



CIFRI NEWSLETTER

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RESEARCH HIGHLIGHTS

- *DUCKWEED AS CARP FEED : TECHNOLOGY FOR ITS MASS PRODUCTION IN TREATED SEWAGE-FED MEDIUM.*
- *A NEW DESIGN FOR FLOATING NET CAGES FOR AIR-BREATHING FISHES.*
- *A NEW MEASURING BOARD FOR AIR-BREATHING FISHES.*
- *SUCCESSFUL SEED PRODUCTION OF SINGHI AND MAGUR.*

VII TH WORKSHOP ON AIR BREATHING FISH CULTURE

FISH CULTURE HOLDS HIGH PROMISES

In India, agriculture is one field in which science and technology has made tremendous impact on development. The field of fisheries would respond equally to science and technology to achieve much higher production rate. So remarked Dr. S. Z. Qasim, Secretary to the Department of Ocean Development, Government of India while delivering his keynote address at the Seventh Workshop on All India Coordinated Project on Air-breathing Fish Culture held at Veterinary College, Patna during 10-11 July, 1984. Dr. Qasim was optimistic of narrowing the gap between the theoretical possibility of production and the rate of production obtained under practical conditions. The intellectual, physical, biological, and engineering inputs together would certainly enable us to obtain our targets in fish production.

The importance of fisheries in the national food scene was highlighted also by Dr. R. M. Acharya, Deputy Director General, ICAR in his presidential remarks. He forecast that next breakthrough in the field of agriculture might be in fisheries. The present rate of yield obtained in experimental farms as well as in farmers' ponds was a pointer to this hope.

Dr. P. V. Dehadrai, Fisheries Development Commissioner, Government of India expressed satisfaction that the significance of air-breathing fishes in human nutrition had gained world-wide recognition. Today India holds a place of pride among nations in the field of aquaculture. He called for development of input supply system and extension for wider adoption and popularisation of aquaculture during Seventh Five Year Plan.

Significant Successes :

Earlier, welcoming the Chief Guest and the participants, Dr. A. V. Natarajan, Director, CIFRI outlined the origin and progress of the Project. Unlike carp culture which received research support right from 1947, the air-breathing fish culture programme started receiving attention only from IVth Five Year Plan and the Co-ordinated Project had to begin from scratches. Yet the Project achieved significant successes, both in breeding and seed production as well as culture of various species of air-breathing fishes. Dr. Natarajan said that with the improved physical facilities it would be possible to achieve much higher rate of production. He called for further efforts to improve and innovate techniques of seed production, brood stock maintenance and rearing of the young.

Vital factors :

Dr. V. G. Jhingran, the Ex-Director of CIFRI in his remarks concentrated on three vital factors of technology of fish raising, viz., seed, feed and breed. He favoured a high density of stocking in air-breathing fish culture to obtain a higher yield.

TECHNICAL SESSIONS

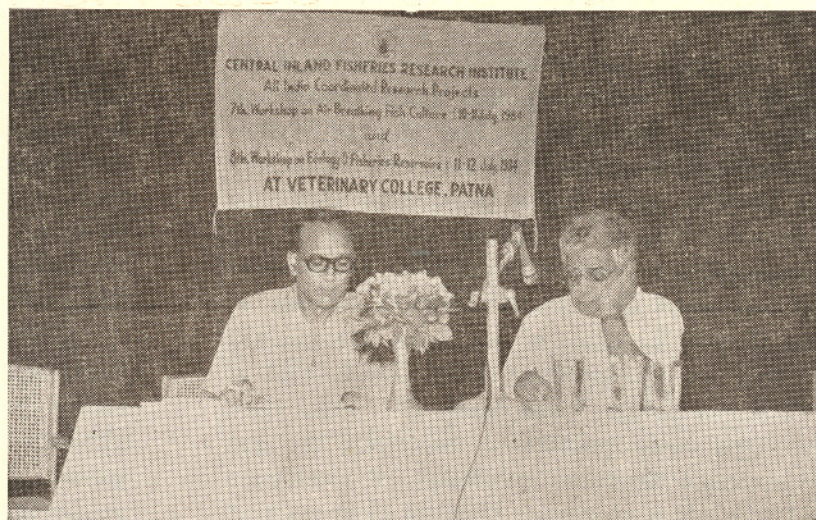
In the two sessions followed, reports on the progress and achievements made at various centres of



The inaugural session of the Seventh Workshop on Air-breathing fish culture. From Left Dr. A. V. Natarajan, Dr. P.V. Dehadrai, Dr. S.Z. Qasim, Dr. R.M. Acharya, Dr. V.G. Jhingran and Dr. G.P. Dubey.

the project were presented and discussed. The work mainly centred round seed survey, breeding under laboratory and field conditions and rearing of the spawn and young ones.

Massscale breeding of magur was achieved under simulated conditions in a plot at Birsa Agricultural university Campus, Ranchi. A plot of 24 m² was modified providing slope and breeding pits.



A technical session chaired by Dr. V. G. Jhingran (right). Dr. M. Y. Kamal in also seen in the picture.

The plot was filled with tube well water and 59 pairs of magur breeders were released. The brood fishes were fed with cowdung, mustard oil cake and kitchen wastes. The fishes were found to breed naturally in the plot at the onset of monsoon and a large number of fry and hatchlings could be collected. The difference in size groups showed that breeding took place more than once with a gap of few days in between.

The Bangalore Centre reported successful breeding of magur under controlled conditions, culture of murrel and magur in ponds, and screening of formulated feeds for magur and singhi.

Palair a centrally sponsored centre achieved 100 percent survival in case of murrel *Channa striatus* seed rearing for over a period of 105 days even at a stocking density as high as 13 lakhs/ha. Six hundred fifty murrel seed (av. 40-60 mm/1.1 g) were raised in a cement cistern of 5 sq.m. area fed with live tadpoles

at 50% of the body weight for the first one month and later with minced fresh trash fishes at 20% of body weight. The seed grew to 90-118 mm in size with an average weight of 9.3 g. The percent survival at such a high stocking density for murrels can be considered remarkable taking into consideration the low rate of survival due to cannibalism often observed in murrel seed rearing experiments. This and other experiments conducted at this centre indicated that in murrel seed rearing, growth rate is density dependent while survival rate is not density dependent, when food is abundant.

The work done at Barrackpore showed that there was a definite dietary optimum protein level in *C. batrachus* for higher growth-rate. Protein sparing action of dietary carbohydrate was more pronounced than that of dietary lipid content.

Dr. M. Y. Kamal, Project Coordinator presented his report

of the work done highlighting the salient findings from December 1982 to April, 1984. Besides, he pointed out the constraints due to which many of the objectives could not be fulfilled as anticipated. With the limited facilities available, the progress had been satisfactory, he noted.

Future Programme :

In the concluding session, the future work programme was finalised in the context of physical facilities available at each centre. It was decided that different centres should concentrate on different species giving due consideration to local ecology and demand. A committee consisting of Dr. V. G. Jhingran, Dr. P. S. B. R. James, Dr. G. N. Mitra, Dr. P. V. Dehadrai, Dr. A. V. Natarajan, Dr. M. Y. Kamal, and Officer-in-charge of different centres attended to the details of working programme for each centre.

WORKSHOP ON COMPOSITE FISH CULTURE

EMPHASIS ON QUALITY FEED

The Seventh Workshop on All India Coordinated Research Project on Composite Fish Culture and Fish Seed Production laid emphasis on production of quality seed of carps. The workshop was held at the Institute of

Engineering and Rural Technology, Allahabad during 5-6 May, 1984. Inaugurating the workshop Dr. R. M. Acharya, Dy. Director-General (Animal Sciences), ICAR said that the workshop had a great responsibility as it was expected

not only to look into the technical programme of the project, but also to evaluate the past performance of the project and to look into the constraints which slowed the pace of the project programme.

Dr. Acharya appreciated that the demonstration of high production rates at all the centres of the project over the years paved the way for the country to embark upon major development programmes on composite fish culture. In a critical observation he said that though the technology had fulfilled its prime objective, there were many areas that still needed to be probed well. This could be attained only through further well planned statistically designed experiments. With the background information collected for over a decade by now the conclusions derived should indicate certain trends with regard to production performance of different species in respect of growth and behaviour. Dr. Acharya desired that the Project should gear up its seed production activity and aim at improving the quality of seed through selection and hybridisation. He also desired for an extensive and rational use of byproducts of animal husbandry as feed input in composite fish culture.

The workshop spanned into four technical sessions, of which the first two were devoted to discussions on progress of work at various centres of the Project. The third session was for the presentation of report by the Project Coordinator and the discussions thereupon.



Dr. A. V. Natarajan addressing the workshop. Also seen (from left) are Dr. P. S. B. R. James, Dr. R.M. Acharya and Dr. V.G. Jhingran.

Finalisation of the Project programme for 1984-85 was done in the last session under the Chairmanship of Dr. A. V. Natarajan, Director, CIFRI. Dr. Natarajan identified a dozen crucial parameters that govern production in

carp culture. This formed the basis for formulation of a new programme for the first time with appropriate design of experiments for the centres covered under the Coordinated Project.



Sri S. D. Tripathi presenting the Project Coordinator's Report.

While discussing the progress at various centres, the important achievements of the project during the period were highlighted. The Jaunpur centre experimented a low input technology resulting in production of 3.0-4.5 t of fish/ha/yr applying fertilizers alone or

by adopting grass carp as the major component in culture system. The operational cost of production worked out to be only Rs. 1.13-1.42/kg fish. By inclusion of higher percentage of exotic carps, water replenishment in the pond and high feed input, the

Karnal and Pune centres obtained production levels upto 8.2 and 10.0t/yr respectively. Tuticorin centre could achieve a breakthrough in carp breeding with the successful breeding of mrigal in December, 1983.

WORKSHOP ON RESERVOIR FISHERIES

The Eighth Workshop on All India Coordinated Research Project on Ecology and Fisheries of Freshwater Reservoirs was held at Veterinary College, Patna during 11-12 July, 1984. In four technical sessions, the progress of work made under the project at various centres was discussed and the future work programme was finalised. The workshop also made an attempt to utilise the information gathered so far under the project in order to identify the areas which needed further investigation.

Shri B. V. Govind, Project Coordinator highlighted the ecosystem approach in reservoir fisheries investigations carried on for over a decade. He said, inspite of limited infrastructural facilities available at the centres, the investigations could help in evolving certain sound management principles, the application of which had already yielded rich dividends in certain reservoirs.

Highlights :

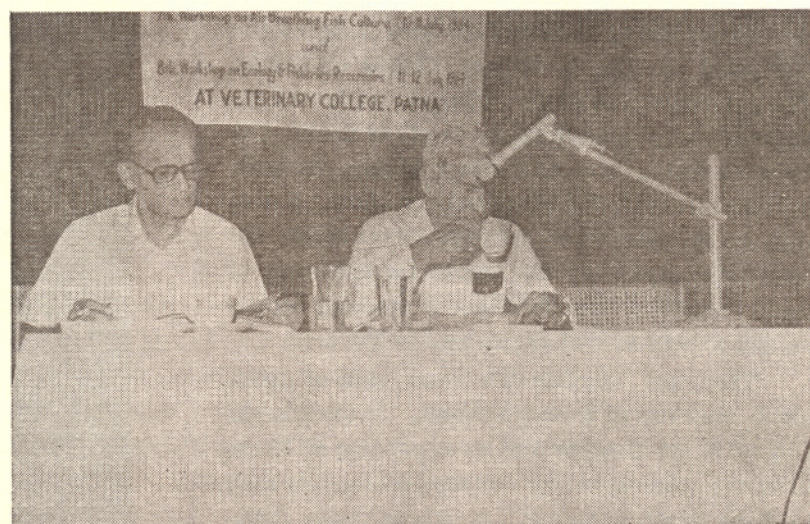
The adoption of a rational fishing effort augmented the yield in

all the three reservoirs where the measures were implemented. In Govindsagar, phased intensification of fishing effort and an increase in the mesh size resulted in sharp upswing in fish yield in a span of four years. A need was keenly felt for the observance of closed season and to stop the over exploitation of catla breeders in the reservoirs during monsoon months. The closed season had also to be observed at Lunkherkhad, the sanctuary for catla and other major carps. This was ex-

pected to result in improved yield from the reservoir in the coming years.

For want of adequate stocking during the formative years, catfish continued to dominate in Nagarjunasagar. It was apprehended that the Srisailem dam was likely to affect adversely the breeding and recruitment of *Silonia childrenii* and *Pangasius pangasius* in the reservoir.

The ascent of catla and mrigal in the commercial fishery of Vallabhasagar (Ukai, Gujrat) was aided by the sustained stocking



Shri G. N. Mitra presiding over a technical session. Shri B. V. Govind, Project coordinator is also seen in the picture.

programme of earlier years in addition to their breeding in this reservoir.

The Getalsud reservoir (Ranchi, Bihar) displayed signs of establishment of major carp fishery by way of natural recruitment in the reservoir, a phenomenon not evident during earlier years of study.

The Aliyar reservoir (Tamil Nadu) wanting in breeding grounds warranted heavy stocking of carp seed.

The unispecies dominance of catla in Rihand reservoir (U.P.) has declined due to poor recruitment, resulting from the lack of optimum inflow in July in recent

years. In view of the recent report on large-scale destruction of catla brooders, the closed season had to be enforced strictly in addition to massive stocking.

The discussions mainly pertained to the studies on breeding and recruitment, appropriate crafts and gears, experimental fishing and the policy on stocking and harvesting.

Dr. A. V. Natarajan, told the participants that the breeding success of fishes in reservoirs did not always amount to recruitment if the survival of hatchling was poor due to various environmental factors. Spawn in such reservoirs required salvaging by way of rearing them and

restocking the reservoirs at fingerling stage. Stocking needs differed from reservoir to reservoir depending upon the magnitude of auto-stocking. The population balance could effectively be done at the time of reservoir formation.

It was decided that all the centres would take up the following programme during 1984-85.

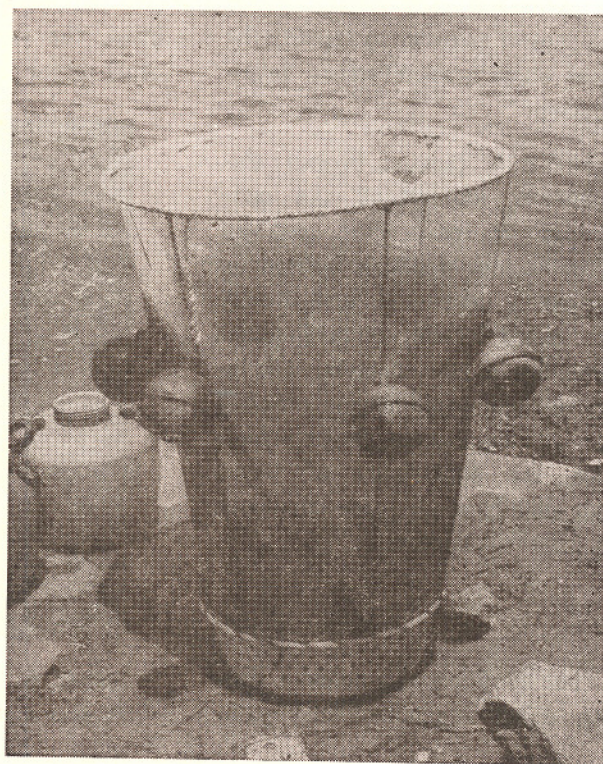
- Analysis of unutilised data
- Experimental fishing with multimeshed gears
- Year-wise analysis of age-groups with reference to the gears used
- drag-netting of all possible inshore areas for studying the possible recruitment.

RESEARCH HIGHLIGHTS

A New Design For The Floating Net Cages For Air-Breathing Fishes

A new type of floating net cage for rearing the air-breathing catfishes has been designed and fabricated at the Bangalore Centre of CIFRI. The parachute type shape of the net suits well the physical and physiological needs of the fishes. The large surfacing area of the cage enables the fishes for frequent surfacing effortlessly without hitting each other. Moreover, the cage comes handy for conducting replicated experiments for screening of feeds, studying the influence of stocking density on fish growth as well as rearing the fish seed.

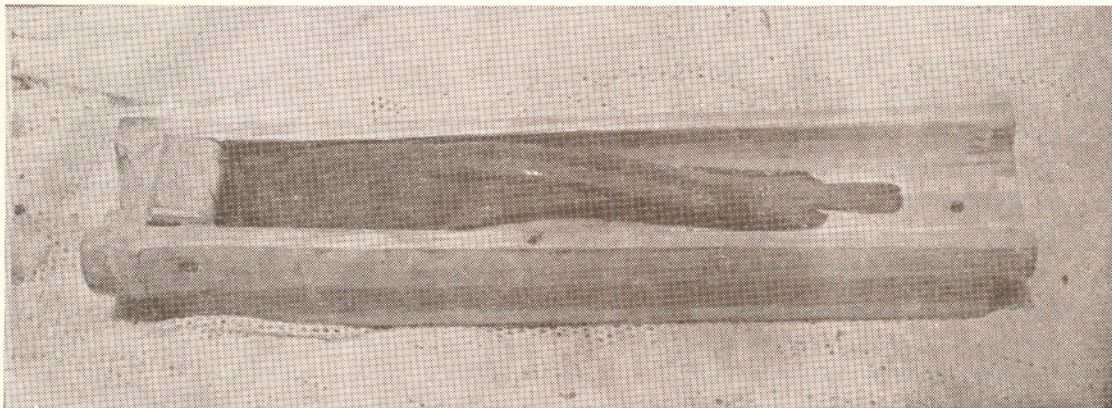
The cage consists of a frame made of galvanised iron rod of 8 mm thickness. It has a lower ring of 50 cm diameter and an upper ring of 75 cm diameter connected by six supporting rods each having a length of 60 cm. A plastic basin (diameter 50 cm; depth 10 cm) is fastened to the lower ring. The frame is covered with a nylon net cloth of 8 mm mesh size, well stretched and stitched to both the rings. The nylon net cloth is



handstitched to upper ring all along, keeping a flap which can be closed or opened. The cage is floated with the help of six rexin floats (dia. 15 cm) one fixed to each supporting rod 25 cm below the upper ring. This ensures enough open space above the water level. A number of such cages can be floated and held in an anchored rectangular floating bamboo frame, if required.

Such a cage is ideal for culture of magur (*Clarias batrachus*) and singhi (*Heteropneustes fossilis*) in any type of protected water body, including irrigation wells as well as in water-bodies in which harvesting is difficult. The cage is light and can be handled with ease.

A New Measuring Board For Air-Breathing Fishes



A new measuring board for easy measuring of the length of air-breathing fishes has been designed at the Air-breathing Fish Culture Unit at Bangalore Centre. This measuring board consists of a piece of split half of a hollow bamboo, a head piece, a scale mounted on a wooden plank and a supporting base. Taking into account the girth of the fish and the spread of the pectoral spines, the suggested inner dimensions of the hollow of the bamboo for the scales of different lengths are as follows :

| Length of the scale (mm) | Inner diameter of the bamboo (mm) |
|--------------------------|-----------------------------------|
| 300 | 45 ± 05 |
| 400 | 55 ± 05 |
| 500 | 65 ± 05 |

A piece of high density polyethylene (HDPE) pipe of desired diameter, cut length-wise into two can also be used instead of the split bamboo.

Measuring the length of live air-breathing fishes, especially the murels with cylindrical body and catfishes with dorso-ventrally flat head is difficult using conventional flat measuring board. The thick layer of slime on the body of these fishes in general and the sharp pectoral spines of singhi and magur in particular render their handling and measuring difficult and time consuming. The present measuring board offsets these problems. Live catfishes will fit exactly in the curvature, thus preventing the fish from struggling and slipping out. The device also reduces the time considerably, *i.e.* up to a level of 50, 53 and 43% in case of murrel, magur and signhi respectively over the time needed by the conventional measuring board.

IMPRESSIVE YIELD USING DUCK WEED AS CARP FEED

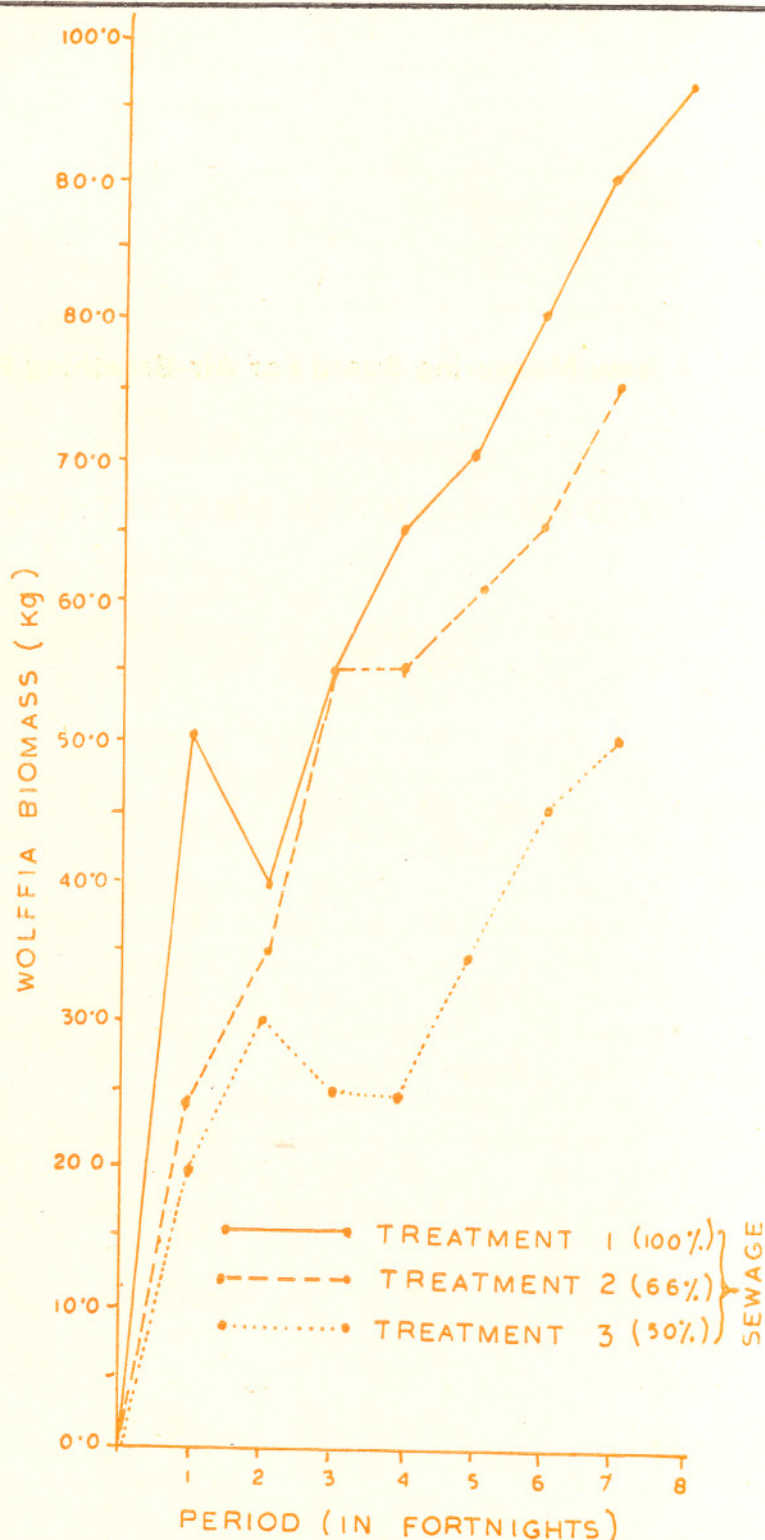
Carp fed exclusively on duckweed flourished well and recorded impressive growth rates. In a yard experiment in cement cistern (0.018 ha each) using duckweed as fish feed, 73 kg of carp was harvested in a period of 143 days. No other feed or fertiliser was provided during the experiment.

The cistern was stocked with 200 nos. of carp seed comprising grass carp, silver carp, common carp, rohu, mrigal and *Puntius javanicus* in the ratio of 5:5:5:2:2:1. Freshly harvested duckweed (*Wolffia arrhiza*) was provided at an average rate of 20 kg/day i.e., ten times the initial weight of the stocked fishes during the first 63 days and 40-50 kg/day i.e. equal to the weight of the stocked fishes during the next 80 days. In 143 days, the average rate of growth was 579.0g for grass carp 342.0g for silver carp, 283.0g for common carp, 430.0g for (*Puntius javanicus*). The yield is equivalent to 4058 kg/ha in 143 days.

Members of duckweed family have been used as fish feed in a few of the earlier experiments. However, this valuable weed is yet to receive its due recognition as a carp feed. Duckweed *Wolffia arrhiza* is a minute free floating weed containing 30-32.5% protein. This weed prefers waterbodies rich in organic nutrients for optimum growth, and under such conditions it grows to a 1.0-1.5 cm thick laxer over the water surface.

WOLFFIA HARVEST EXCEEDS 100 t/HA/YR USING TREATED SEWAGE

Experiments were conducted at the Rahara Centre of the Institute to ascertain growth-rate and total biomass production of duckweed in



sewage-fed medium. Six cement cisterns each having an area of 0.018 ha were filled with primary treated sewage effluent of three concentrations, 100%, 66% and 50%, each in duplicate. After a stabilisation period of one week, one kg fresh *W. arrhiza* was introduced in each cistern. Water depth was maintained at 1 m in all the cases. Profuse growth was observed in all the cisterns and the harvest could be initiated from 10th day onwards. The per hectare yield amounted to 28 t from 50% medium, 38 t from 66% medium and 55 t from 100% sewage medium in 150 days. There was no intermittent supply of sewage during the course of experiment. A gradual fall in nitro-

gen and phosphate values was noted in the medium indicating the utilisation of these nutrients. The peak harvest was observed from 14th to 22nd week of the inoculation. There was a substantial fall in the yield afterwards. This indicates a scope of a much higher yield of duckweed by maintaining the nutrient level of the water through fresh doses of sewage at intervals. At its peak, a rich harvest of 95 kg duckweed was obtained from the cistern having 100% sewage effluent medium in the 8th fortnight. Similarly, peak production of 75 and 50 kg were obtained from 56% and 50% media respectively in the 7th fortnight.

SEED PRODUCTION OF AIR-BREATHING FISHES

Koi and murrel bred naturally in cement cisterns of the size 31x24x0.9 m. The breeding was favoured by providing the cisterns a soil flooring, aquatic vegetation and some earthen hundies at the corners thereby giving the cisterns a resemblance to the natural spawning site.

Singhi and magur could be bred profusely in specially prepared paddy plots. The plots had a gradient of 2.41% and were provided with fish shelter pits. The plots were manured with cowdung and inorganic fertilisers and were subsequently sown with CR.1018 variety of paddy. Singhi and magur brooders collected locally and maintained in cement cisterns were released in three wattle

enclosures erected in the plots. The enclosures were also provided with earthen hundies, aquatic weeds etc. The spawners bred

profusely and small fry of magur and singhi were noticed in 10 days time. The seeds grew to 35-39 mm in size two weeks.

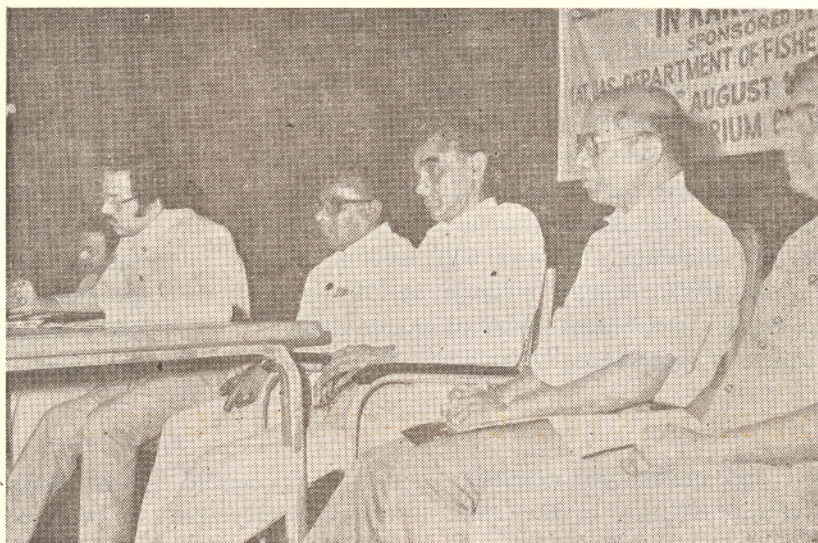


Seed raising of air-breathing fishes in cement cisterns at paddy-cum-fish culture unit of CIFRI, Cuttack.

EXTENSION MACHINERY NEEDS TO BE GEARED UP

A seminar on Inland Fisheries in Karnataka jointly sponsored by the ICAR, Institution of Agricultural Technologists, University of Bangalore and Karnataka State Fisheries Department was held on 18 August 1984 at University of Agricultural Sciences, Bangalore. The Seminar looked into the perspectives that have developed in last few decades as well as the targets and the employment potential, the area would generate.

Serving as the Chief Guest on the occasion, Dr. A. V. Natarajan, Director, CIFRI said production technologies for various species of fishes and suiting different types of water bodies had been developed with promising results. Polyculture of carps demonstrated yield as high as 10 t/ha/yr in the States of Orissa and Maharashtra. Production over 5000 t/ha/yr had been demonstrated in other parts of the Country as well. However, he noted that inspite of efforts to popularise this new technology, both by CIFRI and various state agencies, the yield from an average pond remained a poor 350 kg/ha whereas a minimum of 3 t could easily be achieved. According to him the country could easily achieve a production of 5 million tonnes from the estimated 1.6 million hectares of ponds and tanks. To realise this, it was important that the extension machinery of every state needed to be



Mr. M. Rajavardhan, Hon'ble Minister for Fisheries, Karnataka, inaugurates the seminar.

geared up to higher operational pitch, and resorted to large-scale training and demonstration programmes, audio-visual publicity, easy credit and ready availability of input supplies like seed, and long-term lease of water bodies to farmers. When in full operation, this sector would generate a gainful employment to about 1.5 million people ensuring a per capita income of Rs. 15,000/- per year.

Relevant technologies : Dr. Natarajan outlined various technologies developed by CIFRI which borne a great relevance to Karnataka. Integrating fish farming with other agricultural activities like paddy cultivation, livestock farming and horticulture

could be adopted for better yield and a higher percentage of return. In Karnataka, there was an ample scope for profitably blending fish culture with sericulture. He also spoke of the great relevance the sewage-fed fisheries had in this State.

In southern states, going according to the market demand, there was immense opportunity to develop culture of air-breathing fishes. Large-scale wild seed of murrels, magur, singhi, and koi are available in these States. CIFRI had demonstrated production technology yielding a rate of 4.5 t/ha of murrels and 5 t/ha of magur and singhi in an year. The yield from peninsular irrigation tanks could

be raised manifold by manipulating existing fishery by proper stocking with catla, rohu and mrigal. These waters were also suitable for intensive culture of carps and air-breathing fishes in cages. Dr. Natarajan observed that the yawning shortfall in the production of pulse in meeting our protein requirement could easily be made up if we paid adequate attention to our fishery resources.

Mr. M. Rajavardhan, Minister of State for Fisheries inaugurated the seminar. He said the World Bank Team was now inspecting the tanks and reservoirs in various

parts of Karnataka for launching the World Bank-assisted reservoir fisheries development project at a cost of 27.72 crores. Nearly 500 small and medium-sized tanks with a total area of 60 000 ha in 17 districts of the State had been identified for implementation of the project. He called on the University of Agricultural Sciences, Bangalore to increase the research and extension projects on fisheries, particularly the inland fisheries in the wake of the world Bank Project.

Mr. M. Jayaraj, Director of Fisheries, Govt. of Karnataka

spoke of programmes in both marine and inland fisheries in the State. The rate of growth of inland fisheries in the country was one-and-half times that of marine fisheries. India stood second in inland fish production after China. The State Inland Fisheries Corporation, which was recently set up, would coordinate the activities of seed production, tank fishery development, exploitation and marketing of fish. There were several bank-assisted schemes which would help the poor through lease of tanks and reservoirs for fish culture,

WORLD ENVIRONMENT DAY AT CIFRI

CIFRI's concern over the deterioration of our environment was once again echoed when the Institute observed World Environment Day on 5th June at its Headquarters at Barrackpore. Speaking to an elite gathering on the occasion, Dr. A.V. Natarajan, Director CIFRI drew the attention of the audience to the multifarious activities that adversely affected the delicate fabric of nature. The everincreasing population demands heavily on our limited land and water resources causing them dwindle faster than we often realise. Species of plants and animals disappear for ever in

satisfying man's needs. The damage caused is often irreversible. Dr. Natarajan cited a few examples. The quick depletion of our forest resources is closely followed by the erosion of invaluable top soil at a rate which Nature cannot repair. The subsequent siltation causes river beds to rise rapidly associated with frequent floods. Even the vast sea resources have been now observed to be badly affected with pollution and overexploitation. It is only time that nature's damage takes the upper hand on mankind unless we change our attitude sooner.

Dr. Natarajan said that the elite community of the world is well aware of this. Organisations, governments and departments throughout the world are now keen on reversing the process of environmental deterioration. However, the success rests on the attitude of the masses. He called upon the CIFRI fraternity to enlighten more and more people about the real impact of their activities on environment. It was in fitness of things that the Staff and Scientists of CIFRI once again took pledge to spread the message of the Day far and wide.

EXTENSION

Second Phase of Lab to Land Programme Concludes

The second phase of Lab to Land Programme concluded in the month of May 1984. Three hundred farm families in the States of West Bengal and Orissa were adopted under this programme. With the technological support of CIFRI these farmers not only had a richer harvest but

also got acquainted themselves with the techniques of breeding, rearing and culture of carps and air-breathing fishes. Some farmers resorted also to the paddy-cum-fish culture technology.

In this second phase, the average fish yield from the ponds under Lab to Land Programme at Chanditala and Kamarpukur areas in West Bengal ranged from 2,200 to 4,784 kg/ha/yr for carps and 1,675 to 2,200 kg/ha/6 months for air-breathing fishes, mainly magur.

Third Phase Initiated

The third phase of this technology transfer programme was initiated in June 1984. A total of 600 farm families at six centres in West Bengal and Orissa are being covered under this phase (Table). In June itself the farm families at Chanditala and Nilgunj areas were benefited by the transfer of technology programme on induced breeding, seed raising, and preliminaries of carp culture and integrated fish farming.

Salient features of 600 farm families adopted under Lab to Land Programme of CIFRI during III Phase

| | | | | |
|-----|---------------------------------------|------------|-------------|------------------|
| 1 | Total number of adopted farm families | 600 | | |
| 2 | Breakup—Holdingwise | | | |
| i | Total number of landless families | 83 | | |
| ii | Total number of marginal families | 437 | | |
| iii | Total number of small families | 80 | | |
| 3 | Breakup—Castewise | | | |
| i | Total number of S. C. families | 242 | | |
| ii | Total number of S. T. families | 3 | | |
| iii | Total number of B. C. families | 19 | | |
| iv | Total number of O. C. families | 336 | | |
| 4 | Water area covered | | WEST BENGAL | ORISSA |
| a) | Brackishwater | 10,170 ha | | |
| b) | Freshwater | 179,616 ha | | 189,786 ha |
| 1 | Total number of adopted families | 350 | | 250 |
| 2 | Breakup—Holdingwise | | | |
| i | Landless families | 70 | | 13 |
| ii | Marginal families | 234 | | 203 |
| iii | Small families | 46 | | 35 34 |

EXTENSION

| | | WEST BENGAL | ORISSA |
|-------------------------------------|------------------|-------------|-----------------|
| 3 Breakup—Castewise | | | |
| i Scheduled caste families | | 142 | 100 |
| ii Scheduled tribe families | | 1 | 2 |
| iii Backward community families | | 1 | 2 18 |
| iv Other caste families | | 206 | 130 |
| 4 Total water area (Hectare) | a) Brackishwater | 10.17 | — |
| | b) Freshwater | 144.13 | 35.486 |

Talks

The scientists of the Institute delivered a few extension lectures for the benefit of fish farmers and State extension officers.

- A lecture on **Modern aquaculture** was delivered by Mr. U. Bhaumik, S-2 to the trainee fish farmers of Mandra Unnayan Sanstha, West Bengal.

The lectures delivered to the trainee Fisheries Extension Officers, West Bengal were the following.

- | | |
|---|-----------------------|
| • Work and achievements of CIFRI | Mr. U. Bhaumik, S-2 |
| • Fisheries extension | -do- |
| • Brackishwater prawn and fish culture | Mr. P. K. Pandit, S-1 |
| • Brackishwater farm construction | -do- |
| • Duties of extension officers | Dr. P. Das, S-3 |
| • Breeding and culture of penaeid prawns | Mr. D. D. Halder, S-3 |
| • Reservoir fisheries—origin, ecology, fisheries and management | Mr. V.V. Sugunan, S-2 |
| • Hilsa fisheries of India with special reference to Hooghly-Matlah estuarine system | Mr. D. K. De, S-1 |
| • Biology of hilsa | -do- |

Visitors briefed

Mr. Martin Jennings and Miss. Jillian Hall from University College of Wales, U. K.; Shri Amal Dutta, M.P.; Sarvashri S. C. Ukil and A. Mukherjee, both Bar-at-Law; IAS probationers (1982 batch); Mr. A Prabhakaran, Manager and Mr. T. Ramamurthy, Asst. Executive Engineer both of Tamil Nadu Fisheries Corporation Mr. Kharga Basnet, Assistant Director of Fisheries, Bhutan; 21 Officers Trainee of FAO/UNDP; and 68 trainees of Central Institute of Fisheries Education,



Visitors observe a netting demonstration in a Lab to Land pond.

Bombay who visited the Institute at various occasions were briefed on the activities and achievements of the Institute.

Seed raising in paddy field :

Two crops of major carp seed were raised along with paddy in a farmer's plot under the guidance of the extension scientists. The 18-day experiments yielded healthy fry of the range 18-25 mm. The survival rate was 33-37%. The experiment caused no adverse effect on paddy crop indicating the feasibility of such a venture in paddy plots bringing additional income to the farmers.



French scientists Mr. Patric Lavarsde, Mr J. M. Pelloquet and Miss F. Guinard who visited CIFRI on a discussion with the Lab to Land farmers.

SEMINAR/SYMPOSIUM

● Shri B. B. Ghosh, Dr. M K. Mukhopadhyay, Dr. H. C. Joshi and Shri M. M. Bagchi attended the **Environmental Awareness Workshop** held at Bidhan Chandra Krishi Viswa Vidyalaya, Kalyani during 20-30 June, 1984. The Workshop was jointly organised by the University and the Department of Environment, Government of India.

● Dr. V.K. Unnithan attended the **National Seminar on Integrated Information System for Socio-economic Development** conducted by Society for Information Science at New Delhi during 27-28 June, 1984.

● Dr. H. C. Joshi participated in the **Pre-implementation Workshop of the AICRP on Pesticide Residues** held at IARI, New Delhi during 16-17 August 1984.

● Shri Y. S. Yadava participated in the **Seminar on Guidelines for Science and Technology** organised by the National Productivity Council and Regional Research Laboratory, Jorhat, during 4-6 June, 1984.

CIFRI Scientists at CAB (RBI)

Dr. B. N. Saigal and Shri S. Paul Scientists represented Central Inland Fisheries Research Institute in the 8th course on Finan-

cing Fisheries during 3-5 July, 1984 at the College of Agricultural Banking (RBI), Pune. They were nominated to conduct sessions on the following :

1. Inland fishery resources and seed requirements.
2. Techno-economic appraisal of carp culture murrel & catfish culture
3. Techno-economic appraisal of fish-cum-paddy culture & other integrated systems
4. Techno-economic appraisal of coastal aquaculture.

● Dr. George John, Shri S.N. Mohanty and Shri D. K. Kaushal attended the ICAR sponsored Summer Institute on Applications of Indigenous Electronic Instruments for Fishing and Fisheries Research at CIFT, Cochin during 17th May to 7th June, 1984.

● Shri A. Sengupta participated in the Summer Institute on Energy Management in Agriculture and Rural Sector—Sources and Technologies at Bhopal from 5-28 June, 1984.

● Shri A. B. Mukherjee participated in the Summer Institute on 'Water Management Practice for Humid Tropics' at Kozhikode from 2-22 May, 1984.

● Miss Mira Sen and Miss Lekha Sanfui attended the Summer Institute on 'Recent Research in Child Development—Implications for Curriculum Change' held at New Delhi during 8-28 June, 1984.

● NAARM Training : S/Shri D. Nath, B.K. Saha, B.L. Pandey, B. C. Jha, R. K. Chakraborty and S. Srinivasagam completed the one month *Orientation course in agricultural research management* at NAARM, Hyderabad which was held during 6 June—5 July, 1984.

● R. A. Gupta undergone a *Training Course in use of computer* at IASRI, New Delhi in June, 1984.

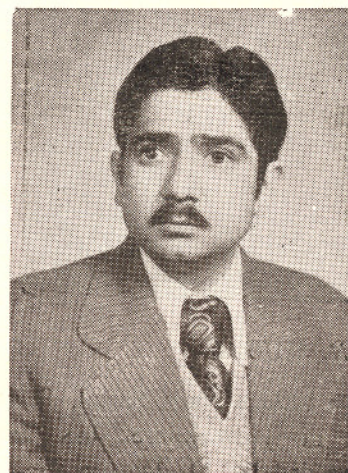
PH. D. AWARDEES

P. DAS



University of Burdwan, West Bengal has conferred the degree of Doctor of Philosophy on Shri Punyabrata Das, Scientist at the Headquarters for his thesis 'Studies on management and limnobiology in relation to fish production in some freshwater ponds'. The study has led to better understanding of the complexities, certain management measures, and pond limnobiology *vis-a-vis* fish production. The regression and correlation studies of some important management variables related to fish yield revealed their role individually and in combination in the production process. The findings of the study have immediate applicability in embanked freshwater ecosystems and thereby the aquaculture development as a whole.

SHYAM SUNDER



Shri Shyam Sunder Scientist, at Srinagar Centre of CIFRI was awarded the Ph.D. Degree by University of Kashmir for his thesis 'Biology of an indigenous carp, *Schizothorax curvifrons* Hackel from stretch of River Jhelum with certain hydrobiological parameters'. The study deals with the fishery and various biological features of this species and correlates them with the hydrobiological conditions prevailing in the river.



B. N. SAIGAL

Shri Bhola Nath Saigal, Scientist at Barrackpore has been awarded Ph. D. Degree of the

University of Calcutta on 25th July, 1984. His thesis entitled 'Biology and fishery of *Mystus* (*Osteobagrus*) *aor* (Hamilton) and *Mystus* (*Osteobagrus*) *seenghala* (Sykes)' embodied the results of investigations on embryonic development and life history, various biological aspects, and population dynamics of these two bagrid species and their commercial fishery in the upper and lower stretches of the Ganga river system.

M. K. MUKHOPADYAY

Shri M. K. Mukhopadhyay, Scientist at Barrackpore obtained his Ph.D. Degree from University

of Kalyani for his investigations on 'Effect of heavy metals on fish and fish food organisms'. Under this problem Dr. Mukhopadhyay delved deep into the influence of heavy metals, i.e., iron, copper and zinc on biota both individually and in different combinations. He also established antagonistic, synergistic and additive impact of heavy metals on aquatic ecosystem. Metal residues in fish and bottom organisms were determined in addition to the effect of metal bioaccumulation on reproductive potential of the fishes studied.

STAFF NEWS

Halder takes over as information chief

Shri D. D. Halder, Scientist took over the charge of Documentation and Information Section from Dr. B. N. Saigal who moved on to Estuarine Fisheries Division as the Head of Capture fisheries; comprising fisheries resources statistics, estuarine ecology, fisheries and water pollution.

Dr. P. Das, presently looking after the Brackishwater Fish Genetics Section has been given additional charge of Extension and Training Division.

Shri P. R. Sen tookover as Officer-in-Charge, Rahara sewage-

fed fish culture centre. This is in addition to his work on hilsa breeding project.

Resignations/Retirements

Shri R. D. Chakraborty, Scientist stands retired voluntarily from the services of ICAR at CIFRI. His retirement came into effect on 27th July, 1984.

Dr. P. U. Varghese, Scientist ceases to be on the rolls of ARS (ICAR) with effect from 11.7.1984.

The resignation of Dr. P. M. Mathew, Scientist at CIFRI has been accepted with effect from 31st May, 1983.

On resignation, Shri Amar Kumar Das, Training Assistant, KVK, Kakdwip stands relieved from his duties under CIFRI w.e.f. 8th October, 1984.

Shri R. N. Mahato, Jr. Clerk also stands relieved of his post under CIFRI w.e.f. 6th August, 1984.

Obituary

We report with grief the sad demise of Shri Kartar Balmiki supporting Gr.-II on 29.5.1984. May his soul rest in peace.

Promotions

On the recommendation of the Agricultural Scientists Recruitment Board, New Delhi, following Scientists of the Institute are promoted as mentioned below :—

| Scientist | Grade | Promoted to | w. e. f. | advance no. of increments | w. e. f. |
|--------------------------|-------|-------------|----------|---------------------------|----------|
| 1. Dr. B. N. Saigal | S-2 | S-3 | 1. 7. 82 | — | — |
| 2. „ K. L. Sehgal | „ | „ | „ | — | — |
| 3. „ T. Ramaprabhu | „ | „ | „ | — | — |
| 4. „ Y. Rama Rao | „ | „ | „ | — | — |
| 5. Shri R. N. Pal | „ | „ | „ | — | — |
| 6. „ M. Ranadhir | „ | „ | „ | — | — |
| 7. „ P. R. Sen | „ | „ | „ | — | — |
| 8. „ N. G. S. Rao | „ | „ | „ | — | — |
| 9. „ B. V. Govind | „ | „ | 1. 1. 83 | Two | 1. 7. 82 |
| 10. „ K. P. Srivastava | S-1 | S-2 | 1. 7. 81 | — | — |
| 11. Smt. K. K. Bhanot | „ | „ | 1. 7. 82 | — | — |
| 12. Shri V. V. Sugunan | „ | „ | „ | — | — |
| 13. „ R. K. Sexena | „ | „ | „ | — | — |
| 14. Dr. Shyamsunder | „ | „ | „ | — | — |
| 15. „ Harbhajan Singh | „ | „ | „ | — | — |
| 16. „ L. H. Rao | „ | „ | „ | — | — |
| 17. Shri P. Kumaraiah | „ | „ | „ | — | — |
| 18. „ K. V. Rao | „ | „ | „ | — | — |
| 19. „ P. L. N. Rao | „ | „ | „ | — | — |
| 20. „ M. Ramakrishnaiah | „ | „ | „ | — | — |
| 21. „ V. K. Murugesan | „ | „ | „ | — | — |
| 22. „ A. K. Datta | „ | „ | „ | — | — |
| 23. Dr. S. P. Rai | „ | „ | „ | — | — |
| 24. „ R. K. Banerjee | „ | „ | „ | — | — |
| 25. „ M. K. Mukhopadhyay | „ | „ | „ | — | — |
| 26. Shri D. N. Singh | „ | „ | „ | — | — |
| 27. „ Kuldeep Kumar | „ | „ | „ | — | — |
| 28. „ U. Bhaumik | „ | „ | „ | — | — |
| 29. Dr. K. M. Das | „ | „ | „ | — | — |
| 30. „ A. K. Laal | „ | „ | „ | — | — |
| 31. „ S. Sivakami | „ | „ | „ | — | — |
| 32. Shri Hardial Singh | „ | „ | „ | — | — |
| 33. „ Y. S. Yadava | „ | „ | „ | — | — |
| 34. Dr. K. J. Ram | „ | „ | „ | — | — |
| 35. Shri C. B. Joshi | „ | „ | „ | — | — |
| 36. Dr. S. Radhakrishnan | „ | „ | „ | — | — |
| 37. Shri P. Ravichandran | „ | „ | „ | — | — |
| 38. „ S. R. Das | „ | „ | „ | — | — |
| 39. „ S. R. Ghosh | „ | „ | „ | — | — |
| 40. „ D. Nath | „ | „ | „ | — | — |

| Scientist | Grade | Promoted to | w. e. f. | advance no. of increments | w. e. f. |
|---------------------------|-------|-------------|----------|---------------------------|----------|
| 41. Dr. H. C. Joshi | S-1 | S-2 | 1. 1. 83 | Three | 1. 7. 82 |
| 42. Shri R. A. Gupta | " | " | " | Two | " |
| 43. " S. K. Saha | " | " | " | " | " |
| 44. " S. D. Gupta | " | " | " | Three | " |
| 45. " D. P. Chakraborty | " | " | " | Two | " |
| 46. " Dilip Kumar | " | " | " | Three | " |
| 47. Dr. Mathew Abraham | " | " | " | " | " |
| 48. " M. Kallamurthy | " | " | " | " | " |
| 49. Shri Dharendra Kumar | " | " | " | " | " |
| 50. " P. K. Chakraborty | " | " | " | " | " |
| 51. " B. C. Tyagi | " | " | 1 7. 83 | Three | " |
| 52. " P. K. Aravindakshan | " | " | " | Two | " |
| 53. " S. Paul | " | " | " | — | — |
| 54. " P. N. Jaitly | S | S-1 | 1. 7. 81 | — | — |

The following scientists were given advance increments as shown below :—

| Name | Designation | No. of increments | |
|---------------------------|-------------|-------------------|---------------|
| | | w.e.f.1.7.82 | w.e.f. 1.1.83 |
| Shri K. K. Sukumaran | S-2 | Three | — |
| Dr. S. P. Ayyar | " | Two | Three |
| Shri G. N. Saha | " | Two | — |
| " S. Patnaik | " | Two | — |
| Dr. G. N. Mukherjee | " | One | Two |
| Shri H. A. Khan | " | One | Two |
| Dr. M. Subrahmanyam | " | One | Two |
| Shri Ch. Gopalakrishnayya | " | One | Two |
| " G. K. Bhatnagar | " | — | Two |
| Dr. M. Y. Kamal | " | — | Two |
| Shri Ravish Chandra | " | One | — |
| " D. V. Pahwa | " | One | — |
| " K. K. Ghosh | " | One | — |
| Dr. K. V. Ramakrishna | " | — | One |
| " R. S. Panwar | " | — | One |
| Shri S. N. Mehrotra | S-1 | Three | — |
| " R. K. Chakraborty | " | Three | — |
| " M. M. Bagchi | " | Three | — |
| " Balbir Singh | " | Three | — |
| Smt G. K. Vinci | " | Two | Three |
| Shri P. M. Mitra | " | Two | Three |
| " K. Gopinathan | " | Two | — |
| " S. C. Thakurta | " | Two | — |
| " M. K. Das | " | Two | — |
| " J. B. Rao | " | Two | — |

| Name | Designation | No. of increments | |
|----------------------|-------------|-------------------|---------------|
| | | w.e.f. 1.7.82 | w.e.f. 1.1.83 |
| Shri B. K. Mishra | S-1 | Two | — |
| „ R. C. Das | „ | Two | — |
| „ S. N. Mohanty | „ | Two | — |
| „ D. N. Mishra | „ | Two | — |
| Dr. S. M. Pillai | „ | Two | — |
| Shri B. Roy | „ | Two | — |
| „ C. P. Rangaswamy | „ | Two | — |
| „ K. J. Rao | „ | Two | — |
| Dr. M. A. Khan | „ | Two | — |
| „ B. P. Gupta | „ | One | Two |
| Shri S. Srinivasagam | „ | One | Two |
| „ B. C. Jha | „ | One | — |
| „ A. K. Sahu | „ | One | — |
| „ V. R. Chitranshi | „ | One | — |
| „ G. N. Srivastava | „ | One | — |
| Smt. Munawar Sultana | „ | One | Two (1.7.83) |

On recommendation of Assessment Committee the following technical Personnel are appointed in the grades as mentioned below :—

| Name | Present grade | Next grade | Place of posting | w.e.f. |
|------------------|---------------|------------|------------------|--------|
| Shri P. K. Ghosh | T-4 | T-5 | Barrackpore | 1.7.84 |
| „ S. K. Das | „ | „ | -do- | „ |
| „ N. P. Saha | T-2 | T-I-3 | -do- | „ |
| „ S. R. Gupta | „ | „ | -do- | „ |
| „ K. L. Das | „ | „ | -do- | „ |
| „ N. C. Roy | „ | „ | -do- | „ |
| „ R. D. Saha | T-1 | T-2 | Allahabad | 1.1.84 |
| „ S. K. Deb | „ | „ | Barrackpore | „ |
| „ Bhailal | „ | „ | Allahabad | 1.7.84 |
| „ B. B. Roy | „ | „ | Kakdwip | 1.1.84 |

Transfers

| Name | Grade/Designation | From | To |
|--------------------------|-------------------|--------------|-------------|
| Shri G. V. Kowtal | S-2 | Puri | Dhauri |
| „ K. K. Bhanot | „ | Barrackpore | „ |
| Smt. K. K. Bhanot | „ | -do- | „ |
| Dr. G. R. M. Rao | „ | Madras | „ |
| „ D. N. Singh | „ | Allahabad | Gauhati |
| „ M. Kaliyamurthy | „ | Bhavanisagar | Pollachi |
| Shri P. K. Aravindakshan | S-1 | -do- | „ |
| „ D. R. Kanaujia | „ | Buxar | Muzaffarpur |

| Name | Grade/ Designation | From | To |
|-----------------------|-----------------------|--------------|-------------|
| Shri N. K. Das | S-1 | Kakdwip | Krishnagar |
| „ M. K. Das | „ | Krishnagar | Barrackpore |
| Dr. Shree prakash | „ | Buxar | Allahabad |
| Shri B. D. Saroj | T-I-3 | Allahabad | Buxar |
| „ R. C. P. Sinha | Stenographer | Barrackpore | Allahabad |
| „ G. M. Chakraborty | „ | Barrackpore | Kalyani |
| „ T. K. Sridharan | Sr. Clerk | Bhavanisagar | Pollachi |
| „ Maha Singh | Gr-1 | Karnal | Allahabad |
| „ Lakhmi Ram | „ | „ | Muzaffarpur |
| „ Chattar Singh | Gr-II | Muzaffarpur | Karnal |
| „ B. Pugalendi | Laker | Bhavanisagar | Pollachi |
| „ V. Mariappan | Fisherman | „ | „ |
| „ A. Murugesan | „ | „ | „ |
| „ S. K. Venkatachalam | „ | „ | „ |
| „ A. Ramaswamy | „ | „ | „ |
| „ S. Mahendran | Watchman | „ | „ |
| „ R. Palaniswamy | „ | „ | „ |



Edited by :

V. V. Sugunan, V. K. Unnithan, (Mrs) G. K. Vinci and S. Paul.

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