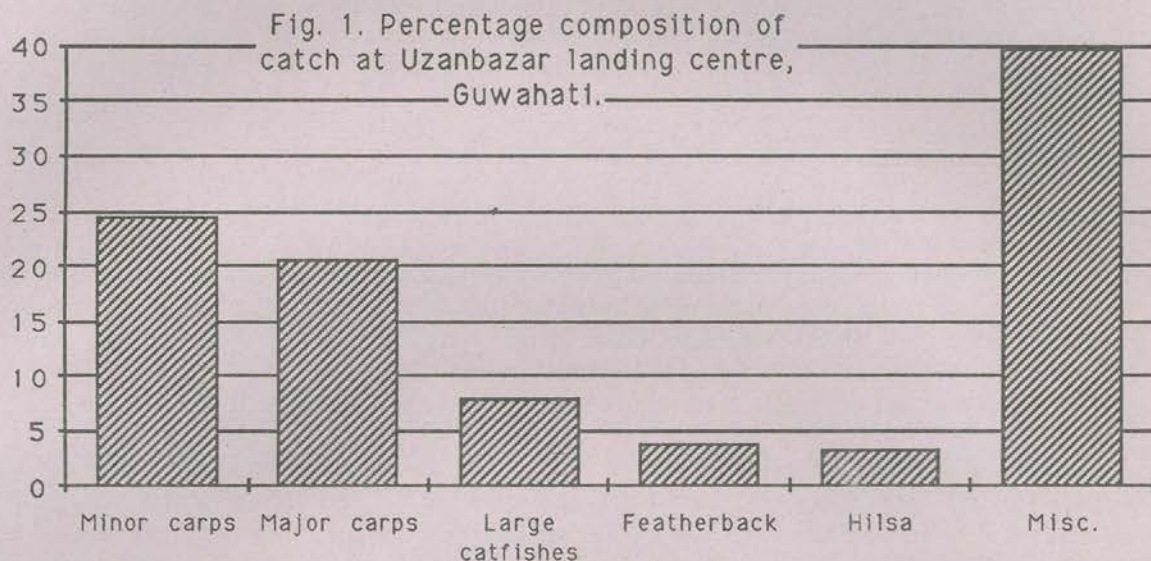
**Dutration** : 1995-2001

**Location** : Guwahati, Assam

### Fish catch statistics

The total estimated fish landing at Uzanbazar assembly centre, Guwahati during April 1995 to March 1996 was 248.8 t against 150.5 t during the corresponding period of previous year thus showing an overall increase of 59.7%. The dominant commercially important species in the catch were *L. bata* (9.90%), *C. catla* (7.67%), *W. attu* (6.96%),

*L. rohita* (6.14%) and *C. reba* (6.14%). Miscellaneous group was dominated by *Aspidoparia* spp., *G. chapra*, *C. garua*, *Chela* spp., *A. coila* and many trash fishes. The fish catch composition at the centre is depicted in Fig. 1.



Fish catch in major fish landing centres between the stretch Jorhat to Dhubri, observed for a very brief period, revealed per day catch to be 476 kg at Jorhat, 214 kg at Tezpur, 85 kg at Goalpara (Jogighopa) and 133 kg at Dhubri.

### Water quality assessment

The water quality of river Brahmaputra in five different stretches between Jorhat to Dhubri and sixteen tributaries, 10 on the north bank and 6 on the south bank were studied.

### Impact of tributaries on the water quality of River Brahmaputra

At Tezpur the tributary Jia Bharali, which had comparatively much lower values of alkalinity, conductance, dissolved salts, calcium, magnesium and hardness than Brahmaputra, caused sudden decline in the values of these parameters at the confluence point. Similarly at Goalpara the highly alkaline Manas water completely changed the water quality of Brahmaputra at the confluence point resulting in abrupt increase in the values of alkalinity, conductance, dissolved solids, calcium, magnesium and hardness and the impact could be seen upto a long distance. The two south bank tributaries Kallong and Bharalumukh also showed considerable impact on the water quality of the main river although with lesser magnitude. The tributary Bharalumukh, which carried the entire city sewage caused severe reduction in oxygen, increase in CO<sub>2</sub>, alkalinity, conductance, dissolved solids, hardness, chloride, etc., at the confluence point.



## Primary production

The rate of gross and net production by producers also showed considerable variations in different stretches of river Brahmaputra. Both the production rates ( $\text{mg C}^{-3} \text{ day}^{-1}$ ) were 365.62 and 227.50 at Jorhat, 413.5 and 264.75 at Tezpur; 657.0 and 495.0 at Guwahati; 953.35 and 629.35 at Goalpara and 776.25 and 618.7 at Dhubri. The production rate showed gradual increase from its lowest value at Jorhat to the highest value at Goalpara with a slight decline at Dhubri.

## Biotic communities

### Plankton

*Brahmaputra*:- Qualitative and quantitative abundance of plankton in five different stretches of Brahmaputra and 16 tributaries in north and south banks were studied. Considerable zonal variations were observed in numerical abundance of plankton being minimum in Jorhat ( $29 \text{ u l}^{-1}$ ) and maximum in Guwahati ( $153 \text{ u l}^{-1}$ ) and Goalpara ( $134 \text{ u l}^{-1}$ ). Phytoplankton remained the dominant component throughout the stretch.

*Tributaries*:- Among the ten north bank tributaries, maximum plankton concentration was observed in Gaurang ( $1401 \text{ u l}^{-1}$ ) and Beki ( $1362 \text{ u l}^{-1}$ ) while minimum was in Gadadhar ( $3 \text{ u l}^{-1}$ ). Except Gadadhar, Champawati and Pagladia the numerical abundance of plankton in other tributaries was more than the main river.

Among the six south bank tributaries, the numerical abundance of plankton ranged between  $16 \text{ u l}^{-1}$  (Bharalu) to  $336 \text{ u l}^{-1}$  (Dhansiri) and showed complete dominance of phytoplankton.

### Benthos

Benthos was generally poor in Brahmaputra except Goalpara ( $258 \text{ nos. m}^{-2}$ ) and Guwahati, the variation throughout the stretch being  $10 \text{ nos. m}^{-2}$  (Jorhat) to  $258 \text{ nos. m}^{-2}$ .

Among the north bank tributaries, the numerical abundance of benthos ranged between  $8 \text{ nos. m}^{-2}$  (Beki) to  $3999 \text{ Nos. m}^{-2}$  (Jia Bharali). Among the south bank tributaries benthos ranged between  $8 \text{ nos. m}^{-2}$  (Krishnai) to  $344 \text{ nos. m}^{-2}$  (Bharalu, head waters). Gastropods remained the dominant component (94.8 to 100%) in all the southern tributaries.

**PROJECT** : **FC/A/4**

**PRELIMINARY ECOLOGICAL INVESTIGATIONS FOR  
FISHERIES MANAGEMENT OF WETLANDS IN WEST  
BENGAL**

**Personnel** : V. V. Sugunan (on study leave till 29.2.1996),  
M. K. Mukhopadhyay, (Mrs.) G. K. Vinci, B. C. Jha,  
(Mrs.) K. Mitra, A. Hassan, A. K. Das, B. K. Bhattacharjya,  
M. P. Singh, Dipak Biswas, (Mrs) Suvra Saha.

**Duration** : 1986-97

**Location** : Barrackpore

Altogether 5 beels, 3 closed and 2 open types, were investigated. The closed beels, Bansdaha, Bhomra and Haripur (II) were located respectively in Burdwan, Nadia and Maldah districts of West Bengal. Two open beels one each from Maldah (Haripur-I) and Hooghly (Kole) districts were also studied.

### **Trophic assessment**

Seasonal fluctuations in water qualities and bio-community structures of different beels were studied following standard methods.

### **Water quality fluctuation**

The water was more transparent in closed beels (0.90-1.70 m) compared to the open system (0.35 -0.94 m).

### **Productivity potentials**

The closed beels were highly productive as indicated by the primary productivity values (GP : 162.50-256.7 mg C/m<sup>3</sup>/h and NP: 150.0-213.0 mg C/m<sup>3</sup>/h) while in open beels the photosynthesis at macrophyte level was within moderate range (GP : 93.7-100 mg C/m<sup>3</sup>/h and NP: 70.3-75.0 mg C/m<sup>3</sup>/h ).

### **Bio-community structure**

#### **Plankton**

The plankton population was highly fluctuative with the season, hydrography and nutrient status of the lakes. The closed beels harboured higher densities of plankton compared to the open beels.



## Macrophyte

In open beels like Haripur (I) and Kole macrophyte infestation was at a lower rate (25-30%) compared to the closed system of Bhomra, Bansdah and Haripur (II) which registered 70-90% of the water spread occupied with submerged, floating and marginal vegetations.

## Macrophyte associated fauna

These were more in closed beels (1156-3240 nos/m<sup>2</sup>) and the population was dominated by insects (91.0%) in Bansdah while gastropods contributed the lion share (79.0%) of the associated fauna in Bhomra beel. In open beels the associated fauna were less diversified and thinly populated.

## Benthic fauna

Though less diversified (SDI- 1.2102-1.8090), the benthic fauna in closed beels (216-6480 nos./m<sup>2</sup>) were densely populated compared to the open systems (240-491 nos./m<sup>2</sup>).

## Fish and fisheries

The open beels in particular Haripur (I) showed presence of wide varieties of fishes inclusive of some Gangetic carps (*Labeo bata*, *Labeo calbasu*, *Cirrhina reba*), catfish (*Mystus aor*, *Mystus seenghala*) and featherbacks (*Notopterus chitala*) in the commercial landing. In closed beels the fish fauna comprised air breathing fish (*Channa* spp., *Clarius batrachus*, *Heteropneustes fossilis*, *Anabus testidineus*) small catfish (*Mystus vittatus*, *Mystus cavasius*, featherbacks (*Notopterus notopterus*), minnows (*Chela bacaila*, *Puntius* spp, *Colisa* spp., *Chanda nama*, *Chanda ranga* etc.) and small prawn.

## Pen culture

Experiments on pen culture of *Macrobrachium rosenbegii* was carried out in shallow weed choked Bhomra beel. With supplementary feeding of 4-10% of the body weight the prawn grew to an average size of 20 g in 70 days.

<b>PROJECT</b>	:	<b>FC/A/7</b>
		<b>ECOLOGY AND FISHERIES OF FRESHWATER RESERVOIRS.</b>
<b>Sub-Projects</b>	:	<p>a) <b>Ecology and fisheries of reservoirs in Karnataka.</b></p> <p>b) <b>Ecology and fisheries of Tawa reservoir, Madhya Pradesh.</b></p>
<b>Personnel</b>	:	<p><b>Karnataka:-</b> V. R. Desai, M. Ramakrishniah, D. S. Krishna Rao (on study leave), P. K. Sukumaran, M. Karthikeyan (on study leave), S. K. S. S. Hameed (up to 24.2.96).</p> <p><b>Madhya Pradesh:-</b> N. P. Srivastava, B. L. Pandey, K. K. Agarwal.</p>
<b>Dutration</b>	:	1995-1999
<b>Location</b>	:	Bangalore and Hoshangabad

### **Survey of selected reservoirs of Karnataka.**

A rapid exploratory survey of some selected reservoirs of Karnataka was initiated. For this survey 14 reservoirs were selected initially, 8 from Cauvery basin (Manchanbele, Markonahalli, Mangala, Hemavathi, Harangi, Kabini, Nugu and Krishnarajasagar), 4 from Krishna basin-(Bhadra, Ghataprabha, Vanivilas Sagar and Malaprabha) one from the west flowing Sharavathi system (Linganamakki) and one perennial tank not connected to any of the above river systems. Information collected (based on one of the three proposed compaigns) are as under.

### **Morphometric features**

Going by morphometric features, Markonahalli, K. R. Sagar and Nugu were more productive followed by Manchanbele, Kabini, Hemavathi and Harangi. Bhadra and Ghataprabha appeared to be less productive.

### **Water quality**

Correlation coefficient (r) calculated between available P of soil and  $PO_4^{-P}$  of water ( $r=0.069$ ) and available N of soil and  $NO_3^{-N}$  of water ( $r=0.162$ ) indicated no relationship between soil nutrients and water quality. Oxycline, an index of reservoir productivity, was there in varying degrees in the reservoirs sampled. Manchanbele showed strong oxycline while in Markonahalli no change in DO was noted with depth.



### **Primary productivity**

Manchanbele showed highest gross production ( $\text{mgC}/\text{m}^3/\text{day}$ ) (2500) followed by K. R. Sagar ( $1500 \text{ C}/\text{m}^3/\text{day}$ ), Linganamakki (1500), Bhadra (1125) and Markonahalli (1125 mg). Harangi showed higher values of productivity than Nugu and Kabini which was not corroborated by other productive characteristics.

### **Plankton**

Among Cauvery basin reservoirs, the standing crop of plankton ( $\text{ml}/\text{m}^3$ ) was richest in Machanbele (1.21) followed by Nugu (1.09) and K. R. Sagar (0.92). Hemavathi recorded lowest (0.05). In Krishna reservoirs it varied from 0.85 in Bhadra to 0.1 in Ghataprabha. Linganamakki also recorded higher standing crop of 0.85.

Phytoplankton was prevalent in K. R. Sagar, Manchanbele, Harangi, Hemavathi and Bhadra while zooplankton was dominant in Nugu, Kabini, Linganamakki, Ghataprabha and Markonahalli.

### **Bottom macrofauna**

Benthic community was poor in general, except in Kabini ( $381 \text{ no}/\text{m}^2$ ) and Manchanbele ( $176 \text{ no}/\text{m}^2$ ).

### **Status of fisheries development**

No reservoir in Karnataka is managed scientifically though the reservoirs had a fairly high yield potential. Some reservoirs were over exploited, such as Markonahalli, Kabini, K. R. Sagar etc. and some were under exploited (Nugu). The fisheries of reservoirs have a mix of indigenous species and major carps. Tilapia has entered into several reservoirs accidentally and established in varying degrees in Kabini, K. R. Sagar and Manchanbele.

### **Fishery potential of reservoirs**

Utilising a model, based on morphometric parameters such as ratio of catchment, reservoir area and mean depth, the fish yield potential of reservoirs had been estimated at  $150 \text{ kg}/\text{ha}$  in Markonahalli,  $50\text{-}100 \text{ kg}/\text{ha}$  in K. R. Sagar, Nugu, Manchanbele and Kabini,  $30\text{-}50 \text{ kg}/\text{ha}$  from Hemavathi, less than  $30 \text{ kg}/\text{ha}$  from Bhadra, Ghataprabha and Harangi reservoirs.

**Sub-Project** : **Ecology and fisheries of Tawa reservoir  
(Madhya Pradesh)**

**Personnel** : N. P. Shrivastava, B. L. Pandey, K. K. Agarwal

### **Physico-chemical features of water**

The physico-chemical parameters did not exhibit any distinct sectoral variations except the water transparency. The extinction coefficient showed an indirect relationship with transparency and euphotic zone.

From nutrient status phosphates ( $0.004-0.022 \text{ mg l}^{-1}$ ) and nitrates ( $0.05-0.06 \text{ mg l}^{-1}$ ) the reservoir can be classified as medium productive. Silicates ( $9.7-10.2 \text{ mg l}^{-1}$ ) were more in the reservoir. The analysis of heavy metals indicated that iron contents were high in Denwa stretch ( $2.64 \text{ mg l}^{-1}$ ).

### **Physico-chemical features of soil**

The soil quality also showed that the reservoir is of medium productive.

### **Primary productivity**

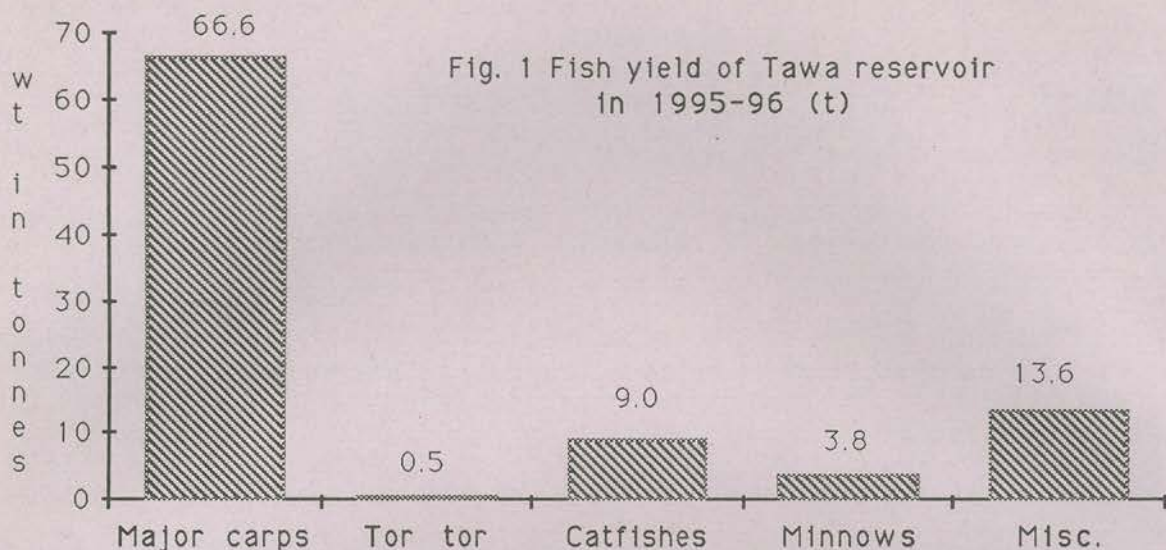
The average annual gross and net production were found to be 1331.6 and 455.3  $\text{mgC/m}^3/\text{d}^{-1}$  respectively. The gross energy fixed by the producers ranged from 4421.5 to 22,473.1  $\text{Cal/m}^3/\text{d}^{-1}$  with average being 13,083.7  $\text{Cal/m}^3/\text{d}^{-1}$ . The net energy fixed by the producers varied from 731.0 to 6166.5  $\text{Cal/m}^3/\text{d}^{-1}$  (av. 4473.9  $\text{Cal/m}^3/\text{d}^{-1}$ ). The energy assimilation efficiency was calculated at 34%.

The potential fish yield of this reservoir was found to be 450 t/yr (=40 kg/ha). The conversion ratio was calculated to be 0.50%. Taking the actual maximum yield of 176 t (1994-95) into consideration, it was evident that the reservoir was under exploited harvesting only 39% of its potential.

### **Fish yield**

During the last 17 years from 1979-80 to 1995-96, the annual fish production of Tawa reservoir ranged from 16.8 t (=1.37 kg/ha) in 1984-85 to 176.2 t (=14.4 kg/ha) in 1994-95 with an overall average of 87.9 t (=7.2 kg/ha). The commercial fishing done from April to June, 1995 for 76 days yielded a total catch of 93.5 t (=7.6 kg/ha). *C. mrigala* (61.6%) was the most dominant with poor representation of *C. calla* (6.7%) and *L. rohita* (2.8%). *T. tor* (0.5%) was insignificant (Fig. 1).





### Fish fauna

During this year nine new species were recorded from Tawa reservoir updating the list of fish fauna to 27 species belonging to 10 families and 20 genera.

### Plankton

Plankton population of Tawa reservoir ranged from  $246 \text{ u/l}^{-1}$  (Jan) to  $4495 \text{ u/l}^{-1}$  (Sep) with an average  $1743 \text{ u/l}^{-1}$ . There was an overall dominance of zooplankton (71.4%). Phytoplankton was 28.6%.

### Macro benthos

The macro benthic population of Tawa reservoir varied from  $441 \text{ nos/m}^2$  (Jun) to  $1205 \text{ nos/m}^2$  (Oct) with an overall average of  $764 \text{ nos/m}^2$ . Dipteran (46.4%) was the most important item followed by gastropods (40.0%), bivalves (9.7%), oligochaetes (2.8%) and Caddisworms (1.1%).

### Periphyton

Periphyton ranged from  $44 \text{ u/cm}^2$  (Mar) to  $9295 \text{ u/cm}^2$  (Jun) average being  $1318 \text{ u/cm}^2$  with two peaks- a distinct one in June and a feeble in February. Diatoms (68.1%) were the most dominant followed by green algae (17.5%), blue-green algae (12.2%) and desmids (2.2%).

## Macrophytes

The availability of macrophytes in Tawa reservoir was poor in this year (5434.8 g/m<sup>2</sup>).

## Pre-recruitment study

Preliminary observations on the pre-recruitment of fish revealed that the breeding of major carps was taking place in Tawa reservoir.

## Stocking

During 1995-96 Tawa reservoir was stocked with 34.219 lakh fish seed with greater emphasis on *L. rohita* (75.2%) followed by *C. mrigala* (17.8%) and *C. catla* (7.0%). The rate of stocking worked out to be 280 nos/ha.

It was recommended that Tawa reservoir needed to be stocked with 200 fingerlings/ha (75-150 mm) in the ratio C5:R3:M2.

**PROJECT** : **FC/A/19**

**PRODUCTION DYNAMICS AND FISHERY  
MANAGEMENT OF THIRUMOORTHY  
RESERVOIR**

**Personnel** : C. Selvaraj, V. K. Murugesan, S. Manoharan

**Dutration** : 1991 to 1996

**Location** : Thirumoorthy (Coimbatore), Tamil Nadu

## Fish yield

The reservoir yielded fish catch of 42.6 t during 1995-'96 against 38.6 t of last year resulting in record production of 182.1 kg/ha/yr. Like previous years, the fish catch was mainly contributed by major carps (91.7%). The minor carps and tilapia were suppressed with stocking of advanced fingerlings of major carps in the reservoirs. *C. catla* (41.77%) was the most dominating species followed by common carp (18.6%), *C. mrigala* (13.8%) and *L. rohita* (10.4%).

## Impact of stocking on exploitation

Against the productivity potential of 200 kg/ha/yr, fish production of 182.1 kg/ha/yr could be achieved from the reservoir.



Survey of reservoirs was initiated in some selected reservoirs of the State, like Uppar, Amaravathy and Kurichikulam which were found to be productive.

<b>PROJECT</b>	:	<b>FC/A/22</b>
		<b>PRELIMINARY ECOLOGICAL INVESTIGATION FOR FISHERIES MANAGEMENT OF WETLANDS IN ASSAM.</b>
<b>Personnel</b>	:	M. Choudhury, V. Pathak, Alok Sarkar, B. K. Biswas
<b>Duration</b>	:	1994-97
<b>Location</b>	:	Guwahati, Assam

Studies were made in 8 beels, two in Kamrup district (Dara and Salsala), two in Morigaon (Charan and Mori), three in Nagaon (Samoguri, Morr and Sibsthan) and one in Goalpara district (Tamranga).

#### **Water quality assessment**

All the beels were common in respect of rich dissolved oxygen (5.6 to 11.73 mg l<sup>-1</sup>), low carbon dioxide (0.0 to 7.41 mg l<sup>-1</sup>) and alkaline pH (7.2 to 8.2) but they differed considerably in respect of bicarbonate, conductance, dissolved salts, calcium and hardness. The nutrients, nitrate (0.008 to 0.075 mg l<sup>-1</sup>) and phosphate (0.002 to 0.00 mg l<sup>-1</sup>) were poor in the water phase but dissolved organic matter was high ranging between 1.53 and 5.0 mg l<sup>-1</sup>.

#### **Primary production**

Primary production in all the beels was contributed both by phytoplankton and macrophytes, the contribution of the latter being maximum. The rate of gross production by phytoplankton ( mg C m<sup>-2</sup> day<sup>-1</sup>) ranged between 192.64 (Merr beel ) and 1856.8 (Mori beel), while net production ranged from 110.32 to 1286.42 mg C m<sup>-2</sup> day<sup>-1</sup>. The gross and net production by macrophytes (mg C m<sup>-2</sup> day<sup>-1</sup>) were maximum (4690.38 & 3397.20) in Merr beel and minimum (1381.95 & 989.48) in Mori beel. The contribution of macrophytes in total production ranged from 80.03 to 96.05% in Dara, Salsala, Merr, Sibsthan and Tamranga beels, while in Charan, Mori and Samoguri, the contribution ranged between 42.67 and 54.42%. Contribution of primary production by phytoplankton was high (45.58 to 57.33%) in three beels viz. Charan, Mori and Samoguri. In other beels production was less than 20%.

## Community structure

### Plankton

Numerical abundance of plankton was maximum in Moribeel ( $12681 \text{ U l}^{-1}$ ) and minimum in Merr beel ( $33 \text{ U l}^{-1}$ ). Phytoplankton remained the dominant component (74.24 to 99.0%) in Charan, Mori, Samoguri, Sibsthan and Tamranga beels while zooplankton dominated in Salsala beel (90.14%) and to some extent in Dara (33.05%) and Merr (39.4%) beels.

### Fishery

A rapid survey carried out in the beels *viz.* Dara and Salsala in Kamrup districts, Tamranga in Goalpara district, Mori and Charan in Morigaon district and Samoguri, Merr and Sibsthan in Nagaon district revealed the abundance of *L. rohita*, *C. catla*, *L. gonius*, *L. bata*, *C. bata*, *W. attu*, *G. chapra*, featherbacks and live fishes including murrels. Dominance of live fishes and trash fishes were observed in Dara and Salsala beels. Tamranga, Mori, Charan, Samoguri and Sibsthan harboured major carps and large cat fishes substantially. It was also reported that artificial stocking of major carps, though casually were carried out in Samoguri, Sibsthan and Mori beel. Cast nets, gill nets, drag nets and *Katal* fishing were the major fishing tools in these beels.

**PROJECT** : **FC/A/23**

**PRODUCTIVITY POTENTIAL OF SELECTED  
RESERVOIRS IN ANDHRA PRADESH TO  
EVOLVE MANAGEMENT GUIDELINES.**

**Personnel** : Ch. Gopalakrishnayya, A. K. Das, T. S. Rama Raju,  
P. S. C. Bose, C. G. Rao, S. Kotaiah

**Duration** : 1995 to 1997

**Location** : Eluru

An exploratory survey of some selected reservoirs in Andhra Pradesh was initiated. Among these reservoirs, three (Wyra, Musi and Srisailam) were on river Krishna, three (Singur, Lower Mannair Dam and Kadam) were on river Godavari, two (Mid Pennar and Somasila) on river Pennar and Yerrakalva respectively. The undermentioned observations were made in two campaigns, completed so far.



## Biotic communities

The plankton density was the highest in Singur, Srisailam, Mid Pennar Dam and Lower Mannair Dam (sedimented volume: 1.4-2.7 ml) and low in Wyra, Musi, Kadam and Somasila (0.2-0.4 ml). There was an overall dominance of zooplankton (copepods and cladocerans) in all the reservoirs. The population of macrobenthos was also good in most of the reservoirs. Chironomids dominated in Wyra, Musi and Mid Pennar Dam, whereas the gastropods occurred in all the reservoirs, particularly more in Singur, Somasila, Kadam, Mid Pennar Dam, Lower Mannair Dam and Yerrakalva.

## Fish potential

The fish potential of the reservoirs calculated through primary production study indicated that most of the reservoirs of Andhra Pradesh were productive. The present estimation was conducted in monsoon (September) at the time of low reservoir productivity. However, based on the chemical parameters the reservoirs may be classified to have medium to high productivity (Table 1).

Table 1. Productivity of reservoirs in Andhra Pradesh

Reservoirs	Total alkalinity (ppm)	Sp. Conductivity (micro $\mu$ hos $\text{cm}^{-1}$ )	Fish potential
<b>Medium</b>			
Singur	112-118	230-290	93.0
Somasila	120-124	510-540	87.0
Mid Pennar Dam	64-68	220-230	83.0
Yerrakalva	60-80	160-240	83.0
Lower Mannair Dam	122-128	400-420	62.0
Musi	256-260	1650-1690	Polluted
<b>High</b>			
Wyra	200-212	580-630	207.0
Srisailam	100-104	430-470	187.0
Kadam	112-148	290-400	145.0

**PROJECT** : **BF/B/3**

**ECOLOGY AND PRODUCTION BIOLOGY OF  
HOOGHLY-MATLAH AND KULTI ESTUARINE  
SYSTEM.**

**Personnel** : M. Sinha, D. K. De, D. Nath, P. Mitra, A. Hajra,  
H. C. Karmakar.

**Dutration** : 1993-1998

**Location** : Barrackpore

**Hydrology**

The observed water temperature (17.5-35.2 °C), dissolved oxygen (5.8-7.8 mg/l), total alkalinity (90-166 mg/l), free CO<sub>2</sub> (2.0-8.0 ppm) and slightly alkaline water reaction (pH 7.4-8.2) were conducive for high productivity in the Hooghly estuary.

**Soil characteristics**

The soil of both Hooghly and Matlah estuaries was found to be rich in organic carbon (0.24-0.87%), available nitrogen (5.4-11.2 mg/100 g), total nitrogen (0.02-0.07%), available phosphate (1.7-16.1 mg/100 g) and free calcium carbonate (3.0-13.5%).

**Plankton**

Plankton production in the estuary showed a bimodal distribution with one peak at winter season and the other during summer months. In Hooghly estuary, plankton production was maximum in the lower marine zone at Frazerganj (1689 u/l) during January and minimum at Tribeni (39 u/l) during monsoon season. In the Upper estuary at Nabadwip. The density of plankton production was also maximum at 610 u/l and 495 u/l during summer and winter months respectively. Phytoplankton production was maximum at Frazerganj (1432 u/l) during February.

**Macrobenthic fauna**

The peak productivity of macro-benthic organisms was recorded at 2226 units/m<sup>2</sup> in March 1428 units/m<sup>2</sup> in October and 1269 units/m<sup>2</sup> in May at Nabadwip.

**Primary production**

Maximum net primary production (16.6-67.0 mgC/m<sup>3</sup>/hr) was found in the marine zone whereas medium production (8.3-137.2 mgC/m<sup>3</sup>/hr) and comparatively low production (12.5-33.3 mgC/m<sup>3</sup>/hr) were observed in the upper freshwater and middle gradient zones respectively.



In Matlah estuary, net primary production varied between 10.4 and 60.9 mgC/m<sup>3</sup>/hr. Primary production was very low during rainy season at all the centres of Hooghly and Matlah estuarine system.

### **Hydrological and soil conditions during bore tide**

Increased level of salinity, total nitrogen, dissolved oxygen, pH, silicate, phosphate, nitrate, sulphate, total nitrogen, hardness and specific conductivity was recorded in the estuary just after the bore tide. During bore tide, gross primary production and community respiration showed some decreasing trend. But the net primary production showed increasing trend during the period.

The bottom soil of the estuary also underwent considerable change during bore tide. Organic carbon, total nitrogen, available nitrogen and available phosphorus showed increasing trend for a few days. Free calcium carbonate showed a little decreasing trend, while specific conductivity exhibited slight increase.

### **Heavy metals and pesticides concentration**

Zn content in the water ranged between 0.019 and 0.049 mg/l. The Mn content was usually low and the values varied from 0.19 to 0.32 mg/l, while, Fe contents in water sample were slightly high (3.53-12.80 mg/l). Metal concentrations were found below the toxic limit of aquatic animals. The pesticides *viz.* total BHC and total DDT were 93.0 mg/l and 14.0 mg/l respectively.

### **Fishery**

Total yield from the Hooghly estuarine system and Digha was estimated at 34280.4 t and 9990.1 t respectively, totalling 44270.5 t during the period from February 95 to January 96 compared to the 38589.6 t of the previous year. The combined catch from both Hooghly and Digha landing centres showed an increase of 5680.9 t (14.7%) as compared to the previous year. The lower zone of the estuary alone contributed 95% of the total fish catch of the estuary. Bagnets and drift gill nets were the most dominant gears employed in the estuary which together contributed 99% of the total catch.

### **Hilsa fisheries**

The hilsa fishery of Hooghly estuary and Digha landing centre by drift gill net during 1995-96 yielded an estimated catch of 2438.1 t (7.1%) and 1990.2 t (19.4%) respectively. Considerable increase in catch from the Hooghly estuary 1534 t and Digha 290.3 t was recorded. Excluding winter migratory bagnet fishery hilsa continued to be the major component of estuarine fishery accounting 27.5% of the total yield.

### **Winter migratory bagnet fishery**

Winter migratory bagnet catch in lower estuary was estimated at 28185.9 t during November 95 to January 96 with an average CPUE of 89.5 kg compared to 20820.4 t with an average CPUE of 93.7 kg during the last winter. The dominant species contributing

the winter fishery were *H. nehereus*, *Setipinna* spp., *P. pama*, *Trichiurus* spp., prawns, *Coilia* spp., *S. cinereus*, *T. jella*, *I. elongata* and *P. paradiseus* which accounted 85.6% of the total winter bagnet catch. A decrease in CPUE was noticed, even with increased total catch. This indicated over exploitation.

### **Prediction of expected catches**

Trend of time series data on the total yield for the period 1984-85 to 1995-96 has been analysed to predict the estimated catches in the coming years as:

#### **Forecast values**

Year	Catch ( in t)
1996-97	41037
1997-98	41401
1998-99	41719
2000-01	41999

**PROJECT** : **BF/B/9**

**ECOLOGY, BIODIVERSITY AND FISHERIES  
OF NARMADA ESTUARINE SYSTEM WITH  
SPECIAL REFERENCE TO THE PROPOSED  
IMPOUNDMENT OF RIVER NARMADA  
(SARDAR SAROVAR)**

**Personnel** : S. N. Singh, B. K. Singh, G. C. Laha, V. Kolekar,  
R. C. Mandi, R. K. Sah, Ram Prasad

**Dutration** : 1995 to 1996

**Location** : Vadodara

### **Ecology of the Narmada estuarine system**

Monthly field compaign for seven sites namely Mahegam, Bhadbhut, Bharuch and Jhanor forming estuarine and transitional expanse, and Vedgam, Poicha and Sisodara representing freshwater expanse was undertaken. Vedgam falls under the proposed submergence area of Sardar Sarovar.



## **Hydrological regime**

Water reaction was alkaline and the pH from 8.13 to 8.24. This alkaline pH was a reflection of a congenial environment. Total alkalinity values varying from 98.0 to 176.0 mg l<sup>-1</sup> reflected high production potential of the system. The nutrients status of the system in terms of availability of nutrients like phosphate and nitrate was poor which started experiencing the impact of impoundment. Silicate content of the system was significantly high and fluctuated from 15.8 to 18.4 mg l<sup>-1</sup>.

## **Soil**

The soil reaction was slightly towards alkaline side and the pH varied from 7.15 to 8.06. A zonal pertinence was reflected with regard to available phosphorus which was high at estuarine extent as compared to transitional and freshwater expanses. This fluctuated from 2.5 to 14.5 mg 100 g<sup>-1</sup>. C: N values fluctuated between 8.72 to 12.70. The soil texture varied from clay loam to sandy loam and loamy sand at different representative sites.

## **Biological regime**

### **Plankton**

The average planktonic biomass of the Narmada estuarine system as single entity drifted from 99 (Mahegam) to 290 nos l<sup>-1</sup> (Bharuch). Phytoplankton was the mainstay of this planktonic abundance which varied from 66-67 to 94.13%. Pertaining to the qualitative texture, Bacillariophyceae excelled as the major group. The zooplankton contributed meagrely and were mostly represented by Rotifera and Copepoda. The estuarine sites namely Mahegam and Bhadbhut recorded considerably high protozoan population but ostracods and cladocerans were insignificantly represented in the zooplankton assemblage of the system.

### **Macrobenthos**

The average macro benthic abundance of the Narmada estuarine complex drifted from 38 to 9014 nos m<sup>-2</sup>. Based on the qualitative spectrum of the macrobenthic fauna, a line of demarcation could be drawn since Oligochaeta/Polychaeta (62.54 to 97.10%) prevailed as major group at estuarine and transitional extents while Diptera (50.28 to 88.55%) excelled as the most prominent group at freshwater expanse. However, the damsite centre, Vedgam had Oligochaeta/Polychaete (57.90%) as major faunal element.

### **Primary production**

Gross production for the Narmada estuarine system as a single entity varied from 25.0 to 116.67 mgC/m<sup>3</sup>/hr while net production from 9.38 to 50.0 mgC/m<sup>3</sup>/hr. Community respiration was observed to involve greater part of the gross production and this drifted from 16.88 to 110.0 mgC/m<sup>3</sup>/hr.



## **Waste discharge and its effect on biological community**

The hydrobiological monitoring of the two waste discharge points namely Baijalpur receiving industrial and domestic effluents and Sakkarpara getting composite discharges revealed setting in of the organic enrichment process at Baijalpur and stress at confluence site.

<b>PROJECT</b>	:	<b>BF/B/10</b>
		<b>CASE STUDIES ON ECOLOGY AND FISH YIELD PATTERN IN SOME BHERIES UNDER DIFFERENT SALINITY REGIME.</b>
<b>Personnel</b>	:	A. K. Ghosh, R. K. Banerjee, P. K. Pandit, H. C. Karmakar, B. B. Das, S. K. Chatterjee, L. K. Parbat, (Mrs.) Abhijita Sengupta, Amoy Barui, Debasis Saha.
<b>Dutration</b>	:	1995-1998
<b>Location</b>	:	Calcutta

Survey was conducted for the selection of bheries from 3 different zones namely near fresh water (Hatgachia), low saline (Kharibari) and high saline (Kumirmari and Chandipur) and from each zone 4 bheries were selected to study the ecology and fish yield, water quality assessment and soil quality studies. The bheries of low saline zone and freshwater zone were found productive according to soil studies.

### **Plankton, periphyton and macrophytes**

The plankton availability was recorded as traces to 1.5 c.c./50 l of water at Hatgachia, traces to 5.0 c.c./50 l at Kharibari and traces to 2.0 c.c./50 l at Basanti-Chandipur area. The maximum availability of plankton was observed (4-5 c.c./50 l) at low saline area. The species diversity at the freshwater region (Hatgachi) was found to vary from 1.43 to 2.67, at low saline area (Kharibari) from 1.10 to 2.83 and high saline (Basanti-Chandipur) zone from 1.20 to 2.40 respectively.

### **Macrobenthos**

The main forms of fauna available were gastropod shell, Acetes, amphipods and tenaids in all the zones. At low saline bheries amphipods and tenaids were found more numbers with the increase of salinity. Polychaete worms were available at high saline zone with the increase of salinity and temperature.



## Fish and Fisheries

Four bheries each from 3 different zones have been selected to assess fish and prawn production. Total production of fish and prawn (*M. rosenbergii*) ranged from 383.4 to 5527.6 kg/ha in a period of 6 months to 12 months (Table 1).

**Table 1. Assessment of production from bheries**

Water body	Area (ha)	Production (kg/ha)		Culture Total	Period (days)
		<i>P. monodon</i>	Others		
<b>Freshwater</b>					
Bheri i (Baraparas)	40.00	-	5527.6	5527.6	365
Bheri ii (Chotaparas)	1.70	-	411.8	411.8	90
Bheri iii (Jeel)	6.50	-	383.4	383.4	180
Bheri iv	2.00	-	175.0	175.0	150
<b>Low saline</b>					
Bheri i (Moller khol)	8.36	143.5	287.1	430.6	330
Bheri ii (42 bigha)	5.67	141.1	282.2	423.3	330
Bheri iii (5 no. Ghery)	8.50	107.5	198.4	305.9	330
Bheri iv (12 Bigha)	1.60	230.6	340.6	571.2	330
<b>High saline</b>					
Bheri i (Chak Ghery)	5.33	41.0	31.9	72.9	*
Bheri ii (Chandipur i)	29.33	10.2	7.0	17.2	*
Bheri iii (Chandipur ii)	30.00	8.7	4.3	13.0	*

## Fish and prawn disease

Besides collecting *palaegygae* species infected prawns, occurrence of diseased shrimp which often exhibit brown or black spots on the carapace was observed. Some shrimp showed white spots underneath the carapace because of poor preparation of bottom and bad water quality which increased algal bloom. Fungal infection was noticed in the rearing ponds. The mycellium grew, ramified through the body wall of post larvae, developed rapidly and replaced muscle and soft tissues in it. Suggested prophylatic measures were dewatering and drying of the pond bed, refilling with fresh tidal waters up to 30 cm. and after 3 days apply bleaching powder @ of 10 ppm.

**PROJECT** : **BF/B/11**

**INVESTIGATION ON DIAGNOSIS AND CONTROL OF FISH AND PRAWN DISEASE EPIDEMIC.**

**Personnel** : M. K. Das, R. K. Das, S. P. Ghosh, S. Bhowmick,

**Dutration** : 1992-1996

**Location** : Barrackpore

About 500 fishes were examined systematically for fish disease investigation. A number of pathogens were identified causing disease epizootics. *Ergasilosis* causing disease problems in cultured *L. parsia* was investigated as in previous years. The incidence and abundance increased with increase in the size of fish and retarded growth was evident. Studies were conducted to determine the normal ranges of physiological parameters in the blood of IMC responsive to stress from a non stressful aquatic environment. Histological examination of the anterior kidney of stressed and non-stressed fishes was done alongwith gills to detrmine the cellular changes especially of the interrenal cells.

Delayed post larva development of *M. rosenbergii* in hatchery was investigated. The study indicated a) high value of hardness b) high value of residual chlorine and c) high value of dissolved oxygen which were not conducive for the hatchery. The prawn larvae were found heavily infested (25 colonies/larvae) with the ciliate *Zoothamnium*. Presence of this cilliate indicated extended intermoult period and poor condition of their hosts and their environment. Bacterial load of  $1.44 \times 10^4$  /ml indicated bad water quality. Remedial measures were suggested. Mortality of *P. monodon* post larvae within one month of stocking was investigated. Results indicated high value of un-ionised Ammonia and presence of H<sub>2</sub>S which was not conducive water quality for *P. monodon*



larvae. The total bacterial count recorded in water was  $5.85 \times 10^3 \text{ m}^{-1}$ . Haemolymph of *P. monodon* in ITCBS Agar through biochemical test indicated presence of *Vibrio* sp. Remedial measures were suggested.

Sudden mortality of adult *P. monodon* in West Bengal bheries were investigated. Pathogen - *Epistylis* sp. was recorded in the gills and body surface in 20% of infected fishes. Bacterial study conducted in water and haemolymph of infected prawn could isolate *Vibrio* sp. in lesser intensity. Viral study was not undertaken. The symptoms of the disease identified here was similar to the white spot disease of *P. monodon* reported earlier in Andhra Pradesh and in several other countries. The causative agent was reported to be a virus named SEMBV (Systemic Ectodermal & Mesodermal Baculovirus).

The environmental parameters recorded from these bheries reveal the disease affected bheris have organic matter in the decomposing phase with consequent higher concentration of unionised ammonia and higher bacterial load. Remedial measures were also suggested.

**PROJECT** : **BF/B/12**

**ASSESSMENT OF IMPACT OF HEADWATER  
FLOW ON THE CHARACTERISTIC FEATURES  
OF THE MANGROVE ESTUARINE SYSTEM.**

**Personnel** : P. K. Chakrabarti, A. Hajra, R. K. Das,  
U. Bhowmik, N. N. Mazumder, A. Mitra and  
C. P. Singh.

**Duration** : 1995 to 1997

**Location** : Barrackpore

The present investigation was continued in two regions of the mangrove estuarine ecosystems, one with headwater discharge (Hooghly-Saptamukhi system) and the other lacking headwater discharge (Jheela-Bidya system).

**Ecobiological studies**

It is observed that the region receiving higher headwater discharge had higher concentration of commonly occurring plankters as well as more number of plankton species. At all the zones, phytoplankton densities and the number of constituting species were the highest in monsoon and the lowest in winter, but for zooplankton, they were the highest in winter and the lowest in summer seasons.

*Macrobenthos*- followed the same trend as those of phytoplankton showing peak densities during monsoon and least densities during winter months at both the estuarine ecosystems while headwater discharge improved these concentrations. Higher abundance of macrobenthos in the Hooghly estuary followed by other estuaries like, Saptamukhi, Jheela and Bidya was observed.

Surface and sub-surface nekton collected by townet showed higher densities and greater species diversities in the estuaries with headwater discharge than those in the estuaries lacking headwater discharge.

It was also noticed that the densities and species diversities increase during monsoon and decline in summer.

### Physico-chemical studies

The nutrient values increased during monsoon with a little higher values in the system with headwater discharge. Gross primary productivity values were higher in the estuarine system where headwater discharge was lacking (Table 1).

**Table 1 Gross productivity of the mangrove estuarine system (mgC/m<sup>3</sup>/hr)**

	Summer	Monsoon	Winter
Hooghly - Saptamukhi (with headwater)	132.6	107.4	123.4
Jheela - Bidya (without headwater)	135.8	121.0	136.2

### Microbial studies

The loads of organic matter mineralizing heterotrophic bacteria was the maximum during monsoon followed by other bacteria such as phosphate solubilizing bacteria and aerobic N-fixing bacteria. They were in the minimum during winter months.

### Physio-biological

The moisture contents were found to be slightly higher in fishes captured from the Hooghly-Saptamukhi system than from the Bidya-Jheela system. These differences might be attributed to the differences in salinity between the two systems.

The condition factor values (Kn) of *P. pama* indicated higher values in monsoon (0.91) and the lowest in winter (0.73). The Hooghly-Saptamukhi system had shown higher values of condition factor than the Bidya-Jheela system. Gonado somatic index (GSI)



values of *P. pama* were recorded to be 6.25, 2.5 and 3.5 in monsoon, winter and summer seasons, respectively from the Hooghly-Saptamukhi system. The GSI of *P. pama* from Bidya-Jheela during monsoon, winter and summer were 5.0, 2.5 and 2.0 respectively.

### Estuarine seed prospecting

The seed collection rate had declined considerably during the current year. In Saptamukhi seed collection rate (no/net/day) varied between 5,274 and 16,163, being down by 9% from 1994-95 and 32% from 1993-94 values. The collection rate of tiger shrimp alone ranged from 29 to 1,099, showing decline of 29% from 1994-95 and 60% from 1993-94 values.

The quantity of fin and shellfish seeds, after the collection of *P. monodon* seed, destroyed by the seed collectors were: 107, 112, 124 and 163 millions at Tat, Bararakshashkhali, Bakkhali and Sagar Island respectively. Indiscriminate exploitation of tiger shrimp and the resultant disturbance in the breeding grounds of fishes and prawns were responsible for the gradual dwindling of the seed availability rate.

A total of 40 nos of hilsa seeds (72-155 mm) were collected for the first time in 1995 from the Curzon Creek.

<b>PROJECT</b>	:	<b>BF/A/21</b>
		<b>ECONOMICS OF MIGRATORY WINTER FISHERY OF HOOGHLY ESTUARY.</b>
<b>Personnel</b>	:	S. Paul, D. K. De, P. Mitra, H. K. Sen, N. C. Mondal, Prahlad Singh.
<b>Dutration</b>	:	1995-1997
<b>Location</b>	:	Barrackpore

During 1995-96 data comprising six centres covering about 231 fishing camps (*Khuties*) located at Sagar Island, Bakkhali, Frasergang, Kalisthan, Upper Jamboo and Lower Jamboo were subjected to financial analysis with regard to input-output relationship at market prices.

### Production

Winter migratory bagnet catch in the lower zone of Hooghly estuary was estimated to be 28185.9 t during November 1995 to January, 1996 with an average CPUE of 89.5 kg compared to 20820.4 t with a CPUE of 93.7 kg during last winter (1994-94) which

show an increase in catch by 7365.5 t (35.4%) but decrease in CPUE by 4.2 kg (4.7%). This marked increase in catch may be attributed to higher concentration of bagnet (30.8%).

Total live catch of 28185.9 t was netted out by 231 fishing camps (*Khuties*) but in terms of dried weight it amounted to 5499 t valued at Rs. 10.14 crores. Besides 383 t of live fish valued Rs. 2.07 crores contributed to gross sale proceeds amounting to Rs. 12.21 crores.

The net income accruing to 231 owners of fishing camps for six centres comes to Rs. 9.69 crores.

### **Employment Generation**

About 4745 fishermen were engaged in winter migratory fishery and about Rs. 4105/- during the winter period was the average wage-paid income of each fisherman showing an increase of 36.8% in wage income compared to 94-95.

### **Research & Development Implications**

The pronounced remunerativeness of winter bag net fishing operations during 1995-96 has contributed towards increase in fishing effort in terms of more number of crafts and gears as was revealed by number of fishing units/*khuties* from 192 in 1994-95 to 231 in 1995-96. The profitability though serving as a production incentive sounds also warning signals for future as high levels of extraction over the years may ultimately result in diminishing returns or increasing costs.

<b>PROJECT</b>	:	<b>BF/A/22</b>
		<b>IMPACT OF FARAKKA BARRAGE ON RECRUITMENT OF HILSA.</b>
<b>Personnel</b>	:	<b>Malda:-</b> A. Mukherjee, A. Ghosh, A. R. Chowdhury, T. Chatterjee.
		<b>Farakka:-</b> K. S. Banerjee, K. P. Singh.
		<b>Barrackpore:-</b> A. B. Mukherjee, A. Hajra
<b>Dutration</b>	:	1993-1997
<b>Location</b>	:	Malda, Farakka and Barrackpore



## General Assessment of Fish Landing at the Farakka Region

The total fish landing from the Farakka region above and below the Farakka barrage has been estimated at 128.24 t. Taltala contributed 45.68% to the total fish landing of the region followed by Beniagram (28.26%) and Feeder Canal (26.06%).

The total fish landing during the period under report showed an increment to the tune of 33.82%, 72.03% and 37.09% respectively when compared with that of 1992-93, 1993-94 and 1994-95.

The species-wise landing at Farakka is depicted in Table 1.

**Table 1. Species-wise landing (in kg) at Farakka region from April, '95 to March, '96.**

Centre	Feeder Canal	Beniagram	Taltala	Landing at Farakka region (a+b+c)	% contribution of each group to total landing
Species	(a)	(b)	(c)		
a) Hilsa					
<i>T. ilisha</i> (upto 100 mm)	1256.39	-	592.96	1849.35	1.44
<i>T. ilisha</i> (101-200 mm)	1552.58	30.00	1907.84	3490.42	2.72
Adult	7945.24	19081.17	1638.42	28664.83	22.35
<b>Group total</b>	<b>10754.21</b>	<b>19111.17</b>	<b>4139.22</b>	<b>34004.60</b>	<b>26.51</b>
b) Carps	5043.53	2515.57	6484.75	14043.85	10.98
c) Catfishes	7266.76	5029.47	9546.14	21942.37	17.11
d) Featherbacks	549.93	86.25	1525.45	2181.63	1.70
e) Murrels	18.75	-	1618.77	1637.52	1.23
f) Miscellaneous	7784.70	6995.77	29858.07	44638.54	34.80
g) Prawns	1880.96	2502.30	5410.17	9793.43	7.65

## Hilsa fishery

The present catch of hilsa from the region has registered an increase of 6.87%, 114.45% and 44.12% over that of 1994-95, 1993-94 and 1992-93 respectively.

Mainly three types of fishing nets viz., *shangla*, *chandi* and *kachal* were in operation for fishing of hilsa in the region. Catch per unit of effort had been estimated at 0.095 kg/man/hr for *shangla*, 0.043 kg/man/hr for *kachal* and 0.041 kg/man/hr for *chandi*.

## Electrophoretic studies

Banding patterns with clear resolution had been obtained which indicated slight difference in the gamma-globulin fraction in the hilsa, caught from Bhagirathi-Hooghly stretch. Barring this difference, the other banding patterns remained more or less similar.

<b>PROJECT</b>	:	<b>AN/A/15</b>
		<b>STOCK ASSESSMENT AND DYNAMICS OF FISH POPULATIONS IN THE MAJOR INLAND WATER SYSTEMS.</b>
<b>Personnel</b>	:	R. A Gupta, S. K. Mandal, P. Mitra, H. C. Karmakar, R. K. Tyagi, P. N. Jaitley.
<b>Dutration</b>	:	1991-97
<b>Location</b>	:	Barrackpore

The studies suggest that in Hooghly estuary there should be about 59% reduction in effort level in respect of *P. pama* to get sustainable yield over 5200 t annually while the present annual catch is less than 4500 t. A reduction of about 26% in effort level in respect of *S. phasa* in this estuary is needed to get MSY of 375 t while the present level of catch is 368 t. The studies also suggest that any increase in the fishing pressure will result in the reduction in catch per unit effort thereby leading the fishery to an uneconomical level.



Trend analysis on catch data collected at two landing centres from Allahabad showed that the total catch from the Ganga River System is declining owing to drastic reduction in the catch of the major carps as well as fall in the catch of cat fishes and other fishes. The linear autoregressive trend of first order has been found to be the best fitted trend in all cases excepting cat fish. Simple quadratic has been found to give best fit in case of cat fish.

**PROJECT** : AN/A/16  
**RESOURCE INVENTORY THROUGH REMOTE SENSING**

**Personnel** : R. A. Gupta, K. K. Vass, R. K. Tyagi, B. C. Jha.  
(Mrs) Sucheta Majumder, (Mrs) K. Jaquiline Ravi

**Duration** : 1995-1998

**Location** : Barrackpore

Literature on assessment of water spread, water quality and productivity through remote sensing, as a preliminary to start the new project, was collected. Consultations were held with various concerned agencies to decide the required collaboration.

## **PUBLICATION 1995-1996**

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**PERSONNEL**

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The following scientists rendered their services to the Institute during the period April 1995 to March 1996.

Dr. V.R.P. Sinha, Acting Director  
(from 1.1.1995-28.3.1996)

Dr. M. Sinha, Director  
(from 29.3.1996)

**RIVERINE DIVISION****Allahabad Centre**

Shri Ravish Chandra, Pr. Scientist  
Dr. R.S. Panwar, -do-  
Dr. G.K. Bhatnagar, -do- (upto  
30.9.1995)  
Shri S.N. Mehrotra, Sr. Scientist (upto  
31.8.1995)  
Dr. H.P. Singh, Sr. Scientist  
Dr. D.N. Singh, -do-  
Dr. Balbir Singh, -do-  
Dr. M.A. Khan, -do-  
Dr. Shree Prakash, -do-  
Dr. A.K. Laal, -do-  
Dr. B.K. Singh, -do- (from 19.6.95)  
Shri R.N. Seth, -do-  
Shri R.K. Dwivedi, -do-  
Dr. R.K. Tyagi, -do-  
Shri P.N. Jaitly, Scientist (Sr. Scale)  
Shri P.K. Katiha, Scientist

**Guwahati Centre**

Dr. V. Pathak, Senior Scientist  
Dr. M. Choudhury, -do-

**Karnal Centre**

Shri D.N. Mishra, Sr. Scientist  
Dr. D.K. Kaushal, -do-  
Dr. V.R. Chitranshi, -do-  
Dr. (Mrs.) U. Moza, -do-  
Dr. V.K. Sharma, -do-

**Lalgola Survey Centre**  
-----**RESERVOIR DIVISION****Bangalore Centre**

Dr. V.R. Desai, Pr. Scientist  
Dr. M. Ramakrishnaiah, Sr. Scientist  
Shri P.K. Sukumaran, -do-  
Dr. D.S. Krishna Rao, -do- (on Study  
Leave)  
Shri M. Karthikeyan, Scientist (on  
Deputation )

**Eluru Centre**

Shri Ch. Gopalakrishnayya,  
Pr. Scientist

**Coimbatore Centre**

Shri C. Selvaraj, Pr. Scientist  
Shri V.K. Murugesan, Sr. Scientist

**Alappuzha Centre**

Dr. V.K. Unnithan, Sr. Scientist

### **Hoshangabad Centre**

Dr. D. Kumar, Sr. Scientist (on Deputation)  
Shri N.P. Srivastava, Sr. Scientist  
Dr. B.L. Pandey, Scientist

### **ESTUARINE DIVISION**

#### **Barrackpore Centre**

Dr. M. Sinha, Pr. Scientist (upto 28.3.1996)  
Dr. D.K. De, Sr. Scientist  
Dr. D. Nath, -do-  
Shri U. Bhaumik, -do-  
Shri P.K. Chakraborti, -do-  
Shri P.M. Mitra, -do-  
Shri A. Hazra, Scientist (Sr. Scale)  
Dr.S. Samanta, Scientist

#### **Calcutta Centre**

Dr. A.K. Ghosh, Pr. Scientist  
Dr. R.K. Banerjee, Sr. Scientist  
Dr. K.R. Naskar, -do- ( on Deputation)  
Shri H.C. Karmakar, -do-  
Dr. P.K. Pandit, -do-

#### **Vadodara Centre**

Dr. S.N. Singh, Sr. Scientist  
Shri G.C. Laha, -do- (upto 30.12.95)  
Dr. B.K. Singh, -do- (upto 8.6.95)  
Shri V. Kolekar, Scientist (Sr. Scale)

#### **Canning Centre**

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#### **Diamond Harbour Survey Centre**

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### **Uluberia Survey Centre**

\_\_\_\_\_

### **Frazergunj Centre**

\_\_\_\_\_

### **FLOODPLAIN WETLANDS DIVISION**

#### **Barrackpore Centre**

Dr. V.V. Sugunan, Sr. Scientist (on deputation till 29.2.1996)  
Dr.(Ms.) Krishna Mitra, -do-  
Ms. G.K. Vinci, -do-  
Dr. M.K. Mukhopadhyay, -do-  
Dr. Archan Kanti Das, Scientist  
Dr. Md. Abul Hassan, -do-  
Dr. B.K. Bhattacharjya, -do- (from 24.7.95)

### **HILSA DIVISION**

#### **Maldah Centre**

Dr. A. Mukherjee, Sr. Scientist  
Dr. Amitabha Ghosh, -do-  
Shri A.R. Choudhury, Scientist (Sr. Scale)

#### **Farakka Survey Centre**

\_\_\_\_\_



**ENVIRONMENTAL MONITORING &  
FISH HEALTH PROTECTION  
DIVISION**

**Barrackpore Centre**

Dr. K.K. Vass, Pr. Scientist  
Shri M.M. Bagchi, Sr. Scientist  
Dr. R.K. Das, -do-  
Dr. M.K. Das, -do-  
Dr. K. Chandra, -do-  
Dr. B.C. Jha, -do-  
Dr. B.P. Mohanty, Scientist (from  
22.9.95)

**RESOURCE ASSESSMENT DIVISION**

**Barrackpore Centre**

Shri R.A. Gupta, Pr. Scientist  
Shri S.K. Mondal, Sr. Scientist  
Shri G.C. Laha, -do- (from 31.12.95)

**OTHER SECTIONS**

**Economics Section, Barrackpore**

Shri S. Paul, Sr. Scientist

**Engineering Section**

Shri A.B. Mukherjee, Pr. Scientist

**Krishi Vigyan Kendra, Kakdwip**

Shri J.G. Chatterjee, Sr. Scientist

**Scientists & staff on  
Deputation/Lien**

Shri M. F. Rahman, T-5, Karnataka  
Power Corporation Ltd., Bangalore.  
(upto 31.12.95)

Dr. Y.S. Yadava, Sr. Scientist,  
(Deputation to Ministry of Agriculture,  
Govt. of India)

The following members of staff  
(Technical/Auxiliary) rendered their  
services during the year.

**T-7**

Dr. A.K. Chattopadhyaya  
Ms. Mira Sen

**T-6**

Shri S.K. Sadhukhan  
Shri A.R. Mazumder  
Dr. Asok Biswas (from 21.7.95)

**T-5**

Shri Ramchandra  
Shri P.S.C. Bose  
Shri R.N. De  
Shri R.C. Singh  
Ms. Anjali De  
Shri P.K. Ghosh  
Shri S.K. Das  
Shri N.K. Srivastava,  
Shri T.S. Rama Raju  
Shri R.C. Satapati  
Shri K.K. Agarwal  
Shri R.C. Mandi  
Shri Sanjoy Bhowmick

Md. S.K. Syed Shakul Hameed  
Shri R.R. Mukherjee  
Shri M.F. Rahaman  
Shri A.R. Paul  
Shri K.S. Banerjee  
Shri B.D. Saroj  
Shri Alok Sarkar  
Shri N.N. Mazumdar  
Shri S.P. Ghosh  
Shri N.C. Mondal  
Shri H.K. Sen  
Shri N.C. Mondal  
Shri H.K. Sen  
Shri Sukumar Saha  
Shri P. Dasgupta  
Dr. S.B. Nandan  
Shri Ladu Ram Mahabhar  
Shri C.N. Mukherjee

**T-4**

Shri H. Chaklader  
Shri Amiya Kr. Banerjee  
Shri Fatik Manna  
Shri Camil Lakra  
Shri M.P. Singh  
Shri B.K. Biswas  
Shri D.K. Biswas  
Shri S.K. Srivastava  
Shri H.C. Banik  
Ms. Keya Saha  
Shri S. Manoharan  
Shri Ramji Tiwari  
Ms. Kum Kum Das  
Ms. K. Sucheta Majumder  
Shri J.P. Mishra  
Shri S.K. Chatterjee  
Shri T. Chatterjee  
Shri Sushil Kumar

**T-II-3**

Shri Pintu Biswas  
Shri B.B. Das  
Shri Sushil Kumar  
Ms K. Jacqueline  
Dr. (Mrs.) Kalpana Srivastava (from  
4.10.1995)

Shri Sita Ram Meena  
Dr. Pratap Kumar Dhar (from 24.1.96)

**T-I-3**

Shri D. Sanfui  
Shri Donald Singh  
Shri M.M. Das  
Shri S.N. Sadhukhan  
Shri Swapan Chatterjee  
Shri K.P. Singh  
Shri R.K. Halder  
Shri A. Mitra  
Shri P. Rajani  
Shri B.N. Das  
Ms. Rina Naiya  
Shri C.K. Vava

**T-2**

Shri D. Chatterjee  
Shri Bhai Lal  
Ms. Abhijita Sengupta  
Shri L.K. Parbat  
Shri C.G. Rao  
Shri S. Kottaiah  
Shri N.K. Saha  
Ms. Shuvra Saha  
Shri A.K. Barui  
Shri S. Chakraborty  
Shri K.K. Das  
Shri H.K. Routh  
Shri Atanu Das  
Shri H.L. Biswas  
Shri D. Saha  
Shri S. Bandopadhyay  
Shri Prahlad Singh  
Shri S.G. Biswas

**T-I**

Shri Rajesh Kumar Sah  
Shri Ashis Roy Chowdhury  
Shri C.P. Singh



## **Auxiliary**

Shri P.R. Rao, Hindi Officer  
Md. Quasim, Language Assistant  
Miss. Sunita Prasad, Hindi Translator  
Shri James Murmu, -do-  
Shri Swapan Kr. Das, Time Keeper  
Shri S.K. Biswas, Carpenter  
Shri S.K. Deb, Plumber  
Shri K.L. Chakraborty, Sr. Gestetner  
Operator (Retd. on 31.10.95)  
Shri S.C. Bhowmick, Sr. Gestetner  
Operator  
Shri M. C. Raikwar, Sr. Gestetner  
Operator  
Shri D. Bergyoary, Driver  
Shri K. Ganesan, -do-  
Shri K.L. Das, -do-  
Shri Kanchan Datta, -do-  
Shri U.K. Chatterjee, -do-  
Shri R.L. Balmiki, -do-  
Shri S. Bahadur, -do-  
Shri Badal Lal Singh, -do-  
Shri V.G. Dhindore, -do-  
Shri N.C. Biswas, -do-  
Shri K.R. Deb, -do-  
Shri Ranjit Singh, -do-  
Shri M.C. Paul, -do-  
Shri Virendra Kumar, -do-  
Shri Ram Prasad, -do-  
Shri Arun Kumar Mondal, -do-  
Shri A.K. Goswami, -do-  
Shri A.K. Majumder, -do-  
Shri P. Ramalingeswara Rao, -do-  
Shri Ram Sajiwan, -do-  
Shri B.K. Naskar, -do-  
Shri Subhendu Mondal, Boat Driver  
Md. Yousuf Ali Sk., -do-  
Shri A.K. Jana, -do-  
Shri T.P. Ghosh, Launch Driver  
Shri Saradindu Chakraborty, Serang  
Shri Suklal Bairagi, Pump Man  
Shri C.R. Das, -do-  
Shri S. Bhattacharjee, Carpenter

The following members of  
Administrative staff rendered their  
services during the year.

### **Senior Administrative Officer**

Shri A.C. Ghosh

### **Accounts Officer**

Sri G.P. Sharma

### **Assistant Administrative Officer**

Shri T.P. Das (from 18.7.94 to 30.11.95)

### **P.A. to Director**

Shri G. Lahiri

### **Senior Stenographer**

Shri U.K. Ghosh  
Shri T.K. Roy (from 22.9.95)

### **Superintendent**

Shri C.C. Das  
Shri B.C. Bhattacharya  
Shri I.N. Kodandaraman  
Shri M.M. Neogi  
Shri D.C. Bose (from 8.4.95)  
Shri Ranjit Kr. Ghosh (A & A)  
Ms. Namita Choudhury (from 27.3.96)

**Assistant**

Shri D.C. Bose (upto 7.4.96)  
Ms. S. Majumder  
Shri D.K. Banerjee (upto 30.11.95)  
Shri R.C.P. Singh  
Shri N.K. Mitra  
Shri S.K. Kar  
Shri M. Kachhap  
Shri L.P. Misra  
Shri K.Prasad  
Shri S.R. Halder  
Shri T.K. Sreedharan (Retired on  
30.11.95))  
Shri H.K. Nath (Retired on 31.8.95))  
Shri H.B. Sutar  
Shri S.K. Sarkar  
Shri D.N. Baidya  
Shri J.N. Banerjee  
Shri A.B. Biswas  
Shri B.C. Mazumdar  
Shri H.L. Sarkar  
Shri T.K. Mazumder  
Shri Kallu Singh  
Shri S. Bhowmick (from 29.1.96)  
Shri D.K. De Sarkar (from 27.3.96)  
Shri Biswanasth Sah (from 27.3.96)

**Stenographer**

Shri T.K. Roy (upto 21.9.95)  
Shri S. Bhattacharjee

**Senior Clerk**

Shri L.P. Mishra  
Shri Baij Nath  
Shri S. Bhowmick (upto 28.1.96)  
Shri M.K. Das  
Shri D.K. De Sarkar (upto 26.3.96)  
Shri Samir Kr. Roy  
Shri S.B. Roy  
Shri S.S. Sinha  
Shri Surendra Kumar  
Shri M.L. Biswas  
Ms. Sikha Mazumder  
Shri Biswanasth Sah (upto 26.3.96)

Shri P. Lahiri  
Shri P.K. Dutta  
Shri B.K. Das  
Shri Kunj Behari Soni  
Shri Ambika Lal  
Ms. Bulbul Mallick  
Ms. Anita Mazumder  
Ms. N. Banerjee  
Shri N.R. Kundu  
Shri J. Roy  
Shri S.P. Mondal  
Shri Sujit Kr. Ghosh  
Shri S.K. Maranappan  
Shri D. Chowdhury  
Shri Chhotey Lal  
Shri Samir Kr. Bose  
Ms. A. Neogi (from 27.3.96)

**Junior Stenographer**

Ms. G. Vinoda Lakshmi  
Ms. Jolly Saha

**Junior Clerk**

Ms. G. Mazumder  
Ms. M. Banerjee  
Ms. A. Neogi (upto 26.3.96)  
Ms. A. Chakraborty  
Ms. Jayasree Pal  
Ms. Swapna Chattopadhyay  
Ms. Sefali Biswas  
Ms. Shyamali Mitra  
Ms. Arati Panigrahi  
Shri K. Majhi  
Shri Paras Ram  
Shri S.K. Tikadar  
Shri U. Bhattacharjee  
Shri P.K. Ghosh  
Md. Quasim  
Shri C.K. Pandey  
Shri C.K.N. Sahi  
Shri K.Subba Rao  
Shri Brahmapal Balmiki  
Shri S. Karmakar  
Shri Sukumar Sarkar  
Shri A.K. Dey  
Shri M.K. Joardar



Ms. S. Sumithra Devi  
Shri Santosh Sarkar  
Shri Rajesh Khandelwal  
Shri C.D. Parmer  
Shri Akahhay Kumar

The following members of staff  
of supporting grade rendered their  
services during the period.

#### **Supporting Grade IV**

Shri R.L. Raikawar  
Shri J.M. Kujur  
Shri Antiram Das  
Shri H.K. Das  
Shri Sunil Kr. Das  
Shri M.S. Burman  
Shri H.K. Pramanick  
Shri Nar Bahadur  
Shri A.M. Patra  
Ms Parmila Taman  
Shri J. Khalko  
Shri Jugol Kishore  
Shri Jangali  
Shri S.P. Yadav  
Shri B.B. Das

#### **Supporting Grade III**

Shri P. Sayalu  
Shri B.N. Mondal  
Shri R.N. Tiwar  
Shri S.N. Burman  
Shri G.C. Mondal  
Shri Tek Bahadur  
Shri H.S. Burman  
Shri S.S. Burman  
Shri L. Samulu  
Shri Bhim Bahadur

Shri N.L. Das  
Shri H.K. Burman  
Shri Ram Sunder  
Shri Khemchand Balmiki  
Shri Gulab Shaw  
Shri A. Murugasan  
Shri S.K. Burman  
Shri P.C. Kachari  
Shri A.L. Yadav  
Shri K.D. Raju  
Shri Bideshi Lal  
Shri B. Prakash  
Shri T.K. Biswas  
Shri S.C. Balmiki  
Shri A.K. Biswas  
Shri D.D. Powdel  
Shri S.K. Das  
Shri B. Hazarika (frin 30.5.95)

#### **Supporting Grade II**

Shri Munnilal Mallah  
Shri Maha Singh  
Shri Dukhharan Sahani  
Shri Laxmi Ram  
Shri Suraj Bahadur  
Shri B.N. Mondal  
Shri Rajendra Ram  
Shri A. Sahani  
Shri P. Seshanna  
Shri P.C. Bez  
Shri D.C. Das  
Shri B.C. Das  
Shri M.L. Saha  
Shri J. Mukhia  
Shri L.K. Halder  
Shri A.C. Ghosh  
Shri J.N. Mallah  
Shri Subrahmani  
Shri M. Mahadeva  
Shri G.C. Paramanick  
Shri R.U. Muchi  
Shri K. Ningigowda

Shri S.T. Gavate  
 Shri S. Mahendran  
 Shri V. Mariappan  
 Shri A. Ramaswamy  
 Shri M.V. Krishnan  
 Shri K. Kalianan  
 Shri Ram Prasad  
 Shri Karam Raj  
 Shri Satyendra Burman  
 Shri Lalta Prasad  
 Shri Sita  
 Shri Rajdhari Mallah  
 Shri Sukhchand Biswas  
 Shri B. Pugalendhi  
 Shri Om Prakash  
 Shri M.P. Bind  
 Shri A. Gangalah  
 Shri K. Bahadur  
 Shri A. Biswas  
 Shri R. Palaneswami  
 Shri K.K. Dhir  
 Shri S.S. Bondre  
 Shri B.N. Krishnappa  
 Shri Gunadhar Dhibar,  
 Shri Sankar Bose  
 Shri G.J. Roundale  
 Shri Umesh Chowdhury  
 Shri U. Satyanarayana  
 Ms. Mina Rani Bahadur  
 Shri Iswar Ram Balmiki  
 Shri K. Subramaniam  
 Shri Provash Chandra Paramanick  
 Shri Bhabalu Boro (from 30.5.95)  
 Ms. Kalosasi Mondal (from 9.5.95)

### Supporting Grade I

Shri Lakshmi Ram  
 Md. Yusuf Dar  
 Shri Suresh Kumar  
 Shri Kuldeep Singh  
 Ms. Bimla Devi  
 Shri Kawalpati Ram  
 Shri Mahadev Panika  
 Shri N. Rajak

Shri Suresh Rajak  
 Shri A. Kistaiah  
 Shri P. Atchaiah  
 Shri S. Kalita  
 Shri N. Deka  
 Shri Khagen Ch. Das  
 Shri Jai Ram Prasad  
 Ms. Godhuli Mondal  
 Ms. Mina Biswas  
 Ms. B. Balmiki  
 Shri K.C. Malakar  
 Shri H.P. Bhanja  
 Shri T. Ghosh  
 Shri Sankar Bose  
 Shri Muktipada Das  
 Shri Kharban Kumar  
 Shri Man Bahadur  
 Shri Bhaskar Sardar  
 Shri Pasupati Ghosh  
 Shri Jagdish Balmiki  
 Shri S. Banerjee  
 Shri Sibulal Das  
 Shri S.C. Sadhukhan  
 Shri Dipak Chakraborty  
 Shri Biswanath Bose  
 Shri Ananta Kr. Bhanja  
 Shri Rabi Kr. Sardar  
 Shri Lal Bahadur  
 Shri Dilip Kr. Das  
 Ms. B. Sakuntala  
 Shri Mohan Lal Sarkar  
 Ms. Hemlata Halder  
 Shri Balkishen Balmiki  
 Shri S.N. Nan  
 Shri Mahendra Balmiki  
 Shri Ullas Nayak  
 Ms. Rupali Chatterjee  
 Shri Ashok Kr. Dey  
 Ms. Anjali Dutta  
 Shri Bharat Kr. Halder  
 Shri Anil Ch. Das  
 Shri S. Guin  
 Shri P. Singh  
 Shri D. Singh  
 Shri Atiullah  
 Shri Sitla Prasad  
 Ms. Kamal Devi  
 Shri M.S. Bhoi  
 Shri T.H. Ghume



Shri K. Subbaiyan  
Shri R. Nagraj  
Shri S. Govindarajan  
Shri K. Subramahnaian  
Shri Gopal Chand  
Shri G. Lal  
Shri Sree Nath  
Shri A.C. Biswas  
Shri R.D. Chaudhury  
Sk. Monsur Ali  
Shri S.K. Chakraborty  
Shri Prasad Sahani  
Shri Amar Nath Prasad  
Shri Umashankar Ram  
Shri P.C. Paramanick  
Shri Prakash Ch. Paramanick  
Shri N.K. Das  
Shri Joydev Patra  
Shri A. Bhattacharjee  
Ms. Dhanmaya  
Shri M. Dutta  
Shri Basudev Gharami  
Shri T.K. Gayen  
Shri B.P. Samanta  
Shri B.P. Mishra  
Shri R.P. Halder  
Shri N.T. Dolui  
Shri Gour Gharami  
Shri M. Mari  
Shri Satya Prakash  
Shri Ganesh Bhanja

Ms. N.K. Chaki  
Shri S.K. Saida  
Shri M.C. Gharami  
Shri C. Muniappa  
Shri T.K. Halder  
Shri Ganesh Chandra Burman  
Shri R. Rajendran  
Ms. Suvra Chakraborty  
Shri Kamlesh Kumar  
Shri Ranjit Kumar Roy  
Shri M.C. Das  
Shri P.N. Rao  
Shri Sitaram Nisad  
Shri M. Pannappa  
Shri K. Mohanan  
Shri Bablu Mondal  
Sk. Abdullah  
Ms. Sibani Roy  
Shri J.L. Balmiki  
Ms. M.G. Soudamini  
Shri T.V. Velayudhan  
Shri P.V. Shajil  
Ms. Luxmi Devi  
Shri C.S. Gawate  
Shri H.J. Chetanbhai  
Shri R.N. Kantibhai  
Shri Manabanda Roy

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## PROMOTIONS

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The following members of staff were promoted on recommendation of the ASRB/Assessment Committee/Departmental Promotion Committee during the period April 1995 to March 1996.

Name	Designation	Promoted to	With effect from
Shri S.K. Wishard	S-2	S-3	01.01.1986
Shri D.C. Bose	Assistant	Superintendent	07.04.1995
Smt. Mina Rani Bahadur	SSG I	SSG II	01.05.1995
Shri Ananta Kumar Biswas	SSG II	SSG III	02.05.1995
Shri Iswar Ram Balmiki	SSG I	SSG II	01.05.1995
Shri B.B. Das	SSG III	SSG IV	01.06.1995
Shri T.K. Roy	Stenographer	Sr. Stenographer	22.09.1995 (Upgradation)
Shri Ladu Ram Mahaver	T-4	T-5	01.01.1995
Smt. K. Suchetha Majumder	T-II-3	T-4	01.07.1994
Shri J.P. Mishra	T-II-3	T-4	01.01.1995
Shri S.K. Chatterjee	T-II-3	T-4	01.01.1995
Shri T. Chatterjee	T-II-3	T-4	01.01.1995
Shri Sushil Kumar	T-II-3	T-4	01.01.1995
Shri C.K. Vava	T-2	T-I-3	01.01.1995
Shri Debasis Saha	T-1	T-2	01.07.1994
Shri S. Bandyopadhyay	T-1	T-2	01.07.1994
Shri Prahlad Singh	T-1	T-2	01.01.1995
Shri S.G. Biswas	T-1	T-2	01.01.1995

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The following members were granted **merit increments/stagnation increments/advance increments** as below on the recommendation of the Assessment Committee/provisions of the Scheme for Training & Examination in Audit and Accounts matter.

Name	Designation	Merit/advance increment	With effect from
Shri D.K. De Sarkar	Senior Clerk	Two	01.08.1994
Shri P.S.C. Bose	T-5	One	01.07.1994
Shri K.K. Agarwal	T-5	Three	01.07.1994
Shri R.C. Mandi	T-5	Three	01.01.1995
Shri Sanjoy Bhowmick	T-5	Three	01.01.1995
Shri S.K.S.S. Hameed	T-5	Three	01.01.1995
Shri B.B. Das	T-II-3	Two	01.01.1995
Shri Pintu Biswas	T-II-3	One	01.01.1995
Shri K.P. Singh	T-I-3	One	01.07.1994
Shri Chittaranjan Das	T-I-3	Two	01.01.1995
Shri S.K. Deb	T-I-3	Two	01.01.1995
Shri R.K. Halder	T-I-3	Three	01.07.1994
Shri D. Chatterjee	T-2	One	01.01.1995
Shri R.K. Sah	T-1	Two	01.01.1995

## Retirement

Name	Designation	Date of retirement
Shri Nar Bahadur	SSG III	30.04.1995
Shri K.S. Rao	T-5	30.06.1995
Shri A.C. Ghosh	SSG II	31.07.1995
Shri S.N. Mehrotra	Scientist (Sel. Gr.)	31.08.1995
Shri H.K. Nath	Assistant	31.08.1995
Dr. G.K. Bhatnagar	Principal Scientist	30.09.1995
Shri K.L. Chakraborty	T-2	31.10.1995
Shri T.K. Sreedharan	Assistant	30.11.1995
Shri T.P. Das	Asstt. Adm. Officer	30.11.1995
Shri D.K. Banerjee	Assistant	30.11.1995

## Resignation

Name	Designation	With effect from
Shri Neeraj Swarup	T-II-3	06.02.1995
Dr. Jagannath Halder	T-4	31.07.1995

## Appointments

Following appointments were made during the period

Name	Designation	Place of posting	Date of appointment
Shri A.B. Biswas	Assistant	Barrackpore	24.05.1995
Shri B.C. Majumder	Assistant	-do-	24.05.1995
Shri H.L. Sarkar	Assistant	-do-	24.05.1995
Shri T.K. Majumder	Assistant	-do-	24.05.1995
Shri Samir Kr. Bose	Senior Clerk	-do-	24.05.1995
Shri N.R. Kundu	Senior Clerk	-do-	24.05.1995
Shri Jyotirmoy Roy	Senior Clerk	-do-	24.05.1995
Shri S.P. Mondal	Senior Clerk	-do-	24.05.1995
Shri Sujit Kr. Ghosh	Senior Clerk	-do-	24.05.1995
Dr. Asok Biswas	T-6	KVK, Kakdwip	21.07.1995
Shri B.K. Bhattacharjya	Scientist	Barrackpore	24.07.1995
Dr. B.P. Mohanty	Scientist	Barrackpore	22.09.1995
Shri Chhotey Lal	Senior Clerk	Allahabad	19.08.1995
Md. Yousuf Ali Sk.	Boat Driver	Barrackpore	11.08.1995
Shri C.S. Gawate	SSG-I	Vadodara	29.08.1995
Miss Sunita Prasad	Hindi Translator	Barrackpore	06.10.1995
Shri H.J. Chetanbhai	SSG-I	Vadodara	15.09.1995
Md. Quasim	Language Assistant	Barrackpore	30.09.1995
Shri R.N. Kantibhai	SSG I	Vadodara	29.09.1995
Shri James Murmu	Hindi Translator	Barrackpore	26.10.1995
Shri Sita Ram Meena	T-II 3	Allahabad	04.12.1995
Shri Kallu Singh	Assistant	Karnal	01.02.1996
Shri D. Chowdhury	Senior Clerk	Guwahati	03.02.1996
Shri K. Subramaniam	SSG.II	Coimbatore	05.02.1996
Shri S.K. Maranappan	Senior Clerk	Coimbatore	05.02.1996



## Transfers

The following transfers were made during the period April 1995 to March 1996

Name	Designation	From	To
Shri Badal Lal Singh	T-I-3 (Driver)	Malda	Barrackpore
Shri Puntu Biswas	T-II-3	Eluru	Canning
Shri C.G. Rao	T-2	Chakradevarapalli	Eluru
Shri P. Sayalu	SSG III	-do-	-do-
Shri P. Seshanna	SSG II	-do-	-do-
Shri B. Pugalendhi	SSG II	Hoshangabad	Barrackpore
Smt. Pramila Tomar	SSG IV	Karnal	Agra (Inter- Institutional Transfer to CSWCR & TI)
Shri S.P. Yadav	SSG-IV	Karnal	Malda
Shri J.N. Mallah	SSG-II	Karnal	Allahabad
Shri S.K.S.S. Hameed	T-5	Bangalore	Barrackpore
Dr. (Mrs) Kalpana Srivastava	T-II-3	Jhansi (Inter-Institutional Transfer from IGFRI)	CIFRI, Allahabad

## वार्षिक प्रतिवेदन 1995-96

केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान  
(भा. कृ. अनु. प.) वैरकपुर : पश्चिम बंगाल

### संक्षिप्त इतिहास

भारत सरकार ने सन् 1943 के अपने एक ज्ञापन में देश के मात्स्यकीय संसाधनों के विकास के लिए एक केन्द्रीय विभाग की स्थापना पर विशेष बल दिया था । तत्पश्चात्, केन्द्रीय सरकार की कृषि, वानिकी तथा मात्स्यकी से संबंधित उप-समिति ने भी इस प्रस्ताव का पृष्ठांकन किया था । फलस्वरूप, भारत सरकार के खाद्य तथा कृषि मंत्रालय के अन्तर्गत केन्द्रीय अन्तर्स्थलीय मात्स्यकी अनुसंधान केन्द्र की स्थापना 17 मार्च 1947 को कलकत्ता में हुई । एक अन्तरिम योजना के रूप में प्रवर्तित यह केन्द्र अब देश की अन्तर्स्थलीय मात्स्यकी क्षेत्र में एक प्रमुख अनुसंधान संस्थान का रूप ले चुका है । वर्ष 1959 में इस केन्द्र को केन्द्रीय अन्तर्स्थलीय मत्स्य अनुसंधान संस्थान का पूर्ण दर्जा प्राप्त हुआ तथा पश्चिम बंगाल के वैरकपुर स्थित नवनिर्मित भवन में इसका स्थानांतरण हुआ । वर्ष 1967 में यह संस्थान भारतीय कृषि अनुसंधान परिषद् का विधिवत सदस्य बना ।



संस्थान का मुख्य उद्देश्य देश के अन्तर्स्थलीय मात्स्यकी संसाधनों का उचित मूल्यांकन एवं इनके संरक्षण तथा अधिकतम समुपयोजन के लिए उपयुक्त प्रणालियों को विकसित करना था । इन उद्देश्यों की पूर्ति के लिए संस्थान ने देश में उपलब्ध अन्तर्स्थलीय जल संसाधनों जैसे- नदी, झील, पोखर, टैंक, जलाशय तथा बाढ़कृत आर्द्र क्षेत्र आदि के पारिस्थितिकी तथा इनकी उत्पादन क्षमताओं का अध्ययन किया तथा इन अध्ययनों द्वारा विभिन्न प्रकार के जलीय परितंत्रों की जटिल पोषी संरचना एवं पर्यावरणीय प्रकार्यों को सुलझाया ।

1970 के दशक में संस्थान ने चार अतिविशिष्ट समन्वित राष्ट्रीय परियोजनाओं का कार्य आरम्भ किया ये परियोजनाएँ थीं 'मिश्रित मत्स्य पालन व मत्स्य बीज उत्पादन' 'वायु-श्वासी मत्स्य पालन' अलवणीय जलाशयों की पारिस्थितिकी एवं मात्स्यकी प्रबन्धन' तथा 'लवणीय जल मत्स्य पालन' ।

इस संस्थान को निम्नलिखित मत्स्य पालन तकनीकों के विकास करने एवं उन्हें लोकप्रिय बनाने का श्रेय प्राप्त है ।

नदीय संसाधनों से मत्स्य बीज संचयन  
मत्स्य बीज परिवहन संबंधित तकनीक  
कार्प मछलियों का प्रेरित प्रजनन एवं नर्सरी प्रबन्धन प्रणाली  
चाईनीज कार्प मछलियों का बंध प्रजनन  
मिश्रित मत्स्य पालन  
जलीय खरपतवारों का नियंत्रण  
वायु-श्वासी मछलियों का पालन  
एकीकृत मत्स्य पालन  
मल जल पर आश्रित मत्स्य पालन

छोटे जलाशयों में मत्स्यकीय प्रबन्धन  
लवणीय जल में मत्स्य पालन  
घोंघा का पालन

उपर्युक्त तकनीकों एवं शोध प्रणालियों के फलस्वरूप ही आज देश का अन्तर्स्थलीय मत्स्य उत्पादन 0.22 लाख टन (1950-51) से बढ़कर 2.1 लाख टन (1994-95) तथा मत्स्य बीज उत्पादन 409 लाख टन (1973-74) से बढ़कर 14,500 लाख टन (1994-95) हो गया है ।

7वीं पंचवर्षीय योजना के आरम्भ में ही इस संस्थान ने तीन अन्य संस्थानों (केन्द्रीय अलवणीय जलीय कृषि संस्थान, केन्द्रीय खारा जलीय कृषि संस्थान और राष्ट्रीय शीत जल मात्स्यकी केन्द्र) को जन्म दिया तथा इस मूल संस्थान का पुनर्नामकरण 1.4.87 से केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान हुआ । इस परिवर्तित व्यवस्था में के. अ. प्र. म. अनु. सं. का दायित्व उन विवृत जल संसाधनों में शोध कार्य करना है जिनमें मत्स्य प्रबन्धन कार्य पर्यावरणीय अनुमापन तथा उसके संरक्षण से संबद्ध है ।

## अधिदेश

इस संस्थान के वर्तमान अधिदेश निम्नलिखित हैं :-

- 1 10 हेक्टर क्षेत्रफल से बड़े जलीय संसाधनों में मत्स्य संख्या गतिकी को अध्ययन
- 2 उक्त प्रकार के जलीय संसाधनों से अधिकतम मत्स्य उत्पादन प्राप्त करने हेतु प्रबन्ध प्रणालियों को विकसित करना ।
- 3 इन जलीय संसाधनों में अपकर्षण / प्रदूषण के कारण एवं उनके प्रभाव का अध्ययन कर इन जलीय संसाधनों के संरक्षण के लिए अनुसंधानात्मक कार्य करना ।



- 4 नदीय घाटी परियोजनाओं के कारण संबंधित बेसिन की मात्स्यकी पर पड़ने वाले दुष्प्रभावों का अध्ययन एवं इनकी प्रबन्धन के लिए प्रणालियों को विकसित करना ।
- 5 अन्तर्स्थलीय मात्स्यकी से संबंधित आंकड़ों के संदर्भ में राष्ट्रीय केन्द्र के रूप में कार्य करना ।
- 6 प्रशिक्षण कार्यक्रमों का आयोजन एवं विस्तार । परामर्शक सेवाएं उपलब्ध करना ।

## संगठन

उपर्युक्त अधिदेश की पूर्ति एवं देश के मात्स्यकीय विकास हेतु केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान के अनुसंधान कार्यों को प्रमुख मात्स्यकीय स्रोतों के अनुरूप सात प्रभागों के अन्तर्गत संगठित किया गया है ।

**नदीय प्रभाग** का मुख्यालय इलाहाबाद में स्थित है और यह प्रभाग नदीय पर्यावरण के संरक्षण पर पर्याप्त ध्यान देते हुए देश के नदीय मात्स्यकीय संसाधनों के प्रभावशाली प्रबन्धन हेतु तकनीकी प्रणालियों को विकसित करने का प्रयास कर रहा है । इस प्रभाग के अनुसंधान प्रकल्प गंगा, ब्रह्मपुत्र, महानदी एवं नर्मदा नदियों तथा उनके मुख्य परितंत्रों से संबंधित है ।

बंगलोर स्थित **जलाशय प्रभाग** के केन्द्र तमिलनाडु, आन्ध्र प्रदेश एवं मध्य प्रदेश राज्यों में हैं । इस प्रभाग की कार्य दिशा छोटे, मध्यम तथा बड़े जलाशयों में मत्स्य उत्पादन की वृद्धि हेतु प्रबन्धन प्रणालियों को विकसित करने की ओर है ।

बैरकपुर स्थित *ज्वारनदमुखी प्रभाग* इस समय हुगली-मातलह तथा नर्मदा ज्वारनदमुखी परितंत्रों पर कार्य कर रहा है । अनेक औद्योगिक ईकाइयों से प्रवाहित बहिःस्त्राव, कृषि एवं नगरपालिकाओं के अपरदूद आदि ने गंगा नदीय तंत्र के हुगली ज्वारनदमुख को एक अति प्रदूषित क्षेत्र बना दिया है । यह प्रभाग इसका अध्ययन कर रहा है । सुन्दरवन के ज्वारनदमुख परितंत्रों एवं मंगलो का जैविक एवं अजैविक अध्ययन भी यह प्रभाग कर रहा है ।

बैरकपुर स्थित *पर्यावरणीय अनुमापन एवं मत्स्य स्वास्थ्य परिरक्षण प्रभाग* को यह अधिदेश दिया गया है कि नदीय, जलाशय एवं ज्वारनदमुखी परितंत्रों में मानवीकृत परिवर्तनों का अनुमापन करें एवं उपयुक्त सुधारात्मक उपायों को विकसित करें । प्राकृतिक स्रोतों से प्राप्त सूचनाओं के निर्धारण के लिए प्रयोगशाला स्थितियों में भी अन्वेषण कार्य किया जा रहा है । प्रभाग द्वारा किये गए अध्ययनों में मत्स्य निवास स्थान की विभिन्नता, जैव विविधता तथा ज्ञात सूचकों के माध्यम से दुष्प्रभाव का शिनाख्त करना, नियंत्रित स्थितियों में विषैले पदार्थों को परखना, जलीय पर्यावरण में कार्बनिक पदार्थों के परिमाण के लिए सूक्ष्म जैविकी का अध्ययन और मत्स्य रोगों की पहचान तथा इनके उपचार से संबंधित मौलिक सूचनाएँ भी सम्मिलित हैं । इस प्रभाग को जलीय परितंत्रों के सुधार के लिए एक कार्य योजना तैयार करने का दायित्व भी सौंपा गया है ।

*बाढ़कृत मैदानी आर्द्र क्षेत्र प्रभाग* का मुख्यालय बैरकपुर में स्थित है । इस प्रभाग के अन्तर्गत गंगा तथा ब्रह्मपुत्र बेसिन के आर्द्र क्षेत्रों की पारिस्थितिक गतिकी का अध्ययन किया जा रहा है ताकि इनके विकास के लिए उपयुक्त प्रणालियों को विकसित किया जा सके । गंगा तथा ब्रह्मपुत्र बेसिन के आर्द्र क्षेत्र अपनी जैव-विविधता के कारण महत्वपूर्ण ही नहीं बल्कि बिहार, पश्चिम बंगाल तथा असम राज्यों के मात्स्यकी का प्रमुख अंग हैं । यह प्रभाग इन पारिस्थितिक परितंत्रों की प्रक्रिया एवं इनकी मत्स्य उत्पादन क्षमता का अध्ययन करता है जिससे इनकी जैव-विविधता को नुकसान पहुँचाए बिना पर्यावरण के अनुकूल तकनीकी प्रणालियों को विकसित किया जा सकें ।



*मत्स्य स्रोत मूल्यांकन प्रभाग* बैरकपुर में है और इस प्रभाग का लक्ष्य मत्स्य सम्पदा एवं मात्स्यकीय स्रोतों से संबंधित आंकड़ों को एकत्रित करना है । इस प्रभाग को विभिन्न जलीय स्रोतों में उपलब्ध मछलियों की संख्या निर्धारण कार्य का दायित्व सौंपा गया है ताकि इन अन्तर्स्थलीय मत्स्य स्रोतों का वैज्ञानिक समुपयोजन किया जा सके ।

*हिल्सा प्रभाग* पश्चिम बंगाल राज्य के मालदह में स्थित है । इस प्रभाग का मुख्य लक्ष्य हिल्सा मछलियों की जैविकी, स्वभाव तथा आचरण आदि पर अनुसंधान कार्य करना है जिससे गंगा नदीय क्षेत्र से कम हुई इन मछलियों की पुनर्स्थापना के उपाय किये जा सके ।

संस्थान का अनुसंधान कार्य कुल 19 अनुसंधान परियोजनाओं में विभाजित किया गया है । इन अनुसंधान परियोजनाओं का कार्य, मुख्यालय के अलावा 10 राज्यों में फैले संस्थान के 11 अनुसंधान एवं 6 सर्वेक्षण केन्द्र तथा एक कृषि विज्ञान केन्द्र से किया जा रहा है ।

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## मुख्य उपलब्धियाँ

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### *हिल्सा मछलियों की प्रजनन एवं डिम्बकों के विकास के नए आयाम*

इन्डियन शैड *टेन्यूलोसा ईलिशा* (हेम.) एक प्रमुख समुद्रापगामी मछली है जो हुगली नदी के ज्वारनदमुखी क्षेत्र में पाई जाती है तथा इसके मात्स्यकी का महत्वपूर्ण अंग है । केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान के वर्तमान अध्ययन से इन मछलियों की प्रजनन पद्धति एवं ज्वारनदमुख के विभिन्न केन्द्रों में इनके बीजों की उपलब्धता पर नया प्रकाश पड़ता है । ज्वारनदमुख क्षेत्र में इस मछली के प्रजनन स्थानों के वितरण में कुछ प्रत्यक्ष देखे गए हैं । इस अध्ययन से स्पष्ट होता है कि फरक्का बाँध निर्माण के पूर्व की अपेक्षा बाँध निर्माण के बाद ज्वारनदमुख में हिल्सा

बीजों की प्राप्ति क्षेत्र का क्षेत्रफल बढ़ गया है। इस परिवर्तन का मुख्य कारण है, बाँध निर्माण के बाद ज्वारनदमुख में अलवणीय जल का अत्यधिक प्रवाह। अलवणीय जल प्रवाह की उच्चतम दर से अनुप्रवाह की क्षारीयता कम हो गयी एवं प्रवणता क्षेत्र लगभग अलवणीय क्षेत्र में परिवर्तित हो गया है जो हिल्सा मत्स्य प्रजनन के लिए सहायक है। ज्वारनदमुख के इन अलवणीय जल क्षेत्रों में मुख्यतः अक्टूबर से मई या जून माह तक हिल्सा मछलियों के जीरों दिखायी पड़ते हैं। यह अलवणीय जल क्षेत्र हिल्सा के जीरों के संवर्धन स्थान के रूप में भी कार्य करता है।

इन अध्ययनों से यह भी ज्ञात होता है कि फरक्का बाँध निर्माण के पूर्व की अपेक्षा बाँध निर्माण के बाद की अवधि में हिल्सा मछलियों के बीज त्वरित गति से विकसित हो रहे हैं। इस तरह फरक्का बाँध निर्माण के पश्चात हुगली ज्वारनदमुख, हिल्सा प्रजनन तथा डिम्बकों के विकास के लिए अधिक अनुकूल बन गया है।

### **हुगली-मातलह ज्वारनदमुखी परितंत्र में मत्स्य संख्या अध्ययन**

हुगली-मातलह ज्वारनदमुखी परितंत्र में *पासा पासा* मछलियों के विश्लेषणात्मक मत्स्य संख्या अध्ययनों से ज्ञात होता है कि इस प्रजाति का अत्यधिक शोषण हो रहा है। इस अध्ययन से यह सुझाव प्राप्त होता है कि इसके मत्स्यन कार्य को 59 प्रतिशत कम कर दिया जाना चाहिए ताकि भविष्य में भी इन मछलियों की उचित मात्रा में प्राप्ति हो सकें। इस अध्ययन से यह भी सुझाव प्राप्त होता है कि यदि इस मछली के मत्स्यन प्रयासों को और बढ़ाया गया तो प्रति यूनिट प्रयास की तुलना में मत्स्य प्राप्ति दर और भी घट जाएगा जिससे मत्स्यन कार्य लाभदायक नहीं रहेगा। इस प्रकार के तथ्य शीत काल के बैगनेट मात्स्यकी में भी देखे गए हैं जिसमें कुल उत्पादन बढ़ने के बाद भी प्रति यूनिट मत्स्यन में कमी आई है। इससे यह पता चलता है कि श्रोत में उचित से ज्यादा मत्स्यन किया जा रहा है।



## ग्रीष्म ऋतु में बड़े अलवणीय जल झींगों (मेक्रोब्रोकेियम रोजनबर्जी) का पेन पालन प्रणाली द्वारा अत्यधिक उत्पादन

पेन पालन प्रणाली द्वारा ग्रीष्म ऋतु में बड़े अलवणीय जल झींगों के पालन की सम्भावनाओं के अन्वेषण हेतु पश्चिम बंगाल के नदीया जिले के बोमरा बील में प्रयोग प्रारम्भ किया गया। ये प्रयोग बाँस से बने तीन पेन में (0.026 हे. प्रति पेने) किये गये। संग्रहण से पूर्व मेक्रोफाइट्स तथा अवांछित जीव जात की सफाई, 500 कि. ग्राम प्रति हे. की दर से चूने का उपयोग आदि कार्य किया गया। चूने के उपयोग के सात दिन बाद, हैचरी से उत्पादित झींगा बीजों (60-75 मि. मी./0.5 ग्राम) को 40000 प्रति हे. की दर से पेन में संग्रहित किया गया। प्राकृतिक आहार के अतिरिक्त झींगा बीजों को प्रत्येक दिन सुबह और शाम (शारीरिक भार का 4-10%) कृत्रिम आहार (40% प्रोटीन) दिया गया। ये झींगे 70 दिनों के संवर्धन के पश्चात् 20 ग्राम वजन के हो गये, जिससे इस अवधि में मत्स्य उपज लगभग 640 किलोग्राम प्रति हे. आँका गया है जबकि संवर्धन के समय में प्रतिकूल पारिस्थितिक स्थितियाँ जैसे जल की कम गहराई (70-90 से. मी.), जल का उच्च तापमान (32°-36° से. ग्रे.) तथा मेक्रोफाइट्स की अधिकता विद्यमान रही।

## जलीय जीव (मत्स्य) पर थर्मल बहिःस्त्राव का प्रभाव

मछली के जीवन काल की विभिन्न अवस्थाओं में थर्मल बहिःस्त्राव के प्रभाव पर किए गए अध्ययनों से यह ज्ञात होता है कि कतला कतला मछली थर्मल बहिःस्त्राव के प्रति अतिसंवेदलशील है। जब इसे 38° से. ग्रे. से 43° से. ग्रे. तापमान के बहिःस्त्राव में रखा गया तो 170 से 4 मिनटों तक ही जीवित रही। यह भी देखा गया है कि 40° से. ग्रे. से 42° से. ग्रे. तापमान में डिम्बकों का विकास रुक गया एवं अंडाणु अपारदर्शी हो गए तथा अंडाणु के आवरण फूटने लगे जिससे 43° से. ग्रे. में भ्रूण की मृत्यु हो गयी। दूसरी ओर 38° से. ग्रे. तथा 39° से. ग्रे. तापमान वाले बहिःस्त्राव में निषेचन एवं विकास शीघ्र हुई किन्तु अंडज बहिःस्त्राव के प्रभाव का शिकार हो गए। 41° और 43° से. ग्रे. वाले तापमान की तुलना में जहाँ इनकी बहिःस्त्राव सहन करने की शक्ति घट कर क्रमशः 20 मिनट एवं 1 मिनट हो गई, वही 38° से. ग्रे. 40° से. ग्रे. का तापमान पोने के लिए अधिक संकटमय रहा जहाँ 120 से 50 मिनटों में इनकी मृत्यु दर शत-प्रतिशत

रही । यह परिलक्षित होता है कि थरमल बहिःस्त्राव का प्रभाव भ्रूण की तुलना में पोना अवस्था पर अधिक है । इसका कारण यह हो सकता है कि अंडों का आवरण (एग शेल) अधिक समय तक उच्च तापमान को सहन करता है ।

### झींगों का जन्तुमारी रोग

केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान बैरकपुर द्वारा किये गये अन्वेषणों से झींगों के जन्तुमारी रोग से संबंधित तथ्य प्रकाश में आए हैं । *पिनियस मॉनोडोन* प्रजाती के झींगे अत्यधिक प्रभावित हुए थे और संदूषण 52 प्रतिशत आँका गया था । रोग का मुख्य लक्षण सफेद धब्बे थे जो पृष्ठवर्म से बढ़कर बहिः कंकाल के अन्य भागों तक फैल गये थे । मृत्यु से पूर्व प्रभावित झींगों का रंग रैडिश पिंक हो गया था । सम्भवतः *इपीस्टाइलिस* प्रजाती के रोगाणु इसके कारक हो सकते हैं जो 20 प्रतिशत झींगों में पाए गए ।

प्रभावित झींगों के हीमोलिम्फ तथा जल क्षेत्र के बैक्टीरिया के अध्ययन में *वैब्रियो* प्रजाती की उपस्थिति देखी गयी ।

### जन्तुमारी रोग से संबंधित पर्यावरणीय प्राचल

स्थान	पी एच	क्षारीयता (पीपीएम)	कठोरता (पीपीएम)	एन एच <sub>3</sub> (पीपीएम)	लवणता (पीपीटी)	बैक्टीरिया
अगामुरा	8.3	127	1800	0.1	9.02	8.4 x 10 <sup>3</sup>
बील समिति	8.5	126	3000	0.5	10.25	1.92 x 10 <sup>5</sup>
कथोर	8.6	127	2800	0.3	6.4	—
ट्रिपले	9.0	147	3200	0.2	7.0	—
मतिगड़ा	8.6	125	3000	1.1	9.0	—



प्रभावित जल क्षेत्र में आयनित अमोनिया तथा वैकटीरीया की उपस्थिति अधिक मात्रा में थी जो मत्स्य जीवन पर अत्यधिक दबाव डालती है जिससे रोग का उद्भव होता है ।

मत्स्य पालकों को दिये गये उपचारात्मक सुझाव :

1. मुक्त अमोनिया के एकत्रीकरण में कारक सभी प्लवमान एवं जलमग्न कार्बनिक पदार्थों का पूर्ण उन्मूलन ।
2. प्रभावित भेरी में जल बदलने के कार्य का स्थगन ताकि रोग अन्य क्षेत्रों में फैल न पाए ।
3. चूने का प्रयोग 200 कि. ग्राम प्रति हे. की दर से एवं एक सप्ताह बाद क्लिचिंग पाउडर, एक पीपीएम की दर से ।
4. पारम्परिक पालन वाले भेरियों में मलजल से अंतर्भरित ज्वारीय जल की गुणवत्ता बढ़ाने के लिए जैविक-उपचार कार्य

### मेक्रोब्रेकियम रोजनवर्जी का बीज उत्पादन

मेक्रोब्रेकियम रोजनवर्जी बीज उत्पादन हेतु सी. आई. एफ. आर. आई. द्वारा एक कुटीर माडल हैचरी की रूप रेखा तैयार कर, बैरकपुर मुख्यालय में इसकी स्थापना की गई । परिवार के सभी सदस्यों द्वारा आसानी से चालित यह मॉडल ग्रामीण क्षेत्रों में बड़े पैमाने पर अपनाए जाने योग्य है । यह प्रणाली इन क्षेत्रों में रोजगार एवं आय का स्रोत हो सकता है ।

परिपक्वै में रोजनवर्जी व झींगों को नदिया जिले के तालाबों से एकत्रित कर, उन्हें अलवणीय जल वाले प्लास्टिक पूल में संग्रहित किया गया । इन झींगा मछलियों को भोजन के रूप में घोंघों का मांस दिया गया और अंडों के विकास का निरीक्षण किया जाता रहा । अंडपूर्ण मादा

झींगों को कृत्रिम समुद्रीय जल वाले स्फुटन टैंक में स्थानांतरित किया गया । कृत्रिम समुद्रीय जल की लवणता 12 -133 पीपीटी (पर्यानुकूलन के पश्चात) रखी गई । अंडजों को संवर्धन हेतु कृत्रिम समुद्रीय जल वाले प्लास्टिक टैंकों (1.0 x 0.8 x 0.7) में संग्रहित किया गया । कृत्रिम समुद्रीय जल की लवणता 12 -133 पीपीटी और अंडजों का संग्रहण दर 50 प्रतिशत प्रति लीटर था । अंडजोत्पत्ति के तीसरे दिन से भोजन देने का कार्य प्रारम्भ किया गया जब अंडजों का मुँह खुल गया । इन अंडजों को तीसरे दिन से बारहवें दिन तक *आरटिमिया लारवा* तथा तेरहवें दिन से अंडचूर्ण भी दिया गया । 21 दिनों के संवर्धन काल के पश्चात इन डिम्बकों का विकास दर, 26-30.5<sup>0</sup> जलीय तापमान, 11-13 पीपीटी जलीय लवणता 5.0 से 7.0 पीपीटी घुले आक्सीजन वाली स्थितियों में 3.4-3.5 मि. मी. कुल लम्बाई रही ।

### *सुन्दरवन क्षेत्र में बड़े अलवणीय-जल झींगों की पेन-पालन विधि पर फार्म प्रयोग*

सुन्दरवन के नोदाखाली क्षेत्र में बड़े अलवणीय जल झींगों के पेन पालन प्रणाली पर 0.3 हे. जलीय क्षेत्र में एक फार्म प्रयोग कार्यक्रम प्रारम्भ किया गया । हुगली ज्वारनदमुख के ज्वारीय जल से बनी इस आर्द्र क्षेत्र में पेन की स्थापना की गयी । बड़े अलवणीय जल झींगों (*भेक्रोब्रेकियम रोजनवर्जी*) के बीजों (औसत वजन 9.85 ग्राम), को 40000 प्रति हे. की दर से संग्रहित किया गया । प्रारम्भिक विकास दर उत्साहवर्धक है ।



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## महत्वपूर्ण घटनाएँ

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### आगमन

#### माननीय केन्द्रीय कृषि मन्त्री का संस्थान में आगमन

डा. बलराम जाखड़, माननीय केन्द्रीय कृषि मंत्री, भारत सरकार ने दिनांक 23.7.95 को संस्थान का निरीक्षण किया था । निरीक्षण के दौरान कृषि मंत्री के साथ भारतीय कृषि अनुसंधान परिषद् के सचिव श्री जी. एस. साहनी भी उपस्थित थे । संस्थान के तत्कालीन निदेशक डा. वी. आर. पी. सिन्हा ने कृषि मंत्री जी को संस्थान के अनुसंधान कार्यों से अवगत कराया । संस्थान के निदेशक एवं वैज्ञानिकों के साथ चर्चा के दौरान डा. जाखड़ ने विभिन्न अनुसंधान कार्यक्रमों के प्रति सन्तोष व्यक्त किया । तदुपरान्त संस्थान के अधिकारियों को सम्बोधित करते हुए कृषि मंत्री जी ने अनुसंधान के लिए उन समस्याओं को पहचानने पर बल दिया जिन्हें देश के किसानों को सीधे तौर पर सामना करना पड़ रहा है ।

#### संसद सदस्यों द्वारा संस्थान का निरीक्षण

श्री नितेश कुमार, संसद सदस्य के नेतृत्व में कृषि से संबंधित संसदीय स्थायी समिति का अध्ययन दल II, संस्थान के दौरे पर दिनांक 10 अक्टूबर 1995 को आया । इस अध्ययन दल में 11 संसद सदस्य एवं लोक सभा सचिवालय के पाँच अधिकारी शामिल थे । अध्ययन दल का हार्दिक स्वागत किया गया । अनुसंधान कार्यक्रमों के संबंध में जानकारी देने हेतु अध्ययन दल के सदस्यों को संस्थान के विभिन्न प्रयोगशालाओं में ले जाया गया । सदस्यों ने अनुसंधान कार्य की समीक्षा की एवं सन्तोष व्यक्त किया । दल ने यह विचार व्यक्त किया कि दीर्घकालीन अनुसंधान कार्य एवं

जलीय परितंत्रों का निरंतर अनुमापन अंतर्स्थलीय मात्स्यकी के विकास में महत्वपूर्ण कार्य होगा । संस्थान में विकसित अनेक तकनीकों जैसे मिश्रित मत्स्य पालन, बीज उत्पादन, झींगा पालन आदि में उन्होंने विशेष रुचि दिखाई । श्री नितिश कुमार, संसद सदस्य ने संस्थान के सदस्यों को प्रेक्षा-गृह में सम्बोधित किया ।

### **ओ. डी. ए. टीम का आगमन**

ब्रिटेन के समुद्रीय विकास प्राधिकरण के तीन सदस्यों वाले दल ने पश्चिम बंगाल के बाढ़कृत आर्द्र क्षेत्र के विकास की परियोजनाओं के प्रतिपादन के लिए संस्थान का दौरा किया । समुद्रीय विकास प्राधिकरण के सलाहकार डा. पॉल वालोगन, नैचरल रिसोर्स इन्सटिट्यूट, चेथाम के समाजशास्त्री डा. मिक ब्लोसिल्ड तथा स्टेरलिंग विश्वविद्यालय के मात्स्यकी सलाहकार डा. क्रिस प्राइस ने संस्थान के विभिन्न प्रयोगशालाओं का निरीक्षण किया । इस दल के सदस्यों ने संस्थान के वैज्ञानिकों से विचार विमर्श किया । इस दौरे का प्रवर्तन ब्रिटिश काउंसिल डीविजन कलकत्ता द्वारा किया गया ।

### **मुख्य बैठकें**

#### **प्रबन्ध समिति की बैठक**

केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान की प्रबन्ध समिति की बैठक निदेशक की अध्यक्षता में 18 जुलाई 1995 को बैरकपुर मुख्यालय की सेंट्रल लाइब्रेरी में सम्पन्न हुई । भारतीय कृषि अनुसंधान पारंपद, नई दिल्ली के सहायक महानिदेशक (मात्स्यकी) सहित 8 सदस्य इस बैठक में उपस्थित हुए थे । बैठक में संस्थान के दो मोटर वाहनों को निराकृत करने एवं उनके स्थान पर दो नये वाहन खरीद करने की स्वीकृति प्रदान की गई । समिति की बैठक में संस्थान के जलाशय प्रभाग की स्थापना हेतु बंगलोर में भूमि खरीद के संबंध में कर्नाटक सरकार को 63,809 भुगतान करने की भी स्वीकृति दी गई । इसके अतिरिक्त अनेक उपकरणों के खरीद की भी स्वीकृति हुई ।



इस समिति की दूसरी बैठक तथा तीसरी बैठक क्रमशः 16 अक्टूबर 1995 एवं 27 जनवरी 1996 को सम्पन्न हुई । इन बैठकों में संस्थान के प्रबन्धन से संबंधित अनेक विषयों पर चर्चा हुई एवं इनका समाधान किया गया ।

### **अनुसंधान सलाहकार समिति की बैठक**

संस्थान के अनुसंधान सलाहकार समिति की पहली बैठक मुख्यालय वैरकपुर में 24 जुलाई 1995 को सम्पन्न हुई । डा. के. वी. देवराज की अध्यक्षता में सम्पन्न इस बैठक में डा. एन. सी. दत्ता, डा. ए. आर. खुदाबक्श, श्री एम. एल. जोशी तथा डा. वी. आर. पी. सिन्हा के अतिरिक्त सदस्य सचिव के रूप में डा. एम. सिन्हा तथा डा. के. के. वास एवं श्री आर. ए. गुप्ता विशेष अतिथि के रूप में उपस्थित थे ।

समिति ने अनुसंधान परियोजनाओं की समीक्षा की एवं इन्हें बेहतर बनाने के लिए अनेक सुझाव दिये । इन सुझावों में नदीय परितंत्रों की निर्वाहन क्षमता का मूल्यांकन, जलाशयों की जल ग्रहण क्षेत्र की पारिस्थितिकी, बाढ़कृत आर्द्र क्षेत्रों के पोषक तत्वों का परिमाण संबंधी अध्ययन एवं जलीय संसाधनों के संरक्षण एवं प्रबन्धन के प्रति जन जागृति लाना आदि सम्मिलित हैं ।

### **भारतीय कृषि अनुसंधान परिषद् की क्षेत्रीय समिति - II की बैठक**

भारतीय कृषि अनुसंधान परिषद् की क्षेत्रीय समिति-II की बैठक, केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान वैरकपुर की केन्द्रीय पुस्तकालय कक्ष में दिनांक 20-21 नवम्बर 1995 को डॉ. राजेन्द्र सिंह परोड़ा, महानिदेशक, भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली की अध्यक्षता में सम्पन्न हुई । उद्घाटन सत्र की अध्यक्षता असम के माननीय कृषि मंत्री श्रीमती अनवरा तैमूर ने की और पश्चिम बंगाल के माननीय कृषि मंत्री श्री निहार रंजन बोस, मुख्य अतिथि रहे । इस दो दिवसीय बैठक में पश्चिम बंगाल तथा असम राज्य के कृषि विश्वविद्यालयों एवं परिषद की संस्थानों के कुल

56 प्रतिनिधि भाग लिए । असम कृषि विश्वविद्यालय, विधान चन्द्र कृषि विश्वविद्यालय तथा पश्चिम बंगाल के पशु विज्ञान एवं मात्स्यकी विश्वविद्यालय के उप-कुलपतियों के अलावा परिषद के अनेक उप-महानिदेशक, सहायक - महानिदेशक तथा विशेष अतिथि इस बैठक में उपस्थित हुए । बैठक में कृषि, पशु विज्ञान तथा मात्स्यकी क्षेत्र में प्राथमिकता प्राप्त क्षेत्रों को सूचीबद्ध किया गया ।

### **भारतीय कृषि अनुसंधान परिषद् की शिखर समिति की संस्थान में बैठक**

केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान में भारतीय कृषि अनुसंधान परिषद की शिखर समिति की बैठक दिनांक 20 फरवरी 1996 को सम्पन्न हुई । बैठक का उद्देश्य भारतीय कृषि अनुसंधान परिषद के संस्थानों, विधान चन्द्र कृषि विश्वविद्यालय एवं कलकत्ता के निकटस्थ गैर सरकारी संस्थानों के वैज्ञानिकों में आपसी विचार-विमर्श था । उक्त संगठनों के 39 वैज्ञानिक इस बैठक में भाग लिए थे । बैठक में चर्चा निम्नलिखित विषयों पर हुई:-

- 1) अनुसंधान कार्यसूची प्रतिपादन ।
- 2) अनुसंधानात्मक परिणामों का परीक्षण एवं अनुकूलन
- 3) प्राद्यौगिकी मूल्यांकन एवं आवश्यकतानुसार सुधार
- 4) मात्स्यकी क्षेत्र के विभिन्न विषयों के संबंध
- 5) आवश्यकतानुसार प्रौद्योगिकी हस्तांतरण
- 6) उपर्युक्त विषयों में अवरोध एवं उनका समाधान

निदेशक, केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान के सभापतित्व में हुई इस बैठक में उप-महानिदेशक (प्रसार) ने बैठक के उद्देश्य के बारे में बताया ।



## हिन्दी सप्ताह

संस्थान के मुख्यालय में 14 से 20 सितम्बर 1995 के दौरान हिन्दी सप्ताह मनाया गया । इस सप्ताह के दौरान अधिकारियों / कर्मचारियों के लिए निबन्ध लेखन, टिप्पणी लेखन, पत्र लेखन प्रतियोगिताएँ तथा बच्चों के लिए निबन्ध प्रतियोगिता का आयोजन किया गया । इन प्रतियोगिताओं के अतिरिक्त संस्थान के वैज्ञानिकों के लिए वैज्ञानिक वाद विवाद का भी आयोजन किया गया । सप्ताह के अन्तिम दिन एक सभा का आयोजन किया गया जिसमें हिन्दी में अत्यधिक काम काज करने हेतु निदेशक तथा अन्य वरिष्ठ अधिकारी संस्थान के कर्मचारियों से अपील की एवं राजभाषा विभाग द्वारा जारी वार्षिक कार्यक्रम में निर्धारित लक्ष्यों का भी उल्लेख किया ताकि इनका कार्यान्वयन किया जा सकें । इसके अतिरिक्त अन्य कार्यक्रमों जैसे अंताक्षरी, कविता पाठ आदि का भी आयोजन किया गया ।

### *नदी पर्यावरण एवं मात्स्यकी पर संस्थान का मिशन परियोजना*

गंगा बेसिन, जो देश के कुल भौगोलिक क्षेत्र के एक चौथाई भाग से भी अधिक है, अपनी जैव-विविधता के लिए प्रसिद्ध है । यह क्षेत्र मूल्यवान मेजर कार्प मछलियों जैसे:- *कतला कतला*, *लेबियो रोहिता*, *सी मृगाला*, *लेबियो कलबसु* आदि का मुख्य निवास स्थान है । इस नदी में अन्य मछलियाँ जैसे बड़ी शिंगटी मछलियाँ, फेदरबैकसू, महासीर, हिल्सा तथा अन्य कार्प मछलियाँ भी प्रचुर मात्रा में पायी जाती हैं । जलीय कृषि क्षेत्र में आवश्यक कार्प बीज भी इस नदी से प्राप्त होते हैं ।

पिछले कुछ दशकों में नदीय परितंत्र में नागरीकरण विकास, कृषि संबंधी कार्य, वनो का कटना एवं औद्योगीकरण बड़े पैमाने पर हुआ है, जिसके परिणामस्वरूप नदीय-आवास पर प्रतिकूल प्रभाव पड़ा है तथा जैविक विविधता एवं जलीय गुणवत्ता में चिन्ताजनक लक्षण उत्पन्न हो गए हैं । मत्स्य-उपज में निरन्तर कमी आ रही है । मेजर कार्प मछलियों की मात्रा में कमी एवं शिंगटी तथा कार्प मिनो मछलियों की उत्पादन में वृद्धि हो रही है । मत्स्य-सम्पदा का अत्यधिक मत्स्यन एवं

पर्यावरणीय प्रभाव इस नदीय पारिस्थितिकी की गुणात्मक एवं परिमाणात्मक परिवर्तन का मुख्य कारण है। नदीय क्षेत्र के अनुमापन तथा नदीय पारिस्थितिकी के संरक्षण, प्रबन्धन एवं विकास में मार्ग-दर्शन कार्य हेतु संस्थान ने एक मिशन परियोजना का कार्य प्रारम्भ किया है जिसके अंतर्गत पूरे नदीय तंत्र के उद्गम स्थान हिमालय से अंतिम लक्ष्य बंगाल की खाड़ी तक का सर्वेक्षण कार्य सम्पन्न किया जा रहा है। इस कार्य दल में मत्स्य-जीव, वनस्पति एवं पारिस्थितिकी से संबंधित वैज्ञानिक शामिल हैं।

इसी प्रकार का अध्ययन कार्य नर्मदा एवं महानदी में भी सम्पन्न किया जा रहा है।

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## सहयोग

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### राष्ट्रीय

संस्थान के जलाशय प्रभाग का अनुसंधान कार्य कर्नाटक, तमिलनाडु, आन्ध्र प्रदेश और मध्य प्रदेश में संबंधित राज्य सरकारों के सक्रिय सहयोग से ही सम्पन्न हो रहा है।

संस्थान ने गंगा परियोजना निदेशालय, पर्यावरण मंत्रालय तथा नेशनल थर्मल पावर कॉर्पोरेशन के साथ विभिन्न परामर्शक एवं प्रवर्तित परियोजना में सहयोग जारी रखा।



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## प्रौद्योगिकी हस्तांतरण

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### मात्स्यकी के विभिन्न पहलुओं का प्रशिक्षण

#### झींगा पालन पर एक अत्यावधिक प्रशिक्षण कार्यक्रम

संस्थान ने पश्चिम बंगाल राज्य सरकार के मात्स्यकी विभाग के विस्तार अधिकारियों हेतु झींगा पालन पर 6 से 16 जून के दौरान एक दस दिवसीय प्रशिक्षण पाठ्यक्रम बैरकपुर मुख्यालय में आयोजित किया, जिसमें 26 प्रशिक्षणार्थी भाग लिए । पाठ्यक्रम में लवणीय तथा अलवणीय जल झींगों के पालन से संबंधित सभी पहलुओं को सैद्धान्तिक तथा प्रयोगात्मक रूप से निरूपित किया गया । फार्म निरीक्षण की भी व्यवस्था की गई । प्रशिक्षण कार्यक्रम का आयोजन प्रौद्योगिकी को निचले स्तर के लोगों तक पहुँचाने के उद्देश्य से किया गया ।

#### 'प्रयोगशाला से भूमि की ओर' कार्यक्रम

इस रिपोर्ट की अवधि के दौरान संस्थान के कृषि विज्ञान केन्द्र ने 'प्रयोगशाला से भूमि की ओर' कार्यक्रम के अंतर्गत 12 ग्रामों के 100 किसान परिवारों को ले कर निरूपण कार्य किया । यह केन्द्र स्थानीय आवश्यकताओं एवं उपलब्ध स्रोतों के अनुसार विभिन्न विषयों से संबंधित प्रौद्योगिकी हस्तांतरण कार्य में संलग्न रहा । मत्स्य पालन एवं फसल उत्पादन प्रौद्योगिकी हस्तांतरण से उपज दर में उल्लेखनीय परिवर्तन हुए हैं और उत्पादन लगभग दुगना हो गया है । यह केन्द्र मात्स्यकी, फसल उत्पादन, बागवानी, पशु-विज्ञान तथा गृह-विज्ञान विषयों से संबंधित प्रौद्योगिकी को कार्यरत किसानों एवं कृषक-महिलाओं तक पहुँचा रहा है । प्रयोगशाला से भूमि की ओर कार्यक्रम से लाभान्वित कृषकों का विवरण निम्न है:-

क्रम सं.	प्रौद्योगिकी का नाम	लाभ भोगियों की संख्या	
		अंगीकृत	निराकृत
1	मिश्रित मत्स्य पालन	80	172
2	अलवणीय जल झींगा-पालन	18	80
3	धान व झींगा पालन	12	50
4	पान के पौधों में कीट प्रबन्धन	20	140
5	पान के पौधों के बीज उपचार	10	80
6	एच. वाई. वी. टमाटर का उत्पादन	20	120
7	छत्रक उत्पादन	20	20
8	अचार का उत्पादन	10	100

### कृषि विज्ञान केन्द्र, काकद्वीप की मुख्य गतिविधियाँ

फसल उत्पादन, फिन व शेल फिश उत्पादन, एकीकृत पालन प्रणाली की प्रौद्योगिकी हस्तांतरण हेतु प्रयोक्ताओं के निचले स्तर में अनेक फार्म साईंस क्लब की स्थापना की गई।

चार्ट, पोस्टर, फोटोग्राफ एवं सजीव नमूनों आदि के माध्यम से ग्रामीण जनता को आधुनिक पालन तकनीकों की जानकारी देने हेतु ग्रामीण मेलाओं का आयोजन किया गया।



अन्य विस्तार कार्य निम्नलिखित हैं:-

		संख्या	लाभभोगियों की संख्या
1	मत्स्य पालक दिवस	12	1217
2	किसान मेला	2	3000
3	पूर्व प्रशिक्षणार्थियों का सम्मेलन	4	16
4	फार्म साईस क्लब का गठन	5	370
5	मास मिडिया कवरेज	3	

### पुस्तकालय एवं प्रलेखन सेवाएँ

इस संस्थान के पुस्तकालय ने अनुसंधान एवं विकास कार्यों में महत्वपूर्ण योगदान दिया है। इस पुस्तकालय का उपयोग न केवल संस्थान के वैज्ञानिकों ने किया अपितु अनेक विश्वविद्यालय एवं संस्थाओं से आए प्राध्यापक, विद्यार्थी एवं शोधकर्ताओं ने भी इसका सार्थक उपयोग किया। इस वर्ष पुस्तकालय ने 96 पुस्तकें तथा 65 विविध प्रकाशनों की वृद्धि किया, साथ ही 27 विदेशी तथा 52 देशी शोध जर्नलों को भी मंगाया। आज संस्थान के पुस्तकालय में कुल 7,249 पुस्तकें, 3,176 अन्य प्रकाशन, 4,240 पुनर्मुद्रित लेख 937 नकशों उपलब्ध हैं। इस वर्ष पाँच राष्ट्रीय एवं अंतरराष्ट्रीय संगठनों के साथ विनिमय सम्बन्ध स्थापित हुए।

संस्थान के पुस्तकालय ने अपने विभागीय प्रकाशनों को विभिन्न संगठनों, विश्वविद्यालयों, उद्यमियों और मत्स्य पालकों को निःशुल्क भेजने का काम जारी रखा। अन्तर पुस्तकालय ऋण के रूप में 23 पुस्तकें अन्य पुस्तकालयों को भेजी गयी। इस वर्ष इस पुस्तकालय में 10,60,885.00 रुपये खर्च हुए।

पुस्तकालय एवं प्रलेखन अनुभाग के अधीनस्थ 'फोटोग्राफी' व 'रेप्रोग्राफी' एककों ने उत्तम कार्य किया है। इसका लाभ संस्थान के वैज्ञानिकों के अतिरिक्त विभिन्न अनुसंधान संस्थानों और विश्वविद्यालयों ने भी उठाया। साइक्लोस्टॉइलिंग एवं जिल्दसाजी एकक ने भी महत्वपूर्ण कार्य सम्पन्न किया।

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## APPENDIX-I

Statement showing the total number of employees in the CIFRI, Barrackpore pertaining to the employees under Scheduled Castes and Scheduled Tribes categories.

(Period from 1.4.1995 to 31.3.1996)

Sl. No.	Class of Posts	Total No. of posts sanctioned	Total No. of employees in position	Total No. of Sch. castes among them	% of total employees	Total No. of Sch. Tribes among them	% of total employees	Remarks
<b>1. SCIENTIFIC POSTS</b>								
	Experimental Scientist	-	-	-	-	-	-	
	Scientist	76	8	-	-	-	-	
	Sr. Scientist/Scientist (Sel.Grade)/Scientist (Sr.Scale)	16	54	3	5%	-	-	
	Pr. Scientist	8	10	-	-	-	-	
	RMP Scientist	1	1	-	-	-	-	
		<b>101</b>	<b>73</b>	<b>3</b>				
<b>2. TECHNICAL POSTS</b>								
	Category-I	32	30	7	23.33%	1	3.33%	*This includes 2(two)
	Category-II	*50	47	10	21.3%	4	8.5%	T-II-3 posts under
	Category-III	3	1	1	Cent %	-	-	C.S.S.
		<b>85</b>	<b>78</b>	<b>18</b>		<b>5</b>		

### 3. ADMINISTRATIVE POSTS

Sr.A.Os/A.Os/Accounts Officer etc.	2	2	-	-	-	-	*This includes 1(one)
AAOs/Supdt.(A/cs)/Supdt./	10	7	2	28.5%	-	-	Assistant, 1(one)
Hindi Officer/S.C./Jr. Analyst/Desk Officer	1	1	-	-	-	-	Stenographer and
Assistants	*19	18	3	16.66%	1	5.55%	1(one) Jr. Clerk posts
Stenographers(Sr. & Jr.)	*7	6	2	33.33%	-	-	under C.S.S.
Sr. Clerks/U.D.Cs	28	26	6	23.76%	-	-	
Jr. Clerks/Hindi	*31	23	5	21.7%	-	-	
	<b>98</b>	<b>83</b>	<b>18</b>		<b>1</b>		

### 4. SUPPORTING STAFF

Grade-I	*99	95	23	24.2%	4	4%	*This includes 1(one)
Grade-II	53	53	18	34%	2	3.77%	SG.I post sanctioned
Grade-III	23	23	10	43.48%	2	8.70%	under C.S.S.
Grade-IV	13	13	6	46.15%	1	7.7%	

### 5. SUPPORTING STAFF (SAFAIWALA)

16	16	11	68.75%	-	-
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### 6. AUXILIARY POSTS

45	33	7	21.21%%	2	6%
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<b>204</b>	<b>200</b>	<b>68</b>		<b>9</b>	
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Note : The other posts available may also please be shown in the respective class of posts mentioned above and the posts, if any, do not come under the above mentioned categories may be shown separately.



## APPENDIX II

### CENTRAL INLAND CAPTURE FISHERIES RESEARCH INSTITUTE (I.C.A.R.) : BARRACKPORE : WEST BENGAL

#### Address List of Research/Survey Centres

Telegramme/Telephone/  
Telex

#### Headquarters

- 1 **Central Inland Capture Fisheries Research Institute**  
Barrackpore-743 101  
WestBengal
- Cable : FISHSEARCH  
BARRACKPORE
- Tele : (033) 560 1190  
560 1191
- Telex : 021 8552 CIFI IN  
FAX (033) 560 0388
- E - Mail : CICFRI @ 400. nicgw. nic. in

#### Research Centres

- 2 **Alappuzha Research Centre**  
Central Inland Capture Fisheries Research Institute  
Near Vazhicherry Bridge,  
Alappuzha - 688 001, Kerala
- FISHSEARCH  
Tele : (0477) 245277
- 3 **Allahabad Research Centre (Riverine Division)**  
Central Inland Capture Fisheries Research Institute  
24, Pannalal Road  
Allahabad-211002, Uttar Pradesh
- FISHSEARCH  
ALLAHABAD  
Tele : (0532) 600531
- 4 **Bangalore Research Centre (Reservoir Division)**  
Central Inland Capture Fisheries Research Institute  
No.22 (Old No.1031-C & D),  
80 ft, Road, 1st Main, IV Block,  
Rajajinagar,  
Bangalore - 560 010
- FISHSEARCH  
BANGALORE  
Tele : (080) 3357213

**Telegramme/Telephone/  
Telex**

- 5 Calcutta Research Centre**  
Central Inland Capture Fisheries Research Institute  
M.S.O. Building (2nd Floor, 'C' Block)  
DF Block, Salt Lake City,  
Calcutta - 700 064  
(033) 3379444
- 6 Coimbatore Research Centre**  
Central Inland Capture Fisheries Research Institute  
No. 68, Raju Naidu Road,  
Tatabad, Coimbatore - 641 012 Tamil Nadu  
FISHSEARCH  
COIMBATORE  
Tele : (0422) 432380
- 7 Eluru Research Centre**  
Central Inland Capture Fisheries Research Institute  
Papasaheb Road,  
P.O. RAMACHANDRARAO PETA,  
ELURU - 534 002, Andhra Pradesh  
FISHSEARCH  
ELURU - 534 002
- 8 Guwahati Research Centre**  
Central Inland Capture Fisheries Research Institute  
Natun Sarania,  
Guwahati - 781 003, Assam  
Tele: (0361) 548757
- 9 Hoshangabad Research Centre**  
Central Inland Capture Fisheries Research Institute  
Kothi Bazar, Hoshangabad - 461001,  
Madhya Pradesh  
CENTRAL FISHERIES  
KOTHI BAZAR  
HOSHANGABAD
- 10 Karnal Research Centre**  
Central Inland Capture Fisheries Research Institute  
Session House Marg,  
Karnal - 132 001, Haryana  
CENTRAL FISHERIES  
KARNAL - 132 001  
Tele : (0184) 23385
- 11 Malda Research Centre (Hilsa Division)**  
Central Inland Capture Fisheries Research Institute  
House of Sri S.K. Pal, Subhas Pally,  
Station Road, Malda - 732 101, West Bengal
- 12 Vadodara Research Centre**  
Central Inland Capture Fisheries Research Institute  
Galkwad Building  
(Opposite Bhimnath Mahadev Temple)  
Sayajiganj  
Vadodara - 390 005



**Survey centres**

- 13 Canning Survey Centre**  
Central Inland Capture Fisheries Research Institute  
R.N. Tagore Road,  
Canning - 743 329, West Bengal
- 14 Diamond Harbour Survey Centre**  
Central Inland Capture Fisheries Research Institute  
House of Bidhu Bhushan Bhuiya,  
New Madhavpur, P.O. Diamond Harbour,  
24 Parganas (South), West Bengal
- 15 Farakka Survey Centre**  
Qtrs. No. - A/66, Block - III,  
P.O. Farakka Barrage - 742 212,  
Dist. Murshidabad
- 16 Frasergunj Field Centre of CIFRI**  
P.O. Frasergunj,  
Dist. 24 Parganas (South)  
West Bengal
- 17 Lalgola Survey Centre**  
Central Inland Capture Fisheries Research Institute  
Lalgola-742 148,  
Dist. Murshidabad,  
West Bengal
- 18 Uluberia Survey Centre**  
Central Inland Capture Fisheries Research Institute  
Uluberia,  
Dist. Howrah,  
West Bengal

**Krishi Vigyan Kendra**

- 19 Krishi Vigyan Kendra**  
Central Inland Capture Fisheries Research Institute  
Kakdwip,  
24 Parganas (South),  
West Bengal

**CENTRAL INLAND CAPTURE FISHERIES RESEARCH INSTITUTE**  
 (Indian Council of Agricultural Research)  
 BARRACKPORE - 743 101, WEST BENGAL

**ORGANIZATION CHART, 1995-1996**

