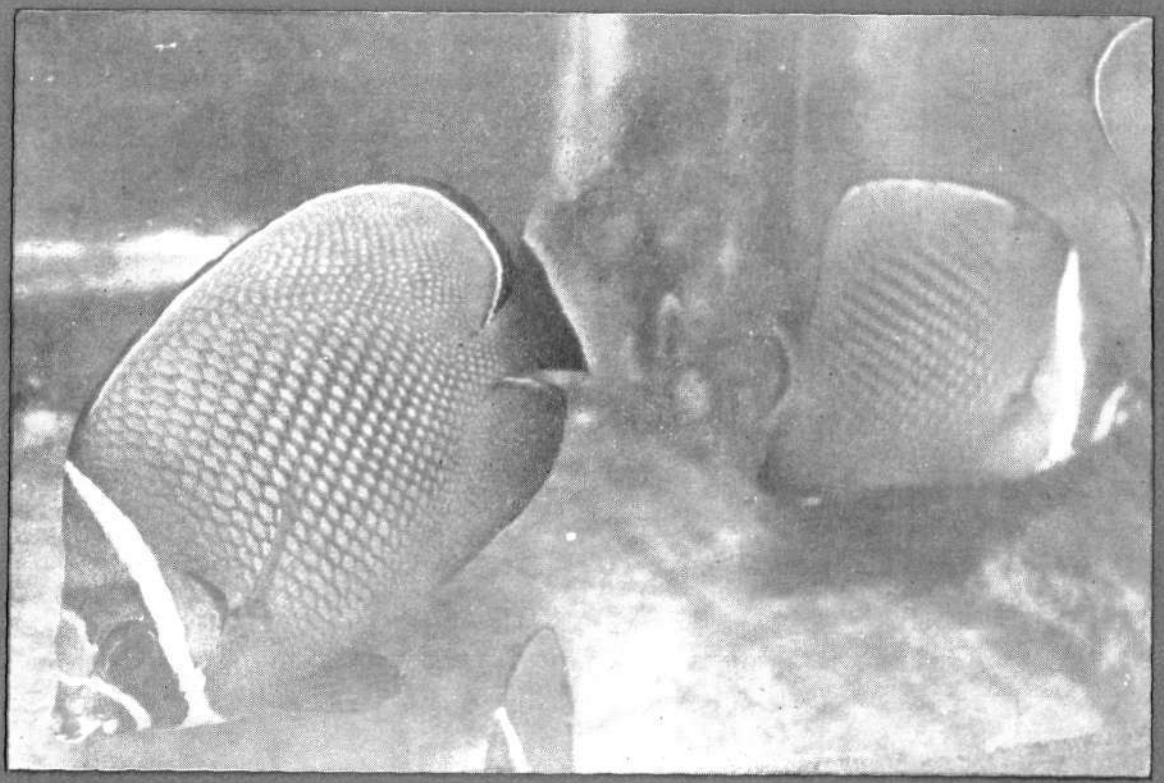
ISSN 0254-380 X

भाकृअनुप
ICAR

समुद्री मात्स्यिकी सूचना सेवा
MARINE FISHERIES INFORMATION SERVICE

No. 93 MARCH 1989



तकनीकी एवं विस्तार अंकावली
TECHNICAL AND EXTENSION SERIES

केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान कोचिन, भारत
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE COCHIN, INDIA

भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

PROCEEDINGS OF THE WORKSHOP ON FISHERIES RESEARCH AND DEVELOPMENT IN MAHARASHTRA HELD AT BOMBAY ON 25TH AND 26TH MAY, 1988

Inauguration

Mr. Satyabir Singh Dodd, Director of Fisheries, Maharashtra who inaugurated the workshop also welcomed the participants and expressed the wish that the deliberations during the two days would bring into focus the problems confronting the marine fisheries sector in the state. He thanked Dr. P.S.B.R. James, Director, CMFRI, Cochin for initiating this dialogue between the state government agencies and the central institutes.

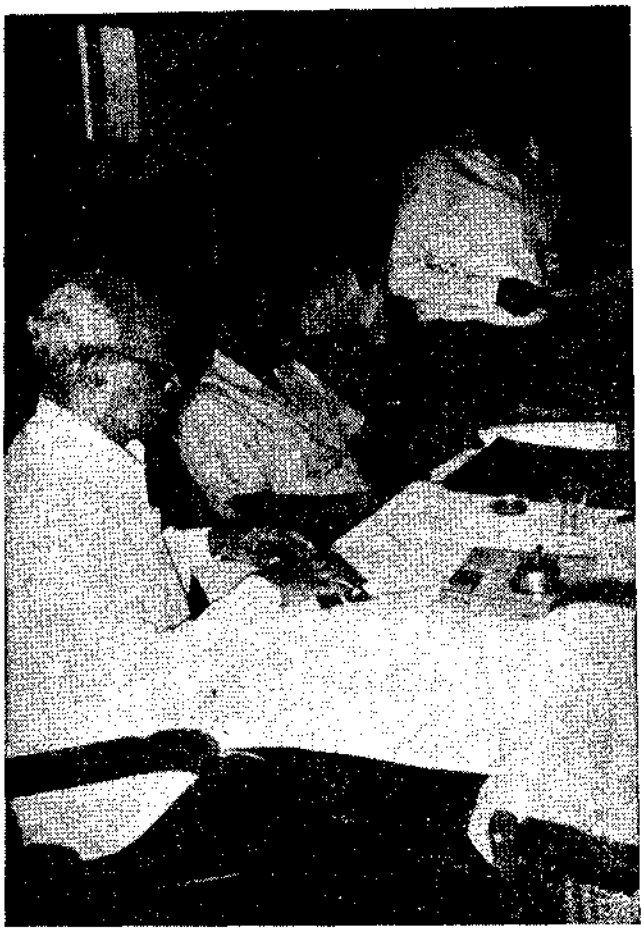
Dr. P.S.B.R. James in his introductory address congratulated Mr. Dodd for being the first Director of Fisheries to convene such a workshop. He outlined the objectives of the Workshop as (1) to take stock of the available information on the status of the marine fisheries sector in the state, (2) to highlight the local problems which need immediate attention, (3) to explore the possibilities of increasing the marine fish production in the state, (4) to identify priority areas of research which should be tackled by the research institutions and (5) to develop greater co-operation between the state and central government agencies concerned with marine fisheries development. The CMFRI being the premier Institution which has been collecting data on marine fish production on all India basis for the past four decades had amassed a wealth of information. The Institute has developed a statistical model for estimating the marine fish production of the country based on a stratified random sampling system which has been highly recommended by the FAO for adoption by the developing countries. For evaluation of the fishery resources, continuous monitoring of the changes in fishing pattern, fishing areas, gear *etc.* have been done. On the occasion of the symposium held at Mandapam to celebrate the 40th anniversary of the CMFRI, the Institute has consolidated and analysed the data for the ten year period 1975–'84 and has brought out a series of publications on the appraisal of marine fish production and potentials for all maritime states of India. It was an occasion for stock taking and for visualising what should be done in the future. Copies of these appraisals have been sent to the state fisheries departments for elucidating their comments so that the research programmes of the Institute could be reoriented to find answers to the local problems. As a follow-up measure the states were requested to organise workshops to discuss matters of importance to the state and to project ideas and suggestions which could be taken up by the concerned institutes for investigation. Dr. James expressed his happiness that Maharashtra State was the first to organise such a workshop in which all institutions and agencies connected with fisheries participated. Dr. James said that it was a landmark in the history of marine fisheries research and development which promised promotion of greater collaboration between the various fisheries institutions and organisations. Similar workshops are expected to be organised by all the other states in the coming months. These workshops will enable the CMFRI to formulate its research programmes based on the real problems of the maritime states. Constant evaluation of the programmes is an important and continuing exercise. It is proposed to conduct such workshops every five years in each state for this purpose.

Status of marine fisheries in Maharashtra

Dr. James then proceeded to review the status of marine fisheries in Maharashtra. The state of Maharashtra with its long coast line and wide continental shelf has ample fishery resources. It is second in marine fish production (about 3 lakh tonnes) in the country and so it is very important in the national scene. The state stands first in prawn production and is rich in resources of Bombay duck, 'ghol', 'dara', cat fish, ribbon fish and pomfret.

The Bombay duck fishery is unique to Maharashtra and Gujarat. It exhibits wide fluctuations from year to year. About 90% of the Bombay duck fishery of the country is accounted for by these two states which seem to share the same general stock. The 'dol' nets are the chief gear operated to capture this fish. The 'dol' net fishery is important in these two states and

needs to be studied in greater detail as the juveniles of a number of quality fish such as pomfrets and prawns are also caught in abundance by this gear.



Shri Satyabir Singh Dodd, Director, Maharashtra Fisheries delivers the inaugural address.

Wide yearly fluctuations in abundance and species composition are also noticed in the landings of penaeid and non-penaeid prawns and croakers. Long range programmes to understand these variations which are most probably fishery independent should be taken up. An increasing trend in the landings of ribbon fish, pomfret and cat fish is noticed, while the non-penaeid prawn landings show a declining trend.

There has been a definite increase in the landings by mechanised boats and a corresponding decline in those by non-mechanised boats. This trend is common to the entire country. About 70-75% of the marine fish production is contributed by mechanised boats. Boats fitted with outboard motors are becoming more popular and important. How far can one allow this increase in mechanised boats and how many boats can be sustained by the resources are matters to be thought of.

Among the four coastal districts of Maharashtra the two northern districts, Thane and Greater Bombay are more developed from the fishery point of view than the two southern districts. But there is scope to increase the production from the southern states. The potential marine catch from Maharashtra waters is estimated to be 3.7 lakh tonnes.

Already 3 lakh tonnes are being landed. The gap can be reduced by increasing the effort in the southern region in a phased manner.

Analysis of the data with the CMFRI shows that there is no further scope to increase production through 'dol' nets. But gill nets and trawl nets can be increased in a gradual manner, in the deeper areas of the presently exploited zone. Resources of the deeper areas and their commercial possibilities are not clearly known. The data from all sources including the FSI and the industry should be received by the National Marine Living Resources Data Centre of the CMFRI to make a proper estimate of the potential resources. Development of deep sea fishing depends on sound data base which is not available at present. The Indo-Polish Survey conducted in the N.W. region has revealed the existence of rich mid-water resources of pomfrets, horse mackerel, ribbon fishes cat fishes and eels.

The poor fishing effort during the monsoon season due to rough weather is good for replenishment of the stocks of prawns. But we need more information on the biological aspects for conservation of prawn stocks. Some species of prawns are more available during night fishing than during day fishing. The ban on night fishing has to be reviewed in the light of this finding.

In view of the stagnation in prawn catches there is an urgent need to step up production through culture. The state should undertake detailed surveys to identify suitable areas for culture and formulate definite policies on land and water use so that prawn culture can develop in a big way in the state. Culturing of *Penaeus japonicus* and *Metapenaeus monoceros* should also be tried. The CMFRI has been helping the states of Kerala and Karnataka in setting up prawn hatcheries and is willing to extend technical assistance to the Maharashtra state also. Farms and hatcheries should be developed simultaneously.

Marine pollution is an important field which is assuming larger dimensions in recent years. Pollution

Dr. P.S.B.R. James, Director, CMFRI clarifies certain points raised by the participants. Seated on his right is Dr. C. V. Kulkarni and on his left is Dr. S. B. S. Dodd.

Dr. Y. L. Srikrishna of CIFE driving his point home. Seated on his right is Dr. A.G. Kalawar and on his left, is Dr. D.V. Bal.

Personnel from central and state fisheries and other organisations, universities and fishing industry and leading personalities associated with fisheries development of Maharashtra participated at the workshop.

Another view of the participants.

is dealt with by various Institutions. There is need to co-ordinate this work by identifying strategic locations and institutions which are capable of dealing with the local problems. A national grid of about six centres can be established. Not all reported cases of fish mortality are due to pollution. Mass fish mortality should be carefully monitored and the factors responsible should be carefully studied. But one should bear in mind that pollution of coastal waters could be one of the reasons for the stagnation in marine fish production.

For increasing production from the presently exploited zone slight increase in fishing effort is possible. But no large trawlers are needed for the purpose. Success of offshore fishing is linked with product development to popularise the fishes which at present do not have a ready market. Diversification of fishery products is essential. It is a healthy sign that processors in Maharashtra and Gujarat are interested in doing this. Waste products from the processing industry for prawns, cuttle fish and squids can be utilised as ingredients in prawn feeds. Mussel and clam flesh is also an excellent feed for growing prawns in culture systems. There is a very good demand for fish meal as poultry and cattle feed in Punjab. All these possibilities should be explored.

There is an urgent need to study the molluscan resources (oysters, mussels and clams) of the Maharashtra coast as it has a number of creeks and inlets which can harbour these resources.

Dr. James concluded by inviting all the concerned agencies to work together for the development of marine fisheries in the state.

Problems faced by the fishery administration

Mr. Sivaramakrishnan, Secretary, Government of Maharashtra, then spoke about the problems faced by the administrators. He pointed out the discrepancies in the estimates of fishery potential and actual production figures published by various organisations and stressed the need for standardizing the procedures and for reducing the areas of uncertainity. He wanted to know whether we have reached the maximum level of production as far as fish is concerned or whether there is scope to increase production from the sea. He stressed that the policies should benefit the fishermen. The conflict of interests between deep sea/off shore fishing and artisanal fishing should be tackled carefully. He wanted answers for the frequently asked question whether the trawler operations really affect the catch of traditional fishermen and whether the number of mechanised boats can be increased further. He pointed out that income per boat is more important than catch per boat. When boats from other states are coming in every day, is there any justification in stopping mechanisation of boats in the state, he asked. Authentic and reliable information are not available for planning. The fishermen should be convinced by providing unimpeachable data. Interest of the different sectors of fishermen should be protected. In view of the fact that the prawn catch rate is more during the monsoon, should we prohibit fishing during the monsoon?

He stressed the need for gear development to make them more efficient. He pointed out that while OBMs are very popular in Gujarat, the Maharashtra fishermen want only inboard motors.

Mr. Dodd said that before regulatory measures are enforced the opinion of the scientists should be taken.

Responding to the questions raised by Mr. Sivaramakrishnan, Dr. Alagaraja said that CMFRI has been collecting fish landing data on an all India basis since 1947 and has over the years perfected a statistical system which has won the approval of the FAO and other International agencies. The discrepancies between the CMFRI data and the data collected by the states can be reconciled only by following a uniform method of assessing the landings. In fact, the CMFRI has been conducting training courses for the state government officials in the methods of collection and analysis of data for arriving at an estimate of marine fish production.

Mr. Muthu said that although the catch rate for prawns is higher during the monsoon the fishing effort is hardly 25% of the effort expended during the other months and hence the lull in fishing activity is likely to have a beneficial effect on the replenishment of the prawn stocks. Prof. Sreekrishna stressed the need for introducing mesh regulations to avoid capture of juveniles. He felt that a cod-end mesh size of 30 mm is optimum for the shrimp trawlers.

Dr. V.S. Somvanshi presented a summary of the results of the exploratory fishing conducted by the vessels of the FSI in Maharashtra waters for the period 1972–'87. A general trend of decline in the catch rate over the years was noticed. There was an indication that the low rainfall years were followed by poor catch rates. Dr. James suggested that the FSI may attempt commercial fishing in collaboration with other organisations to verify the commercial viability of fishing with large trawlers in deeper waters.

Dr. P.V. Kagwade reviewed the trends in the major fisheries of Maharashtra during the last three decades. The very lucrative fisheries for 'dara', 'ghol' and 'karkara' during the sixties have declined in the seventies and eighties. After the introduction of shrimp trawlers, a number of species of penaeid prawns contribute to the lucrative prawn fishery.

Dr. Vijayalakshmi Nair presented a review of the work on pollution undertaken by the NIO. Mercury pollution is very high in Thane creek due to industries. Mahim creek is practically dead with very high BOD levels. While polychaetes dominate in sewage polluted areas, foraminiferans are common in industrially polluted creeks. The high primary productivity in polluted areas does not lead to increase in fishery resources, due to damage of the environment. Growth of oysters in the highly polluted Bandra shore is less compared to their growth in the less polluted Mudh area. Mr. Dodd said that since most of the areas identified as suitable for culture are situated adjacent to the creeks, the possible effects of pollutants on the cultured organisms should be assessed. Dr. James suggested that existing information on marine pollution in Indian waters may be collected and presented as pollution status maps by the Pollution Control Board.

Dr. M. Devaraj, then presented his paper on the population dynamics of the marine fishery resources of Bombay based on the catch and effort data published by the CMFRI. He emphasised the need to collect reliable data on effort for each type of fishing gear. The importance of speeding up the calculations using computers was stressed by Shri K.K. Ghosh. The drawbacks of the surplus production model used by Dr. Devaraj were pointed out by Dr. Alagaraja.

Dr. Arul James spoke about the low cost products developed by the CIFT utilising the prawn and fish caught by the 'dol' nets. Dr. James stressed the need to develop value added products from the non-conventional deep sea fish. He also added that the technologies evolved by the CIFT should be taken to the people through extension programmes. Dr. Kalawar said that people want fish as fish and not as wafers, pickles, *etc.* This preferance should be borne in mind while developing new fishery products. Mr. K.K. Ghosh pointed out the need to do market research for fisheries products. The importance of popularising hygienic methods of drying fish was stressed by Dr. James.

Prof. Sreekrishna reviewed the recent advances in craft and gear technology in detail. Use of high opening trawl nets, matching mesh size to engine power, two-boat mid-water trawling, rigging to increase the sweep of the trawl nets, changing the design of the existing boats to make them less heavy, use of fuel saving devices such as kort nozzles are some of the suggestions put forward by Prof. Sreekrishna to improve the fishing efficiency of the fleet. Dr. James suggested that a small group in the state can take up the work of testing these new technologies. He also suggested that the state government should put artificial reefs for the benefit of the fishermen. The CMFRI could give technical support in this work. Lack of adequate information on purse seine operations in the southern part of Maharashtra was highlighted, during the discussions. Dr. James said that CMFRI will take steps to fill this lacuna.

Mr. Dodd spoke on the problems encountered in implementation of the Maharashtra Maritime Fisheries Regulation Act. Dr. Kalawar elaborated the provisions of the Act and suggested practical ways of solving some of the problems. Mr. Joshi, Deputy Director of Fisheries, stressed the need to include the District Fishery Officer in enforcing the Act.

Dr. Kulkarni spoke about the need to expand the physical facilities at the Taraporevala Aquarium in view of its mounting popularity. Steps to show video films on marine life for the visitors to the aquarium was also suggested. The possibility of establishing a dolphinarium should also be explored, he said.

Concluding remarks of Dr. James

Summarising the deliberations of the two-days workshop, Dr. James listed out the salient points that emerged during the discussions.

The CMFRI would like to continue publishing the data on all India marine fish production after hearing the opinion of the maritime states also. The Institute is ready to train the officials from the state fisheries departments in the statistical methods evolved by the CMFRI.

Marine Fisheries Regulation Acts should be formulated on a national basis after examining all the issues involved. Self regulatory measures adopted by the fishermen themselves to avoid conflicts at sea should be encouraged. The scientific basis for regulations needs urgent attention.

While formulating the policy on introduction of more trawlers, the effect of such a step on the small scale sector should be carefully considered.

There are no solutions yet to problems created by inter-state migration of fishing boats during the fishing seasons. Such larger issues should be taken up at the higher levels.

Problems of the fishermen community engaged in 'dol' net fishery, 'dara' fishery and other traditional fisheries *viz-a-viz* the introduction of purse seining, deepwater/offshore fishing should be examined in greater detail.

The effects of bottom trawling on the seabed and the benthic organisms and their repercussions on the fishery of the region should be studied.

The optimum number and type of fishing boats for each state/region is to be determined. Collection of reliable statistics on existing boats is vital for this work.

Special efforts are to be made to study the monsoon fishery for prawns along the entire west coast to answer questions regarding banning fishing during the monsoon period.

An all India project to study the effects of the introductin of OBMs in all the states may be proposed with proper funding.

The effect of drought conditions on the marine fisheries should be examined. The relationship between a good monsoon and spawning success of fishes needs to be understood.

The existing information on the status of marine pollution in the country may be collected and brought out in the form of pollution status maps.

The FSI may take up commercial fishing in deeper areas with larger vessels to work out the economic viability of such ventures.

The CMFRI may critically examine the changes that have taken place in the fishery for 'ghol', 'dara' and 'karkara' in the Maharashtra state over the years.

New prawn resources have been discovered in Maharashtra waters. The CMFRI would study these resources in greater detail.

Brackishwater fish farming can increase fish production in the state. Microlevel surveys to locate suitable sites may be taken up by the state govt./MPEDA. The possible effects of pollution on brackishwater farming should be assessed. Development of hatcheries and farms should go hand in hand.

Suitable mathematical models should be developed to study the population dynamics of the multispecies fisheries of the Indian seas. The models developed in the temperate waters for slow growing, long lived species with well defined spawning periods are not applicable to the tropical fish with short life span, fast growth rate and year round spawning.

CMFRI has developed suitable proformae for collection of basic data on catch and effort. A simplified proforma for large vessels has been prepared and given to the Chairman, MPEDA for distribution to the large vessels. It is essential that the basic data are supplied by these vessels to the CMFRI for proper monitoring of stocks.

There is an urgent need to assess the untapped fishery resources of each state and work out ways and means of increasing the catch. The fixing of production targets for the 8th plan period should be realistic in relation to the resource potential.

The non-conventional fish which are caught in the deeper regions should be the target of research on the processing side by the CIFT, IFP and CIFE. Extension work to popularize the technologies and products developed should be intensified.

All available fishing technologies to be prioritized and the relevent ones chosen for implementation by the various maritime states in a phased manner, according to local requirements.

The CMFRI would devote special attention to the study of monsoon fishery on the west coast, the purse seine fishery in southern Maharashtra and the breeding biology of prawns from the point of view of conservation of the resources.

Trade in ornamental marine fishes is a neglected field. Rich resources of ornamental fish are available in the Lakshadweep and Andaman groups of islands and also in the islands in the Gulf of Mannar region. In this connection the Taraporevala Aquarium which is the most popular marine aquarium in the country can take a lead in doing research and extension work in this new field. The CMFRI has identified about 60 species of ornamental fishes in the Lakshadweep islands and has initiated work in studying them.