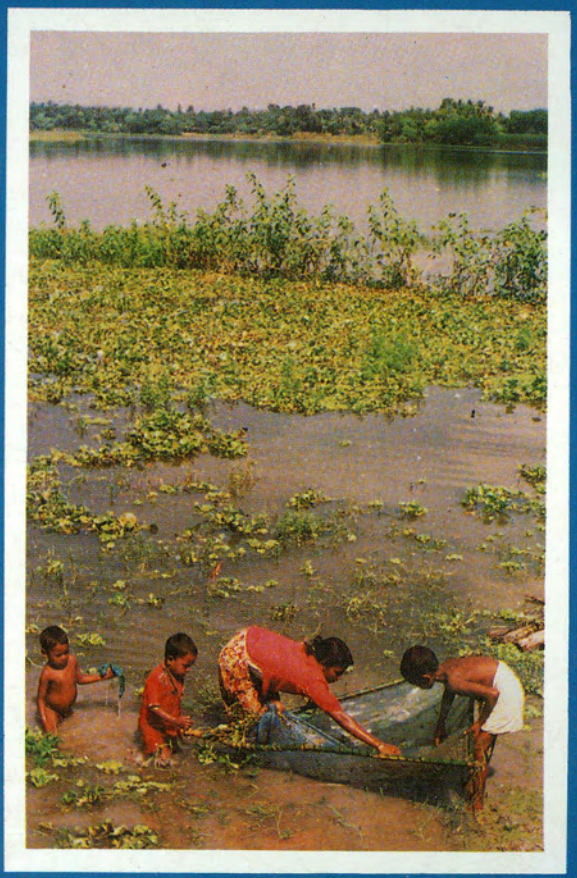
ANNUAL REPORT

CIFRI

1996-97



CENTRAL INLAND CAPTURE FISHERIES RESEARCH INSTITUTE · BARRACKPORE

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ANNUAL REPORT
1996-97

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

BRIEF HISTORY

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 and has **completed 50 years of its existence** on March 16, 1997. 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 2.2 million t in 1995-96) which can be mainly attributed to the above technologies.

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 are 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 under the laboratory conditions 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 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 development of environment-friendly 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 main aim of the ***Hilsa Division,*** located at Maldah, West Bengal 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 20 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

New light on the population dynamics of estuarine fishes

Critical analyses on fish population dynamics in the Hooghly-Matlah estuarine system have resulted in interesting findings. The fishing mortality worked out for the current year was at a very low level of F=2.81 for *L. parsia*, compared to higher value of F=4.91 recorded during 1987-89. The reduction in fishing intensity resulted in an increase in the fish catch from 14.72 t to 19.23 t, an increase of 31%. This indicates higher fishing pressure (overfishing) even at present.

On the contrary, fishing effort was found to be at optimum level in case of *P. paradiseus*. This was evident from the decrease on fish catch when fishing mortality was reduced. The fishing mortality in case of *P. paradiseus* dropped from the 6.00 to 4.49 during the year. The catch dropped from 180.97 tonnes during 1987-89 to 150.33 t during 1994-96, a decrease of about 17%.

This fall in fishing pressure in the coastal areas in recent years can be attributed to the changes in the fishing pattern in the estuary. Nowadays, more motorised boats are operated in the mouth of the estuary covering wider area extending even up to the sea. As a result, the fishing pressure on these two species which are available near the coastal region of the estuary is less. This is quite obvious since increase of fishing intensity has rendered the fishery to uneconomical level and fishing area has been shifted towards the sea.

New light on the population dynamics of estuarine fish, *Pama pama*

Population dynamics of commercially important fish species is an important component of the Research Project Programme of the Resource Assessment Division.The length-frequency distribution of *Pama pama* collected from Hooghly-Matlah Estuarine system was subjected to critical analysis. Based on this and the growth parameters estimated earlier, mortality rates of the fish were worked out. The total mortality rate was found to be Z=10.70 with fishing mortality rate at F=8.584. The present exploitation rate of 0.80 was found to be higher than the exploitation rate (0.77) during 1987-89. Fishing intensity went up by 3.9%. The increase in catch was 5.6% compared to 1987-89.

The increase in catch and recruitment was due to extension in the area of exploitation employing more motorised boats. The recruitment to the fishing ground increased by 7%. However, the mean length recorded as 16.22 cm in 1987-89 decreased to 16.03 cm in 1994-96 indicating over exploitation. There is a need to reduce fishing pressure by 64% from the existing level in order to maintain a sustainable yield.

Microbiological profile of the river Ganga

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

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

Impact of headwater discharge on plankton and benthos of mangrove estuarine systems.

Among different estuaries of the Sunderbans, Hooghly receives the maximum headwater followed by Saptamukhi, Jheela and Bidya. It has been observed that in different seasons *viz.* summer, monsoon and winter, the densities of plankton and macrobenthos increased with the increased flushing of the headwater into the estuaries. Thus, the concentrations of these two communities showed peaks (phytoplankton : 380.9 units/l in monsoon, zooplankton : 126.1 units/l in winter, and macrobenthos : 172.5 units/m^2 in monsoon) in the Hooghly estuary and declined to the least values (phytoplankton : 192.8 units/l in winter, zooplankton : 45.9 units/l in summer and macrobenthos 58.2 units/m^2 in winter) in the Bidya estuary. The varying numbers of constitutent species of phyto-and zooplankton communities during different seasons and in different estuarine systems more or less followed the same trend, excepting that the varying number of the macrobenthos species showed the reverse trend in relation to headwater discharge, since the peak was observed at the Bidya estuary (16 spp.) in monsoon and the least values at the Hooghly estuary (4 spp.) in winter.

Extension of Mangrove species beyond intertidal zone

The Central Inland Capture Fisheries Research Institute, under its National Fellowship Scheme, has started a major initiative to save the *Sundari* tree from extinction. *Heritiera fomes* Buch Ham., the *Sundari* tree has become very rare and is considered as a threatened species of the Indian Sunderbans. The main cause for its depletion is the changed environmental conditions, like abstraction of upstream freshwater supply to this Sunderbans mangals, due to neo-tectonic movement of the flow of the River Ganga towards east and the rapid, premature or over exploitation of this tree for its strong, durable timber. Propagation of *Heritiera fomes* suffers setback due to lack of its spontaneous natural regeneration and growth in these changed intertidal mangals of the Sunderbans, West Bengal.

Attempts have been made by Central Inland Capture Fisheries Research Institute to collect the viable seeds of *Heritiera fomes* from the Sundarbans tidal water during monsoon months and germinate their seedlings in the laboratory. Several of these seedlings were initially distributed to different interested persons and organizations. These initial attempts for plantation of this species have given highly encouraging results on its growth and development pattern in the non-saline zones beyond the tidal interaction zone. The plant has registered a growth of 4 m height within 2 years.

After these sporadic field trials, a concerted attempt was made to introduce and plant this important mangrove species beyond the intertidal zones at the Central Park (Bano Bitan), Salt Lake. Apart from beautifying this important park, the campaign is expected to help popularising the tree among the common people and create awareness about its importance leading to the conservation of this threatened species.

On 10th May, 1996, a campaign to popularise the plant was inaugurated by Shri G.S. Mondal, Principal Chief Conservator of Forests, Govt. of West Bengal, at a function attended by Dr. M. Sinha, Director, CIFRI, Shri J.N. Bhadury, Chief Conservator of Forest & Director, Sundarban Biosphere Reserve, Shri Sukumar Seth, Sundarbans Development Board and others.

Betelvine as an important cash crop

Betelvine is a very important cash crop which plays a vital role in the total economy among some sections of farmers of Sunderbans. The KVK of CIFRI at Kakdwip popularises betelvine cultivation among the farming communities on a small scale basis. The technology has already been adopted by a number of farmers of Sunderbans. It is possible to generate employment both for male and female workers throughout the year. A small scale betelvine farmer can earn about Rs. 1,500-2,000 per month.

The impact of hotwater discharge on the aquatic life of Rihand Reservoir

Hotwater discharge into the natural waters from the thermal power plants has always been a cause of concern for environmentalists and fishery biologists. Recent studies conducted by CIFRI have thrown new lights on the impact of thermal effluents into the reservoir ecosystem. The highlights of the finding are :

1 The thermal differnce between inlet and the discharge water during all the seasons was above the permissible limit of 5°C and the 8 km long discharge channel did not help in lowering the effluent temperature to any desirable level.

2 Damage caused to the natural populations of fish larvae other than that of major carps as result of entrapment in the rotating screens in pump house is comparatively lesser than the destructive methods of catching small fish by contractors in the littoral zone of reservoir. This has resulted in significant decline in forage fish, which formed a food chain base for carnivorous fish species in the reservoir, thus contributing to the biodiversity loss.

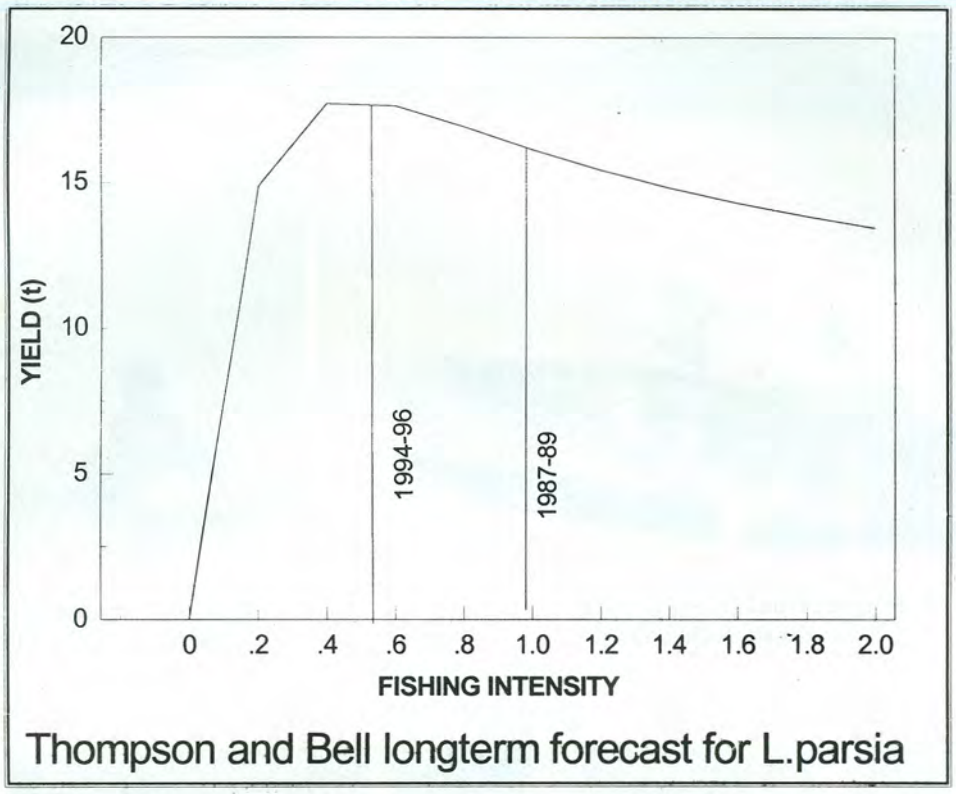
3 Among major carps, young ones of *Labeo calbasu* were found to be marginally resistant to higher temperature.

4 It has been found that long-term exposure of plankton community to a temperature of 36°C and above, supressed the rate of primary production at the stressed site in the reservoir. A temperature range of 37-40°C was observed to be above the tolerance limit of most of planktonic organisms.

5 The thermal avoidance experiments using fry/fingerlings of *Catla catla* and *Labeo rohita* revealed that they could tolerate a 6°C rise of temperature in receiving water without any apparent adverse impact. The *in situ* experiments with fry/fingerlings of Indian major carps at a temperature of above their tolerance limit, caused death due to disintegration in secondary lamellae of gills.

6 However, this thermal impact was restricted to the plume area and did not adversely affect the biotic communities in other parts of the reservoir.

The studies were conducted under a consultancy assignment the Institute has done for NTPC.



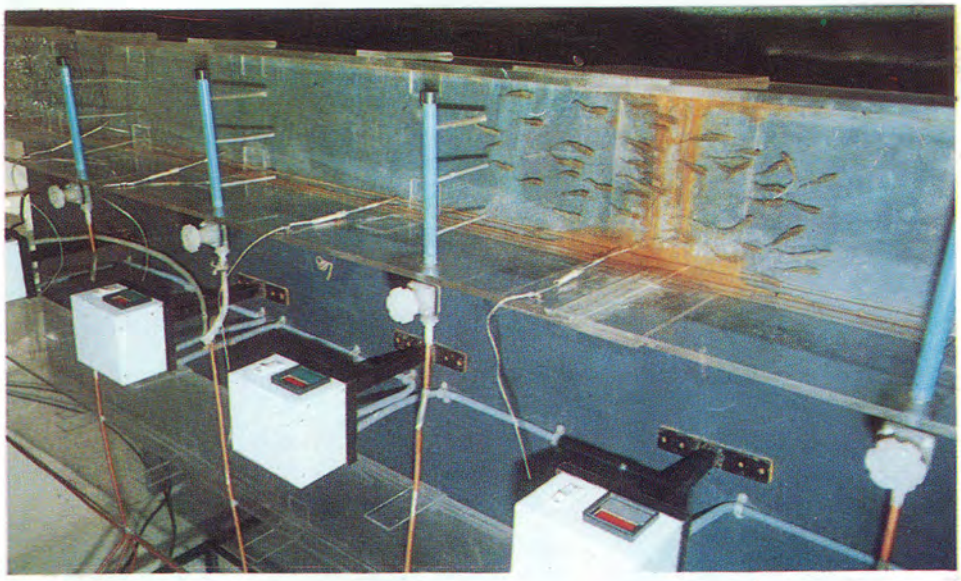
Population structure (above) of *L. parsia* (below)

In situ thermal tolerance experiment using fish spawn

Studies on impact of thermal pollution

Commercial fishing activity in Rihand

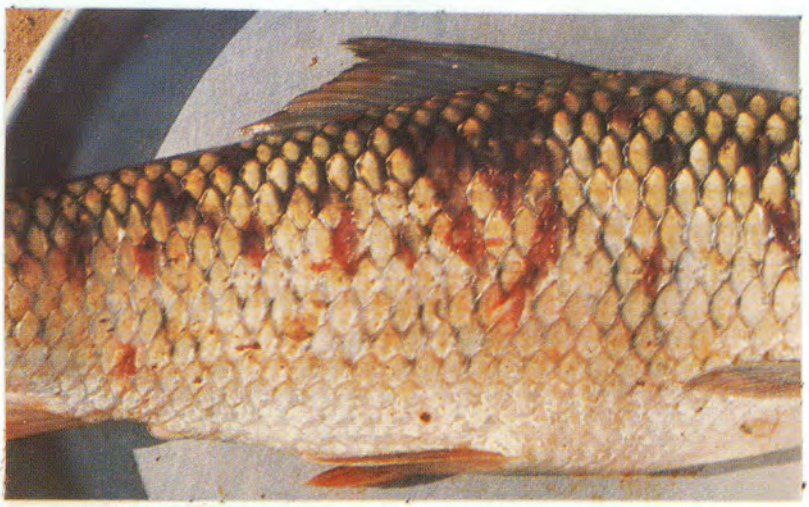
In situ exposure of test fish in the hotwater channel inside the plant



Thermal avoidance experiments using fish as test organism

Tagging of hilsa

Infected specimens of fish and prawn



Fish and prawn disease

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

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

Hilsa can negotiate Farakka barrage

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

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

Another significant findidng is the breeding of hilsa above the Farakka barrage. Some of the recaptured fish had completed its shedding of gonadal products clearly suggesting their breeding above the barrage. Farakka barrage is provided with a fish lock built for the purpose of facilitating migration of hilsa. The lock appears to be ineffective as the collapse of hilsa coincided with the commissioning of Farakka barrage. It is evident that hilsa caught in the middle stretch of Ganga during the pre-Farakka barrage days was accountable to the migratory stock of Padma and Hooghly. In the recent past, there has been some evidence of recruitment in the upstream stretches which aroused the curiosity of many. The present findings prove beyond doubt that the breeding reported above the barrage is due to the fish migrated upstream across Farakka.

Golden Jubilee Celebration of CIFRI

Central Inland Capture Fisheries Research Institute, has completed 50 years of its service to the nation on 16th March 1997, a one year period from 17 March 1996 to 16 March 1997 as the *Golden Jubilee Year* to commemorate the event. A National Workshop on Fish and Prawn Disease Epizootics and Quarantine Adoption India was organised on 9th October, 1996 at Barrackpore. This was followed by a National Consultation on Inland Fisheries held at Barrackpore during 17 to 19 January 1997.

A series of Golden Jubilee Talks, were delivered at Barrackpore at a monthly interval is an important feature of the celebrations.

A National Seminar on Changing Perspectives of Inland Fisheries was organised at Barrackpore as a grand finale of the Golden Jubilee Celebrations on 16 and 17 March 1997.

Union Minister of Agriculture visits CIFRI

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

Jal Krishi Pradarshini at Darbhanga, Bihar - September 1996

A *Jal Krishi Pradarshan* (aquaculture exhibition), highlighting the technological advancements made by ICAR in fisheries sector, was organised at Darbhanga (Bihar) from 28th to 30th September 1996, under the banner of ICAR, New Delhi and in close coordination with the State Department of Fisheries, Bihar. Three premier Research Institutes on Fisheries *viz.* Central Inland Capture Fisheries Research Institute, Barrackpore; Central Institute of Freshwater Aquaculture, Bhubaneshwar; and Central Institute of Fisheries Education, Bombay were the main participants in the exhibition. **Shri Chaturanan Mishra, Union Minister of Agriculture,** who was the guiding force behind this show, inaugurated the exhibition on 29th September. He emphasised the urgent need for effective transfer of technologies to the farmers' field. The question - answer sessions, organised during the exhibition was the main attraction, where the fish farmers of the area got a unique opportunity to address their problems in connection with the aqua-farming to the specialists and receive expert advice. Dr. P.V. Dehadrai, Deputy Director General (Fisheries), ICAR led the team of ICAR Scientists comprising Dr. M. Sinha, Director, CIFRI; Dr. S. Ayyappan, Director, CIFA; Dr. N.K. Thakur, Jt. Director, CIFE and many other Scientists.

MINISTER'S VISIT

Shri Chaturanan Mishra, Hon'ble Minister for Agriculture, being received at the Institute

The Minister in consultation with Dr. M. Sinha, Director, CIFRI

MINISTER'S VISIT

Shri Mishra addressing the Institute's staff

New Scheme

An ad-hoc research scheme entitled, "**The dynamics of tilapia populations in peninsular reservoirs and their possible impact on the native fish genetic resources**" has been approved by the ICAR under A.P. Cess Fund with sanction of Rs.4,94,956/- for a period of three years under the leadership of Dr. V.K Unnithan, Senior Scientist, Alappuzha Centre of the Institute.

IMPORTANT WORKSHOPS/SEMINARS, ETC.

National Workshop on fish and prawn disease epizootics and quarantine adoption in India

As a part of Golden Jubilee year celebrations, the CIFRI, Barrackpore, West Bengal, organised a National Workshop on 9th October, 1996 for providing a befitting platform for interactions among scientists, developmental officials and fish farmers to tackle the growing menace of fish and prawn diseases in the country. The Workshop was inaugurated by Shri Kiranmay Nanda, Hon'ble Minister of Fisheries, Government of West Bengal at a function presided over by Dr. P.V. Dehadrai, Deputy Director General (Fisheries), ICAR, New Delhi. Dr. M. Sinha, Director, CIFRI and the Chairman of the Organising Committee while welcoming the Minister and the distinguished delegates set the tone of the Workshop by emphasing the urgency for having meaningful dialogues among various fisheries agencies for the proper growth of fishery sector in the country. The Hon'ble Minister Shri Kiranmay Nanda in his inaugural address expressed the urgent need to contain this burning problem and expressed the hope that positive recommendations, beneficial to fish farmers, would emerge from the day long deleberations. Dr. P.V. Dehadrai in his presidential address held the optimism that operationally significant policy guidelines, uniformly applicable throughout the length and breadth of the country, would come out of the Workshop which would be helpful in minimising the sufferings of the fish farmers, who frequently face the outburst of fish epizootics and prawn diseases.

A galaxy of scientists, fishery managers, developmental officials, fish farmers and others from various central and State Govt. organisations took active part in the deliberations.

National Consultation on Inland Fisheries

The Central Inland Capture Fisheries Research Institute has completed the 50 years of its service to the nation. In order to commemmorate this occasion in a befitting manner, a **National Consultation on Inland Fisheries** was organised at Barrackpore during 17 to 19 January 1997. The Consultations included :

i) A National Workshop on Reservoir Fisheries,

ii) A National Workshop on Research Thrust and Priorities in Inland Fisheries and

iii) A Plenary Session

The Workshop on Reservoir Fisheries was jointly sponsored by the Union Ministry of Agriculture and Central Inland Capture Fisheries Research Institute.

The Consultation was inaugurated by Dr. P.V. Dehadrai, Deputy Director General, ICAR, New Delhi, at a function chaired by Shri R.K. Tripathi, Secretary, Fisheries, Government of West Bengal at Barrackpore on 17 January. Dr. Y.S. Yadava, Fisheries Development Commissioner, Govt. of India was also present on the occasion. The meeting was attended by Secretaries and Directors and other Senior Officers of many State Departments of Fisheries. Representatives from NABARD also participated. The main objective of the Consultation was to provide a forum for exchange of ideas among cross section of experts, State Officials, fishery managers, administrators and planners with a view to enabling them in identifying problem areas in management of inland fisheries in general and reservoir fisheries in particular. A set of guidelines for reservoir fisheries management formulated jointly by CIFRI and Union Ministry of Agriculture was presented, discussed and later adopted by the meeting after suitable modifications.. One of the major outcome of the Consultation was the finalisation of guidelines for reservoir fisheries management in India. The meeting also identified the research thrust and priorities in inland fisheries.

National Seminar on *Changing Perspectives of Inland Fisheries* jointly organised with Inland Fisheries Society of India on March 16-17, 1997 at CIFRI, Barrackpore

A two-day National Seminar on *Changing Perspectives of Inland Fisheries* was organised by CIFRI in collaboration with Inland Fisheries Society of India at the Central Inland Capture Fisheries Research Institute, Barrackpore, during 16-17 March 1997 which was attended by 200 delegates from various research institutes, universities, non-gevernmental organisations and representatives from the State and Central Governments. The Seminar was inaugurated by Shri Kiranmay Nanda, Hon'ble Minister of Fisheries, Government of West Bengal.

There was 6 technical sessions *viz.*,

1 Environmental impact and management
2 Fish population and food chain dynamics
3 Productivity management and eco-friendly aquaculture, and
4 Socio-economic issues
5 Special session on the Young Scientist Award
6 Plenery session

More than 75 research papers were presented by different workers.

After two days of detailed interaction and discussions among the delegates, the following major recommendations have emerged.

1 The Seminar expresses its concern towards the general lack of expertise in the science of systematics of aquatic organisms. There is a need to encourage young researchers to take up such studies in order to develop a strong data base on aquatic biodiversity.

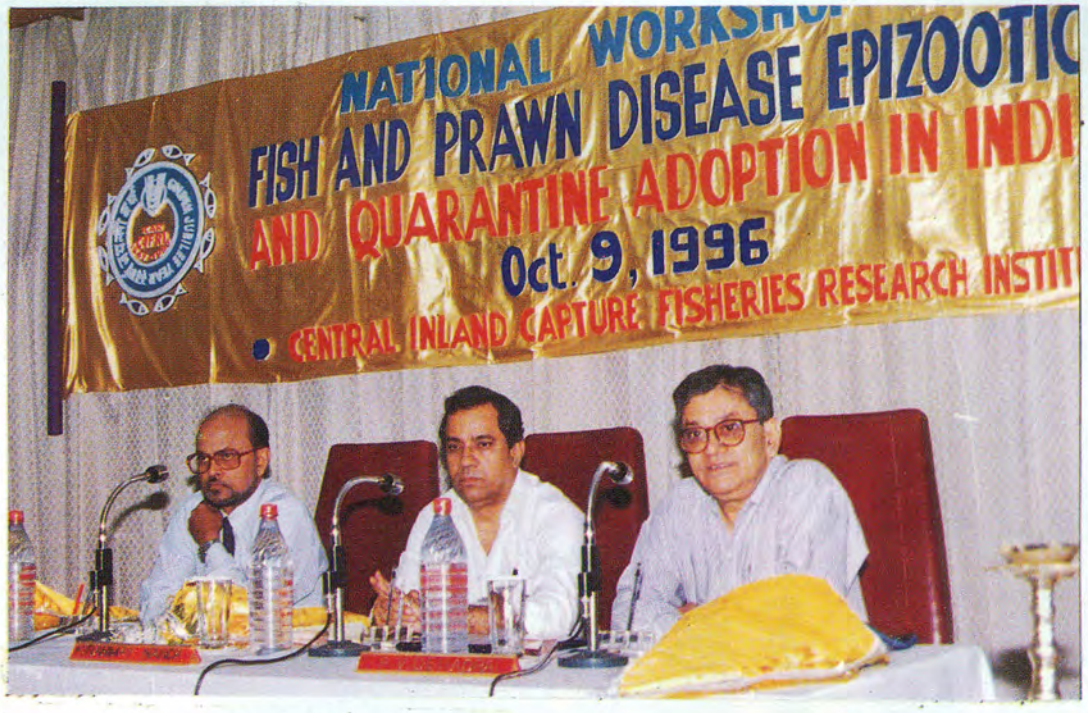
2 The vast data base available on environmental aspects on Indian open water ecosystem with a focus on biodiversity should be utilised to initiate a Master level Degree Course on Aquatic Biodiversity Environment Management at CIFRI.

GOLDEN JUBILEE SEMINAR

Golden Jubilee Seminar on Changing Perspectives of Inland Fisheries being inaugurated by Shri Kiranmay Nanda, Hon'ble Minister of Fisheries, Govt. of West Bengal

A Technical Session in progress

GOLDEN JUBILEE WORKSHOP



Inaugural function of National Workshop on Fish and Prawn Disease Epizootics and Quarantine Adoption in India. On the dais are Dr. P.V. Dehadrai, Dy Director General (right) Shri Kiranmay Nanda (middle) and Dr. M. Sinha (left)

Shri Nanda speaking on the occasion

NATIONAL CONSULTATION

Dr. M. Sinha, Director, CIFRI, Shri R.K. Tripathi, Secretary Fisheries, West Bengal and Shri S.V. Joshi, Secretary Fisheries, Maharashtra at the National Consultation

A technical session in progress

Dr. V.V. Sugunan, Senior Scientist, CIFRI making a presentation

GOLDEN JUBILEE EXHIBITION

Mrs. Alikunhi inaugurating the exhibition in connection with the National Seminar on Changing Perspectives of Inland Fisheries

Dr. M. Sinha, Director, CIFRI, visiting the KVK stall at the Exhibition

Shri Kiranmay Nanda releasing Golden Jubilee publications

Shri U. Bhaumik, Senior Scientist being conferred with Fellowship of Inland Fisheries Society of India

FELICITATIONS

Eminent fishery scientists were falicitated on the occasion of the Golden Jubilee Celebration. Dr. P.V. Dehadrai (top second from left)

Dr. H. Chaudhuri

Shri K.H. Alikunhi

3 Use of extraneous inputs to raise the carrying capacity of water bodies should be restricted to sustainability limitations for environmental protection and biodiversity conservation.

4 The Seminar notes the absence of a national protocol on quarantine in fishes. Such procedures need to be developed and standardized.

5 The Seminar emphasises the need to conserve the Himalayan rivers, especially the small streams in order to protect the prized species of mahseer, snow trout and trout. Ranching and restocking programmes may be seriously examined. The stocking of riverine stretches in the plains of India with major carps should be undertaken with caution. The impact of stocking hatchery-bred seed into open waters shoud be carefully evaluated.

6 The Seminar also recommends that apart from chemical monitoring of open water ecosystems, a standard biomonitoring protocol should be developed utilising, the gross biotic communities, indicator species, and biochemical markers.

IMPORTANT MEETINGS

Second Meeting of CIFRI Research Advisory Committee

The second meeting of CIFRI Research Advisory Committee was held at Barrackpore on 29th and 30th July 1996 which was attended by the following members :

1	Dr. K.V. Devaraj	Chairman
2	Dr. N.C. Dutta	Member
3	Dr. V. Vats	Member
4	Dr. Brij Gopal	Member
5	Dr. E.J. James	Member
6	Dr. A.R. Khudabuksh	Member
7	Dr. M.Y. Kamal	Member
8	Dr. M. Sinha	Member
9	Dr. K.K. Vass	Member Secretary

Apart from RAC members, six Heads of Division, other project leaders and scientists stationed at Barrackpore and Calcutta also participated in the meeting.

The meeting on 29th July was exclusively devoted to the discussions on different project programmes being pursued under various divisions and the sponsored/consultancy projects. The Research Advisory Committee members were informed about the progress achieved through presentations made by different Heads of Division and Project leaders. The suggestions made by different members were noted by the respective Project leaders for incorporation in their technical programmes.

The meeting on 30th July focused on the Institute's Perspective Plan. The Chairman and members appreciated the efforts put in by the Director and scientists of the Institute for preparing a balanced and well thought out Perspective Plan. It was approved by the RAC members after suggesting some modifications.

The Director expressed his thanks to the Chairman and the members for critically evaluating the project programmes and offering valuable suggestions on the Perspective Plan. He assured the Committee that the proposed changes will be incorporated both in Project Programme document and Perspective Plan.

Staff Research Council Meeting of CIFRI

Annual Staff Research Council Meeting of the Institute was held at CIFRI Auditorium, Barrackpore on 27 & 28 May 1996. Dr. M. Sinha, Director, chaired the proceedings and Dr. M.Y. Kamal, Assistant Director General(Inland Fishery), ICAR, was present on the occasion. The SRC Meeting reviewed the progress made under the 19 regular research projects in the light of their technical programme. A thorough review of the ongoing technical programmes of the research projects of the Institute was made. Some policy decisions were taken regarding administrative and technical overhauling of the existing seven Divisions of the Institute. The Project Programme for the year 1997-1998 was finalised at the meeting in the light of the discussions, and within the framework of guidelines given by the Research Advisory Committee of the Institute.

Brainstorming Session on Tilapia

Dr. V.V. Sugunan, Senior Scientist was nominated by the ICAR to participate in a Brainstoring Session on introduction of new tilapia species into India held at Lucknow from 7-8 January 1997. Dr. Sugunan prepared and presented the base paper for the brainstorming entitled, *"Possible Impact of Species Enhancement in Indian Reservoirs through introduction of genetically modified tilapia"*. The brainstorimng session, chaired by Dr. E.G. Silas, has submitted its findings to the Director General, ICAR.

Social Audit Committee

The Guwahati Centre of the Institute has hosted the 2nd meeting of Social Audit Committee on fisheries during 12-14 February 1997 under the Chairmanship of Dr. P.C. Sharma, Hon'ble Member of Parliament (LS). The meeting was attended by the Directors of various fisheries Institutes, Assistant Director General (Fy), ICAR, and Officers from State Fisheries Department, Govt. of Assam.

CIFRI Study Circle

The CIFRI Study Circle arranged scientific lectures in commemoration with the Institute's Golden Jubilee celebrations during 1996-1997. The following persons delivered lectures during 1996-97 :

Dr. Brij Gopal, Jawaharlal Nehru University
Dr. Krishna Swarup, Ex-Head, Zoology Department, Gorakhpur University
Dr. Amalesh Choudhury, Retired Professor, Department of Marine Science, Calcutta University
Dr. Ashim Chowdhury, Reader, Department of Agricultural Chemistry & Soil Science, Bidhan Chandra Krishi Viswavidyalaya
Mr. S. Paul, Senior Scientist, CIFRI, Barrackpore.

MEETINGS

A session of the Social Audit Committee meeting

Dr, K.V. Devaraj, Chairman, Research Advisory Committee
and Dr. M. Sinha, Director, CIFRI

Research Advisory Committee meeting in session

Hindi Week

The Institute observed the Hindi Week during 14-20 September 1996 by organising meetings and various competitions for essay writing, official letter writing and drafting. The major highlights of this year's Hindi Week were the essay competition for the children of staff and a debate on scientific topic participated by the scientific, technical and administrative staff of the Institute. The week long celebrations culminated in a meeting attended by all members of staff. While addressing the gathering, the Director appealed for progressive use of Hindi in the day to day activities of the Institute.

COLLABORATIONS

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.

The Institute actively collaborated with the State Fisheries Department of Uttar Pradesh to conduct a National Workshop on Riverine Fisheries from 8-9 January 1997. The Director and six scientists from the Institute participated and acted as Resource Persons.

The Institute has actively collaborated with the Gujarat Ecology Commission (GEC), Vadodara, an apex organisation for the ecological restoration of the degraded area of the State, on work programme pertaining to Environmental Impact Assessment (EIA).

Concultancy projects in collaboration with the Rajasthan Tribal Area Development Cooperative Federation (RTADCF) and Madhya Pradesh Matsya Vikas Nigam are under various stages of negotiations. A sponsored project in collaboration with the National Bank for Agriculture and Rural Development (NBARD) is also on the anvil.

A consultancy project entitled *Fish conservational and hydrobiological perspectives of River Narmada with reference to Sardar Sarovar Project* sponsored by Government of Maharashtra is being executed.

MANPOWER DEVELOPMENT

Training (Inland)

Shri S.P. Ghosh, T-5, participated in the training programme on *"Aquatic Microbiology in freshwater aquaculture"* held from 23-30 April 1996 at CIFA, Bhubaneswar.

Shri B.P. Mahanti, Scientist, participated in the Summer Institute on *"Impact of Environmental Pollution with special reference to industrial wastes & effluent on livestock health"* held in OUAT, Bhubaneswar, from May 24 to June 12, 1996.

Shri P.K. Ghosh, T-5 (Sr. Photographer) undergone 10 days training course on Videography in Agriculture, organised at NAARM, Hyderabad from 3-13 September, 1996.

The Institute organised an in-house training programme on use of computers at Barrackpore from 26.11.1996 to 26.12.1996 which was attended by Sarvashri Ranjit Kr. Ghosh, Supdt. (A & A), T.K. Roy, Sr. Stenographer, Biplab Majumder, Assistant, T.K. Majumder, Assistant, Dipankar Chatterjee, T-2, P.K. Dutta, Sr, Clerk, Samir Kr. Bose, Sr. Clerk, Sukumar Sarkar, Jr. Clerk, P.K. Ghosh, Jr. Clerk, A.C. Biswas, Jr. Clerk, Ms. Anjali Neogi, Senior Clerk and Ms. Jolly Saha, Jr. Stenographer.

Training (Abroad)

Ms. Keya Saha, T-II-3 has been deputed for training in Post Graduate Study on Biography and Regional Assessment at the University of Dessaarlandes for a period of 18 months with effect from first week of April 1996 under DAAD Fellowship Programme.

Dr. K.K. Vass, Principal Scientist, participated in a training of *Breeding Hatchery and culture of Rainbow Trout and Brown Trout Technologies* under Indo-Iranian MOU for cooperation in agricultural research during 30 December 1996 to 20 January 1997 at Islamic Republic of Iran.

Shri M. Karthikeyan, Scientist has successfully completed the two years Post-Graduate Programme on *Agricultural Science and Resource Management in Tropics and Subtropics* at University of Boan, Germany.

HONOURS AND AWARDS

The following scientists of the Institute were honoured with the Fellowship of Inland Fisheries Society of India during 1996-97 :

Dr. V.R. Desai, Ex-Principal Scientist
Dr. Dhirendra Kumar, Senior Scientist
Shri Utpal Bhaumik, -do-
Shri P.K. Chakraborty, -do-
Dr. (Mrs.) Krishna Mitra, -do-

Dr. V.V. Sugunan, Senior Scientist was invited to deliver a guest lecture on *"Biological monitoring of pollution in inland open waters"* by the Association of Microbiologists India (IMI) at IIT Madras on 4.12.1996. The lecture was delivered on the occasion of the 37th Conference of AMI.

Dr. V.K. Unnithan, Senior Scientist, Alappuzha Centre of the Institute has been nominated as Ex-Officio Member of the State Guidence Council of the *Janakeeya Matsyakrishi* programme of Government of Kerala.

Dr. K.K. Vass, Principal Scientist is elected as a member of the National Executive Council of National Institute of Ecology, New Delhi.

Dr. S.N. Singh, Senior Scientist has been recognised as *Expert Member* by the Government of Gujarat for implementation of KALPSAR Project.

Dr. K.K. Vass, Principal Scientist and Dr. V.V. Sugunan, Senior Scientist were recognised as Honorary Members of Faculty at CIFE Bombay. They have delivered guest lectures for various courses.

Ms. Nandita Chakraborty was awarded Ph.D. Degree by the University of Kalyani based on the work done by her under the Institute based ICAR ad-hoc scheme on *Biological monitoring of the environmental perturbations in the river Hooghly*. The thesis "Biomonitoring of pollution in Hooghly estuary through plankton species diversity" was submitted under the guidance of Dr. V.V. Sugunan, Senior Scientist, CIFRI and Prof. S.C. Santra of Kalyani University.

Young Scientist Award

In commemoration with the Golden Jubilee Celebration of CIFRI, a *Young Scientist Award* was given to Ms. Borati Raina, Dept. of Biosciences, Jammu University, Jammu. The award carrying a citation and Rs.10,000/- was given on the basis of preparation of a research paper and its presentation. The Award was given away during the National Seminar on Changing Perspectives of Inland Fisheries conducted jointly by the Institute and the Inland Fisheries Society of India from 16-17 March 1997.

TRANSFER OF TECHNOLOGY

Efficacy of extension methods

To know the effectiveness of various extension techniques used in transfer of technology programmes in three tier carp culture system, an investigation was carried out in Sunderbans. Five extension techniques *viz.*, demonstration, fish farmers' day and field visit, group discussion, fish farmers visit to Research Institute and distribution of literature were tried to assess their effectiveness. Demonstration was found to be the most effective tool to motivate the fish farmers.

The following services were imparted through the extension activities of the Institute.

Extension Activities	Beneficiaries
1. Advisory service	Fish farmers, entrepreneurs, Govt. agencies, NGOs (232 nos.)
2. Training	Extension officers, fish seed collectors (51 nos.)
3. Communication services through literature, Video cassettes, etc.	Govt.Agencies, NGOs Entrepreneurs (18 nos.)
4. Talks (22 nos)	Farmers, students, general public
5. Mass Media coverage (5 Doordarshan programmes, 2 Radio Programmes)	-do-
6. Exhibition (5 in different parts of India)	-do-

Training Programme

A 2-day training programmeon Inland Fisheries Development was organised at Patharpratima, an island of Lower Sunderbans, during April 16-17, 1996. Forty resource poor fish farmers/fishermen and 15 farm women participated in the training course. Audio-visual equipments like, cine projector and slide projector were utilised to create mass awareness in the area. The participants showed their keen interest towards learning the modern technologies on prawn and fish farming.

A 10 day training course in ***Prawn farming*** was organised at Barrackpore during 6-16 June, 1996 for the benefit of 27 Extension Officers of the State Fisheries Department of West Bengal.

Training Programme KVK/TTC

The following Training Courses were organised at KVK, Kadkwip during 1996-1997 :

Discipline	Type of training	No. of course		No. of beneficiary	
		*T	*A	*T	*A
Fisheries	On-campus	7	7	70	70
	Off-campus	15	25	260	454
Crop production	On-campus	7	7	70	70
	Off-campus	9	30	190	617
Horticulture	On-campus	8	8	80	80
	Off-campus	12	25	230	396
Animal Science	On-campus	7	7	70	70
	Off-campus	12	22	160	283
Home Science	On-campus	9	9	90	90
	Off-campus	7	21	120	301
Total :	On-campus	38	38	380	380
	Off-campus	55	123	960	2051

*T - Target *A - Achievement

LIBRARY SERVICE

CIFRI Library has providing its services to the scientists of the Headquarters and centres,apart from served the research scholars, teachers, students and officials from other organizations. The library added 201 books, 206 miscellaneous publications and 600 loose issues of journals to its collection and subscribed 22 foreign and 48 Indian journals during the year. The current total holding of the library comprises : 7,450 books, 4,240 reprints, 937 maps, 3,382 miscellaneous publications and 51 theses.

The library maintained free mailing of the Institute's 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 extended inter-library loan of 17 publications to other libraries. Rs.11,12,786.00 was spent during 1996-97 for procuring library books, journals and other reading materials.

PROJECT MONITORING & DOCUMENTATION SERVICE

The section monitors the progress of 20 Research Projects of the Institute and organises Staff Research Council Meetings. It also assists the Director in policy formulation and technical guidelines on plan scheme preparations, apart from publishing reports, write ups, project programmes, and newsletters. The section processes the research papers, submitted by the scientists for their publications in different journals or presentation in symposia/workshops, etc. Participation of scientists in seminars, symposia, conferences, etc. was monitored by the section.

The section maintains an active DTP, photocopy, duplicating (cyclostyling) and binding unit to cater to the needs of the Institute.

Research Project Files

Annual progress reports of all the research projects and the contribution made by individual scientist are being maintained and monitored through 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.

Technical reports/queries

More than 20 technical reports pertaining to progress of research activities of the Institute were compiled and sent to the Council, Ministry of Agriculture and other agencies Technical queries regarding the activities of the Institute from various quarters of the country and abroad were attended to by the section.

Personal Information System (PIS)

During the reported period, biodata of 75 scientists of the Institute have been updated in the PIS based database which is being maintained at the Institute and ICAR.

Publications

The following departmental publications were brought out by CIFRI during the year 1996-1997 :

1 CIFRI Annual Report 1995-96

2 THE INLAND FISHERIES NEWS (two issues, Vol.1, No. 1 & 2)

3 Bull.No.59 - Bibliography of Reservoir Fisheries in India
G.K. Vinci & Anjali De

4	Bull.No.61	-	Possible impact of species enhancement in Indian Reservoirs through introduction of geneticaslly modified tilapia *V.V. Sugunan & M. Sinha*
5	Bull.No.62	-	List of CIFRI Publications (1985-96) *Anjali De*
6	Bull.No.67	-	Fisheries of the Hooghly-Matlah estuarine system - An appraisal *P.M. Mitra, H.C. Karmakar, M. Sinha, A. Ghosh & B.N. Saigal*
7	Bull.No.69	-	Epizootic ulcerative syndrome in fishes - its present status in India *M.K. Das*
8	Bull.No.70	-	Uttar Bihar Ke Matsyaki Jal Sansadhan (in Hindi) *Maniranjan Sinha & Bankim Chandra Jha*
9	Bull.No.71	-	Kusheshwar sthan chaur (North-Bihar) - Status and prospects for fisheries development *B.C. Jha & K. Chandra*
10	Bull.No.72	-	Ecology-based fisheries management in Aliyar reservoir *C. Selvaraj, V.K. Unnithan & V.K. Murugesan*
11	Bull.No.73	-	Ecology & Fisheries of Bhatgar Reservoir *Reservoir Fisheries Division*
12	CIFRI Perspective Plan - VISION 2020		
13	Folders :	1	Pen Culture in floodplain lakes
		2	Fisheries of floodplain lakes
		3	*Barkrit maydani jhilon ki matsyaki* (in Hindi)
		4	*Barkrit maidani jhilon men pen pranali dwara matsya palan* (in Hindi)
		5	*Jalia Prayavaran aur matsyaki* (in Hindi)
		6	Training Programme 1997-98
14	Current Contents		

Three issues (Jan.-June 1996; July-Sept. 1996 and Oct.-Dec., 1996).

CONFERENCE, SYMPOSIA, ETC.

The following important Meetings/Workshops/Seminars, etc. are organised by the Institute during 1996-97 :

Staff Research Council Meeting of CIFRI, held at Barrackpore on 27 and 28 May 1996

Management Committee meeting of CIFRI, held on 29 May 1996 and 15 March 1997

Research Advisory Committee meeting held at Barrackpore on 29 and 30 July 1996

National Workshop on Fish and Prawn Disease Epizootics and Quarantine Adoption in India organised on 9 October 1996

Institute's Joint Staff Council meetings held on 18 April 1996, 10 September,1996 and 30 December 1996

National Consultation on Inland Fisheries including Workshop on Reservoir Fisheries and Workshop on Research Thrust and Priorities in Inland Fisheries organised jointly with the Ministry of Agriculture, Govt. of India on 17 & 18 January 1997

National Seminar on Changing Perspectives of Inland Fisheries jointly organised with Inland Fisheries Society of India to celebrate Golden Jubilee of the Institute on March 16-17, 1997

The scientists of the Institute participated in various conferences/symposia/seminars and and meetings held during April 1996 to March 1997, wherein they presented their research findings and exchanged views with the other delegates. List of scientists who participated/presented papers in such gatherings is given below :

Conference/Symposium/ Seminar	Paper presented	Authors/Participants
Workshop on fish farming at Jorhat organised by the Assam Agricultural University held from 10-11 April 1996	-	V. Pathak
Workshop on "Peninsular Aquaculture" held at CIFA, Bangalore on 21 May, 1996	Need for restraint on stocking rohu and mrigal in tanks with permanent inorganic turbidity	D.S. Krishna Rao
Symposium on "Fish Genetics and bio-diversity conservation for sustainable production" held NBFGR, Lucknow on 26 & 27 Sept., 1996	Impact of changes in environment on fish germplasm	M. Sinha

Symposium on "Fish Genetics and bio-diversity conservation for sustainable production" held NBFGR, Lucknow on 26 & 27 Sept., 1996	Environmental alterations in rivers Ganga and Yamuna - a stretch from Delhi to Varanasi and conservation strategies	K. Chandra
-do-	Role of extension in arousing mass awareness and public participation in fish conservation movement	U. Bhaumik & S.K. Saha
-do-	The exploitation of riverine fish stock in temporal context	P.K. Katiha, R. Chandra, R.K. Tyagi & P.N. Jaitly
-do-	Exotic germplasm *vis a vis* fish biodiversity conservation in India	P.K. Pandit
National Seminar on "Human factor, resource management and development, at New Delhi during 3-5 October, 1996, organised by Indian Society for Human Ecology and Indian Institute of Bio-social Res. & Dev. (Calcutta)	Retting of coconut husk, a serious case of aquatic pollution in Kerala - an ecological and socio-economic perspective	Bijoy Nandan & V.K. Unnithan
William Roxburgh Memorial Seminar organised by Calcutta Wildlife Society during 8-10 Nov. 1996	Brackishwater finfish and shellfish seed collection in Sunderbans and its impact	U. Bhaumik, A. Mitra & S.K. Saha
-do-	Water and soil characteristics of different estuaries in Sunderbans	D. Nath & D.K. De
-do-	Mangrove wetland - a niche for survival and growth of juvenile *L. calcarifer* (Bloch)	P.K. Pandit & N.C.Dutta
-do-	The status of prawn and fish seed resources in the Sunderbans of Hooghly-Matla estuarine system	D.K. De
-do	Recent trends in fish catch in Sunderbans area of Hooghly-Matlah estuarine system	P.M. Mitra, H.C. Karmakar & N.C. Mondal

William Roxburgh Memorial Seminar organised by Calcutta Wildlife Society during 8-10 Nov. 1996	Fish and prawn disease epizootics in aquatic ecosystems of Sunderbans an overview	M.K. Das
-do-	Plankton of the tide pools and phytolmates of the Sunderbans	P.K. Chakraborti, A. Hajra & M. Sinha
Workshop on Eco-oriented approach in the development of fisheries of Pong reservoir held at Sansarpur Terrace, Himachal Pradesh, on 20 Nov. 1996	An ecological approach towards development of Fisheries in Pong reservoir, Himachal Pradesh	D.K. Kaushal
The Fourth Indian Fisheries Forum, Kochi-682016, Kerala (for Young Scientists' Award) held from 24-28 Nov. 1996	Environmental status and faunal diversity of selected backwaters on the South-West Coast of India	V.K. Unnithan & Bjoy Nandan
-do-	Modelling and monitoring the impact of retting of coconut husk on the ecology and faunal resources of the estuarine systems on the South-West Coast of India	Bijoy Nandan
37th Annual Conference of the Ass. of Microbiologists of India conducted at IIT, Madras, from 4-6 Dec., 1996 (Guest lecture)	Biological monitoring of pollution in open watrer ecosystems (Guest lecture)	V.V. Sugunan
Workshop on Analytical Quality Control organised by the NRCD and CPCB at Delhi on 5-6 December 1996	-	K.K. Vass
Seminar/Group Discussion held at the campus of Eastern Regional Station of IVRI, Calcutta on 17-18 December 1996	-	A.K. Ghosh
Seminar on Sustainable Fisheries Development in N.E. Region, College of Fisheries Student's Union, Assam Agricultural University, Raha, Nagaon, Assam, held on 22 December 1996	Energy dynamics of beel ecosystems	V. Pathak

Seminar on Agriculture towards new horizons held at Chaudhary Charan Singh Haryana Agricultural University, Hissa, from 24-25 December 1996	-	D.N. Mishra
The Brainstorming session on tilapia held at Lucknow from 7-8 January 1997. (chaired by Dr. E.G. Silas)	Possible Impact of species Enhancement in Indian Reservoirs through introduction of genetically modified tilapia (base paper for brainstorming)	V.V. Sugunan
Workshop on River Fisheries Management, U.P. State Fisheries, Lucknow, held from 8-9 Jan. 1997	Systems approach in integrated river basin management	V.V. Sugunan & M. Sinha
-do-	Riverine fisheries - certain legal and constitutional issues in policy management	S. Paul
-do-	Environmental degradation in the river systems and restoration efforts	K.K. Vass & K. Chandra
-do-	Assessment of fish production of river stretches based on primary, secondary and tertiary production	M.A, Khan, Ravish Chandra & R.K. Tyagi
National Consultation on Inland Fisheries, held at Barrackpore (16-18 Jan. 1997), organised jointly by CIFRI and Ministry of Agriculture, Govt. of India	Guidelines for reservoir fisheries management in India	V.V. Sugunan
Golden Jubilee National Symposium on Biology for sustainable development, held at the Zoological Society, Calcutta, from 16-18 Jan. 1997	Refinement of carp culture technology - perceived approach of fish farmers for sustainable development	U. Bhaumik
-do-	Benthos of intertidal pools and mangrove swamps in the Sunderbans	P.K.Chakraborti, M. Sinha, A, Hajra & R.K. Das

Golden Jubilee National Symposium on Biology for sustainable development, held at the Zoological Society, Calcutta, from 16-18 Jan. 1997	Spawning migration and recruitment of juvenile hilsa, *T. ilisha* in the Hooghly estuary in post-Farakka barrage period	D.K. De & M. Sinha
-do-	Integrated fish and shrimp health management for sustained production	M.K. Das
National Seminar on Changing Perspectives of Inland Fisheries, CIFRI, Barrackpore, held on 16-17th March, 1997	Effect of ecological parameters on fish yield - a multivariate approach	M. Chaudhury
-do-	Possible manifestations of closure of construction sluices on the downstream environment of Sardar Sarovar Dam	S.N. Singh
-do-	Biology of weed fishes in relation to major carps in Ravisankar Sagar Reservoir, M.P., India	Dhirendra Kumar
-do-	On the identification of two populations of *T. ilisha* (Ham.) in the Hooghly estuary and the Ganga below Farakka Barrage	H.C. Karmakar & P. Mitra
-do-	Ecological succession in Chilka lake, an analysis and impact assessment	M. Sinha, R.K. Banerjee, P.K. Pandit & S.K. Chatterjee
-do-	Ecology and biodiversity study of different wetlands with their productive potentials	A.K. Ghosh, P.K. Pandit, H.C. Karmakar, R.K. Banerjee
-do-	Impact of trans-Himalayan tributaries on the hydro-dynamics of River Brahmaputra	V. Pathak & A. Sarkar
-do-	Impact of organic wastes on physico-chemical quality of Gurupur estuary, Mangalore	B.K. Bhattacharjya, T.R.C. Gupta

National Seminar on Changing Perspectives of Inland Fisheries, CIFRI, Barrackpore, held on 16-17 March, 1997	Havey metal toxicity in aquatic system and its remedial measures	K. Chandra
-do-	Primary production of Hooghly-Matlah estuary with special reference to pollution in the Hooghly estuary	M.M. Bagchi & D. Nath
-do-	Impact of thermal effluents and city sewage on the distribution of biota in a lake and a rivulet	B.C. Jha
-do-	A study on coliform and faecal coliform bacterial load in the river Hooghly/Ganga	R.K. Das, S. Bhaumik, S.P. Ghosh & S. Dutta
-do-	Biotic spectrum of river Mahanadi in the context of physical degradation	Sree Prakash, K. Srivastava & Ravish Chandra
-do-	Changing scenario of fish and fisheries of River Yamuna - Part II	D.N. Mishra & U. Moza
-do-	Biochamical composition of *L. parsia* as influenced by mangrove litters in the Sunderbans coastal estuarine system	A. Hajra, P.K. Chakraborti & M. Sinha
-do-	Record fish yield from Thirumoorthy reservoir under scientific management	C. Selvaraj, V.K. Murugesan & S. Manoharan
-do	An account of the aquatic macrophytes in some *beels* of lower Brahmaputra	Bulbul Acharjee, A. Dutta & M. Choudhury
-do-	Seasonal distribution of nutrients of the lower Mahanadi complex	S. Samanta & P.K. Chakraborty
-do-	Changes in the environmental features of the Hooghly estuary in relation to bore tide	D. Nath & D.K. De

National Seminar on Changing Perspectives of Inland Fisheries, CIFRI, Barrackpore, held on 16-17 March, 1997	Efficacy of various techniques in transferring carp culture technology	U. Bhaumik, S.K. Saha & Arunabha Mitra
-do-	Role of sewage treatment plant in environmental mitigation	Santanu Ghosh & K.K. Vass
-do-	Urceolariid ciliate of fish as indicator of water quality	M.K. Das, R.K. Das, S.P. Ghosh & S. Bhowmick
-do-	*Rita rita* as indicator species for environmental impact assessment in Ganga river system	K.K. Vass, M.K. Mukhopadhyaya, K. Mitra & M.M. Bagchi
-do-	Income and employment generation from Indian inland waters	P.K. Katiha & R. Chandra
-do-	Plankton abundance and drift in its diversity in the river Ram Ganga, a tributary of River Ganga	M.A. Khan, A.K. Laal, D.N. Singh & R. Chandra
-do-	Biological monitoring of the river Hooghly through plankton community structure	V.V. Sugunan & Nandita Chakraborty
-do-	Conventional project evaluation techniques and their limitations for estimating environmental costs	S. Paul & H. K. Sen
-do-	Mangrove associated aquafauna of intertidal ditches and pits of deltaic West Bengal	P.K. Chakraborty, M. Sinha, A. Hajra, R.K. Das & N.N. Majumder
-do-	Studies on the migration of hilsa, *T. ilisha* by tagging experiment	D.K. De & M. Sinha
-do-	Seasonal abundance and species diversity of periphyton in Markonahalli reservoir, Karnataka	P.K. Sukumaran M. Karthikeyan

National Seminar on Changing Perspectives of Inland Fisheries, CIFRI, Barrackpore, held on 16-17 March, 1997	Population dynamics and stock assessment of *Polynemous paradiseus* of Hooghly-Matlah Estuarine System	S.K. Mandal, P. Mitra & R.A. Gupta
-do-	Assessment of fisheries of the Hooghly-Matlah estuarine system - A profile	P. Mitra, S.K. Mandal, H.C. Karmakar, G.C. Laha & N.C. Mandal
-do-	Feasibility studies on self sustained production of *Macrobrachium rosenbergii* on low saline wetlands of West Bengal	M.K. Mukhopadhyay U. Bhaumik, A.K. Das & S.K. Saha
-do-	Studies and significance of detritus in the *beels* of West Bengal	A.K. Das
-do-	Sustainable development of floodplain wetlands - a case study of two *beels* in West Bengal	G.K. Vinci & Mrs. K. Mitra
-do-	Application of remote sensing techniques in inland fisheries resource evaluation	R.A. Gupta
-do-	Use of bioindicators in aquatic environmental monitoring programmes	B.P. Mohanty & K.K. Vass
-do-	Combined cultivation of *M. rosenbergii* and *C. idella* in a marginal pond of Bhomra *beel* in West Bengal	M. A. Hassan & M.K.Bandopadhyay

VISITORS

A number of distinguished personalities including national leaders visited the Institute's Headquarters and its centres during 1996-97. This included Hon'ble **Shri Chaturanan Mishra, Union Minister of Agriculture, Hon'ble Shri Kiranmay Nanda, Minister of Fisheries, Govt. of West Bengal,** and **Hon'ble Dr. Prem Sai, Minister of Fisheries, Govt. of M.P.**

Other distinguished visitors were :

Dr. A. Chaturvedi, Deptt. of Statistics, University of Allahabad, Allahabad
Dr. A. Mishra, Scientist-in-charge, Regional Centre of Sugarcane, Karnal
Dr. Anil Agarwal, Sr. Scientist, ICAR, New Delhi
Dr. Anita Gopesh, Deptt. of Zoology, Allahabad University, Allahabad
Dr. B.K. Dwivedi, Secretary, Bioved Society, Allahabad
Dr. B.S. Saharan, Director of Fisheries, Govt. of Haryana, Chandigarh
Dr. D.N. Jana, Director (Research, Extension & Farm), West Bengal University of Animal & Fishery Science, Calcutta-37
Dr. Dilip Kumar, NACA
Dr. G.P. Dubey, Ex-Director, M.P Fisheries
Dr. G.S. Pandey, Deptt. of Statistics, University of Allahabad, Allahabad
Dr. K. Gopakumar, Director, CIFT, Cochin
Dr. K.G. Padmakumar, Asst. Proffesor, Regional Res. Stastion, Kerala Agri. University
Dr. L.S. Bhushan, Head, Research Centre, CSWCTRI, Dehradun
Dr. P. Das, Ex-Director, National Bureau of Fish Genetics Resources, Lucknow
Dr. P.K. Mondal Reader, Deptt. of Zoology, Allahabad University, Allahabad
Dr. P.M. Sheriff, Asst. Professor, College of Fisheries, Kerala Agricultural University
Dr. P.S. Easa, Scientist, Kerala Forest Research Institute, Peechi
Dr. P.U. Varghese, Secretary, MPEDA, Kochi
Dr. R. Singh, S.R.O., Agro-economic Research Centre, University of Allahabad, Allahabad
Dr. R.N. Singh, Director, C.S.W.R.I, Avikanagar, Jaipur, Rajasthan
Dr. Ram Lal, Reader, Allahabad Agricultural Institute, Allahabad
Dr. S.D.J. Bohra, P.S. (AG & PC (SB), C.S.W.R.I., Aviknagar, Jaipur, Rajasthan
Dr. V.C. George, Principal Scientist (Retd.), CIFT, Cochin
Dr. V.K. Srivastava, Reader, CMP Degree College, Allahabad
Dr. V.K. Tondon, Anthropologist, Anthropological Survey of India, Dehradun
Dr. V.S. Shitole, Director, M.P. Fisheries, Bhopal
Dr. Vedavyass Rao, Former Director, CMFRI, Kochi
Dr. Velayudhan, Sr. Scientist, CMFRI, Kochi
Major Dr. V.K. Sareen, Registrar, Moti Lal Nehru Medical College, Allahabad
Md. Irshadul Haq, Secretary, Ministry of Fisheries and Livestock, Govt. of Bangladesh
Mr. D.S. Bharati, Chief Executive Officer, FFDA, Karnal
Mr. M. Sud, Joint Secretary, Ministry of Agriculture, Govt. of India
Mr. M.B. Pantha, Chairman, NACA, Chief of Fisheries, Nepal
Mr. N.S. Patil, Member ICAR Region II, 317, Laxminagar, Nagpur-22
Mr. P.P. Mathur, Secretary, Govt. of M.P.
Mr. Hassanai Kongkeo, NACA Coordinator
Mr. Udai Patel, Director, Special Projects, Surrey, U.K.
Prof. H.R. Singh, Head, Deptt. of Zoology, Allahabad University, Allahabad
Prof. K.K. Azad, Deptt. of Mathematics, University of Allahabad, Allahabad
Prof. Krishna Swarup, Emeritus Scientist, National Academy of Sciences, Allahabad

JAL KRISHI PRADARSHINI

Shri Chaturanan Mishra, Hon'ble Minister for Agriculture
at the *Jal Krishi Pradarshini* at Darbhanga

A section of farmers and fishermen who gathered at the *Pradarshini*

VISITORS

Mr. Hassanai Kongkeo, NACA Coordinator (second from right) visiting CIFRI library

Md. Irshadul Haq, Secretary, Ministry of Fisheries & Livestock, Bangladesh visiting the computer laboratory

Sri B.L. Jaiswar, Chief Executive Officer, FFDA, Allahabad
Sri C. Radhakrishnan, Jt. Director of Fisheries, Govt. of Kerala
Sri K.D. Pandey, Director, U.P. Fisheries, Lucknow
Sri U.S. Tewari, Director, Allahabad Museum, Allahabad
Sri Udai Patel, Director, Special Projects, Surrey, U.K.

FINANCE

For the year 1996-97
(Rs. in lakhs)

		B.E.	R.E.	Actual Expenditure
Plan	:	150.00	140.00	140.00
Non-Plan	:	300.50	340.00	340.00
Total	**:**	**450.50**	**480.00**	**480.00**

ONGOING PROJECTS

CENTRE-WISE LIST OF ONGOING PROJECTS 1996-97

BARRACKPORE	:	FC/B/11	*FC/B/12*	FC/A/4
		BF/B/3	BF/B/11	BF/B/12
		BF/A/21	*BF/A/22*	AN/A/15
		AN/A/16		
ALAPPUZHA	:	FC/B/13		
KARNAL	:	FC/B/10	*FC/B/11*	*FC/B/12*
		FC/A/25		
ALLAHABAD	:	*FC/B/11*	FC/B/12	*AN/A/15*
BANGALORE	:	FC/A/7		
CALCUTTA	:	*FC/B/11*	*FC/B/12*	BF/B/10
		AN/A/15		
COIMBATORE	:	FC/A/24		
ELURU	:	FC/A/23		
MALDA (Farakka)	:	*FC/B/12*	BF/A/22	
GUWAHATI	:	*FC/B/12*	FC/B/14	FC/A/22
HOSHANGABAD	:	*FC/A/7*		
VADODARA	:	BF/B/9		

Survey Centres

CANNING	:	*BF/B/3*
DIAMOND HARBOUR	:	*BF/B/3*
LALGOLA	:	*FC/B/12*
ULUBERIA	:	*BF/B/3*

(The projects shown in italics have their headquarters elsewhere)

PROGRESS OF RESEARCH

PROJECT : FC/B/10

ECODYNAMICS AND FISHERY STATUS OF UPPER STRETCHES OF RIVER YAMUNA AND ASSOCIATED CANALS.

Personnel : D.N. Mishra, Usha Moza, C. Lakra, S.K. Srivastava

Duration : 1995 - 1999

Location : Karnal

Physico-chemical characteristics of water and soil

The physico-chemical characteristics of water in Western Yamuna canal at OF Yamunanagar indicated high values of free CO_2 (9.0 ppm) coupled with low values of dissloved oxygen 4.32 ppm, high values of total alkalinity (212.18 ppm) and specific conductance (562 µmhos/cm) indicating OF Yamunanagar as highly polluted due to discharge of industrial effluents (both paper and sugar mill waste). Sediments showed the river bed to be slightly acidic having pH range of 6.73 to 6.77 from Hathnikund to Karnal. The river bed is alkaline at Panipat, having pH of 8.04. The soil characteristics of canal resemble that of river bed in almost all parameters.

Primary productivity

The gross carbon in river Yamuna was comparatively higher at Hathnikund being 120.83 $mgC/m^3/hr$ and lowest at Panipat 90.62 $mgC/m^3/hr$. The gross carbon in canal was comparatively higher than river. It ranged between 132.8 at AOF Yamunanagar to 105 $mgC/m^3/hr$ at Panipat. The annual respiration values ranged from 61.87 (AOF Yamunanagar) to 85.85 $mgC/m^3/hr$ at Panipat.

Biotic communities

The standing crop of plankton, on an average in River Yamuna was estimated at 193.3 units/l. The composition of plankton indicated dominance of phytoplankton (89.87%). In Western Yamuna Canal at Yamunanagar, the plankton productivity on an average varied from 398 u/l at AOF to 488 units/l at OF. The high abundance of plankton at OF was dominated by Myxophyceae (*Oscillatoria, Spirulina* and *Phormidium* 45.29%).

Macrophytes within Yamuna were present at Karnal and Panipat only. The average biomass varied from 16 to 1 g/m^2. Annual assessment showed presence of vegetation only during winter and pre-monsoon season. In Western canal the average biomass varied (dry wt.) between 3.75 g/m^2 (AOF Yamunanagar) to 30 g/m^2 (confluence). Maximum biomass (58.82 g/m^2) and diversity was encountered at SYL.

Insects along Yamuna were encountered at Karnal and Panipat only. The average density varied between 11 to 9 units/m^2).

Benthic density of river between Hathnikund to Panipat varied between 253 units/m^2 to 330 um^{-2} barring Karnal which has low average density of 92 units/m^2 only.

Spawn prospecting

The dominant species encountered were *Chela* spp (85%) and *Puntius* sp. (13%). Other species were *B.bagarius, M.armatus, Nemachielus* sp. and *Ambasis* sp. etc.

Estimation of total fish biomass

During the year 1996-97, fish catch from open water resources within upper stretch of Yamuna amounted to 40.9 tonnes showing not much variation from previous year's catch of 39.27 tonnes. The percentage catch composition of different species from different centres is given in Table 1.

Table 1. Centre-wise estimated fish landing from River Yamuna, for the year 1996-97.

Species	Yamunanagar		Karnal		Panipat		Total	
	t	%	*t*	%	*t*	%	*t*	%
C.mrigala	0.68	41.98	0.32	20.10	0.51	33.33	1.51	32.26
C.catla	0.17	10.49	0.07	4.58	0.24	15.69	0.48	10.26
L.rohita	0.49	30.25	0.49	32.03	0.44	28.76	1.42	30.34
L.calbasu	0.28	17.28	0.65	42.48	0.34	22.22	1.27	27.14
Sub-total	**1.62**	**18.16**	**1.53**	**14.38**	**1.53**	**7.14**	**4.48**	**11.41**
M.aor	0.01	0.50	0.17	7.79	0.03	0.98	0.21	2.87
M.seenghala	0.43	21.72	1.02	44.93	1.09	55.62	2.54	34.74
M.attu	1.54	77.78	1.08	47.58	1.94	63.40	4.56	62.38
Sub-total	**1.98**	**22.20**	**2.27**	**21.34**	**3.06**	**14.28**	**7.31**	**17.83**
Misc. Group	5.17	57.97	5.38	50.56	16.39	76.48	26.94	65.72
Tor spp.	0.05	0.56	0.06	0.56	0.01	0.05	0.12	0.29
C.carpio	0.07	0.78	1.32	12.41	0.44	2.05	1.83	4.47
H.molitrix	0.01	0.11	0.08	0.75	-	-	0.09	0.23
A.nobilis	0.02	0.22	-	-	-	-	0.02	0.05
Sub-total	**5.32**	**59.64**	**6.84**	**64.28**	**16.84**	**78.58**	**29.00**	**70.76**
Total	**8.92**	**-**	**10.64**	**-**	**21.43**	**-**	**40.99**	**-**

PROJECT : FC/B/11

ENVIRONMENTAL IMPACT ASSESSMENT IN RIVERINE ECOSYSTEMS

Personnel : K.K. Vass, M.K. Mukhopadhyay, R.K. Das, K. Mitra, Krishna Chandra, B.C. Jha, H.P. Singh, Balbir Singh,U. Moza, R.K. Banerjee, P.K. Pandit, H.C. Karmakar, B.P. Mohanty, A. Hazra, Sanjay Bhowmick, S.P. Ghosh, S. Bandopadhayay.

Duration : 1991-1998

Location : Barrackpore, Calcutta, Karnal

Assessment of bacterial load

For the first time an attempt was made to assess the bacterial load, both coliform and faecal coliform, in the Ganga river system from Rishikesh (U.P) to Nurpur near Diamond-Harbour (West Bengal) covering 8 centres. The disturbing observation was higher bacterial load at Haridwar in comparison to Bhagalpur and Patna.

The metal contaminated fishes were histologically examined for any damages in their gills and kidney. The fish species examined for tissue level changes were *Rita rita, Pama pama, Mystus tengra* and *.Mystus aor.* The study revealed maximum tissue damage in case of *Rita rita* sampled from Bandel, Patna and Rishra while in case of *Pama pama* the maximum damage was registered from Patna and Diamond Harbour.

Toxicity experiments with test organisms

The toxicity bioassay experiments using pulp and paper treated waste water were conducted both under static and flow-through systems. The experiments using ova and larvae of *Catla catla* indicated significant differences.

Biological features

At the reference site (Lunavala) the phytoplankton assemblage was of typical hill stream type recording dominance of Chlorophyceae closely followed by Bacillariophyceae while zooplankton were dominated by copepods. The benthic population at this site was dominated by gastropods.

At the Fasalpur site which receives dairy effluent the plankton density increased sharply registering a range of 650 to 865 units/l in which phytoplankton contributed 75 to 80% population. The macrobenthic fauna at this site was largely represented by the members of oligochaetes and chironomids.

The Nandeshwari stretch of the river, being stressed due to discharge of petrochemical effluents, recorded greater dominance of cyanophycean forms contributing more than 80% to total population density which ranged between 1800-2150 units/l. It is significant to note that the Chlorophyceae which was maximum (62-71%) at the upper stretch of Lunavala declined to just 2.5-3.1% at Nandeshwari, indicating drastic shift in population structure.

Water quality

Different water quality parameters analysed from various samples collected from different stretches indicated the impact of different stress factors operating on this river system which have significantly altered the quality at three centres reflecting varying degree of eutrophication.

PROJECT : FC/B/12

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

Personnel : Ravish Chandra (up to Feb. 97), R.S. Panwar, H.P. Singh, D.N. Singh, Balbir Singh, M.A. Khan, A.K. Lal, R.N. Seth, Sree Prakash, B.K. Singh, R.K. Dwivedi, R.K. Tyagi, P.N. Jaitly, P.K. Katiha, R.C. Singh, N.K. Srivastava, Ram Chandra, B.D. Saroj, L.R. Mahavar, Ramji tiwari, J.P. Mishra, (Ms.) Kalpana Srivastava, Sitaram Meena, P. Rajani, Moolchand Raikwar (upto Jan. 97).

Duration : 1993-1998

Location : Allahabad

RIVER YAMUNA

River Yamuna was surveyed from Etawah downstream to confluence with Ganga at Allahabad. Nine sampling centres and four fish landing centres were selected. After confluencing of four tributaries in Yamuna at Etawah, the river flows downstream through Hamirpur, Fatehpur, Mau and Allahabad districts.

Physico-chemical characteristics of water and soil

Fair range of DO, total absence of free CO_2, high specific conductance, low nutrients and moderate concentration of calcium were observed. The soil was alkaline in nature and poor in organic carbon. Calcium as $CaCO_3$ content was low. The analysis indicated poor soil fertility.

Pollution

No major industrial or sewage drain joins the river Yamuna in the stretch studied except a few at Hamirpur, Madauka and Arail causing pollution temporarily.

Primary productivity

Gross production ranged between 68.7 and 296.2 mg $C/m^3/hr$, being lowest at Kalpi (68.7 to 78.0 mg $C/m^3/hr$). Higher gross production was measured at Madauka (250 to 281.75 mg $C/m^3/hr$) and Arail (187.5 to 296.2 mg $C/m^3/hr$). Net production was high at Mau (125.0 to 189.5 mg $C/m^3/hr$) and low at Hamirpur (39.0 to 70.1 mg $C/m^3/hr$). Respiration was high at Arail (31.2 to 75.0 mg $C/m^3/hr$) and Madauka (23.4 to 112.4 mg $C/m^3/hr$) and low at Kalpi (2.16 to 12.0 mg $C/m^3/hr$).

Biotic communities

Total plankton density ranged between 4 and 1150 units/l. Zooplankton and phytoplankton ratio was 1 : 40. Periphyton was dominated by diatoms (80%) followed by green algae (10%), blue green algae (6%) and rotifers (4%). Periphyton was represented by 20 genera. Benthic population ranged from 115 units/m^2 to 674 units/m^2 dominated by Mollusca (20-80%) followed by Insecta (5.7 to 77%), Annelida (3.4-45.5%). Macrophytes and associated fauna were found to be 60 g/m^2 (dry wt.) during autumn.

Fishery

Fish catch at Sadiapur mainly fed from river Yamuna, was estimated at 59.30 t, registering an increase of 7.3% due to better contribution of hilsa and wallago than the preceding year. (Major carps - 4.94 t; catfish - 14.29 t; hilsa - 2.47 t; others (37.61 t). Among carps, *L.calbasu* contributed 1.98 t, followed by *L.rohita* (1.74 t). Among large catfishes, *M. aor* formed the bulk (7.69 t) followed by *M.seenghala* (4.39 t) and *W.attu* (2.20 t). A few specimens of common carp also were recorded.

Market study

Cat fishes fetched better prices than carp. The distribution of consumer rupee was observed at 75.45% for fishermen, 8.88% for wholesalers and 15.6% for retailers.

RIVER GHAGRA

Survey of 700 km (approx.) stretch of river Ghagra from Nepal border to confluence at Bajitola was conducted.

Physico-chemical parameters of water and soil

Chemical parameters did not show any appreciable change in diurnal variation. The water was free from any pollutional effects. Sediment was sandy (70%) with low percentage of clay (4-11%), silt (5-19%) organic carbon (0.15-0.22%) and calcium carbonate. Altogether the soil was not very productive in the river.

Pollution studies

The heavy metals in sediments showed marked change at Tanda (NTPC). Hot water and fly ash were being discharged in the river. This adversely affected the primary productivity. Zinc and cadmium showed higher values both in sediment and water.

Primary productivity

Gross production ranged from 25.0 to 280.0 mg $C/m^3/hr$ with lowest value at Guptarghat in July and highest value at Jankighat in March. Minimum (12.5 mg $C/m^3/hr$) and maximum (127.5 mg $C/m^3/hr$) net production were recorded at Guptarghat in July and March, respectively. Respiration value was low (15-107.5 mg $C/m^3/hr$) at Guptarghat and high at Dohrighat (15-145 mg $C/m^3/hr$).

Biotic communities

Poor plankton population and dominance of diatoms indicated that the whole stretch was oligotrophic in character. The average plankton population varied from 1 to 906 units/l.

Periphyton was represented by Bacillariophyceae (50.0-81.25%), Chlorophyceae (18.75-35.25%) and Myxophyceae (nil-20%). The benthic population ranged from nil to 345 units/m^2 comprising molluscs throughout the year and insects and their larvae (chironomids) during summer.

Fishery

In river Ghagra fishery assumes importance from Faizabad downstream. For post monsoon and winter months, the average monthly catches at Faizabad, Tanda, Barhalganj/Dohrighat and Belthara were estimated at 1.52, 0.82, 2.91 and 1.28 t, respectively. The contribution of major carps at all the centres excepting Barhalganj/Dohrighat (0.89 t) was almost negligible. Catfishes contributed 26 to 54%. The catch composition revealed miscellaneous fishes as the major share at all the centres except at Tanda, where catfishes contirbuted the maximum.

Socio-economic survey

The prices of catfishes were more than those of carps indicating consumer preference for the farmer.

PROJECT : FC/B/13

ECOLOGY AND FISHERIES INVESTIGATIONS IN VEMBANAD LAKE FOR EVALUATING CHANGES IN TIMESCALE.

Personnel : V.K. Unnithan, Bijoy Nandan, C.K. Vava

Duration : 1994-1999

Location : Alappuzha

Water and sediment samples collected from 12 stations south of barrage and one control station north of the barrage were analysed.

Water quality : Nutrient values were highly influenced by the monsoon discharges from the four rivers. The values (phosphate-P : Tr-72, av. 19 µg/l; nitrate-N : 20-710, av. 263 µg/l) gradually declined during the post-monsoon and pre-monsoon months.

Sediment : The sediment pH was low (av. 4.71), characteristic to the locality. Available phosphorous was high (av. 177 µg/100 g) and had an inverse relationship with that of the water during the three seasons. The organic carbon varied between 0.43 and 5.43% with considerably higher values in the southern end of the lake.

Primary productivity: The average gross primary productivity amounted to 0.975 $gC/m^3/day$ and the net productivity was 0.513 $gC/m^3/day$.

Fish and fisheries

The total harvest from the sector during April 96 to March 97 was estimated at 485.04 tonnes. The fish constituted 78.9% of the landings and the prawn 21.1%. The overall fish landings improved by 10.97% compared to that of last year, while the prawn landings decreased by 21.31%. The records for different species/groups for the year were as follows :

Species/Groups	1996-97 (kg)	% to the total landings	Variation from 1995-96
Etroplus suratensis	202,040	52.77	+ 38.70
E.maculatus	23,632	6.17	-
Mugil cephalus	1,372	0.36	- 6.95
M.cunnesius	3,078	0.80	- 13.72
Channa striatus	5,912	1.54	+ 10.76
C.marulius	14,828	3.87	+ 22.72
Labeo dussumieri	23,742	6.20	+25.39
L. rohita	586	0.15	+ 24.15
Cyprinus carpio	32	0.01	- 15.79
Puntius spp. (*P.filamentosus* & others)	31,586	8.25	-
Lutjanus argentimaculatus	4,212	1.10	- 35.49
Lates calcarifer	1,822	0.47	- 17.26
Scatophagus argus	3,852	1.01	-
Chanos chanos	1,370	0.36	- 28.20
Mystus spp.	5,008	1.31	-
Horabgrus brachysoma	2,150	0.56	-
Tachysurus arius	11,381	2.97	-
Other catfishes	2,386	0.62	-
Hemiraphus sp.	25,578	6.68	+ 29.46
Miscellaneous	18,284	4.78	-
Total fish	**382,841**	**100.00**	**+ 10.97**
Macrobrachium rosenbergii	36,332	35.55	- 47.61
M.idella	33,250	32.53	+ 18.47
Metapenaeus dobsonii	31,430	30.75	- 20.93
M. Monoceros	1,118	1.16	- 34.62
Total prawn	**102,200**	**100.00**	**- 21.31**

Pre-monsoon ecological survey of selected backwaters

Environmental and faunal investigations were conducted in ten of the thirty interconnected backwaters along the southwest coast during May to early June 1996. The study indicated that retting of coconut husk in the backwaters had been the major contributing factor to the organic pollution.

PROJECT : FC/B/14

ECOLOGY AND EVALUATION OF PRODUCTION RELATIONSHIP IN THE RIVER BRAHMAPUTRA WITH SPECIAL EMPHASIS ON ITS TRIBUTARIES.

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

Duration : 1995-2001

Location : Guwahati

Fishery

Studies were made in nine different stretches in river Brahmaputra in 20 north bank and 13 south bank tributaries. The total estimated fish landing from Brahmaputra at Guwahati was 251.8 t comprising miscellaneous species (44.52%), minor carps (24.54%), major carps (20.48%), large catfishes (7.99%), featherbacks (3.79%) and hilsa (3.26%). There was overall increase of 4.55% in the total catch from the previous year. Daily catch recorded at various landing centres was 100 kg at Central Lohit, 150 kg at Sadiya, 117 kg at Dibrugarh, 225 kg at Jorhat, 141 kg at Biswanath Chariali, 124 kg at Tezpur, 49 kg at Mangaldo, 74 kg at Goalpara (Jogighopa) and 236 kg at Dhubri. Mahseers (*Tor putitora* and *Neolisochilus hexagonolepis*) *L.dero* and *L.dyocheilus* were dominant in the upper stretch Lohit and Sadiya, while in the down stretch maximum catch consisted of miscellaneous group.

Physico-chemical characters of water and soil

The common features of tributaries on both the banks were rich in oxygen, low in CO_2, alkaline pH, high organic matter and low nutrients.

The rates of gross and net production were minimum at 356.2 and 265.0 mg C/m^2 /day or 3498 and 2603 Cal/ m^2/day in Jorhat and maximum 712.5 and 427.5 mg C/m^2 /day or 6997 and 4198 Cal/^{2}m /day at Dhubri. Average production rate throughout the stretch was 5086 Cal/ m^2/day and 3206 Cal/ m^2/day.

Biotic communities

Considerable zonal variation was observed in numerical abundance of plankton being maximum in Sadiya (557 units/l) and minimum (8 units/l) in Chandrapur (Guwahati). Numerical abundnace of benthos was negligible throughout the Brahmaputra stretch except at Guwahati (16units /m^2).

PROJECT : FC/A/4

ECODYNAMICS AND FISHERY MANAGEMENT OF *BEEL* ECOSYSTEMS IN WEST BENGAL.

Personnel : V.V. Sugunan, M.K. Mukhopadhyay, G.K. Vinci, K. Mitra, M.K. Bandopadhyay, A. Hassan, A.K. Das, B.K. Bhattacharjya

Duration : 1986-1998

Location : Barrackpore

Details of the 7 *beel*s studied during the period under report are given in Table 1. One beel (Nehali) is permanently closed while others are seasonally or permanently open type *beel*s.

Assessment of water and sediment quality

On an average, all *beel*s showed free CO_2. But in all *beel*s except Bhomra, free CO_2 was absent during winter. In tune with the acidic nature of the soil, the water pH in north Bengal beels was low (7.19 to 7.87) compared to Bhomra, Bansdaha and Kole *beel*s. A striking feature of the Dinajpur *beel*s was the low specific conductivity (52.75-85.25 µmhos/cm). Low values of nitrates (Tr. - 0.05 mg/l) and phosphates (Tr. - 0.056 mg/l) were due to quick turn over of nutrients release. North Bengal beels were characterised by acidic soil (5.69 to 5.89). Among three other *beel*s, Kole had higher soil pH. North Bengal *beel*s were also high in C/N ratio indicating clearly that all organic matter are not decomposed and released effectively in the acidic medium.

Primary productivity

The production cycle is based mainly on plankton in open beels like Kole and Bansdaha where the net primary productivity was very high. The weed infested closed systems had lower rate of primary productivity through plankton phase. However, they are also productive systems, with higher biomass of macrophytes.

Biotic communities

The study on quality composition and diversity of plankters (phyto & zoo) was conducted in seven different *beel*s in West Bengal. Plankton composition was distinctly different in open (Moranadi and Kole) and closed types (Nehali & Kola) of beels. Seasonal changes in benthic population densities were studied in Bhomra, Bansdaha and Kole *beel.* Bhomra beel maintained higher population density throughout the season over rest of the beels with highest being during monsoon (1050 u/m^2). However, lowest (137 units/m^2) value was recorded in Nehali *beel,* while, no trend could be descernible from the data available for Bansdaha and Kole *beel.*

Macrophyte infestation was found to be maximum in Bhomra and Nehali beels (90%). The Kole *beel* on the other hand, was found to be almost devoid of any submerged weeds except for a few patches of *Vallisneria* or *Ceratophyllum.* The *beel*s in south Dinajpur in gereral are less infested with weeds than those of North Dinajpur. In all the *beel*s under investigation, the associated fauna showed a direct relationship with magnitude of flora infestation.

Energy flow

In Bansdaha, out of 65.82 x 108 K cal. of solar energy available at the water surface, 1.03% was fixed by the primary producers. The overall ecological efficiency, as determined by conversion of NPP into fish flesh was 0.27%. Similar efficiency levels were estimated for Kole and Bhomra.

Fisheries

Organised fishing with maintenance of catch statistics was present only in Bhomra and Bansdaha beels of southern districts. Here the yield rates were 710 and 1247 kg/ha respectively. In Bhomra, Indian major carps formed 2555.5 quintals and miscellaneous fish constituted 64.42 q. In Bansdaha, Indian major carps formed 291.3 q and *G.chapra* 9.79 q and miscellaneous fishes 23.12 q. Most of the beels were dominated by carp fishery and particularly where stocking is done by the society. In Bansdaha, a clupeid species *G.chapra* comes next to carp. Riverine fauna dominated the Kole *beel* which has direct connection with river Ganga.

Nehali beel where a portion of it has been excavated and converted into culture pond two distinct faunistic picture was noted. The unexcavated portion being dominated by catfishes, murrels and minnows while the excavated part dominated by carps along with some catfishes and murrels. Beels of south Dinajpur was dominated by catla, rohu, while the north Dinajpur *beel*s *viz.*, Nehali and Moranadi were dominated mainly by catfish and low valued cyprinids.

Crafts and gear

Drag net was the most popular gear used in the beels, followed by traps, cast nets and other gear. Commode fishing, by a group of fishermen, using a drag net by covering a fish shelter of cut branches and twigs was very popular in Kole and Bansdaha.

Dingi nauka, Dug out canoes, and other improvised crafts were used by fishermen as fishing crafts.

Standardization of pen culture techniques

A pen made of split bamboo was erected in Kola *beel* (24 Parganas North) by enclosing a 0.6 ha area of the beel. Parameters were studied inside and outside the pen. Average depth of the pen is 0.92 m at the time of pen construction. An experimental culture of *M. rosenbergii* was envisaged.

Table 1. *Beels* studied during 1996-97

Name of the beel	Area (ha)	Type	Level of weed infestation (%)
Bhomra	45	Open (Seasonally)	90
Bansdaha	26	Open (Seasonally)	75
Kole	70	Open	20
Bhaluka	35	Open (Seasonally)	5-10
Patari	43	Open (Seasonally)	nil
Nehali	41	Closed	80-90
Moranadi	24	Open (Seasonally)	10-20

PROJECT : FC/A/7

ECOLOGY AND FISHERIES OF FRESHWATER RESERVOIRS.

Personnel : M. Ramakrishniah, D.S. Krishna Rao, P.K. Sukumaran, M. Karthikeyan, M.F. Rahman

Duration : Sub-Project No. 1 - 1995- 1998
Sub-Project No. 2 - 1996 - 2000
Sub-Project No. 3 - 1993 - 1998

Location : Bangalore, Hoshangabad

Sub-Project (i) **Assessment of fish yield potential of selected reservoirs of Karnataka to evolve management strategies.**

Under this project a rapid exploratory survey of ten reservoirs belonging to major river systems of Karnataka initiated in July 1995, was continued to determine the fish yield potential of these reservoirs based on eco-morphological characteristics and draw guidelines for development. The reservoirs covered were - Kabini, Nugu, Harangi, Hemavathi (Cauvery system), Vanivilas sagar, Bhadra, Narayanpur, Ghataprabha and Malaprabha (Krishna system) and Linganamakki (west flowing Sharavathi system).

Soil and water quality

Soil was acidic and poor in nutrients in most of the reservoirs. Organic carbon was in the productive range (1.9 - 2.0%) in Cauvery basin reservoirs and relatively in less productive range (0.7-1.1%) in Krishna system reservoirs. pH of water ranged from near neutral (Linganamakki and Kabini) to alkaline range. Essential nutrients such as NO_3-N and PO_4-P were poor (0.016-0.04 ppm) in all the reservoirs. There was no correlation between soil nutrients and water quality indicating that thhe latter was largely governed by inflows from catchment rather than basin soil. There was no correlation observed between alkalinity and primary production ($r = 0.145$) and PO_4-P and primary production ($r = -.105$).

Biotic communties

The standing crop of plankton was richer in Malaprabha (2.37 ml/m^3), Kabini (1.78 ml) and Hemavathi (1.46 ml) and poor in Vanivilas sagar and Bhadra. Benthic communities were poor in most of the reservoirs. Relatively richer density of macro benthos occurred in Kabini (2038 units/m^2), Nugu (647 units/m^2) and Narayanpur (340 units/m^2).

Fishing effort and fisheries

Fishing was at low ebb during post monsoon months except at Vanivilas sagar and Narayanpur reservoirs. No fishing was observed in Nugu, Harangi, Ghataprabha and Malaprabha. In Narayanpur, Bhadra and Linganamakki fishery consisted mostly of indigenous species, while in Vanivilas sagar and Kabini common carp was dominant. Rohu occurred sporadically in Kabini and Vanivilas sagar while *C.catla* was not observed. Tilapia was recorded in Kabini, Nugu, Narayanpur and Linganamakki.

Yield potential

Fish yield potential had been estimated on the basis of modified morphoedaphic index, incorporating a drainage parameter in place of edaphic parameter.

Production level	*Reservoir*
Highly productive	Narayanpur
Productive	Kabini, Nugu, Vanivilas sagar
Medium productive	Hemavathi, Harangi & Malaprabha
Low productive	Bhadra, Ghataprabha, Linganamakki

Sub-Project (ii) **Ecology and fisheries of Manchanbele reservoir.**

Soil was acidic (pH 5.4) and rich in organic carbon (2.04%). Level of nutrients was low. Thermal stratification occurred during summer between 5 and 6 m. Oxycline was strong (6.0 (Surface) - 0.2 ppm (Bottom) indicating the productive potential of the reservoir. Euphotic zone extended upto 4 m and GP was estimated at 1856 mg C/m^2/day. High community respiration (1000 mg C/m^2/day) suggested the productivity of the reservoir. Zooplankton was dominant throughout. Benthic fauna was poor. Aquatic plants were absent.

Great potential exists for the development of fisheries in Manchanbele reservoir. However, the process is yet to commence, though the impoundment was formed in 1991. There is no organised fishing. Miscellaneous species and tilapia occurred in the catches.

Sub-Project (iii) **Ecology and fisheries of Tawa reservoir (M.P).**

Fishery

Fishery exploitation in the reservoir resumed from 2nd Jan. 1997 after 18 months of suspension. The catch till the end of February amounted to 50.6 t. *C.catla* contributed 48.6 and *C.mrigala* 25.7%, *L.rohita* came a poor third with 4.9%. Indigenous carps and catfishes accounted for 19%. Catla occurred in the size range of 420 to 720 mm (wt. 0.75 to 6.3 kg) *C.mrigala* 460 to 705 mm (wt. 0.75 to 3.5 kg) and *L.rohita* 450 to 620 mm (1.0 to 3.15 kg). Indigenous species consisted of *T.tor, L.calbasu, M.aor, M.seenghala, W.attu* etc.

Fry of major carps were collected during August and September by operating fine meshed dragnets in the shallow areas of intermediate sector. This indicated successful breeding and recruitment of major carps though on a limited scale.

Biotic communities

The standing crop of plankton was in the range of 0.7 (May) to 2.82 ml/m^3 (April) zooplankton comprising copepods, cladocerans and rotifers formed 80% of the population. Phytoplankton was represented by Chlorophyceae and Bacillariophyceae.

Macrobenthos was fairly good with an average of 1400 units/m^2. Molluscs accounted for more than 50% followed by dipteran larvae.

Fish food resources of Tawa and the present catch warrant stocking of catla as a major species. However, the stocking figures for 1996-97 showed *L.rohita* as 49% followed by catla 32% and mrigala 20%.

PROJECT : FC/A/22

ECOLOGY AND FISHERIES MANAGEMENT OF WETLANDS IN ASSAM.

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

Duration : 1994-1999

Location : Guwahati

Water quality of beels

Water quality parameters of Kaptanpur (15 ha), Banskandi (30 ha), Algapur (20 ha), Ramnagar (18 ha), Barchunati (5 ha), Boiya (17 ha), Sone (2800 ha) Anganai (30 ha), Sakty (9 ha) and Howder (10 ha) beels in Barak valley and Badisisha (80 ha), Godhia (20 ha), Malhota (21 ha), Kaloi (20 ha), Khoroi (18 ha), Bilmukh (450 ha), Digholi (60 ha) and Mandira (10 ha) in Brahmaputra valley were studied. Beels in both Barak and Brahmaputra valleys reflected diverse limnochemical characters.

Primary productivity

Rate of carbon production, both by phytoplankton and macrophytes, were studied in six beels, three each from Brahmaputra and Barak valleys. Gross and net production rates (mg C/ m^2/day) by phytoplankton were 1964.62 and 988.2 in Ramnagar; 1012.44 and 584.62 in Sone; 1524.82 and 982.48 in Boiya; 962.52 and 712.56 in Bodisisha; 1784.38 and 1286.12 in Digholi and 1378.08 and 1057.56 in Bilmukh beels, while that by macrophytes were 2842.5 and 1700.0; 4787.56 and 3011.38; 3046.6 and 1711.6; 2956.82 and 2114.64; 3814.7 and 2550.4 and 3258.12 and 2238.8 in the six beels respectively. The rate of total production (mg C/ m^2/day) ranged between 3919.34 and 5800.0 (gross) and 2688.2 and 3836.52 (net) with maximum in Sone and minimum in Bodisisha beels. Among the two producer groups phytoplankton contributed 17.4 to 40.7% (av. 29.5%) of the total and the rest was contributed by macrophytes.

Biotic communities

Considerable variations were observed in the numerical abundance of plankton in the beels of Brahmaputra valley being maximum in Bagheswari (8156 units/l) and minimum in Bilmukh (28 units/l). Phytoplankton remained the dominant component in

all the beels, except Kaloi and Bilmukh where the contribution of zooplankton ranged between 67.86 and 78.11%. The overall variation of zooplankton was nil to 78.11% of the total. The numerical abundance of plankton in the *beels* of Barak valley ranged between 9 to 406 units/l being maximum in Angnai and minimum in Howder. Phytoplankton dominated in all the beels except Kaptanpur (zooplankton 100%) and Sakty (zooplankton 78%).

The concentration of benthos ranged between 8 to 212 units/m^2 in beels of Brahmaputra valley and negligible to 151 units/m^2 in Barak valley. Among the various groups gastropods dominated in Kaloi, Boiya and Sone *beels* (76..77 to 100.0%) and in the remaining beels oligochaetes remained the dominant component (80 to 100%).

Fish production

Fish landing and catch composition from various landing centres, Mangaldoi, Tezpur, Biswanath chariali, North Lakhimpur, Gogamukh and Jorhat in Brahmaputra valley and Silchar and Karimganj in Barak valley has been presented in Table 1.

Pen culture in Mandira beel complex

Pen culture experiments are being conducted in two pens of 0.1 ha each. Both the pens were stocked with major carp fingerlings of initial average length 10 cm and weight 15 g, in the ratio of 35% rohu, 35% catla and 30% mrigal.

PROJECT : FC/A/23

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

Personnel : Ch. Gopalakrishnayya, A. K. Das

Duration : **1995-1997**

Location : **Eluru**

The study was conducted in nine reservoirs of Andhra Pradesh. They were Wyra, Musi, Nagarjunasagar, Srisailam (Krishna River System), Singur, Lower Manair Dam, Kadam (Godavari River System), Mid Pennar Dam and Somasila (Pennar River system). Among these, the oldest was Wyra (1930) and the latest was Singur (1989). Nagarjunasagar, Srisailam, Singur, L.M. dam and Somasila were large reservoirs having area of more than 5000 ha at FRL. The rest were between 1000-5000 ha in area. Nagarjunasagar was the deepest with a mean depth of 40.6 m at FRL and the shallowest was Wyra (3.98 m). The most irregular shore line was found with Srisailam. Musi was polluted with not much fishing activity.

Physico-chemical characters

The transparency was maximum during pre-monsoon for all the reservoirs. On an average euphotic zone in all were extended to more than 2 m throughout the year. Pre-monsoon, monsoon and post-monsoon air and water temperatures ranged from 28.0-34.0°C and 25.5 to 32.0° C respectively. DO was more during pre- and post-monsoon seasons (6.4 - 8..4 mg/l) excepting the polluted Musi. CO_2 was nil or in trace level in all the reservoirs. Except Musi other reservoirs showed sp. conductance in the range of 316.0 - 610.0 µmhos/cm on an average. On an average the total alkalinity value ranged from 94.66 (Mid Pennar dam) to 150.0 mg/l (Kadam). Wyra showed the most productive potential (132.42 kg/ha fish) in comparison with other reservoirs.

Nutrient status of soil

Available nitrogen was in the range of 27.07 (Somasila) to 62.87 mg/l (Wyra). Most of the A.P. reservoirs were of moderate to high productive.

Biotic communities

Plankton

Zooplankton dominated in all the reservoirs. Protozoa, rotifers, cladocerans and copepods were the representatives.

Bottom biota

Concentration of bottom biota was found to be more during pre-monsoon in all the reservoirs. Bulk of the bottom biota were contributed by dipteran larvae and gastropods in all the reservoirs.

Fisheries

From the catch data available major fishery and species available were recorded . (Table 1).

Table 1. Catch composition from selected A.P. reservoirs

Reservoir	dominant group	species recorded
Wyra	*M. malcolmsonii* - > 50%	*Catla catla, Labeo rohita, Mystus aor, M. cavasius, Ompok bimaculatus*
Musi	No commercial fishing during the study period. Experimental fishing was conducted.	*C.catla, L.rohita, Puntius sarana, Wallago attu, N otopterus notopterus, O.bimaculatus*
Nagarjunasagar	Carps - 85-90%	*Cirrhinus mrigala, C.catla, L.rohita, L.calbasu, L.fimbriatus, M.seenghala, O.bimaculatus, M.aor, P.pangasius, S.childrenii, W.attu*
Singur	Carps - > 67%	*L. rohita, C.mrigala, N.notopterus, O.bimaculatus, M.seenghala, M.vittatus, M.aor, Chanda nama, Mastacembelus armatus*
Lower Manair Dam	Carps - > 60%	*L.calbasu, L.rohita, C.catla, P.sarana, M.seenghala, O.bimaculatus, Clarias batrachus, Channa* sp., *Anabas* sp., *Mastacembelus* sp., *Notopterus notopterus*
Kadam	Carps - > 55%	*L.rohita, L.calbasu, P.sarana, C.reba, T or khudree, W.attu, M.seenghala, N.notopterus, M.corsula, O.bimaculatus, C.nama*
Srisailam	Carps	*C.catla, L.rohita, Cirrhinus mrigala*
M.P. Dam	Catfish - >34%	*C.catla, L.rohita, Labeo potail, P.sarana, M.seenghala, M.armatus, L.calbasu, C.reba, Puntius kolus, M.aor, M.cavasius, O.bimaculatus, N.notopterus, Channa punctatus, Glossogobius* spp., *Osteobrama cotio, Chela bacaila*
Somasila	Carps - > 64%	*C.catla, L.calbasu, L.rohita, C.mrigala, W.attu, O.bimaculatus*

PROJECT : FC/A/24

ASSESSMENT OF PRODUCTION POTENTIALITY OF RESERVOIRS IN TAMIL NADU

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

Duration : 1996-98

Location : Coimbatore

Nine reservoirs were studied *viz.,* Amaravathy, Uppar, Palar-Poranthalar, Parambikulam, Thunakadavu, Peruvaripallam, Annderipallam, Varattupallam and Pilloor.

Ecological studies

Soil quality

The soil pH of the reservoirs varied from 5.9 to 7.8. The electrical conductivity of Gunderipallam reservoir was 0.77 mmhos. It was ranging from 0.20 to 0.35 mmhos for all other reservoirs. Available nitrogen ranged from 16.1 to 34.1/mg and available phosphorus ranged from 0.4% (Uppar) and 4.1% (Parambikulam).

Water quality

The pH of water showed acidic reaction in Parambikulam (6.4 - 6.6 units) and Thunakadavu (6.6 - 6.8). The maximum pH was recorded at Gunderipallam (7.9 - 8.3 units). The dissolved oxygen content of water from surface layers in all the reservoirs was fairly good whereas, it was below the desired level in certain reservoirs like Varattupallam (2.9 ppm), Gunderipallam (3.0 ppm) and Palar-Poranthalar (3.6 ppm). Free carbondioxide was recorded in almost all the reservoirs. Highest alkalinity was recorded in Gunderipallam (184.6 - 220.3 ppm) and minimum was in Thunakadavu (24.6 - 24.7 ppm). Very small quantities of phosphates (0.01 - 0.22 ppm) was recorded in the reservoirs. Silicates were fairly good (4.9 - 8.6 ppm).

Plankton

Plankton population was dominated by phytoplankton (52.2 - 97.4%) in all the reservoirs, excepting Varattupallam where zooplankton (89.2%) dominated. The number of plankters varied from 2040 to 32930 per litre and the volume ranged from 2.0 to 11.0 ml/m^3.

Macrobenthos

The macrobenthos were mostly constituted by members belonging to *Chirnonomus, Chaoborus* and oligochaetes.

Primary productivity

The average primary productivity indicated that Varattupallam reservoir was the most productive one followed by Gunderipallam, Palar-Poranthalar, Uppar, Thunakadavu, Peruvaripallam, Parambikulam, Pilloor and Amaravathy.

Stocking

Of the nine reservoirs selected for survey and sampling, regular stocking of seed of cultivated carps was done in 5 reservoirs, *viz.*, Amaravathy, Uppar, Palar-Poranthalar, Gunderipallam and Pilloor on an average density of 3.73, 1.99, 3.39, 1.74 and 0.59 lakhs respectively per annum, during the last 5 years. The reservoirs like Parambikulam, Thunakadavu and Peruvaripallam are not stocked for many years as these reservoirs are located in the wild life sanctuary.

Fishing and fish yield from the reservoirs

Regular fishing is being done using gillnets by professional fishermen on share-crop basis. The average fish catch per year during the last 5 years worked out at 132.4 t in Amaravathy, 81.0 t in Palar-Poranthalar, 59.1 t in Uppar, 22.4 t in Gunderipallam and 2.5 t in Pilloor. The contirbution by stocked varieties was high in Palar-Poranthalar (85.83%), followed by Amaravathy (73.64%) and Gunderipallam (32.72%). The contirbution by indigenous varieties of fish was more in the landings at Pilloor and Uppar reservoirs. In Parambikulam, Thunakadavu and Peruvaripallam no organised fishing was carried out except some illegal fishing by the tribal people.

PROJECT : FC/A/25

ECOLOGICAL INVESTIGATIONS OF SELECTED RESERVOIRS IN HARYANA, PUNJAB AND HIMACHAL PRADESH TO EVOLVE MANAGEMENT PACKAGE.

Personnel : D.K. Kaushal, V.K. Sharma

Duration : 1996-1997

Location : Karnal

The details of the seven reservoirs studied are given in Table 1.

Table 1. The details of the reservoirs surveyed

Name of the reservoir	State to which it belong	District	Area (ha)
Badkhal	Haryana	Faridabad	22.8
Peacock	Haryana	Faridabad	10.8
Dholbaha	Punjab	Hoshiarpur	57.0
Janauri	Punjab	Hoshiarpur	17.0
Maili	Punjab	Hoshiarpur	46.0
Nangal	Punjab	Ropar	280.0
Chamera	Himachal Pradesh	Chamba	900.0

Limnological observations

The Badkhal reservoir was productive (Calcium 20.04 ppm and specific conductivity 117-212 μmhos/cm). Peacock lake was eutrophic in character (Cal. 24.04 to 32.0 ppm and Sp. conductivity 667-721 μmhos/cm). Dholbaha, Janauri and maili reservoirs also were classified as productive. Chamera and Nangal reservois were low productive.

Primary productivity

Gross organic carbon production ranged from 68.3 $mgC/m^2/hr$ in Maili reservoir to 135.7 $mgC/m^2/hr$ in Peacock reservoir. Values of net organic carbon production varied from 30.0 $mgC/m^2/hr$ in Janauri reservoir to 97.93 $mgC/m^2/hr$ in Peacock reservoir.

Aquatic biodiversity

Plankton studies exhibited dominance of Myxophyceae (34.8%) in Badkhal reservoir, Chlorophyceae was abundant (32.7%) in Peacock reservoir. In Dholbaha Janauri, Maili and Nangal and Chamera reservoirs, the Bacillariophyceae was dominant ranging from 36.01 in Maili to 67.1% in Dholbaha reservoir. Periphytic communities in all the reservoirs was dominated by Bacillariophyceae varying from 66.8% in Peacock to 83.9% in Janauri reservoir. The average standing crop of macrobenthos was low in Janauri (200 units/m^2) and was high in Dholbaha (1450 units/m^2) reservoir. The lake bottom as well as margin in Badkhal was found chocked with profuse growth of aquatic vegetation.

Fishery

The details on fishery of these reservoirs are given in Table 2.

Table 2. Fishery of the reservoirs during 1995-96

Name of the reservoir	Fish composition	Stocking (nos/yr)	Yield (kg/ha)
Badkhal	*Catla catla, Labeo rohita, L. calbasu, Cirrhinus mrigala, Ctenopharyngodon idella, Wallago attu, Channa* sp.	2 lakhs (IMC)	658
Peacock	*C.catla, L.rohita, C.mrigala, C.idella, C.carpio, Heteropneustes fossilis, Puntius sarana, H. molitrix*	1.25 lakhs	920
Dolbaha	*C.carpio, L.rohita, C.idella, C.mrigala* (all stocked)	75,100	57
Janauri	*C.carpio, C.idella, L.rohita* (all stocked)	25,000	-
Maili	*C.carpio, C.mrigala, L.calbasu, C.idella, L.rohita* (all stocked)	-	10
Nangal	*C.carpio, H.molitrix, Schizothorax plagiostomus, Tor putitora, Channa garua*	1.5 lakhs	13.5
Chamera	Commercial fishing not yet started. No. Data on stocking and fish yield.		

PROJECT : BF/B/3

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

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

Duration : 1983-1998

Location : Barrackpore

Investigations on physico-chemical features, soil conditions and primary productivity of the estuarine system were carried out for studying the ecology. No appreciable variation was found in the values of pH, D.O., transparency, alkalinity and phosphate. Nitrate and silicate values continued to show the decreasing trend since 1994-95. Moderate to high values of phosphate, nitrate and silicate are recorded in the different zones of the estuarine system.

Hydrological and soil conditions during bore tide

Considerable change in nutrient concentrations in the system was observed. Increased levels of salinity, dissolved oxygen, pH, silicate, phosphate, nitrate, sulphate , total nitrogen, hardness, specific conductivity were recorded in the estuary just after the bore tide. The bottom soil of the estuary also changed considerably during bore tide.

Primary production

Maximum average net primary production (88.47 $mgC/m^3/hr$) was found in the marine zone at Frazerganj whereas medium production (62.8 $mgC/m^3/hr$) and comparatively low production (27.1 $mgC/m^2/hr$) were observed in the upper freshwater (Nabadwip) and gradient (Diamond Harbour) zones respectively.

Biotic communities

Plankton production in the estuary showed a bimodal distribution with one peak during winter and the other during summer months the maximum production of plankton was high in the upper zone during winter (920 units/l) and summer (566 units/l) as well as in the lower marine zone during summer (981 units/l) and winter (492 units/l) seasons. The bulk of plankton is constituted by phytoplankton of which 90-95% by number is contributed by diatoms. The maximum production of macro-zoobenthos was observed in the upper freshwater zone of the estuarine system at Tribeni during summer (4085 $units/m^2$) as well as winter (3422 $units/m^2$).

Fishery

Estimation of catch and effort structure

Total fish yield from the Hooghly-Matlah estuarine system and Digha centre was estimated at 51126.1 t and 17478.3 t respectively, during the period from February'96 to January '97 compared to 34280.4 t and 9990.1 t, during 1995-96. The reasons for the increased fish yield from the Hooghly-Matlah estuarine system may be attributed to high level of hilsa catch of 7,653.4 t as well as winter migratory bagnet catch in lower estuary of 35,844.6 t. The improved level of fish yield at Digha landing centre was due to maximum abundnace of *Pama pama* (4326 t), *Tenualosa ilisha* (2379.4 t), *Sciaena biauritus* (2061.6 t), *Tachysurus jella* (1578.7 t) and prawn (1121.5 t) which exhibited an increase in catch by 232%,20%,82% and 81% respectively.

The lower zone of the estuary contirbuted 97% of the total catch of the system. Bagnets and drift gill nets were the most dominant gears deployed in the estuary. Average CPUE of drift gill net and bag net were 1.39 kg and 3.55 kg in the upper estuary.

Hilsa fishery by drift gill net

The hilsa fishery of Hooghly-Matlah estuarine syystem and Digha landing centre during 1996-97 yielded an estimated catch of 7,653.4 t (15.0%) and 2379.4 t (13.6%) respectively. This was the highest catch ever recorded since 1960-61 and exhibited 40-60% increase than the bumber years of 1971-72, 1981-82 and 1990-91. Barring winter migratory bagnet fishery hilsa was the major component of estuarine fishery accounting 50% of the total yield from the estuary and 30.6% of totàl catch from Hooghly estuary and Digha centre.

Catch and effort of winter migratory bagnet fishery (WMBF)

About 6248 fishermen were engaged in fishing with 565 crafts (of which 268 were mechanised) and 1629 gears. The estimated catch in WMBF was 35844.7 t during November 1996 to January 1997 continuing 70% of catch of Hooghly estuary with an average CPUE of 85.75 kg. With the help of 'Fox model' the maximum sustainable yield (MJSY) for WMBF is derived as 35673.7 t. The dominant species contributing to the winter fishery in order of abundance were *Harpodon nehereus* (30.9%), *Trichiurus* sp. (20.4%), *Setipinna* spp. (14.2%) and *Pama pama* (9.3%).

Hilsa juveniles

Indiscriminate exploitation of hilsa juveniles through small meshed nets (chatberjal and beenjal) in the upper freshwater stretch of the estuary was estimated as 57.9 t during Feb. 1996 to Jan. 1997.

Exploitation of bagda (Penaeus monodon) *seed*

The total arrivals of bagda seed in the markets during the period February to June 96 (5 months) was estimated at 1,393.76 million. The sale price per thousand number seed varied from Rs. 110-1,400 during 1996 while it was Rs. 700-3,500 and Rs. 160-800 during 1995 and 1994 respectively.

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, V. Kolekar, R.C. Mandi, R.K. Sah

Duration : 1988 - 1998

Location : Vadodara

For exploring the hydro-biological variants, seven centres based on the topography and salinity ingress were identified and these were Mahegam, Bhadbhut, Bharuch and Jhanor, representing esturine and transitional extents while Sisodara, Poicha and Vedgam constituted the freshwater expanse.

Hydrological regime

The physico-chemical parameters of water and soil showed almost the same trend as those of previous year. Pollutional effects were recorded at Baijalpur and Sakkarpura.

Primary production

The gross production of the Narmada Estuarine System varied from 25.0 to 241.67 mgC m^{-3} hr^{-1} during this year. Average values of net production by and large reflected marginal increase. The net production fluctuated between 7.5 to 125.0 mg C/m/hr^{1}. Community respiration drifted between 15.0 to 165.0 mg C/m^3 /hr for the Narmada Estuarine System as a whole.

Biotic communities

There had been marked improvement in the planktonic biomass of the system during this year and the same fluctuated from 196 (Bhadbhut) to 555 units/l (Vedgam). Phytoplankton excelled as the major component of this planktonic abundance which varied from 86.86 (Bhadbhut) to 92.58%) (Jhanor). The average macro-benthic abundance of the Narmada esturaine complex drifted from 156 (Vedgam) to 10,838 units/m^2 (Bharuch).

PROJECT : BF/B/10

INVESTIGATIONS ON PRODUCTION DYNAMICS OF SALINE *BHERIES* IN RELATION TO THEIR FISHERIES DEVELOPMENT

Personnel : A.K. Ghosh, R.K. Banerjee, P.K. Pandit, H.C. Karmakar, T. Chatterjee, S.K. Chatterjee, B.B. Das, L.K. Parbat, A. Sengupta, Amoy Barui, Debasis Saha

Duration : 1991 - 1998

Location : Calcutta

During the period, the survey was initiated to select *bheries* from 3 different zones at Hatgachia (freshwater), Kharibari (low saline) and Kumirmari-Chandipur (high-saline). At freshwater and low saline zones 4 *bheries* each were selected and at high saline zone 3 *bheries* were selected for the collection of monthly samples to study the ecological parameters and production trend of fish and prawn (mainly *P. monodon*).

Water quality

The physico-chemical characters of water and soil of the selected *bheries* were studied.

Biotic communities

The plankton availability was recorded from traces to 3.3 ml/50 l at Hatgachia, traces to 4.0 ml/50 l at Kharibari and traces to 1.6 ml/50 l at Kumirmari-Chandipur area. The maximum plankton availability was at freshwater and low saline area 3.2 to 4.0 ml/50 l. The species diversity index was found to vary from 0.28 to 2.92 at freshwater; 0.97 to 2.73 at low saline and 0.38 to 2.73 at high saline areas during the period. The qualitative and quantitative analysis of periphyton, macrovegetation and benthos were carried out.

Statistical interpretation regarding plankton abundance.

Hydrobiological data collected from 21 bheries were analysed to identify the factors having positive, negative or synergetic effect on the plankton abundance. A linear multiple regression model of plankton abundance against available phosphate of water (X_1), water temperature (X_2), water depth (X_3), alkalinity (X_4), dissolved oxygen (X_5) has been worked out as :

$$Y = -89.3862 + 221.1866\,X_1 + 6.4448\,X_2 - 0.6589\,X_3 + 0.6203\,X_4 - 13.7111\,X_5$$

The regression was tested and was found to be significant at 1% level. The model is capable of explaining nearly 77% of the variability of plankton abundance at bheries.

Fish and fisheries

The estimated total fish production at freshwater zone ranged from 5750 to 8160.0 kg/ha/yr. The species cultured were Indian major carps, silver carp, *Cyprinus carpio, Tilapia* spp., *Labeo bata,* etc. At low saline zone, the production was fluctuated from 378.0 to 760.13 kg/ha/yr. While at high-saline zone, the production was from 217.23 to 367.73 kg/ha/yr. The production of *P.monodon* at most of the bheries of low and high-saline areas were hampered due to occurrence of white spot disease.

Fish and prawn disease

The occurrence of prawn diseases were reported from both low and high-saline zone bheries during the year. Isopod parasites and white spot disease were recorded from the prawn samples collected from the areas. About 15% of the sample was found to be infected.

Socio-economic study

To study the socio-economic conditions of the fishermen and the daily labourers engaged in operational work from the nearby villages of the selected *bheries*, a structured schedule was developed and so far 108 randomly selected clients were personally interviewed at low and high-saline areas.

PROJECT : BF/B/11

INVESTIGATION ON DIAGNOSIS AND CONTROL OF FISH AND PRAWN DISEASE EPIDEMIC

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

Duration : ***1992 - 1998***

Location : Barrackpore

During the period under report 400 fishes and prawns were examined for fish prawn disease investigation. A number of pathogens were recorded as illustrated in Table 1.

Table 1. Pathogens of fish and prawn identified during the year

Location	Disease	Host	Pathogen identified
Barasat Pond	Argulosis	*C.catla*	*Argulus* sp.
Kharibari *bheri*	Ergasilosis Trichodiniasis	*L. parsia M. gulio*	*Ergasilus, Trichodina*
Basirhat *bheri*	White spot disease	*P.monodon*	*Vibrio* sp.
Matlah estuary	Ergasilosis	*L. ParsiaL. tade*	*Ergasilus* sp.
Debpukur	Trichodiniasis	*C.mrigala*	*Tripartiella bulbosa*

Observations on Ergasilosis disease of *Liza parsia* recorded for the last three years in the Hooghly-Matlah estuary and the *bheries* reveal that the aetiological agent *Ergasilus* sp. cause epizootics only in the *bheries* but is harmless to the same host in the estuary. Investigations were conducted to determine the approximate normal ranges of physiological parameters in blood from clinically healthy Indian major carp under optimum water quality conditions. The results are shown in Table 2.

Table 2. Ranges of some physiological parameters in fishes

Fish species	S_1 *L.rohita* (25-60 gm)	S_2 *C.mrigala* (30-50 gm)
Haemoglobin (g/100 ml)	6-6.5	8.5-9.0
Haematocrit (%)	36-49	38-49
Leucocrit (%)	-	-
Clotting time (sec.)	39-46	24-34
Plasma chloride (mEq/l)	92-94	81-98
Plasma glucose (mg/100 ml)	48-118	45-66
Plasma protein (g/dl)	3.2-4.6	3.5-4.0
P. cholesterol (mg/100 ml)	250-329	332-368
Liver glycogen (mg/gm)	9-12	2-2.5
Muscle glycogen (mg/gm)	5-6.5	7-8.5

The anterior kidney of clinically healthy *L.rohita* inhabiting non stressed water body was examined histologically for standardising the nuclear diameter and cell size of the interrenal cell, required for stress assessment of fish. Specific disease epizootics investigated on Argulosis and remedial measures were suggested. Mortality of *P.monodon* juvenile was investigated. The following remedial measures were suggested :

1. *Removal of submerged weed from the bheri*
2. *Application of bleaching powder @ 1 mg/l*
3. *Incorporation of a storage tank to improve water quality of the bheri*

PROJECT : BF/B/12

SPATIO TEMPORAL VARIATIONS IN THE BIOTIC AND ABIOTIC FEATURES OF THE MAJOR ESTUARIES AMIDST SUNDERBAN MANGROVES

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

Duration : 1993-1997

Location : Barrackpore

Research investigations were continued at six major estuaries *viz.*, Jheela, Bidya, Matlah, Thakuran, Saptamukhi and Hooghly located amidst Sunderban mangals.

Physico-chemical parameters

Physico-chemical parameters of different estuarine waters in different seasons were studied. The values of pH, DO, alkalinity and soluble nitrogen values, etc. were at optimal level in different seasons at all the six selected estuaries. The values of PO_4-P (0.012-0.045 ppm) during monsoon and winter also were condusive.

Biotic communities

For all the seasons the plankton concentration was the highest at the Bidya estuary and quite low at the Hooghly estuary though the poorest concentration was recorded at the Jheela. Unlike plankton density, the concentration of macrobenthos was the maximum (74.8-173.4 units/m^2) at Hooghly-Saptamukhi estuarine system with adequate headwater influx and the minimum (54.7-134.3 units/m^2) at Bidya-Jheela estuarine system with scanty headwater discharge. Availability of *P.monodon* seed in the nektonic samples was quite rich at Bidya-Jheela estuarine system and less at the Thakuran estuary.

Microbes

Certain microbes are responsible for the nutrient levels in the water while some are harmful for the estuarine fishes. In general, the bacterial loads were at their maxima during monsoon and at the minima during winters for all the estuaries within the Sunderban mangals. Another striking feature was that the load of heterotrophic bacteria was always at the highest level followed by the load of phosphate solubilizing bacteria and aerobic N-fixing bacteria.

Biochemical studies

The studies on hydration, condition factors and gonadosomatic indices of *S. panijus* and *P. paradiseus* were taken up during the period under report. These three parameters showed direct relationship with the headwater flow into the estuaries. The values of moisture content, condition factors and gonadosomatic indices were the highest at the Hooghly-Saptamukhi system with ample headwater discharge and the least at the Bidya-Jheela system with scanty headwater. The environment did not show any stressed condition or abnormality.

Socio-economic studies on *P.monodon* seed collectors

The investigation was conducted through structured schedule and the efficiency of the gears were tested through actual operation of the nets. Seed collected through experimental nets were compared with those of the seed collectors. Since 1993-94, the per net/day seed availability in the Hooghly, Saptamukhi, Thakuran and Matlah estuaries were going down gradually. The total seed collection rates declined by 10.5, 12.4, 9.5 and 7.7% over those of the previous year (1995-96) thus depleting the corresponding rates of *P.monodon* seed availability by 13,5.3,1.9 and 7.5%.

PROJECT : BF/A/21

ECONOMICS OF MIGRATORY BAGNET WINTER FISHERY OF HOOGHLY ESTUARY

Personnel : S. Paul, D.K. De, P.M. Mitra, N.C. Mondal, H.K. Sen, Prahlad Singh

Duration : 1993 - 1997

Location : Barrackpore

Data comprising 6 centres covering about 282 fishing camps (*khuti*es) located at Sagar Island, Bakkhali, Fraserganj, Kalisthan, Upper Jamboo and Lower Jamboo under Sunderban area 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 at 35844 (t) during November, 1996 to January, 1997 with an average CPUE of 75.75 kg by 282 khuties. Concentration of nets has increased from 1247 to 1629 an increase of 30.6% of the total nets deployed. With the increase in efforts by 40% catch has increased by 27%. The catch was marketed in the form of dried fish (35,143 t fresh fish gave 6939 dried fish) and live fish (701 t) having sale proceeds amounted to Rs. 18. 24 crores (dried fish - 13.38 + live fish 4.86 crores). The net income accrued to 282 owners of fishing camps for 6 centres was Rs. 14.52 crores.

Employment generation

6248 fishermen were engaged in winter migratory fishery camps in 6 centres and about Rs. 4517 was the average wage - paid for each fisherman during the winter period.

PROJECT : BF/A/22

IMPACT OF FARAKKA BARRAGE ON RECRUITMENT OF HILSA

Personnel : A. Mukherjee, A.B. Mukherjee, A. Ghosh, A.R. Chaudhury and A. Hajra

Duration : 1993 - 1997

Location : Maldah

Recording of fish landing data at Farakka Fish Assembly Centres with particular reference to three fishing zones *viz.*, Taltala (upstream of river Ganga, above the Farakka barrage). Beniagram (downstream of river Ganga, below the Farakka barrage) and Feeder Canal (leading to river Bhagirathi) has been carried out.

The total fish landing from the Farakka region above and below the Farakka barrage has been estimated to the tune of 140.53 t, an increase of 9.58% over that of 1995-96 (Table 1).

Table 1 . Fish landing at Farakka Region

Species	Feeder canal (a)	Beniagram (b)	Taltala (c)	Farakka (a+b+c)	% of group
a) Hilsa					
(up to 100 mm)	738.95	-	704.66	1443.61	1.03
(101-200 mm)	988.37	-	1010.27	1998.64	1.42
Adult	9192.99	19282.13	2469.87	30944.99	22.02
Group Total	**10920.31**	**19282.13**	**4184.80**	**34387.24**	**24.47**
b) Carps	6172.85	3247.27	8375.12	17795.24	12.66
c) Catfishes	8636.84	6047.26	10717.24	25401.34	18.08
d) Featherbacks	1053.17	376.48	2183.57	3613.22	2.57
e) Murrels	-	-	2106.30	2106.30	1.50
f) Miscellaneous	9450.25	7244.57	33563.31	50258.13	35.76
g) Prawns	1847.46	1965.33	3156.78	6969.57	4.96
Grand Total	**38080.88**	**38163.04**	**64287.12**	**140531.04**	
% of Centre	27.1	27.15	45.75		

Hilsa fishery

The total catch of hilsa, *Tenualosa ilisha* from the Ganga River System at the Farakka region during the period under report has been estimated to the tune of 34.39 t forming 24.47% of the total fish landing from the region. The catch of hilsa from the region depicts an increasing trend over the years. The catch of hilsa juveniles (upto 100 mm) from the Farakka region forms 4.20% (1.44 t) of the total catch of hilsa and is solely contributed by the upstream of Farakka barrage. This indicated the natural recruitment of the species at the upstream above the Farakka barrage.

Manikchawk fish landing centre

At Manikchawk centre the total fish landing estimated to the tune of 30.25 t depicting a decrease of 29.9% when compared with that of 1995-96. At Rajnagar the total fish landing was to the tune of 42.97 t.

Breeding grounds of hilsa

In order to delineate the breeding ground of hilsa in and around Farakka barrage a study was conducted along the river stretch of 100 km down stream and 140 km up stream of Farakka barrage. The presence of hilsa juveniles of the sizes varying from 36 mm to 60 mm in December and 40 mm to 73 mm in January has been recorded from the fish landing centres at the upstream of Farakka barrage.

PROJECT : AN/A/15

ASSESSMENT AND DYNAMICS OF FISH POPULATION IN MAJOR INLAND WATER SYSTEMS

Personnel : R.A. Gupta, S.K. Mandal, G.C. Laha, P.M. Mitra, H.C. Karmakar, R.K. Tyagi

Duration : 1991-1997

Location : Barrackpore

Studies were conducted on the stock structure and population dynamics of few important fish species by length based stock assessment models. Utilising the information on growth parameters as inputs, the average mortality rates, average length in the catch and total estimated catch were worked out and are presented in Table 1.

Table 1 . Fishing mortality rates, mean length and catch of various species

Species	Fishing mortality		Mean length (cm)		Catch (t)	
	1987-89	*1994-96*	*1987-89*	*1994-96*	*1987-89*	*1994-96*
L. parsia	4.91	2.81	9.51	10.01	14.72	19.23
P.paradiseus	6.00	4.49	16.03	14.81	180.97	150.33
P.pama	7.33	8.58	16.22	16.03	4500	4752.88
S.phasa	4.28	13.76	16.03	13.82	368	318.00

Comparison of data of mortality rates and effort levels of *Liza parsia* taking 1987-89 as the base year indicated that there has been appreciable decrease in fishing mortality (fishing effort) in the recent years contributing higher landings of this species. In case of *Polynemus paradiseus* marginal decline in effort was noticed thereby decreasing the catch of the species by 17%.

PROJECT : AN/A/16

INLAND FISHERIES RESOURCE EVALUATION THROUGH REMOTE SENSING TECHNIQUES

Personnel : R.A. Gupta, S.K. Mandal, G.C. Laha, P.M. Mitra, H.C. Karmakar, R.K. Tyagi

Duration : 1995-1998

Location : Barrackpore

The work had to be kept suspended during the year for want of suitable satellite imagery. Efforts are in progress to obtain the same as well as suitable software for required interpretation.

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PERSONNEL

The following scientists rendered their services to the Institute during the period April 1996 to March 1997.

Dr. M. Sinha, Director

RIVERINE DIVISION

Allahabad Centre

Dr. R.S. Panwar, Pr. Scientist
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-
Shri R.N. Seth, -do-
Shri R.K. Dwivedi, -do-
Dr. R.K. Tyagi, -do-
Dr. B.K. Singh, -do-
Shri P.N. Jaitly,Scientist (Sr. Scale)
Shri P.K. Katiha, -do-
Shri Ravish Chandra, Pr. Scientist (Retd. on 28.2.1997)

Guwahati Centre

Dr. V. Pathak, Senior Scientist
Dr. M. Choudhury, -do-
Shri B.K. Bhattacharjya, Scientist

Karnal Centre

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

RESERVOIR DIVISION

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Shri C. Selvaraj, Pr. Scientist (from 24.2.1997)
Dr. M. Ramakrishnaiah, Sr. Scientist
Shri P.K. Sukumaran, -do-
Shri D.S. Krishna Rao, -do-
Shri M. Karthikeyan, Scientist (Sr. Scale)
Dr. V.R. Desai, Pr. Scientist (Retd. on 31.7.1996)

Eluru Centre

Shri Ch. Gopalakrishnayya, Pr. Scientist (Retd. on 28.2.1997)

Coimbatore Centre

Shri V.K. Murugesan, Sr. Scientist

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Hoshangabad Centre

Shri N.P. Srivastava, Sr. Scientist
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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 (Retd. on 30.9.1996)
Dr. K.R. Naskar, -do- (on Deputation)
Shri H.C. Karmakar, -do-
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Vadodara Centre

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Dr. Archan Kanti Das, Scientist
Dr. Md. Abul Hassan, -do-
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Dr. M.K. Das, -do-
Dr. K. Chandra, -do-
Dr. B.C. Jha, -do-
Dr. B.P. Mohanty, Scientist

RESOURCE ASSESSMENT DIVISION

Barrackpore Centre

Shri R.A. Gupta, Pr. Scientist
Shri S.K. Mondal, Sr. Scientist
Shri G.C. Laha, -do-
Dr. Dhirendra Kumar, -do- (from 3.9.1996)

OTHER SECTIONS

Economics Section, Barrackpore

Shri S. Paul, Sr. Scientist

Engineering Section

Shri A.B. Mukherjee, Pr. Scientist (Retd. on 31.10.1996)

Krishi Vigyan Kentra, Kakdwip

Shri J.G. Chatterjee, Sr. Scientist

Scientists on Deputation/Lien/Duty in other organizations

Dr. Y.S. Yadava, Sr. Scientist,
Dr. V.R. Chitranshi, -do-
Dr. K.R. Naskar, -do-

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

T-5

Shri P.S.C. Bose
Shri R.C. Singh
Ms. Anjali De
Ms. Sukla Das (from 3.2.1997)
Shri P.K. Ghosh
Shri S.K. Das
Shri N.K. Srivastava,
Shri T.S. Rama Raju
Shri R.C. Satapati
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
Shri Ram Chandra (Retd. on 28.2.1997)
Shri R.N. De (Retd. on 31.10.1996)

T-4

Shri H. Chaklader
Shri Amiya Kr. Banerjee
Shri Fatik Manna
Shri Camil Lakra
Shri M.P. Singh
Shri B.K. Biswas (on study leave)
Shri D.K. Biswas
Shri S.K. Srivastava
Shri H.C. Banik
Ms. Keya Saha (on deputation abroad)
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
Ms K. Jacquline
Dr. (Mrs.) Kalpana Srivastava
Shri Sita Ram Meena
Dr. Pratap Kumar Dhar (from 24.1.96)
Md. Quasim, Language Assistant (from 29.6.1996
Miss Sunita Prasad, Hindi Translator (from 29.6.1996
Shri James Murmu, -do-

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 (on study leave from 27.1.97)
Shri B.N. Das
Ms. Rina Naiya
Shri C.K. Vava
Shri K.L. Das, Driver, (from 29.6.1996)
Shri Badal Lal Singh , -do-
Shri Suraj Bahadur , -do-
Shri K.K. Dutta, -do-
Shri A.K. Majumder, -do-
Shri N.C. Biswas, -do-
Shri M.C. Pal, -do-
Shri Uday Kr. Chatterjee, -do-
Shri Ranjit Singh -do-
Shri D. Burgayary, -do-
Shri Kanu Ranjan Deb, -do-
Shri K. Ganeshan, -do-
Shri S. Bhattacharjee, Carpenter, -do-
Shri Chittaranjan Das, Pumpman,-do-
Shri Swapan Kumar Deb,Plumber,-do-
Shri Santosh Kumar Biswas, Carpender, -do-
Shri S.C. Bhowmick, Sr. Gestetner Operator

T-2

Shri D. Chatterjee
Ms. Abhijita Sengupta
Shri L.K. Parbat
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
Shri C.G. Rao (Retd. on 31.5.1996)

T-I

Shri Rajesh Kumar Sah
Shri Ashis Roy Chowdhury
Shri C.P. Singh
Shri Arun Kumar Mondal, Driver, (from 29.6.1996)
Shri Aditya Kumar Goswami, (-do-)
Shri V.G. Dhindore, (-do-)
Shri Virendra Kumar, (-do-)
Shri Ram Prasad, (-do-)
Shri Ram Sajiwan, (-do-)
Shri Suk Lal Bairagi, Pumpman, (-do-)

Auxiliary

Shri R.L. Balmiki, Driver
Shri P. Ramalingeswara Rao, -do-
Shri B.K. Naskar, -do-
Shri Subhendu Mondal, Boat Driver
Md. Yousuf Ali Sk., -do-
Shri A.K. Jana, -do-
Shri M. C. Raikwar, Sr. Gestetner Operator (Retd. on 31.1.1997)

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

Senior Administrative Officer

Shri A.C. Ghosh

Finance & Accounts Officer

Sri G.P. Sharma

Hindi Officer

Shri P.R. Rao

Assistant Administrative Officer

Shri Arun Kumar Chakraborty (from 6.12.1996)

P.A. to Director

Shri G. Lahiri

Senior Stenographer

Shri U.K. Ghosh
Shri T.K. Roy

Superintendent (Admn.)

Shri I.N. Kodandaraman
Shri C.C. Das
Ms. Namita Choudhury
Ms. Sandhya Majumder (from 14.6.1996)
Shri M. Kachhap (from 7.11.1996)
Shri B.C. Bhattacharya (Retd. on 28.2.1997)
Shri M.M. Neogi (Retd. on 31.10.1996)

Superintendent (A & A))

Shri Ranjit Kr. Ghosh

Assistant

Shri R.C.P. Singh
Shri N.K. Mitra
Shri S.K. Kar
Shri K.Prasad
Shri S.R. Halder
Shri J.N. Banerjee
Shri D.N. Baidya
Shri S.K. Sarkar
Shri H.B. Sutar
Shri A.B. Biswas
Shri B.C. Mazumdar
Shri H.L. Sarkar
Shri T.K. Mazumder
Shri Kallu Singh
Shri D.K. De Sarkar (on deputation from 6.9.96)
Shri S. Bhowmick
Shri Biswanasth Sah
Shri Surendra Kumar (from 28.6.1996)
Shri Malay Kumar Das (from 1.10.1996)
Shri S.S. Sinha (from 7.11.1996)

Stenographer

Shri S. Bhattacharjee

Senior Clerk

Shri Baij Nath
Shri Samir Kr. Roy
Shri S.B. Roy
Shri M.L. Biswas
Ms. Sikha Mazumder
Shri P. Lahiri
Shri P.K. Dutta
Shri B.K. Das
Shri Ambika Lal
Ms. Anita Mazumder
Ms. N. Banerjee
Shri Kunj Behari
Ms. Bulbul Mallick
Shri Samir Kr. Bose
Shri J. Roy
Shri N.R. Kundu
Shri S.P. Mondal
Shri Sujit Kr. Ghosh
Shri Chhotey Lal
Shri S.K. Maranappan
Shri D. Chowdhury
Ms. A. Neogi
Shri Achintya Kumar De (from 16.11.1996)
Shri K. Manjhi (from 6.4.1996)
Shri K.S. Rao (from 22.11.1996)
Ms. Sefali Biswas (from 16.11.1996)

Junior Stenographer

Ms. G. Vinoda Lakshmi
Ms. Jolly Saha

Junior Clerk

Shri S.K. Tikadar
Ms. M. Banerjee

Ms. Arati Panigrahi
Ms. A. Chakraborty
Shri S. Karmakar
Shri P.K. Ghosh
Ms. Jayasree Pal
Shri U. Bhattacharjee
Ms. G. Mazumder
Shri C.K.N. Sahi
Shri Sukumar Sarkar
Ms. Swapna Chattopadhyay
Shri M.K. Joardar
Shri C.K. Pandey
Ms. Shyamali Mitra
Shri Paras Ram
Ms. S. Sumithra Devi
Shri Santosh Sarkar
Shri C.D. Parmer
Shri Akahhay Kumar
Shri Ganesh Ch. Burman (from 28.6.96)
Shri Akhil Chandra Biswas (from 21.11.1996)
Shri Shyam Sunder Ghosh (from 31.3.1997)

Time Keeper

Shri Swapan Kr. Das

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 M.S. Burman
Shri H.K. Pramanick
Shri A.M. Patra
Shri J. Khalko
Shri Jugol Kishore
Shri Jangali
Shri S.P. Yadav
Shri B.B. Das
Shri R.N. Tiar (from 4.12.1996)
Shri Surendra Nath Burman (from 27.11.1996)
Shri Tek Bahadur (from 19.11.1996)
Shri Sudhangsu Kumar Burman (from 26.11.1996)
Shri P. Sayalu

Supporting Grade III

Shri G.C. Mondal
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 P.C. Kachari
Shri A.L. Yadav
Shri K.D. Raju
Shri Bideshi Lal
Shri B. Prakash
Shri S.K. Das
Shri B. Hazarika
Shri L.K. Halder (from 29.1.1997)
Shri Bholanath Mondal (from 8.1.1997)
Shri Ram Prasad (from 10.1.1997)
Shri Karam Raj (from 10.1.1997)
Shri Maha Singh (from 9.1.1997)
Shri Suraj Bahadur (from 18.11.1996)
Shri J.N. Mallah (from 26.11.1996)
Shri P. Seshanna (from 21.11.1996)
Shri Aghnu Sahani (from 19.11.1996)
Shri S.C. Biswas (from 21.11.1996)
Shri Satyendra Burman (from 26.11.1996)
Shri S.S. Bondre (from 28.11.1996)
Shri Rajendra Ram (from 29.11.1996)
Shri K. Kaliannan (from 23.11.1996)
Shri M.V. Krishnan (from 23.11.1996)
Shri Sita Ram Nishad (from 1.12.1996)
Shri A. Ramaswamy (from 30.11.1996)
Shri Biswanath Mondal
Shri A.K. Biswas
Shri T.K. Biswas (Retd. on 31.5.1996)
Shri S.C. Balmiki (Retd. on 30.6.1996)
Shri D.D. Powdel (Retd. on 31.10.1996)

Supporting Grade II

Shri Munnilal Mallah
Shri Laxmi Ram
Shri P.C. Bez
Shri D.C. Das
Shri B.C. Das
Shri M.L. Saha
Shri J. Mukhia
Shri Subrahmani
Shri M. Mahadeva
Shri G.C. Paramanick
Shri R.U. Muchi
Shri K. Ningigowda
Shri S. Mahendran
Shri V. Mariappan
Shri Lalta Prasad
Shri Sita
Shri Rajdhari Mallah
Shri B. Pugalendhi
Shri Om Prakash
Shri M.P. Bind
Shri A. Gangaiah
Shri Karna Bahadur
Shri Ananda Biswas
Shri R. Palaneswami
Shri K.K. Dhir
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
Ms. Kalosasi Mondal
Ms. Kamala Devi (from 27.1.1997)
Shri Pasupati Ghosh (from 29.1.1997)
Shri Sree Nath (from 3.2.1997)
Sk Munsur Ali (from 4.2.1997)
Shri Gour Gharami (from 10.2.1997)
Shri M.C. Gharami (from 10.2.1997)
Shri Kharban Kumar (from 31.12.1996)
Shri Man Bahadur (from 31.12.1996)
Shri T.H. Ghume (from 10.1.1997)
Shri M.S. Bhoi (from 10.1.1997)
Shri Bhaskar Sarder (from 31.12.1996)
Shri Jagdish Balmiki (from 9.1.1997)
Shri M.C. Das (from 13.1.1997)
Shri G. Lal (from 10.1.1997)
Shri N.K. Das (from 31.12.1996)
Shri K.P. Ram (from 22.11.1996)
Ms. Hemlata Halder (from 31.12.1996)
Shri M. Anjanappa (from 20.11.1996)
Shri Sitala Prasad (from 26.11.1996)
Shri M.P. Das (from 19.11.1996)
Shri Lal Bahadur (from 19.11.1996)
Shri Kuldeep Singh (from 21.11.1996)
Shri K. Subbaiyan (from 30.11,.1996)

Supporting Grade I

Shri Lakshmi Ram
Shri Suresh Kumar
Ms. Bimla Devi
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. P. Ghosh
Shri S. Banerjee
Shri Sibu Lal Das
Shri S.C. Sadhukhan
Shri Dipak Chakraborty
Shri Biswanath Bose
Shri Ananta Kr. Bhanja
Shri Rabi Kr. Sardar
Shri Dilip Kr. Das
Ms. B. Sakuntala
Shri Mohan Lal Sarkar
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. Gayan
Shri Paramjit Singh

Shri Dalbir Singh
Sk Atiullah
Shri R. Nagraj
Shri S. Govindarajan
Shri Gopal Chand
Shri R.D. Chaudhury
Shri Prasidh Sahani
Shri Amar Nath Prasad
Shri Umashankar Ram
Shri Prakash Ch. Paramanick
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 M. Mari
Shri Satya Prakash
Shri Ganesh Bhanja

Ms. N.K. Chaki
Sk Saida
Shri C. Muniappa
Shri T.K. Halder
Shri R. Rajendran
Ms. Suvra Chakraborty
Shri Kamlesh Kumar
Shri Ranjit Kumar Roy
Shri P.N. Rao
Shri K. Mohanan
Shri Bablu Mondal
Sk. Abdullah
Ms. Sibani Roy
Shri Jamlal 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
Shri M. Pennappa

PROMOTIONS

The following members of staff were promoted/granted advance increments/opted for revertion/appointed/retired/resigned/transferred during the period as mentioned below :

Promotions

Name	Designation	Promoted to	With effect from
Dr. P.K. Katiha	Scientist	Scientist (Sr.Scale)	14.04.1994
Dr. B.L. Pandey	-do-	-do-	01.01.1987
Shri M. Karthikeyan	-do-	-do-	06.03.1994
Dr. Ashoke Kumar Chatterjee	T-7	T-8	01.01.1993
Smt. Sandhya Majumder	Assistant	Superintendent	14.06.1996
Shri Malay Kumar Das	Senior Clerk	Assistant	01.10.1996
Shri S. S. Sinha	-do-	-do-	07.11.1996
Shri Achintya Kumar Das	Junior Clerk	Senior Clerk	16.11.1996
Smt. Sefali Biswas	-do-	-do-	16.11.1996
Shri K.S. Rao	-do-	-do-	22.11.1996
Shri K. Majhi	-do-	-do-	06.04.1996
Shri Akhil Chandra Biswas	SSG.I	Junior Clerk	21.11.1996
Shri Surendra Nath Burman	SSG.III	SSG.IV	27.11.1996
Shri Tek Bahadur	-do-	-do-	19.11.1996
Shri Sudhangsu Kr. Burman	-do-	-do-	26.11.1996
Shri Biswanath Mondal	-do-	-do-	14.01.1997
Shri Suraj Bahadur	SSG.II	SSG.III	18.11.1996
Shri J.N. Mallah	-do-	-do-	26.11.1996
Shri P. Seshanna	-do-	-do-	21.11.1996
Shri Aghnu Sahani	-do-	-do-	19.11.1996
Shri S.C. Biswas	-do-	-do-	21.11.1996
Shri Satyendra Burman	-do-	-do-	26.11.1996
Shri S.S. Bondre	-do-	-do-	29.11.1996
Shri Rajendra Ram	-do-	-do-	29.11.1996
Shri L.K. Halder	-do-	-do-	29.01.1997
Shri Bholanath Mondal	-do-	-do-	08.01.1997
Shri Ram Prasad	-do-	-do-	10.01.1997
Shri Karam Raj	-do-	-do-	10.01.1997
Shri Maha Singh	-do-	-do-	09.01.1997
Shri K. Kaliannan	-do-	-do-	23.11.1996
Shri M.V. Krishnan	-do-	-do-	23.11.1996
Shri A. Ramaswamy	-do-	-do-	30.11.1996
Shri M. Anjanappa	SSG.I	SSG.II	20.11.1996
Shri Sitala Prasad	-do-	-do-	26.11.1996
Shri M.P. Das	-do-	-do-	19.11.1996
Shri Lal Bahadur	-do-	-do-	19.11.1996
Shri Kuldeep Singh	-do-	-do-	21.11.1996
Shri K. Subbaiyan	-do-	-do-	30.11.1996
Shri K.P. Ram	-do-	-do-	22.11.1996

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Shri Kharban Kumar	-do-	-do-	31.12.1996
Shri Man Bahadur	-do-	-do-	31.12.1996
Shri T.H. Ghume	-do-	-do-	10.01.1997
Shri M.S. Bhoi	-do-	-do-	10.01.1997
Shri Bhaskar Sarder	-do-	-do-	31.12.1996
Shri Jagdish Balmiki	-do-	-do-	09.01.1997
Shri M.C. Das	-do-	-do-	13.01.1997
Shri G. Lal	-do-	-do-	10.01.1997
Shri N.K. Das	-do-	-do-	31.12.1996
Smt. Hemlata Halder	-do-	-do-	31.12.1996
Smt. Kamala Devi	-do-	-do-	27.01.1997
Shri Pasupati Ghosh	-do-	-do-	29.01.1997
Shri Sree Nath	-do-	-do-	03.02.1997
Sk. Munsur Ali	-do-	-do-	04.02.1997
Shri Gour Gharami	-do-	-do-	10.02.1997
Shri M.C. Gharami	-do-	-do-	10.02.1997

Advance increments

Ms. Mira Sen	T-7	3 advance increments	1.1.1995

Reversion

Name from	Designation	Reverted to	With effect
Shri Sita Ram Nishad	SSG.IV	SSG.III	01.12.1996
Shri Jugal Kishore	SSG.IV	SSG.III	01.06.1997

Appointments

Name	Designation	Place of posting	Date of appointment
Dr. M.K. Bandopadhyay	Scientist (Sr.Scale)	Barrackpore	04.05.1996
Shri K. Manjhi	Senior Clerk	Hoshangabad	06.04.1996
Shri Surendra Kumar	Assistant	Allahabad	28.06.1996
Shri A.K. Chakraborty	AAO	Barrackpore	06.12.1996
Shri M. Kachhap	Superintendent	Barrackpore	07.11.1996
Shri R.N. Tiar	SSG.IV	Malda	04.12.1996
Shri Shyam Sunder Ghosh	Jr. Clerk	Barrackpore	31.03.1997

Retirement/Resignation

Name	Designation	Date of retirement
Shri A.B. Mukherjee	Principal Scientist	31.10.1996
Dr. V.R. Desai	Principal Scientist	31.07.1996
Dr. V.R.P. Sinha	Principal Scientist	02.01.1997
Shri Ch. Gopalakrishnayya	Principal Scientist	28.02.1997
Shri Ravish Chandra	Principal Scientist	28.02.1997
Dr. R.K. Banerjee	Senior Scientist	30.09.1996
Shri R.N. De	T-5	31.10.1996
Shri Ram Chandra	T-5	28.02.1997
Shri Ch. G. Rao	T-2	31.05.1996
Shri M.M. Neogi	Superintendent	31.10.1996
Shri B.C. Bhattacharyya	Superintendent	28.02.1997
Shri M.C. Raikwar	Sr. Gestetner Operator	31.01.1997
Shri S.C. Balmiki	SSG III	30.06.1996
Shri T.K. Biswas	SSG III	31.05.1996
Shri D.D. Powdel	SSG III	31.10.1996
Shri Rajesh Khandelwal	Resigned as Junior Clerk	12.04.1996

Transfers

Name	Designation	From	To
Dr. V.R. Desai	Principal Scientist	Bangalore	Hoshangabad
Shri C. Selvaraj	Principal Scientist	Coimbatore	Bangalore
Shri Bablu Kr. Naskar	Boat Driver	Hoshangabad	Barrackpore
Shri Dhirendra Kumar	Senior Scientist	IGKVV, Raipur	CIFRI, Barrackpore
Shri A.K. Goswami	Driver	KVK, Kakdwip	Barrackpore
Shri B.K. Bhattacharjee	Scientist	Barrackpore	Guwahati
Shri Bablu Kr. Naskar	Boat Driver	Hoshangabad	Barrackpore
Shri Kallu Singh	Assistant	Karnal	Allahabad
Shri D.K.Desarkar	-do-	Barrackpore	PDVR, Varanasi (on lien)
Shri T. Chatterjee	T-4	Malda	Calcutta
Shri Sukumar Saha	T-5	KVK, Kakdwip	Barrackpore
Smt. Sukla Das	T-5	NBFGR, Lucknow	CIFRI, Salt Lake (Inter-Institutional Transfer)
Shri Suresh Kumar	SSG.I	Allahabad	Karnal
Shri Karna Bahadur	SSG I	Barrackpore	Calcutta
Shri N.K. Das	SSG I	Calcutta	Barrackpore

contd...

Shri M. Anjanappa	SSG I	Markonahali Reservoir	Bangalore
Shri C. Muniappa	SSG I	-do-	-do-
Shri B.P. Mishra	SSG.I	KVK, Kakdwip	Hiamond Harbour
Shri T.K. Gayen	SSG.I	-do-	Barrackpore
Shri Munnilal Mallah	SSG.II	Karnal	Allahabad
Shri D. Borgoyary	Driver	Guwahati	Barrackpore
Shri M.K.Bandyopadhyay	Scientist (S. S)	CIFA, Dhauli	Barrackpore (Inter Institutional Transfer)
Shri J.N. Banerjee	Jr. Clerk	Barrackpore	Calcutta

हिन्दी खण्ड

वार्षिक प्रतिवेदन 1996-97
केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान
(भा. कृ. अनु. प.) बैरकपुर : पश्चिम बंगाल

संक्षिप्त इतिहास

भारत सरकार ने सन् 1943 के अपने एक ज्ञापन में देश के मात्स्यकीय संसाधनों के विकास केलिए एक केन्द्रीय विभाग की स्थापना पर विशेष वल दिया था । तत्पश्चात् केन्द्रीय सरकार की कृषि, वानिकी तथा मात्स्यकी से संवंधित उप-समिति ने भी इस प्रस्ताव का पृष्ठांकन किया था ।फलस्वरूप, भारत सरकार के खाद्य तथा कृषि मंत्रालय के अन्तर्गत केन्द्रीय अन्तर्स्थलीय मात्स्यकीअनुसंधान केन्द्र की स्थापना 17 मार्च 1947 को कलकत्ता में हुई । एक अन्तरिम योजना के रूप में प्रवर्तित यह केन्द्र अव देश की अन्तर्स्थलीय मात्स्यकी क्षेत्र में एक प्रमुख अनुसंधान संस्थान का रूप लेकर अपनी स्थापना का 5०वीं वर्षगांठ मना चुका है । वर्ष 1959 में इस केन्द्र को केन्द्रीय अन्तर्स्थलीय मत्स्य अनुसंधान संस्थान का पूर्ण दर्जा प्राप्त हुआ तथा पश्चिम वंगाल के वैरकपुर स्थित नवनिर्मित भवन में इसका स्थानांतरण हुआ । वर्ष 1967 में यह संस्थान भारतीय कृषि अनुसंधान परिषद् का विधिवत सदस्य वना ।

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 उपलव्ध अन्तर्स्थलीय जल संसाधनों जैसे- नदी, झील, पोखर, टैंक, जलाशय तथा वाढ़कृत 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 वीज उत्पादन, वायु-श्वासी मत्स्य पालन, अलवणीय जलाशयों की पारिस्थितिकी एवं मात्स्यकी प्रवन्धन तथा लवणीय जल मत्स्य पालन ।

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

नदीय संसाधनों से मत्स्य वीज संचयन
मत्स्य वीज परिवहन संवंधित तकनीक
कार्प मछलियों का प्रेरित प्रजनन एवं नर्सरी प्रवन्धन प्रणाली
चाईनीज कार्प मछलियों का वंध 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 प्रवन्धन
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 वढ़कर 2.1 लाख टन (1994-95) तथा मत्स्य वीज उत्पादन 409 लाख टन (1973-74) से वढ़कर 14,500 लाख टन (1994-95) हो गया है ।

7 वीं 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 1-4-1987 से केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान हुआ । इस परिवर्तित व्यवस्था में केए अ. प्र. म. अनु. सं. का दायित्व उन विवृत जल संसाधनों में शोध कार्य करना है जिनमें मत्स्य प्रवन्धन कार्य पर्यावरणीय अनुमापन तथा उसके संरक्षण से संवद्ध है ।

अधिदेश

इस संस्थान के वर्तमान अधिदेश निम्नलिखित हैं :-

1. 10 हेक्टयर क्षेत्रफल से वड़े जलीय संसाधनों में मत्स्य संख्या गतिकी का अध्ययन
2. उक्त प्रकार के जलीय संसाधनों से अधिकतम मत्स्य उत्पादन प्राप्त करने हेतु प्रवन्ध प्रणालियों को विकसित करना ।

3. इन जलीय संसाधनों में अपकर्षण व 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 संवंधित वेसिन की मात्स्यकी पर पड़ने वाले दुष्प्रभावों का अध्ययन एवं इनकी प्रवन्धन के लिए प्रणालियों को विकसित करना ।

5. अन्तर्स्थलीय मात्स्यकी से संवंधित आंकड़ों के संदर्भ में राष्ट्रीय केन्द्र के रूप में कार्य करना ।

6. प्रशिक्षण कार्यक्रमों का आयोजन एवं विस्तार व परामर्शक सेवाएं उपलब्ध करना ।

संगठन

उपर्युक्त अधिदेश की पूर्ति एवं देश के मात्स्यकीय विकास हेतु केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान के अनुसंधान कार्यों को प्रमुख मात्स्यकीय स्त्रोतों 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 प्रवन्धन हेतु तकनीकी प्रणालियों को विकसित करने का प्रयास कर रहा है । इस प्रभाग के अनुसंधान प्रकल्प गंगा, व्रह्मपुत्र, महानदी एवं नर्मदा नदियों तथा उनके मुख्य परितंत्रों से संवंधित है ।

वंगलोर स्थित जलाशय प्रभाग के केन्द्र तमिलनाड, आन्ध्र प्रदेश एवं मध्य प्रदेश राज्यों में हैं। इस प्रभाग की कार्य दिशा छोटे, मध्यम तथा वड़े जलाशयों में मत्स्य उत्पादन की वृद्धि हेतु प्रवन्धन प्रणालियों को विकसित करने की ओर है ।

वैरकपुर स्थित ज्वारनदमुखी प्रभाग इस समय हुगली-मातलह तथा नर्मदा ज्वारनदमुखी परितंत्रों पर कार्य कर रहा है । अनेक औद्योगिक ईकाइयों से प्रवाहित वहिःस्त्राव, कृषि एवं नगरपालिकाओं के अपरद्द 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 स्त्रोतों 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 स्त्रोत मूल्यांकन प्रभाग बैरकपुर में है और इस प्रभाग का लक्ष्य मत्स्य सम्पदा एवं मात्स्यकीय स्त्रोतों से संबंधित आंकड़ों को एकत्रित करना है । इस प्रभाग को विभिन्न जलीय स्त्रोतों में उपलब्ध मछलियों की संख्या निर्धारण कार्य का दायित्व सौंपा गया है ताकि इन अन्तर्स्थलीय मत्स्य स्त्रोतों का वैज्ञानिक समुपयोजन किया जा सकें ।

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 ।

मुख्य उपलब्धियाँ:-

ज्वारनदमुखी मत्स्य संख्या गतिकी के नए तथ्य

हुगली-मतलह ज्वारनदमुखी परितंत्र की मत्स्य संख्या गतिकी के विश्लेषण से रोचक तथ्य उजागर हुए हैं। इस वर्ष *एल. पारसिया* मछलियों के मत्स्यन दर में काफी गिरावट आई है (एफ = 2.81) जबकि 1987 - 89 के दौरान यह दर 4.91 थी । मत्स्यन कार्य की गहनता कम होने के परिणामस्वरुप इसके प्रग्रहण में 14.72 टन से 19.23 टन की वृद्धि हुई, अर्थात 31 प्रतिशत की वृद्धि, जो अभी भी अत्यधिक मत्स्यन कार्य को सूचित करता है ।

पी. पाराडाइसियस के मामले में स्थिति विपरीत है, जहाँ मत्स्यन कार्य अनुकूलतम स्तर का रहा। मत्स्यन कार्य की गहनता कम होने पर भी इसके प्रग्रहण में आई कमी इस बात का प्रमाण है। इस वर्ष के दौरान *पी. पाराडाइसियस* मछली का मत्स्यन दर 6.0 से घटकर 4.49 पाया गया। इसका प्रग्रहण 1987 - 89 के दौरान प्राप्त 180.97 टन से घटकर 1994-96 के दौरान 150.33 टन हो गया, अर्थात 17 प्रतिशत की कमी ।

मत्स्यन कार्य की गहनता में आई कमी का मुख्य कारण ज्वारनदमुख में मत्स्यन कार्य पद्धति में हुए परिवर्तन है । आजकल ज्वारनदमुख से समुद्रीय क्षेत्र में अनेक मोटर बोट उपयोग में लाये जा रहे हैं, जिसके कारण इन दोनों प्रजातियों, जो ज्वारनदमुख के तटीय क्षेत्र में उपलब्ध है, पर मत्स्यन का दवाव कम पड़ता है । यह स्पष्ट है कि मत्स्यन की गहनता में हुई वृद्धि मात्स्यिकी क्षेत्र को घाटे की स्तर तक पहुँचा दिया है एवं मत्स्यन क्षेत्र समुद्र की ओर वढ़ गया है ।

ज्वारनदमुखी मछली *पामा पामा* की मत्स्य गतिकी के नए तथ्य

संस्थान के स्त्रोत मूल्यांकन प्रभाग के अनुसंधान परियोजना कार्यक्रम में, व्यवसासिक तौर पर महत्वपूर्ण मछलियों की संख्या गतिकी का अध्ययन एक विशेष अंग है । हुगली-मातलह ज्वारनदमुख से संग्रहित *पामा-पामा* मछलियों की लम्वाई का समीक्षात्मक विश्लेषण किया गया । इस विश्लेषण तथा पहले परिकलन किए गए विकास कारकों के आधार पर मछलियों की मृत्यु दर का मूल्यांकन किया गया । मछलियों का कुल मृत्यु दर जेड=10.70, जिसमें मत्स्यन मृत्यु दर एफ=8.584, आंका गया । मत्स्य समुपयोजन दर वर्ष 1987-89 (0.77) की अपेक्षा इस वर्ष अधिक (0.80) पाया गया । मत्स्यन कार्य की गहनता में 3.9 प्रतिशत की वृद्धि तथा मत्स्य उपज में 1987-89 की तुलना में 56 प्रतिशत की वृद्धि देखी गई ।

इस मत्स्य प्रग्रहण में वृद्धि का मुख्य कारण मोटर बोट की सहायता से विशाल क्षेत्र में किए जा रहे मत्स्यन कार्य का होना है । मत्स्यन क्षेत्र में 7 प्रतिशत की वृद्धि हुई । परन्तु वर्ष 1987 से 89 के दौरान आकलित मछली की औसत लम्बाई 16.22 सेन्टीमीटर से घटकर 1994-96 के दौरान 16.03 सेन्टीमीटर रह गई जो अत्यधिक मत्स्यन को सूचित करती है । इस समय मत्स्यन दबाव को 64 प्रतिशत घटाना आवश्यक है, जिससे उपयुक्त मत्स्य उपज दीर्धकाल तक प्राप्त किया जा सके ।

गंगा नदी में सूक्ष्मजैविकी की रुपरेखा

इस नदी की पर्यावरणीय अनुमापन कार्य के अंतर्गत हरिद्वार से नुरपुर तक के गंगा नदीय क्षेत्र में उपस्थित बैक्टिरिया की मात्रा का अध्ययन किया गया । अध्ययन के दौरान अधिकतम बैक्टिरिया का भार नुरपुर में 572×10^4 तथा न्यूनतम भार 22×10^4 पटना में देखा गया है । इसका मुख्य कारण नुरपुर क्षेत्र में दामोदर तथा रुपनारायण नदियों से अत्यधिक बहाव है । विभिन्न क्षेत्रों में बैक्टिरिया का भार साधारणत: इस क्रम में पाया गया नुरपुर > कानपुर > दक्षिणेश्वर > वाराणसी > नावाद्वीप तथा हरिद्वार > भागलपुर > पटना । इस क्रम से ज्ञात होता है कि हरिद्वार में भी बैक्टिरिया की मात्रा में वृद्धि हुई है । फीकल कोली फार्म बैक्टिरिया के मामले में उच्चतम दर 90×10^3 कानपुर में पाया गया है । इस मामले में विभिन्न केन्द्रों का क्रम इस प्रकार पाया गया: कानपुर > वाराणसी > दक्षिणेश्वर > हरिद्वार > नुरपुर = पटना = भागलपुर = नवद्वीप । इस अध्ययन से यह पता चलता है कि हरिद्वार क्षेत्र में भी बैक्टिरिया का परिमाण निरंतर वढ़ता जा रहा है, जो इस क्षेत्र की जलीय गुणवत्ता में हो रहे परिवर्तनों का सूचक है ।

मैंग्रोव ज्वारनदमुखी परितंत्र के प्लवक व नितल जीवजात पर नदीशीर्ष विसर्जन का प्रभाव

सुन्दरवन के विभिन्न ज्वारनदमुखों में हुगली में सर्वाधिक नदी शीर्ष जल का विसर्जन होता है वैसे क्रमानुसार जल विसर्जन इस प्रकार है हुगली > सप्तमुखी > झीला > विद्या । अध्ययन से पाप्त आंकड़ों से पता चलता है कि प्लवक तथा नितल जीव समुदायों की सघनता शीर्षजल के विसर्जन पर आधारित है क्योंकि अधिक शीर्षजल के विसर्जन के साथ इनके सघनता में वढ़ोतरी पायी गई है । अत: इन समुदायों की उच्चत्तम सघनता (पादपप्लवक: 380.9 सं / ली वर्षाकाल जन्तुप्लवक : 126.1 सं / ली शीतकाल एवं नितलजीव 172.3 सं / ली शीतकाल) हुगली में पाया गया तथा निम्नतम सघनता (पादपप्लवक : 192.8 सं / ली शीतकाल : जन्तुप्लवक : 45.9 सं / ली ग्रीष्म : एवं नितलजीव 58.2 सं / ली ग्रीष्म) विद्या में देखा गया है । पादपप्लवक तथा जन्तुप्लवक समुदायों में पायी जानेवाली प्रजातियाँ ज्वारनदमुखों में लगभग एक ही तरह का देखा गया है । नितल जीवजातों की विभिन्नता नदीशीर्ष जल के विसर्जन के संदर्भ में उल्टा पाया गया क्योंकि यह अधिकतम विद्या ज्वारनदमुख में मानसून में (16 जातियाँ) तथा हुगली ज्वारनदमुख में (4 जातियाँ) शीतकाल में पायी गयीं ।

अन्तरज्वारीय क्षेत्र के पार मैंग्रोव प्रजातियों का विस्तार

केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान ने नेशनल फेलोशिप स्कीम के अंतर्गत "सुन्दरी " पेड़ को विलोपन की स्थिति से उभारने के लिए एक वृहत कार्यक्रम का शुभारंभ किया। *हेरीटियरा फोमस*, "सुन्दरी " पेड़ भारतीय सुन्दरवन क्षेत्र में दुर्लभ तथा लुप्त होने के कगार पर है । इसका मुख्य कारण है परिवर्तित पर्यावरणीय परिस्थितियाँ जैसे:- गंगा नदी का पूर्व की ओर विवर्तनिक प्रवाह के कारण, सुन्दरवन क्षेत्र में ऊपरीय प्रवाह से मीठा जल पहुँचने में अवरोध तथा इन वृक्षों की अच्छी लकड़ी के कारण अनुचित कटाई । इन वृक्षों के प्रजनन में भी यह बाधा है कि ये वृक्ष परिवर्तित पर्यावरण में प्राकृतिक रुप से सहज ही प्रजनन एवं विकास नही कर पाते हैं ।

अत: संस्थान ने *हेरिटियरा फोम्स* के बीजों को मानसून के दौरान सुन्दरवन के ज्वरीय जल से एकत्रित कर संस्थान के प्रयोगशाला में अंकुरित करने का प्रयास किया । अनेक अंकुरित बीजों को विभिन्न संगठनों एवं इच्छुक व्यक्तियों में वितरित किया गया । इस वितरण कार्य से ज्वार प्रभावित क्षेत्र के पार क्षारियता रहित क्षेत्र में इस वृक्ष के रोपन कार्य से अच्छे परिणाम प्राप्त हुए हैं। दो वर्ष में यह वृक्ष 4 मीटर ऊँचे हो गए हैं ।

इन अनियमित क्षेत्रीय प्रयोगों के उपरांत, अन्तरज्वारीय क्षेत्र के पार केन्द्रीय पार्क, साल्टलेक में इस महत्वपूर्ण मैंग्रोव प्रजाति के वृक्ष के रोपण हेतु ठोस प्रयास प्रारम्भ किया गया। इस महत्वपूर्ण पार्क की सुन्दरता को बढ़ाने के अतिरिक्त जन-साधारण में इस वृक्ष को लोकप्रिय बनाने एवं इसके संरक्षण के प्रति जनसाधारण को सचेत करने की दिशा में यह प्रयास सहायक होने की आशा है ।

इस महत्वपूर्ण वृक्ष को लोकप्रिय बनाने के अभियान का शुभारम्भ 10 मई 1996 को पश्चिम बंगाल सरकार के प्रधान मुख्य वन संरक्षक श्री जी. एस. मंडल द्वारा किया गया । इस समारोह में संस्थान के निदेशक डा. मणीरंजन सिन्हा, मुख्य वन संरक्षक एवं सुन्दरवन बायोस्फियर रिजर्व के निदेशक श्री जे. एन. भादुड़ी, सुन्दरवन विकास बोर्ड के श्री सुकुमार सेथ तथा अन्य गणमान्य व्यक्ति उपस्थित हुए ।

सुपारी एक महत्वपूर्ण व्यवसायिक फसल

सुपारी एक लाभदासक व्यवसायिक फसल है जो सुन्दरवन क्षेत्र के कृषकों के एक वर्ग की आर्थिक स्थिति में महत्वपूर्ण स्थान रखता है । काक्द्वीप स्थित संस्थान का कृषि विज्ञान केन्द्र छोटे पैमाने पर सुपारी की खेती को लोकप्रिय बनाने का प्रयत्न कर रहा है। सुन्दरवन के अनेक किसान इस तकनीक को अपना चुके हैं । इसकी फसल से पुरुषों एवं महिलाओं के लिए वर्षभर रोजगार उपलब्ध होने की संम्भवनाएँ हैं । छोटे पैमाने पर सुपारी की खेती करनेवाले किसान 1500 - 2000 रुपये प्रतिमाह अर्जित कर सकते हैं ।

रिहन्द जलाशय के जलीय जीवों पर ऊष्ण-जल विसर्जन का प्रभाव

पर्यावरण पर्यवेक्षकों एवं मत्स्य-जीव वैज्ञानिकों के लिए थरमल पॉवर संयत्रों द्वारा प्राकृतिक जल स्त्रोतों में विसर्जित ऊष्ण-जल गम्भीर समस्या वनी हुई है । इस संस्थान द्वारा वर्तमान में किए गए अन्वेषणों से जलाशय परितंत्र में विसर्जित उष्ण जल वहिस्त्राव से संवंधित नए तथ्य प्रकाश में आए हैं। इन परिणामों में उल्लेखनीय तथ्य निम्नलिखित हैं:-

(1) थरमल प्लांट में प्रवाहित जल के तापमान की तुलना में विसर्जित जल का तापमान सभी ऋतुओं में अपेक्षित सीमा से अधिक रहा है । विसर्जन जल हेतु वनाए गए 8 किलोमीटर लम्वी नहर से भी वहि:स्त्राव के तापमान को कम करने में वांछित परिणाम प्राप्त नही हुए हैं ।

(2) पम्प हाउस के घुमावदार स्क्रीन में फँसने के कारण मेजर कार्प को छोड़कर अन्य मछलियों के डिम्भकों जो हानि होती है वह जलाशय के वेलांचली क्षेत्र में ठेकेदारों द्वारा व्यवहरित मत्स्यन कार्य के अनुचित पद्धति के कारण हो रही हानि की तुलना में कम विनाशक है । इस प्रकार की हानि के कारण मांसाहरी मछलियों के लिए आहार के रुप में उपल्ब्ध होनेवाली मछलियों का उत्पादन घट रहा है, जिसके फलस्वरुप जैव-विविधता को भी नुकसान पहुँचा है।

(3) मेजर कार्प प्रजातियों में *लेवियो कालवासु* के वच्चे थोड़ा सा अधिक तापमान सहने योग्य पाये गए हैं ।

(4) यह देखा गया है कि यदि प्लवक समुदाय को अधिक समय तक 36^0 से. से अधिक तापमान में रखा जाय तो यह उस क्षेत्र की प्राथमिक उत्पादकता दर को घटा देती है । प्लवक जीवों के लिए 37 - 40^0 से. का तापमान सहनशक्ति से अधिक पाया गया ।

(5) थरमल वहि:स्त्राव के तापमान के दुष्प्रभाव को दूर करने की दिशा में किए गए प्रयोगों से यह स्पष्ट होता है कि *कतला - कतला* तथा *लेवियो रोहिता* की पोना एवं अंगुलिकाएँ जलीय स्त्रोत के तापमान से 6^0 से. तक अधिक तापमान वाले विसर्जित जल को सहन कर सकती हैं । भारतीय मेजर कार्प मछलियों की पोना एवं अंगुलिकाओं पर किए गए प्रयोगों में देखा गया है कि सहनशक्ति से अधिक तापमान में गिल के गौण पटलिकाओं के विघटन से मछलियों की मृत्यु हो जाती है ।

(6) इस थरमल वहि:स्त्राव का दुष्प्रभाव जलाशय के कुछ क्षेत्र तक ही सीमित है और जलाशय के अन्य क्षेत्रों में इसका प्रभाव नही है । ये अध्ययन नेशनल थरमल पॉवर कार्पोरेशन के लिए परामर्शक सेवा के अन्तर्गत किया गया।

मत्स्य रोग अनुमापन कार्यक्रम के अंतर्गत पश्चिम बंगाल के ज्वारनदमुखी भेरियों का सर्वेक्षण किया गया । इस अध्ययन के दौरान 16 भेरियों में *पीनियस मोनोडोन* झींगों के शरीर पर दागवाली बीमारी देखी गई है । इन भेरियों में ज्वारीय जल प्रवाहित होता है जिसमें घुले हुए कार्बनिक पदार्थ मौजूद रहते हैं । इसके कारण जलीय गुणवत्ता घट गई है । इसका स्पष्ट प्रमाण है अनायनित अमोनिया (0.2 से 1.1 पीपीएम) का उच्च स्तर एवं बैक्टिरिया का उच्चतम भार ($8.4x\ 10^4$ से $1{:}92x10^5$) । किन्तु जिन तीन भेरियों में जलीय गुणवत्ता सामान्य रही उनमें *पीनियस मोनोडोन* की सफेद दागवाली बीमारी नही देखी गई । इस रोग के उपचारात्मक उपाय जो कारगर प्रमाणित हुए हैं वे इस प्रकार है:-

I) सभी तैरनेवाले व जलनिमग्न कार्बनिक पदार्थों का उन्मूलन
II) क्लिचिंग पाउडर का 1 पीपीएम की दर से प्रयोग
III) भेरियों में पालन करने हेतु, ज्वारीय जल प्रवाहित होने के पूर्व, इनका उपचार ।

इस प्रकार यह देखा गया कि *पीनियस मोनोडोन* झींगों के सफेद दागवाली बीमारी के रोकथाम के लिए पर्यावरणीय दवाव को दूर करना आवश्यक है । झींगों में सफेद दागवाली तथा अन्य बीमारियों के रोकथाम के लिए पालन क्षेत्र में जलीय गुणवत्ता वनाए रखना आवश्यक है ।

हिल्सा मछली के लिए फरक्का बाँध अवरोध नही

संस्थान के ज्वारनदमुखी प्रभाग द्वारा इंडियन शेड *टेनुलोसा इलीशा*, जो सामान्यतः हिल्सा मछली के नाम से प्रचलित है, के टैगिंग प्रयोगों से स्पष्ट होता है कि 22 वर्ष पुराना फरक्का वाँध इसके लिए पूर्णतः अवरोध नही है । इस तथ्य से इन मछलियों द्वारा इस वाँध को पार करने संवंधी विभिन्न विवादों का सामाधान हुआ है। किन्तु इस मछली की तीन उप-जातियों की उपस्थिति का कोई प्रमाण प्राप्त नही हुआ है, जिनके वारे में यह माना जाता कि ये उप-जातियाँ उपस्थित हैं।

केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान का ज्वारनदमुखी प्रभाग पिछले कुछ वर्षों से हिल्सा टैगिंग प्रयोग कर रहा है ताकि इनकी पारगमन की दिशा का पता लगाया जा सके । इसके अंतिरिम परिणाम ज्ञानवर्द्धक हैं । गंगा एवं पद्मा नदियों में वाँध से नीचे छोड़े गए टैग की गई हिल्सा मछलियों को वाँध के ऊपरी प्रवाह से प्रग्रहण किया गया, जिससे स्पष्ट होता है कि मछलियाँ वाँध के पार जाने में सक्षम हैं। परंतु यह पारगमन सिर्फ अच्छे वर्षा वाले मानसून काल में ही सम्भव हो पाता है जव फरक्का वाँध के ऊपर और नीचे के नदी क्षेत्र में जल का स्तर समान हो जाता है और वाँध के द्वार खोल दिए जाते हैं । ऐसी अवस्था में भी मालदा छोर वाले कुछ द्वारों से ही यह पारगमन सम्भव हो पाता है क्योंकि वहाँ नदी की गहराई एवं जल प्रवाह वहुत कम होता है । वाँध के पार निचली प्रवाह में भी इन मछलियों का संचलन कुछ इसी प्रकार का है । हुगली नदी से ये मछलियाँ वाँध के ऊपर फीडर केनल के निकास द्वारों के कारण नही जा पाती हैं।

इन तथ्यों के अतिरिक्त यह भी ज्ञात हुआ है कि फरक्का बाँध के ऊपरी क्षेत्र में भी हिल्सा का प्रजनन होता है । प्रग्रहण किए गए मछलियों के अध्ययन से यह ज्ञात होता है कि इन मछलियाँ के जनन ग्रन्थियों से डिम्ब निकल चुके हैं । इससे प्रजनन का संकेत मिलता है । फरक्का बाँध में हिल्सा मछलियों के पारगमन के लिए "फिश लॉक" लगा हुआ है । किन्तु ऐसा प्रतीत होता है कि यह फिस लॉक प्रभावशाली नही है क्योंकि बाँध का चालू होना एवं हिल्सा का लुप्त होना एक ही समय पर हुआ है । बाँध निर्माण के पूर्व गंगा नदी के मध्य क्षेत्र से प्राप्त हिल्सा मछलियाँ पद्मा तथा हुगली नदी की हिल्सा मछलियों के प्रवास का स्पष्ट प्रमाण हैं । कुछ समय पूर्व बाँध के ऊपरी प्रवाह में हिल्सा बीजों की आपूर्ति के प्रमाण मिले हैं जिनसे अनेकों का ध्यान इस ओर आकृष्ट हुआ है ।

मुख्य घटनाएँ

संस्थान का स्वर्ण जयंती समारोह

केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान ने देश की सेवा में अपने 50 वर्ष दिनांक 16 मार्च 1997 को पूर्ण किया। संस्थान ने 17 मार्च 1996 से 16 मार्च 1997 तक की एक वर्ष की अवधि स्वर्ण जयन्ती वर्ष के रुप में विताया। इस दौरान दिनांक 9 अक्टूबर 1996 को बैरकपुर मुख्यालय में 'मत्स्य एवं झींगा मछलियों के जन्तुमारी रोग एवं संघरोध के उपाय' पर एक राष्ट्रीय कार्यशाला का आयोजन किया गया ।इसके उपरांत जनवरी 17 से 19 तक की अवधि में 'अन्तर्स्थलीय मात्स्यकी' विषय पर एक राष्ट्रीय चर्चा का भी आयोजन किया गया ।

इस वर्ष के दौरान बैरकपुर मुख्यालय में हर महीने आयोजित विभिन्न वैज्ञानिक व्याख्यान इस स्वर्ण जयन्ती स्मरणोत्सव का महत्वपूर्ण आकर्षण रहे ।

संस्थान के मुख्यालय में 16-17 मार्च 1997 के 'दौरान अन्तर्स्थलीय मात्स्यकी के बदलते परिवेश' पर एक राष्ट्रीय सेमिनार का भी आयोजन किया गया ।

केन्द्रीय कृषि मंत्री का संस्थान में आगमन

माननीय केन्द्रीय कृषि मंत्री श्री चतुरानन मिश्र जी ने दिनांक 12 अक्टूबर 1996 को संस्थान के मुख्यालय का संदर्शन किया। निदेशक महोदय ने माननीय मंत्रीजी को संस्थान के कार्य-कलापों एवं उपलब्धियों से अवगत कराया । मंत्रीजी के समक्ष संस्थान के कार्य-कलापों पर आधारित एक विडियो फिल्म प्रदर्शित किया गया । माननीय मंत्रीजी ने संस्थान के परियोजनाओं में विशेष रुचि दिखाया एवं संस्थान के निदेशक तथा वैज्ञानिकों से संस्थान के भावी योजनाओं पर विस्तृत चर्चा किया । अन्त में संस्थान के कर्मचारियों को संवोधित करते हुए उन्होंने संस्थान के कार्य निष्पादन के प्रति संतोष व्यक्त किया एवं वैज्ञानिकों से मछुवारों की उन्नति के लिए सार्थक कार्य करने का आग्रह किया ।

विहार, दरभंगा में जल कृषि प्रदर्शनी
सितम्बर-1996

विहार के दरभंगा शहर में 28-29 सितम्वर 1996 के दौरान एक जलकृषि प्रदर्शनी का आयोजन किया गया, जिसमें भारतीय कृषि अनुसंधान परिषद् द्वारा मात्स्यकी के क्षेत्र में की गई प्रगति को दर्शाया गया । इस प्रदर्शनी का आयोजन परिषद् के वैनर तले, विहार राज्य मात्स्यकी विभाग के सहयोग से किया गया । इस प्रदर्शनी में मात्स्यकी क्षेत्र के तीन मूल संस्थान, केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान, वैरकपुर, केन्द्रीय अलवणीय जलकृषि संस्थान,तथा भुवनेश्वर तथा केन्द्रीय मत्स्य शिक्षा संस्थान, वम्वई ने प्रमुख रुप से भाग लिया। माननीय केन्द्रीय कृषि मंत्री श्री चतुरानन मिश्र जी जिनकी प्रेरणा से यह आयोजन सम्भव हो पाया, ने इस प्रदर्शनी का उद्घाटन दिनांक 28 सितम्वर 1996 को किया। मंत्री जी ने उपल्ब्ध तकनीकों को मत्स्य-पालकों तक पहुँचाने पर विशेष वल दिया ।प्रदर्शनी में आयोजित किसान गोष्ठी जिसमें जलीय कृषि से संवंधित विभिन्न समस्याओं का विशेषज्ञों द्वारा समाधान किया गया, इस प्रदर्शनी का मुख्य आकर्षण रहा, जिससे इस क्षेत्र के मत्स्य पालको को विशेष जानकारियाँ प्राप्त करने का अवसर प्राप्त हुआ । डॉ. पी. वी. देहद्राय, उप-महानिदेशक, (मात्स्यकी), भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली व डॉ. मणीरंजन सिन्हा, निदेशक, सी. आई. एफ. आर. आई., डॉ. एस. अयप्पन, निदेशक, सी. आई. एफ. ए., डॉ. एन. के. ठाकुर, संयुक्त-निदेशक, सी. आई. एफ. ई. ने अन्य वैज्ञानिकों के साथ इस प्रदर्शनी में भाग लिया।

नई परियोजना

भारतीय कृषि अनुसंधान परिषद् ने कृषि उत्पाद सेस फंड के अन्तर्गत एक तदर्थ परियोजना "प्रायद्वीप जलाशयों में तिलापिया की मत्स्य संख्या गतिकी तथा स्थानीय मत्स्य अनुवांशिक स्त्रोतों पर इनका प्रभाव" की स्वीकृति दी । यह परियोजना संस्थान के अलपुज्ञा केन्द्र के व. वैज्ञानिक डा. वी. के. उन्नीथन के नेतृत्व में कार्यान्वित होगी । तीन वर्ष की इस तदर्थ परियोजना हेतु परिषद् ने 4,94,956/- रुपयों की वित्तीय मंजूरी दी है।

महत्वपूर्ण कार्यशालाएँ एवं सेमिनार

मछली एवं झीगों के महामारी एवं भारत में संगरोध कार्य पर राष्ट्रीय कार्यशाला

संस्थान के स्वर्ण जयन्ती समारोह के अन्तर्गत संस्थान के मुख्यालय बैरकपुर में दिनांक 9 अक्टूबर 1996 को एक राष्ट्रीय कार्यशाला का आयोजन किया गया । कार्यशाला का उद्देश्य देश में मत्स्य एवं झींगों की वढ़ती वीमारियों पर वैज्ञानिकों, विकास अधिकारियों एवं मत्स्य-पालकों को परस्पर चर्चा का अवसर प्रदान करना था । कार्यशाला का उद्घाटन पश्चिम वंगाल राज्य सरकार के माननीय मात्स्यकी मंत्री श्री किरणमय नन्दा ने किया एवं समारोह की अध्यक्षता भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली के उप-महानिदेशक (मात्स्यकी) डा. पी.वी. देहांदराय ने किया । संस्थान के निदेशक एवं आयोजन समिति के अध्यक्ष डा. मणीरंजन सिन्हा ने मंत्री महोदय तथा अन्य गणमान्य व्यक्तियों का स्वागत करते हुए देश में मात्स्यकी विकास के लिए विभिन्न मत्स्य अभिकरणों के वीच उचित वार्तालाप की आवश्यकता पर वल दिया । माननीय मंत्री महोदय ने उद्घाटन के दौरान कहा कि इस समस्या का समाधान करना अति आवश्यक है और आशा व्यक्त की कि कार्यशाला से मत्स्य-पालकों के लिए उपयोगी सुझाव आयेंगे । डा. पी. वी. देहादराय ने अपने अध्यक्षीय भाषण में आशा व्यक्त की कि कार्यशाला से ऐसे उल्लेखनीय नीति संवंधी मार्गनिर्देशन प्राप्त होंगे जिन्हें पूरे देश में एक समान लागू किया जा सकेगा, तथा मत्स्य पालकों को सहायता मिलेगी क्योंकि निरंतर मछलियों एवं झीगों के बीमारी से उन्हें अत्यधिक हानि हो रही है ।

देश के विशिष्ट वैज्ञानिक, मत्स्य प्रवंधक, मत्स्य विकास अधिकारी, मत्स्य-पालक तथा केन्द्र और राज्य सरकारों के अनेक संगठनों से आए अधिकारियों ने इस कार्यशाला में सार्थक योगदान दिया।

अंतर्स्थलीय मात्स्यकी पर राष्ट्रीय चर्चा

केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान देश की सेवा में अपनी 50वी वर्षगांठ मना रहा है । इस अवसर के स्मरणोत्सव के रुप में अंतर्स्थलीय मात्स्यकीय विषय पर बैरकपुर मुख्यालय में 17-19 जनवरी 1997 के दौरान एक राष्ट्रीय चर्चा का आयोजन किया गया जिसमें निम्नलिखित विषयों पर गौर किया गया ।

(1) जलाशय मात्स्यकी पर राष्ट्रीय कार्यशाला
(2) अंतर्स्थलीय मात्स्यकी क्षेत्र में अनुसंधान का रुख एवं प्राथमिकताएँ पर राष्ट्रीय कार्यशाला
(3) प्लेनरी सेशन

जलाशय मात्स्यकी कार्यशाला का आयोजन इस संस्थान तथा केन्द्रीय कृषि मंत्रालय ने संयुक्त रुप से किया । इर्स चर्चा का उद्घाटन बैरकपुर मुख्यालय में दिनांक 17 जनवरी 1997 को भारतीय कृषि अनुसंधान परिषद के उप-महानिदेशक डा. पी. वी. देहादराय ने एक समारोह में किया एवं इसकी अध्यक्षता पश्चिम बंगाल राज्य सरकार के मत्स्य सचिव श्री आर. के. त्रिपाठी ने की। भारत सरकार के मत्स्य विकास आयुक्त डा. युवराज सिंह यादव भी इस चर्चा में उपस्थित हुए। बैठक में अनेक राज्य सरकारों के मात्स्यकी विभाग के सचिव, निदेशक एवं अन्य वरिष्ठ अधिकारियों ने भाग लिया। नाबार्ड के प्रतिनिधियों ने भी इस बैठक में भाग लिया । इस चर्चा का मुख्य उद्देश्य विभिन्न मत्स्य विशेषज्ञ, राज्य सरकार के अधिकारी, मत्स्य प्रबंधक, प्रशासक एवं योजनाकारों को एक ऐसा मंच प्रदान करना था जिसके तहत अंतर्स्थलीय मात्स्यकी क्षेत्र, विशेषकर जलाशय मात्स्यकी के प्रबंधन की समस्याओं की सही पहचान की जा सके। जलाशय मात्स्यकी प्रबंधन हेतु कुछ मार्ग निर्देश, जो इस संस्थान तथा केन्द्रीय कृषि मंत्रालय ने संयुक्त रुप से तैयार किया था, को प्रस्तुत किया गया । उक्त बैठक में गहन चर्चा के वाद उचित संशोधनों के साथ उसे अपनी मान्यता प्रदान की । इस चर्चा की मुख्य उपलब्धि यह रही कि जलाशय मात्स्यकी प्रबंधन हेतु कुछ दिशा-निर्देशों को अंतिम रुप दिया गया । इस कार्यशाला ने अंतर्स्थलीय मात्स्यकी क्षेत्र के रुख एवं प्राथमिकताओं का भी निर्धारण किया ।

अंतर्स्थलीय मात्स्यकी के बदलते परिवेश पर राष्ट्रीय सेमिनार

केन्द्रीय अंतर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान ने "भारतीय अन्तर्स्थलीय मात्स्यकी सोसाइटी" के सहयोग से संस्थान के मुख्यालय बैरकपुर में 16-17 मार्च 1997 के दौरान "अन्तर्स्थलीय मात्स्यकी के वदलते परिवेश" पर एक राष्ट्रीय सेमिनार का आयोजन किया, जिसमें विभिन्न अनुसंधान संस्थानों, विश्वविद्यालयों, गैर-सरकारी संगठनों तथा केन्द्र एवं राज्य सरकारों के लगभग 200 प्रतिनिधियों ने भाग लिया । सेमिनार का उद्घाटन पश्चिम बंगाल राज्य सरकार के माननीय मत्स्य विकास मंत्री श्री किरणमय नन्दा ने किया ।

सेमिनार में निम्नलिखित छः तकनीकी सत्रों का संचालन किया गया:-

(1) पर्यावरणीय प्रभाव एवं प्रबंधन
(2) मत्स्य संख्या एवं आहार चक्र की गतिकी
(3) उत्पादकता प्रबंधन एवं पर्यावरण के अनुकूल जलीय कृषि
(4) सामाजिक - आर्थिक पहलुएँ
(5) युवा वैज्ञानिक पुरस्कार का विशेष सत्र
(6) प्लेनरी सत्र

इस सेमिनार में विभिन्न प्रतिनिधियों द्वारा 75 अनुसंधान पत्र प्रस्तुत किए गए । "युवा वैज्ञानिक पुरस्कार" के लिए एक विशेष सभा का आयोजन भी किया गया ।

इस दो दिवसीय चर्चा में निम्नलिखित मुख्य सुझाव स्पष्ट हुए है :-

1. सेमिनार ने जलीय-जीवों के वर्गीकरण की दिशा में निपुणता की कमी पर चिन्ता प्रकट किया । तरुण वैज्ञानिकों को जलीय जैव-विविधता के आंकड़ों संवंधी अध्ययन के लिए प्रेरित करने पर वल दिया गया ।

2. भारतीय विवृत जलीय परितंत्रों पर उपलव्ध विस्तृत पर्यावरणीय आंकड़ों, विशेषकर जैव-विविधता संवंधी आंकड़ो को केन्द्रीय अंतर्स्थलीय प्रग्रहण मत्स्य अनुसंधान संस्थान में स्नातकोत्तर स्तर के कोर्स आरम्भ करने की दिशा में प्रयास करने को कहा गया ।

3. जलीय परितंत्रों की वहन क्षमता को वढ़ाने के लिए उपयोग किए जा रहे वाह्य निवेशों (इनप्यूट्स) को संपोषित स्तर तक ही सीमित रखने को कहा गया ताकि ससटेनेविलिटि लिमिट, पर्यावरणीय संरक्षण एवं जैव-विविधता का संतुलन वना रहे ।

4. संगोष्ठि ने यह माना कि मछलियों के संगरोध के लिए राष्ट्रीय संलेख की कमी है ।इस प्रकार के पद्धतियों का विकास एवं मानकीकरण आवश्यक है ।

5. सेमिनार में हिमालय के नदियों, विशेषकर छोटे जल प्रवाहों के संरक्षण पर विशेष वल देने को कहा गया ताकि महत्वपूर्ण मत्स्य प्रजातियों जैसे:- *महसीर, स्नो ट्राउट* और *ट्राउट* मछलियों का परिरक्षण हो सके । मत्स्य वीजों के पालन एवं जलीय स्त्रोंतों में संग्रहित करने की सम्भावनाओं पर विचार करने का आग्रह किया गया । मेजर कार्प वीजों को मैदानी क्षेत्र के नदीय स्त्रोतों में संग्रहित करते समय सावधानी वरतने को कहा गया । हैचरी में प्रजनित मत्स्य वीजों को विवृत जलीय स्त्रोतों में संग्रहित किए जाने पर उत्पन्न प्रभाव का उचित मूल्यांकन करना आवश्यक है ।

6. उन्मुक्त जलों के रसायनिक परीक्षण के साथ-साथ जैव-विविधता परीरक्षण सम्वन्धी पद्धतियों के विकास पर आवश्यक कदम उठाने पर जोर दिया गया । इसके लिए कुल जैविक समुदाय, सूचक प्रजाति एवं जैव रसायनिक सूचकों का उपयोग करना चाहिए ।

मुख्य बैठकें

अनुसंधान सलाहकार समिति की दूसरी बैठक

वैरकपुर मुख्यालय में संस्थान की अनुसंधान सलाहकार समिति की दूसरी बैठक 29-30 जुलाई 1996 के दौरान सम्पन्न हुई । इस बैठक में निम्नलिखित सदस्य उपस्थित हुए

1. डॉ. के. वी. देवराज	-	अध्यक्ष
2. डॉ. एन. सी. दत्ता	-	सदस्य
3. डॉ. वी. वत्स	-	सदस्य
4. डॉ. ब्रिज गोपाल	-	सदस्य
5. डॉ. इ. जे. जेम्स	-	सदस्य
6. डॉ. ए. आर. खुदावक्स	-	सदस्य
7. डॉ. एम. वाई. कमाल	-	सदस्य
8. डॉ. मणीरंजन सिन्हा	-	सदस्य
9. डॉ. के. के. वास	-	सदस्य सचिव

इन सदस्यों के अतिरिक्त संस्थान के छ: प्रभागाध्यक्ष, परियोजना प्रमुख तथा वैरकपुर एवं कलकत्ता केन्द्र में नियुक्त सभी वैज्ञानिकों ने बैठक में भाग लिया ।

इस समिति की बैठक के दौरान 29 जुलाई को संस्थान के विभिन्न प्रभागों के अन्तर्गत सम्पादित विभिन्न अनुसंधानात्मक परियोजनाओं तथा प्रायोजित परामर्शक परियोजनाओं पर ही चर्चा की गई । प्रभागाध्यक्षों ने समिति के सदस्यों को परियोजनाओं में की गई प्रगति से अवगत कराया । संबंधित परियोजना प्रमुखों ने समिति के विभिन्न सदस्यों द्वारा दिए गए सुझावों को नोट किया ताकि भावी तकनीकी कार्यक्रमों में इनका समावेश किया जा सके ।

दिनांक 30 जुलाई की बैठक में संस्थान के परिप्रेक्ष्य योजना (परसपेक्टिव प्लान) के संबंध में चर्चा की गई । समिति के अध्यक्ष एवं सदस्यगण ने संस्थान के निदेशक एवं वैज्ञानिकों को एक संतुलित एवं विवेकात्मक प्ररिप्रेक्ष्य योजना तैयार करने के लिए प्रशंसा की । कुछ सुधारात्मक सुझावों के उपरान्त योजना का अनुमोदन कर दिया गया ।

संस्थान के निदेशक ने अध्यक्ष एवं अन्य सदस्यों को योजना की समीक्षात्मक मूल्यांकन एवं महत्वपूर्ण सुझावों के लिए अपना धन्यवाद ज्ञापित किया । उन्होंने समिति को आश्वासन दिया कि उनके द्वारा दिए गए सुझावों का परियोजना कार्यक्रमों एवं परिप्रेक्ष्य योजना प्रलेखों में समावेश किया जाएगा।

संस्थान के अनुसंधान परिषद् की बैठक

संस्थान की वार्षिक अनुसंधान परिषद् की बैठक बैरकपुर मुख्यालय के प्रेक्षागृह में दिनांक 27-28 मई 1996 के दौरान सम्पन्न हुई । बैठक की अध्यक्षता संस्थान के निदेशक डा. मणीरंजन सिन्हा ने की जिसमें भारतीय कृषि अनुसंधान परिषद् के सहायक महानिदेशक (अ.मा.) डा. एम. वाई. कमाल भी उपस्थित थे । बैठक में संस्थान के 19 नियमित अनुसंधान परियोजनाओं में हुई प्रगति का तकनीकी कार्यक्रम के परिप्रेक्ष्य में समीक्षा की गई । संस्थान में कार्यान्वित हो रहे अनुसंधान परियोजनाओं के भावी कार्यक्रमों पर विस्तृत समीक्षा की गई । संस्थान के वर्तमान सात प्रभागों में प्रशासनिक और तकनीकी सुधारों के लिए कुछ नीति संबंधित फैसले भी लिए गए । इस बैठक में वर्ष 1997-98 के लिए परियोजना कार्यक्रम को संस्थान के अनुसंधान सलाहकार समिति द्वारा दिए गए सुझावों तथा बैठक में की गई चर्चा के अनुरुप अंतिम रुप दिया गया ।

तिलापिया मछली पर महत्वपूर्ण तकनीकी सत्र

संस्थान के वरिष्ठ वैज्ञानिक डा. वी. वी. सुगुणन को भारतीय कृषि अनुसंधान परिषद् ने भारत में नए *तिलापिया* जाति के मछली को लाने की दिशा में आयोजित एक महत्वपूर्ण तकनीकी सत्र में भाग लेने हेतु नामांकित किया । यह बैठक 7-8 जनवरी 1997 के दौरान लखनऊ में सम्पन्न हुई। सत्र की अध्यक्षता डा. इ. जी. साइलस ने की और सत्र की कार्यवृत भारतीय कृषि अनुसंधान परिषद के महानिदेशक को अग्रसारित कर दी गई ।

सोशल आडिट समिति

डा. पी. सी. शर्मा माननीय संसद सदस्य लोकसभा की अध्यक्षता में 12-14 फरवरी 1997 के दौरान संस्थान के गुवाहाटी केन्द्र में सोशल आडिट समिति की दूसरी बैठक सम्पन्न हुई । इस बैठक में परिषद के विभिन्न मत्स्य अनुसंधान संस्थानों के निदेशक, सहायक निदेशक (अ.मा.), भा. कृ. अ. प. तथा असम राज्य सरकार के मत्स्य विभाग के अधिकारियों ने भाग लिया ।

केन्द्रीय अन्तरर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान का अध्ययन दल

संस्थान के इस अध्ययन दल ने स्वर्ण जयन्ती के स्मरणोत्सव के रुप में वर्ष 1996-97 के दौरान वैज्ञानिक व्याख्यानों का आयोजन किया । निम्नलिखित विशिष्ठ व्यक्तियों ने विभिन्न विषयों पर वैज्ञानिक व्याख्यान दिए:-

डा. ब्रिज गोपाल, जवाहरलाल नेहरु विश्वविद्यालय ।

डा. कृष्ण स्वरुप, भूतपूर्व अध्यक्ष, जीव विज्ञान विभाग, गोरखपुर विश्वविद्यालय ।

डा. अमलेश चौधरी, सेवा निवृत प्रोफेसर, समुद्रीय विज्ञान विभाग,
कलकत्ता विश्वविद्यालय ।

डा. अशीम चौधरी, रीडर, कृषि रसायनिकी एवं मृदा विज्ञान विभाग,
विधान चन्द्र कृषि विश्वविद्यालय ।

श्री एस. पाल. वरिष्ठ वैज्ञानिक, केन्द्रीय अन्तर्स्थलीय प्रग्रहण मात्स्यकी अनुसंधान संस्थान, बैरकपुर ।

हिन्दी सप्ताह

संस्थान में दिनांक 14-20 सितम्बर 1996 के दौरान हिन्दी सप्ताह मनाया गया । इस अवसर पर अनेक प्रतियोगिताओं जैसे:- निवन्ध लेखन प्रतियोगिता, पत्र लेखन प्रतियोगिता, सरकारी प्रारुप लेखन आदि, का आयोजन किया गया । इस वर्ष हिन्दी सप्ताह का विशेष आकर्षण कर्मचारियों के बच्चों का निबन्ध लेखन प्रतियोगिता एवं वैज्ञानिक विषय पर वाद-विवाद प्रतियोगिता रहा जिसमें संस्थान के वैज्ञानिक, तकनीकी एवं प्रशासनिक कर्मचारियों ने उत्साहपूर्वक भाग लिया । हिन्दी सप्ताह का समापन एक बैठक में किया गया, जिसमें संस्थान के सभी अधिकारी एवं कर्मचारी उपस्थित हुए । इस सभा की मुख्य अतिथि श्रीमती रंजना सिन्हा थीं जिन्होंने विभिन्न प्रतियोगिताओं के विजेताओं को पुरस्कार वितरण किया । संस्थान के निदेशक ने सभा को संवोधित करते हुए सरकारी काम-काज में हिन्दी के प्रयोग को बढ़ाने की अपील की।

सहयोग

संस्थान के जलाशय प्रभाग के तकनीकी कार्यक्रम कर्नाटक, तामिलनाडू, आन्ध्रप्रदेश और मध्यप्रदेश राज्य सरकारों के सहयोग से सफलतापूर्वक सम्पन्न किया गया।

संस्थान ने गंगा परियोजना निदेशालय, ब्रिटिश काउंसिल डिविजन, पर्यावरण मंत्रालय और नेशनल थरमल पॉवर कार्पोरेशन को विगत वर्षों की तरह इस वर्ष भी विभिन्न परामर्शक सेवाओं के तहत अपना सहयोग जारी रखा ।

संस्थान ने उत्तरप्रदेश राज्य सरकार के मात्स्यकी विभाग को दिनांक 8-9 जनवरी 1997 के दौरान नदीय मात्स्यकी पर राष्ट्रीय कार्यशाला का आयोजन करने में अपना सक्रिय सहयोग दिया। संस्थान के निदेशक एवं छः अन्य वैज्ञानिकों ने इस कार्यशाला में भाग लिया एवं विषय स्त्रोतों की भूमिका निभायी ।

संस्थान ने गुजरात एकोलोजी कमीशन को अपना सक्रिय सहयोग दिया । यह कमीशन गुजरात के अवकर्षित क्षेत्रों की पारिस्थितिकी के पुनर्रुद्धार करने हेतु गठित की गई है।

राजस्थान ट्रेबल एरिया डवलपमेंट कोअपरेटिव फेडरेशन तथा मध्यप्रदेश मत्स्य विकास निगम के साथ विभिन्न परामर्शक परियोजनाओं हेतु बातचीत चल रही है । नेशनल बैंक फार अग्रीकल्चर एण्ड रुरल डवलपमेंट द्वारा प्रायोजित परियोजना की भी सम्भावना है ।

संस्थान द्वारा परामर्शक सेवाओं के अन्तर्गत "सरदार सरोवर परियोजना के संदर्भ में नर्मदा नदी की मत्स्य संरक्षण एवं जल जैविकी संदर्श" नामक परियोजना पर कार्य किया जा रहा है । इस परियोजना का व्यय महाराष्ट्र राज्य सरकार द्वारा वहन किया जा रहा है ।

अधिकारियों एवं कर्मचारियों की कार्यक्षमता का विकास

प्रशिक्षण (देश में)

श्री एस. पी. धोष, तकनीकी अधिकारी ने 23-30 अप्रैल 1996 के दौरान केन्द्रीय अलवणीय जलकृषि संस्थान, भुवनेश्वर में आयोजित "अलवणीय जलकृषि में जलीय सूक्ष्मजैविकी" प्रशिक्षण कार्यक्रम में भाग लिया ।

श्री बी पी महन्ती वैज्ञानिक ने उड़ीसा कृषि एवं प्रौद्यौगिकी विश्वविद्यालय, भुवनेश्वर में मई 24 से जून 12, 1996 के दौरान आयोजित "पशुधन स्वास्थय पर पर्यावरणीय प्रदूषण विशेषकर औधौगिक अपरद एवं बहि:स्त्राव का प्रभाव" विषयक सम्मर इन्स्टीटिच्युट में भाग लिया।

श्री पी. के. घोष, तकनीकी अधिकारी (वरिष्ठ फोटोग्राफर) ने राष्ट्रीय कृषि अनुसंधान प्रबंधन अकादमी, हैदरावाद में आयोजित 'कृषि क्षेत्र में विडियोग्राफी' विषय में प्रशिक्षण प्राप्त किया ।

संस्थान ने अपने मुख्यालय बैरकपुर में दिनांक 26 नवम्बर 1996 से 26 दिसम्बर 1996 के दौरान "कम्प्यूटरों के उपयोग" पर एक प्रशिक्षण कार्यक्रम का आयोजन किया, जिसमें संस्थान के श्री रंजित कुमार घोष अधिक्षक (लेखा परीक्षा व लेखा) श्री तरुण कांति रॉय, वरिष्ठ अशुलिपिक; श्री विप्लव मजुमदार, सहायक; श्री टी. के. मजुमदार, सहायक; श्री दीपांकर चटर्जी, टी-2; श्री पी. के. दत्ता, वरिष्ठ लिपिक; श्री सुकुमार सरकार, कनिष्ठ लिपिक; श्री पी. के. घोष, कनिष्ठ लिपिक; श्री ए. सी. विश्वास, कनिष्ठ लिपिक; श्रीमती अंजली नियोगी, वरिष्ठ लिपिक तथा कुमारी जॉली साहा ने इस कार्यक्रम में प्रशिक्षण प्राप्त किया ।

प्रशिक्षण (विदेश में)

श्रीमती केया साहा. टी-II-3 को 'बयोग्राफी एण्ड रीजनल एसेसमेंट' विषय में स्नातकोत्तर स्तर के अध्ययन हेतु डेसारलैंड्स विश्वविद्यालय में डी ए ए डी फेलोशिल के अन्तर्गत प्रनियुक्त किया गया। यह पाठ्यक्रम 18 महीनों के लिए अप्रैल 1996 में आरम्भ हुआ ।

डॉ. कुलदीप कुमार वास, प्रधान वैज्ञानिक, ने भारत और ईरान के बीच कृषि क्षेत्र में परस्पर सहयोग हेतु हुए समझौते के अन्तर्गत "प्रजनन हैचरी तथा रैनबो ट्राउट के पालन एवं ब्राउन ट्राउट तकनीकों" पर ईरान में आयोजित एक प्रशिक्षण कार्यक्रम में भाग लिया । इस कार्यक्रम की अवधि 30 दिसम्बर 1996 से 20 जनवरी 1997 तक थी ।

श्री एम. कार्तीकेयन ने जर्मनी के बोन विश्वविद्यालय से "कृषि विज्ञान तथा उष्णकटिबंधीय एवं उप उष्णकटिबंधीय क्षेत्रों के स्त्रोत प्रबंधन" विषय पर एक दो वर्षीय स्नातकोत्तर अध्ययन सम्पन्न किया ।

सम्मान एवं उपाधियाँ

वर्ष 1996-97 के दौरान निम्नलिखित वैज्ञानिकों को भारतीय अन्तर्स्थलीय मत्स्य सोसाइटी ने अपने फेलोशिप प्रदान की:-

डॉ. वी. आर. देसाई, भूतपूर्व-प्रधान वैज्ञानिक
डॉ. धीरेन्द्र कुमार, वरिष्ठ वैज्ञानिक
श्री उत्पल भौमिक, वरिष्ट वैज्ञानिक
श्री पी. के. चक्रवर्ती, वरिष्ठ वैज्ञानिक
डॉ (श्रीमती) कृष्णा मित्रा, वरिष्ठ वैज्ञानिक

डॉ. वी. वी. सुगुणन्, वरिष्ठ वैज्ञानिक को एसोसियेशन ऑफ मैक्रोबयोलोजिस्टस् ने "विवृत जल क्षेत्रों में प्रदूषण का जैविक अनुमापन" विषय पर एक अतिथि व्याख्यान हेतु आमंत्रित किया । यह व्याख्यान दिनांक 4-12-97 को ऐसोसिएशन की 37वीं सम्मेलन के अवसर पर दिया गया ।

डॉ. वी. के. उन्नीथन्, वरिष्ट वैज्ञानिक, को केरल सरकार का जनकीय मत्स्यकृषि कार्यक्रम के राज्य सलाहकार परिषद् में सदस्य मनोनीत किया गया ।

डॉ. कुलदीप कुमार वास, प्रधान वैज्ञानिक को राष्ट्रीय एकॉलोजी संस्थान, नई दिल्ली के राष्ट्रीय कार्यकारी परिषद् का सदस्य चुना गया ।

डॉ. एस. एन. सिंह, वरिष्ठ वैज्ञानिक को गुजरात सरकार द्वारा कलपसर परियोजना हेतु निपुण सदस्य (एक्सपर्ट मेम्बर) के रुप में मान्यता दी गई ।

डॉ. कुलदीप कुमार वास, प्रधान वैज्ञानिक एवं डा. वी. वी. सुगुणन को केन्द्रीय मत्स्य शिक्षा संस्थान, बम्बई के संकाय में अवैतनिक-सदस्य के रुप में मान्यता दी गई ।

कुमारी नन्दिता चक्रवर्ती को कल्याणी विश्वविद्यालय ने "प्लवक प्रजातियों के माध्यम से हुगली ज्वारनदमुख में प्रदूषण का जैविक-अनुमापन" नामक शोध-ग्रन्थ हेतु पी. एच. डी. की उपाधि प्रदान की । यह शोध-ग्रन्थ संस्थान के "हुगली नदी के पर्यावरणीय अस्तव्यवस्तता का जैविक-अनुमापन" नामक तदर्थ योजना पर आधारित है । यह शोध ग्रन्थ संस्थान के वरिष्ठ वैज्ञानिक डा. वी. वी. सुगुणन एवं कल्याणी विश्वविद्यालय के प्रोफेसर एस. सी. सांतरा के मार्ग-दर्शन में प्रस्तुत किया गया ।

युवा वैज्ञानिक पुरस्कार

संस्थान के स्वर्ण जयन्ती स्मरणोत्सव के रुप में कुमारी वोराता रैना, जैव-विज्ञान विभाग, जम्मु, विश्वविद्यालय जम्मु को युवा वैज्ञानिक पुरस्कार प्रदान किया गया । पुरस्कार के रुप में एक प्रशस्ति पत्र एवं 10000/- रुपये नगद राशि दी गई। कुमारी रैना द्वारा प्रस्तुत शोध-पत्र के आधार पर यह पुरस्कार दिया गया । संस्थान तथा भारतीय "अन्तर्स्थलीय मत्स्य सोसाइटी द्वारा संयुक्त रुप से अन्तर्स्थलीय मात्स्यकी के बदलते परिवेश" विषय पर आयोजित राष्ट्रीय सम्मेलन में दिनांक 17-3-97 को यह पुरस्कार प्रदान किया गया ।

प्रद्यौगिकी हस्तांतरण

विस्तार कार्य पद्धतियों की सार्थकता

कार्प मछलियों के तीन स्तरीय मत्स्यपालन पद्धति की प्रद्यौगिकी हस्तान्तरण के लिए अपनाए गए विभिन्न विस्तार माध्यमों की सार्थकता की जानकारी के लिए सुन्दरवन क्षेत्र में अध्ययन किया गया । विस्तार कार्य से संबंधित पाँच प्रकार के तकनीकों का जैसेः- निदर्शन कार्य, मत्स्य पालक दिवस तथा फार्म का संदर्शन, दलीय चर्चा, मत्स्य पालकों को अनुसंधान संस्थान का संदर्शन कराना एवं आवश्यक साहित्यिक सामग्री का वितरण आदि के सार्थकता की जानकारी हेतु अध्ययन किया गया। इनमें निदर्शन कार्य, मत्स्य पालकों को उत्साहित करने का सबसे सशक्त माध्यम पाया गया ।

संस्थान के विस्तार कार्य द्वारा निम्नलिखित सेवाओं को उपलब्ध कराया गया ।

विस्तार कार्य	लाभगोभी
1. सलाहकार सेवाएँ	मत्स्य पालक, उद्यमियों, सरकारी अभिकरणों एवं गैर सरकारी संगठन (232)
2. प्रशिक्षण कार्यक्रम	विस्तार अधिकारी, मत्स्य बीज संग्रहक (51)
3. संचार सेवाएँ-साहित्यिक सामग्री, विडियो कैसेट आदि	सरकारी अभिकरणों, गैर सरकारी संगठनों एवं उद्यमियों (18)

	के माध्यम से	
4.	व्याख्यान (22)	मत्स्य पालक, विद्यार्थीगण एवं जनसाधारण
5.	जन संचार सेवाएँ	वही
	5 दूरदर्शन कार्यक्रम,	
	2 रेडियो कार्यक्रम	
6.	प्रदर्शनियाँ (देश के पाँच विभिन्न भागों में आयोजित)	वही

प्रशिक्षण कार्यक्रम

वर्ष 1996 के 16-17 अप्रैल के दौरान दक्षिणी सुन्दरवन के एक द्वीप पथरप्रतिमा में अन्तर्स्थलीय मात्स्यकी विकास पर एक दो दिवसीय प्रशिक्षण कार्यक्रम का आयोजन किया गया । इस प्रशिक्षण कार्यक्रम में संसाधनों के अभाव वाले 40 मत्स्यपालक / मछुए तथा 15 फार्म पर काम करनेवाली महिलाओं ने भाग लिया । इस क्षेत्र में जागृति उत्पन्न करने की दृष्टि से श्रव्य व दृश्य उपकरणों जैसे:- मिनी प्रोजेक्टर, स्लाइड प्रोजेक्टर आदि का प्रयोग किया गया । प्रतिभागियों ने झींगों तथा मछली पालन की नई तकनीकों को सीखने में विशेष रुचि दिखाई ।

पश्चिम बंगाल राज्य मात्स्यकी विभाग के 27 विस्तार अधिकारियों के लिए 6-16 जून 1996 के दौरान *"झींगा पालन"* विषय पर एक दस दिवसीय प्रशिक्षण पाठ्यक्रम बैरकपुर मुख्यालय में आयोजित किया गया ।

कृषि विज्ञान केन्द्र में प्रशिक्षण

वर्ष 1996-97 के दौरान निम्नलिखित प्रशिक्षण पाठ्यक्रमों का संस्थान के कृषि विज्ञान केन्द्र ने आयोजन किया ।

विषय क्षेत्र	प्रशिक्षण का प्रकार	पाठ्यक्रमों की संख्या		लाभगोभियों की संख्या	
		लक्ष्य	उपस्थित	लक्ष्य	उपस्थित
मात्स्यकी	परिसर में	7	7	70	70
	परिसर से वाहर	15	25	260	454
फसल उत्पादन	परिसर में	7	7	70	70
	परिसर से वाहर	9	30	190	617

बागवानी	परिसर में	8	8	80	80
	परिसर से बाहर	12	25	230	396
पशु विज्ञान	परिसर में	7	7	70	70
	परिसर से बाहर	12	22	160	283
गृह विज्ञान	परिसर में	9	9	90	90
	परिसर से बाहर	7	21	120	301
कुल योग	परिसर में	38	38	380	380
	परिसर से बाहर	55	123	960	2051

पुस्तकालय सेवाएँ

इस संस्थान के पुस्तकालय ने मुख्यालय तथा इसके अनुसंधान केन्द्र के वैज्ञानिकों को अपनी सेवाएँ उपलब्ध करायी । वैज्ञानिकों के अतिरिक्त इस पुस्तकालय का उपयोग अनेक संगठनों के शोधकर्ता, अध्यापक, विधार्थीगण, अधिकारियों ने भी किया । इस वर्ष पुस्तकालय ने अपने भंडार हेतु 201 पुस्तकें, 206 विविध प्रकाशनों तथा जरनलों के 600 खुले अंकों का संग्रहण किया । इसके अतिरिक्त 22 विदेशी तथा 48 भारतीय जनरलों को भी मंगाया गया । आज संस्थान के पुस्तकालय में 7450 पुस्तकें, 4240 पुनर्मुद्रित लेख, 937 मानचित्र, 3382 विविध प्रकाशन तथा 51 शोध प्रवंधन उपलब्ध हैं ।

पुस्तकालय ने अपने विभागीय प्रकाशनों को विभिन्न अनुसंधान संगठनों, विश्वविद्यालयों, उद्यमियों तथा मत्स्य-पालकों को निःशुल्क भेजने के काम को भी जारी रखा । अन्तर-पुस्तकालय ऋण के रुप में 17 प्रकाशनों को अन्य पुस्तकालयों में भेजा गया । इस वर्ष पुस्तकालय के मद में कुल 11,12,786=00 रुपए खर्च किए गए।

परियोजना अनुमापन एवं प्रलेखन सेवाएँ

इस अनुभाग ने संस्थान में कार्यान्वित हो रहे 21 अनुसंधान परियोजनाओं का अनुमापन कार्य तथा संस्थान के अनुसंधान परिषद् की वैठकों का आयोजन किया । इसके अतिरिक्त इस अनुभाग ने निदेशक महोदय को नीति निर्धारण,अनुसंधान योजनाएँ वनाने में तकनीकी सहायता प्रदान किया । वैज्ञानिकों द्वारा प्रस्तुत अनेक शोध-पत्रों को विभिन्न जरनलों में प्रकाशन या कार्यशाला और संगोष्ठियों में प्रस्तुत करने हेतु उनका संवीक्षण भी इस अनुभाग ने किया ।

इस अनुभाग में संस्थान की आवश्यकताओं की पूर्ति के लिए लघु प्रकाशन प्रणाली, फोटोकॉपी, साइक्लोस्टाइलिंग, जिल्दसाज आदि सुविधाएँ भी उपलव्ध हैं ।

अनुसंधान परियोजना संबंधी फाइल

अनुसंधान परियोजनाओं की वार्षिक प्रगति रिपोर्ट तथा वैज्ञानिकों का व्यक्तिगत योगदान संबंधी रिपोर्ट इस अनुभाग द्वारा प्राथमिक परियोजना फाइल तथा वैज्ञानिकों के निजी फाइलों में संग्रहित किया जाता है । इन कार्यों के अतिरिक्त अनुसंधान परियोजनाओं का अनुमापन, आर. पी. एफ. I, II तथा III, एक्टीविटी माइलस्टोन और मासिक, त्रैमासिक व वार्षिक रिपोर्टों तैयार करना आदि भी इस अनुभाग का ही दायित्व है।

तकनीकी रिपोर्ट व तकनीकी प्रश्नों का समाधान

इस वर्ष अनुभाग में अनुसंधान कार्यों से संवंधित 20 से भी अधिक रिपोर्टों का संकलन किया गया । संस्थान के वैज्ञानिकों द्वारा प्रस्तुत अनेक शोध-पत्रों को विभिन्न जरनलों में प्रकाशन के पहले उनका संवीक्षण किया गया । विदेश व देश के विभिन्न भागों द्वारा किये प्रश्नों का समाधान भी इस अनुभाग द्वारा किया गया । संस्थान के वैज्ञानिकों द्वारा विभिन्न कार्यशालाओं, संगोष्टियों में भाग लेने संवंधी कार्य का भी परिवेक्षण इस अनुभाग द्वारा किया गया ।

पर्सनल इनफरमेशन सिस्टम (पी.आई.एस.)

रिपोर्ट की अवधि के दौरान पर्सनल इनफरमेशन सिस्टम डाटावेस के तहत 75 वैज्ञानिकों के वयोडाटा को संकलित कर संस्थान एवं परिषद् के मुख्यालय में सुरक्षित किया गया ।

प्रकाशन

वर्ष 1996-97 के दौरान निम्नलिखित विभागीय प्रकाशनों को प्रकाशित किया गया।

1. संस्थान का वार्षिक रिपोर्ट 1995-96
2. अन्तर्स्थलीय मात्स्यकी समाचार (दो अंक, खण्ड-1 नम्बर 1 एवं 2)
3. बुलेटिन संख्या 59 - विबलियोग्राफी ऑप रिजर्वायर फिसरीज इन इंडिया
   जी. के. विन्सी एवं अंजली डे
4. बुलेटिन संख्या 61 - पॉसिबुल इम्पेक्ट ऑप स्पेसीज एनहेन्समेंट इन इंडियन रिजर्वायरस् थ्रू इंटरोडक्सन ऑफ जेनेटिकली मोडिफाइड तिलापिया
   वी. वी. सुगुणन एवं एम सिन्हा
5. बुलेटिन संख्या 62 - लिस्ट ऑफ सी. आई. सी. एफ. आर. आई. पब्लिकेशनस् (1985-96)
   अंजली डे
6. बुलेटिन संख्या 67 - फिसरीज ऑफ दी हुगली-मातलह ऐस्टुराईन सिस्टम-ऐन अप्रैराइजल
   पी. एम. मित्रा, एच. सी. कर्माकर, एम. सिन्हा, ए.घोष एवं वी एन सैगल
7. बुलेटिन संख्या 69 - ऐपीजूटिक अल्सरेटिव सिन्ड्रोम इन फिशस्-इट्स प्रजेन्ट स्टेटस् इन इंडिया
   एम. के. दास
8. बुलेटिन संख्या 70 - उत्तर विहार के मात्स्यकी जल संसाधन -- वर्तमान अवस्था एवं भावी संभवनाएँ (हिन्दी में)
   मणीरंजन सिन्हा एवं वंकिम चन्द्र झा
9. बुलेटिन संख्या 71 - कुशेश्वर स्थान चौर (नार्थ विहार) स्टेट्स एण्ड प्रोस्पेक्टस् फर फिशरीज डवलपमेंट
   वी. सी. झा एवं के. चन्द्रा
10. बुलेटिन संख्या 72 - ऍकोलॉजी वेसड् फिशरीज मेनेजमेंट इन अलियार रिजर्वायर
    सी. सेल्वाराज, वी. के. उन्नीथन एवं वी. के. मुरुगेसन
11. बलेटिन संख्या 73 - ऍकोलोजी एण्ड फिसरीज ऑप भाटगर रिजर्वायर
    रिजर्वायर फिशरीज डिविजन
12. सी. आई. एफ. आर. आई. पर्सपेक्टिव प्लान विजन -2020
13. फोल्डर्स:
    1. पेन कल्चर इन फल्डप्लेइन लेकस्
    2. फिशसीज ऑप फल्डप्लेइन लेकस्
    3. वाढ़कृत मैदानी झीलों की मात्स्यकी (हिन्दी में)
    4. वाढ़कृत मैदानी झीलों में पेन-प्रणाली द्वारा मत्स्य-पालन (हिन्दी में)
    5. जलीय पर्यावरण और मात्स्यकी (हिन्दी में)
    6. ट्रेनिंग प्रोग्राम 1997-98
14. करेन्ट कन्टेन्टस् (जनवरी-जून 1996; जुलाई-सितम्बर 1996 एवं अक्टूबर-दिसम्बर 1996) तीन अंक ।

APPENDIX-I

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

(Period from 1.4.1996 to 31.3.1997)

Sl. No.	Class of Posts	Total No. of posts sanctioned	Total No. of employees in position	Total No. of Sch. Cast among them	% of total employees	Total No. of Sch. Tribe among them	% of total employees	Remarks
1.	**SCIENTIFIC POSTS**							
	Experimental Scientist	-	-	-	-	-	-	
	Scientist	76	65	3	5.25%	-	-	
	Sr. Scientist/Scientist (Sel.Grade)/Scientist (Sr.Scale)	16	1	-	-	-	-	
	Pr. Scientist	8	1	-	-	-	-	
	RMP Scientist	1	1	-	-	-	-	
		101	**68**	**3**				
2.	**TECHNICAL POSTS**							
	Category-I	73	56	8	14.28%	2	3.5%	*This includes 2(two) posts under C.S.S. and 15 (fifteen) posts under KVK
	Category-II	56	55	11	20%	4	7.2%	
	Category-III	8	5	1	20 %	-	-	
		137	**116**	**20**		**6**		

contd..2

3. ADMINISTRATIVE POSTS

Sr.A.Os/A.Os/Accounts Officer etc.	2	2	-	-	-	-	This includes 1(one) Assistant, 1(one) Stenographer and 1(one) Jr. Clerk posts under C.S.S. and 1 (one) Supdt., 1 (one) Jr. Clerk under KVK
A.AOs/Supdt.(A/cs)/Supdt.	11	7	2	28.57%	1	14.29%	
Hindi Officer/S.C./Jr. Analyst/Desk Officer	1	1	-	-	-	-	
Assistants	20	19	6	31.58%	1	5.26%	
Stenographers(Sr. & Jr.)	9	6	2	33.33%	-	-	
Steno and 1 (one) Jr. Sr. Clerks/U.D.Cs	28	26	7	26.92%	-	-	
Jr. Clerks/Hindi	33	23	5	21.73%		-	
	104	**84**	**22**		**2**		

4. SUPPORTING STAFF

Grade-I	86	85	36	42.35%	3	8.33%	This includes 1(one) post of SSG under C.S.S. and 8 (eight) post of SSG under KVK
Grade-II	61	60	21	35%	2	3.33%	
Grade-III	35	35	13	37.14%	3	8.57%	
Grade-IV	18	18	10	55.56%	2	11.11%	
	200	**198**	**80**		**10**		
5. AUXILIARY POSTS	10	4	2	50%	-	-	

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
ALAPPUZHA
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, 1st Main,
80 ft, Road, IV Block,
Rajajinagar,
Bangalore - 560 010

FISHSEARCH
BANGALORE
Tele : (080) 3357213

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

Tele : (033) 3379444

		Telegramme/Telephone/ Telex
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 H. No. 25-1-2 Ground Floor, Papasaheb Road, P.O. RAMACHANDRARAO PET, ELURU - 534 002, West Godavari Dist., Andhra Pradesh	FISHSEARCH ELURU - 534 002
8	**Guwahati Research Centre** Central Inland Capture Fisheries Research Institute Bhangagarh-Rajgarh Road, Opp. UCO Bank, Guwahati - 781 005, Assam	Tele: (0361) 548757
9	**Hoshangabad Research Centre** Central Inland Capture Fisheries Research Institute Kothi Bazar, Opposite Rest House, Hoshangabad - 461001, Madhya Pradesh	CENTRAL FISHERIES KOTHI BAZAR HOSHANGABAD
10	**Karnal Research Centre** Central Inland Capture Fisheries Research Institute Session House Marg, E-9, Karnal - 132 001, Haryana	CENTRAL FISHERIES KARNAL - 132 001 Tele : (0184) 23385
11	**Malda Research Centre (Hilsa Division)** Central Inland Capture Fisheries Research Institute 52/36, Rabindra Avenue, 2nd Floor, Opp. to Malda College Gate, Malda - 732 101, West Bengal	
12	**Vadodara Research Centre** Central Inland Capture Fisheries Research Institute B-12, Hans Society, Behind Sangam Bus Stand, Harni Road, Vadodara - 390 022	Tele : (0265) 473 601

Survey centres

13	**Canning Survey Centre** Central Inland Capture Fisheries Research Institute R.N. Tagore Road, Canning - 743 329, West Bengal	

Telegramme/Telephone/ Telex

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, Pin. 711 315,
Dist. Howrah,
West Bengal

Krishi Vigyan Kendra

19 Krishi Vigyan Kendra Tele : (03210) 56496
Central Inland Capture Fisheries Research Institute
Kakdwip, Pin. 743 347,
24 Parganas (South),
West Bengal

APPENDIX - III

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

ORGANIZATION CHART, 1996-1997