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**SEMINAR ON POTENTIAL
MARINE FISHERY RESOURCES**

April 23, 1986

Central Marine Fisheries Research Institute

(Indian Council of Agricultural Research)

P. B. No. 2704, E. R. G. Road, Cochin-682 031, India

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Seminar on Potential Marine Fishery Resources

PROCEEDINGS AND RECOMMENDATIONS

The seminar was organized by the Central Marine Fisheries Research Institute at Cochin on 23rd April 1986, marking the occasion of the Institute's moving into its own permanent building.

The objective of the seminar was to find ways and means of bridging the gap between the estimated potential marine fishery resources of the country and the present level of actual yield from the exploited stocks. Considering the increasing demand for marine fish and the potential for export of marine products, critical information on the presently exploited stocks and those identified as under-exploited or unexploited resources is vitally essential for suggesting management and other measures to obtain optimum yields from these resources.

Besides fulfilling the need for more precise information on potential resources, much remains to be done on the harvest and postharvest technology related to these resources. Although the country is well equipped with research and survey vessels to undertake the responsibility of exploration and assessment of resources, so also with trained manpower and expertise in several areas, a co-ordinated effort by all the institutions is urgently needed to evolve the necessary strategies for harnessing the potential resources. The industry also can play a more purposeful role in this effort by giving correct and timely feedback information. The seminar had thus the objective of providing the common platform to discuss the above aspects of resources exploitation, and the utilization and management of potential resources.

A. PROCEEDINGS

Inaugural Session

The inaugural session was presided over by Dr. S. Jones, a former Director of CMFRI. Dr. P. S. B. R. James, Director, CMFRI, welcoming the distinguished participants, stated that the subject of potential resources was of considerable importance to all the concerned Government departments, universities, industry and developmental agencies for giving proper orientation and impetus to their future programmes. In view of the present stagnation in the marine fish production, a number of factors were to be examined. The yield from inshore fishing in the currently exploited grounds was not likely to increase even if the fishing effort were increased. The changing pattern in the fishery such as large-scale introduction of purse seiners in the same exploited grounds was also unlikely to result in increased production, but was likely to bring about further conflict between local fishermen and purse-seine operators.

Considering the large population of artisanal fishermen depending on the resources in the narrow coastal belt, it was also essential to safeguard their interests and livelihood. A shift in our emphasis from capture fisheries to culture fisheries for increasing production might perhaps result only in a marginal increase in the overall marine fish production. The total area of the Exclusive Economic Zone, on the other hand, was very vast and the potential resources available in it varied in extent and quantity, according to depth zones and areas. But heavy capital investments were necessary for exploiting and utilizing these potential resources, and a great deal of information was necessary, too, in understanding the existing exploited resources and the underexploited potential resources of the shelf and oceanic regions. In this regard, Dr. James gave an overview of the pivotal role played by CMFRI in the stock assessment of various fishery resources. He drew attention also to the work done by other Institutes engaged in fisheries resources survey and stressed the need for a coordinated programme for greater

understanding of the resources and called for necessary inputs needed for future development of fisheries and an action plan for increasing production, giving due consideration for improving the socio-economic status of fishermen.

In his presidential address, Dr. Jones said that the scientists and planners were now dealing with a dynamic environment much different from the static resources such as of coal or minerals. Considering the fact that a wealth of information was already available on the marine fish resources, he stated that the country was passing through a transitional period from purely artisan-based fishery to industry-oriented development. In a concerted effort by different departments and institutes to tackle the problem of exploiting the potential resources, it would be worth while to put the effort together rather than debating on issues as to who should do what. Such an effort would usher in something good for the society as a whole and fishermen in particular.

Dr. K. Gopalan, Vice-Chancellor of Cochin University of Science and Technology, inaugurating the seminar, drew attention to the large gap between India's potential marine resources and the present production, and stressed the need for intensification of research and development efforts to harness the resources that are beyond our reach at present. Dr. P. V. Rao, Senior Scientist, CMFRI, then read out felicitation messages from Dr. S. Z. Qasim, Secretary, Department of Ocean Development, and others who could not attend the seminar. Following this, the chief guest released a Bibliography of the CMFRI publications prepared by the Institute. Dr. P. V. Ramachandran Nair, Joint Director, CMFRI, proposed a vote of thanks.

Technical Sessions

The Seminar consisted of 4 Technical sessions, in which 8 papers were presented by eminent scientists, administrators and representatives of the industry on various aspects of the potential resources. About 300 delegates drawn from different organizations participated in the Seminar.

The Technical Sessions were as follows:

- Session I** *Potential Marine Fishery Resources*
Chairman : Shri M. Devidas Menon
Repporteurs : Dr. K. C. George, CMFRI,
 Shri. K. V. Narayana Rao,
 CMFRI.
- Session II** *Exploitation of Potential Marine Fishery Resources*
Chairman : Dr. S. N. Dwivedi, Director,
 CIFE.
Rapporteurs : Shri. P. Appukutta Panickar,
 CIFT,
 Dr. P. Vedavyasa Rao, CMFRI.
- Session III** *Utilization of Potential Marine Fishery Resources*
Chairman : Shri. R. C. Chaudhary,
 Secretary, Govt. of Kerala.
Rapporteurs : Dr. G. Gopakumar, CIFT,
 Mr. Edward Samuel, IFP.
- Session IV** *Management of Potential Marine Fishery Resources*
Chairman : Dr. S. Jones, Former Director,
 CMFRI.
Rapporteurs : Shri. T. Jacob, CMFRI,
 Dr. K. Alagaraja, CMFRI.

Technical Sessions

Session I

POTENTIAL MARINE FISHERY RESOURCES

In this session two papers were presented, one by Shri. K. M. Joseph, Department of Agriculture, Government of India, and another by the CMFRI Director and his associates. In his paper, Shri. Joseph gave an appraisal of the various resources based on the surveys carried out by the Government vessels. He drew attention to the regionwise estimates and potentials of under-exploited demersal resources such as perches, nemipterids, carangids, lizard fishes, catfishes, pomfrets and pelagic resources such as mackerel, lesser sardine and cephalopods. He pointed out the resources such as sciaenids, ribbonfish, barrakuda and elasmobranchs as having the possibility for exploitation by at least 50% more than the current level of production if the fishing effort was extended to outer shelf areas.

The fish stocks along the continental slope of both west and east coasts were totally unexploited. These consisted of non-conventional species such as Big eye, Black ruff, Green eye, *Cubiceps* and deepsea crustaceans. He also highlighted the results of recent surveys by FSI vessels which had reconfirmed the availability of many species identified as potential resources along the Kerala coast, western slope of Wadge Bank, Gulf of Mannar and off the Konkan coast. The results of the survey by purse-seining for resources of coastal species of tunas, horse mackerel and other carangids were also highlighted. The potential of oceanic species such as tunas, bill fishes pelagic shoals and other varieties in the Arabian Sea, Bay of Bengal, Andaman Sea and equatorial waters were also discussed. He concluded in general, that the Indian EEZ was highly productive of various resources such as ground fishes pelagic fishes and oceanic species.

In the paper prepared by the CMFRI and presented by Mr. M. S. Muthu, Senior Scientist, the present rates of exploitation of different resources in the different coastal zones of India were given in terms of trends in production of major species, average annual productions of species of medium importance and the annual fluctuations from year to year. Pointing out the stagnation in the yield of exploited stocks in 0-50m zones, the paper emphasized the need for looking for resources beyond 50 m zones. The estimates of annual potential yields from EEZ as arrived at by the Institute and other organizations were presented, indicating the production potential in the depth region up to 200 m as very high in the southwest coast, followed by northwest, northeast and southeast coasts. In the depth regions beyond 200 m the oceanic resources were observed to have a potential of 500,000 tonnes.

The paper drew attention also to the estimates of potential demersal resources, crustacean resources and cephalopod resources based on the Institute's own observations by participating in the exploratory surveys of different vessels belonging to the Institute and other organizations. The paper pointed out the prospects for increasing production, giving information on (i) the type and magnitude of the most promising resources, capable of yielding additional production, in the presently exploited inshore regions along our coast, (ii) the potential fishing grounds and abundance of resources in different depth zones immediately beyond the 0-50 m and (iii) the potential non-conventional and oceanic resources in the deeper waters of the EEZ. The paper brought into view the levels of under-exploited and unexploited resources and suggested ways and means of exploiting them. It also discussed the measures such as regulation on purse-seining, prevention of destructive fishing of spawners and young fish, deployment of vessels for bulk capture and marketing storage and other inputs needed to handle increased production. It discussed also the needs for conducting simulated commercial fishing on identified resources in order to work out the economic viability and for creating infrastructural facilities and marketing means, such as fishing harbours and other major places of landing.

Session II

EXPLOITATION OF POTENTIAL MARINE FISHERY RESOURCES

Dr. S. N. Dwivedi, who was the Chairman of this session, stated that we had a large resource potential to be utilized properly and that the industry was now able to invest a greater share of capital. Therefore, many incentives were needed in the form of package plans to help the entrepreneurs to go ahead with increased phase of exploitation. A great deal of information on the resources and their availability in different areas and seasons had to be provided by research and survey organizations and, in this regard, computerization of data would reduce the time lag. He also stated that 80% of the EEZ was less productive compared to nearshore regions and exploitation of the potential resources could be possible through such actions as joint ventures with technologically developed countries. He cited the example of White Fish Authority in England and the Inter American Tropical Tuna Commission in the U.S.A. and the role they played to help the industry. He also indicated the needs for efficient methods of post-harvest technology and economics of operation and adequate manpower to handle modern fishing methods.

Two papers were presented by the representatives of the industry during this session. Shri. R. K. Verma, President of the Association of Indian Fishery Industries, New Delhi, presenting his paper on exploitation and utilization of the resources, stated that the industries, attitude had remained largely shrimp-oriented and no tangible headway had been made in increasing the production of other varieties. In the opinion of the industry, he stated, it was possible to achieve a target of at least 50% of the projected potential almost in the immediate future by

organizing more effective effort to exploit the offshore and deep-sea areas. Such a step called for a new, bold, imaginative and multi-dimensional approach through application of innovative action plan. The industry was at present looking forward to more specific data on resource assessment on an area-wise and species-wise basis. He stated that based on the existing information on resources modern fishing methods such as long-lining, purse-seining, deep-water trawling and squid jigging could be undertaken in unexploited areas.

He emphasized that the industry had to determine the economy of the scales of operation and to identify the right type of vessels for fishing operations. It was expedient to think of 3 sizes of vessels: 20-25 m, 26-30 m and 31-35 m. The industry wanted at least 250 fishing vessels to be added to the present fleet. Any delay in the procurement of these would result in wastage of the resource, and, in this context, the country should also go in for joint venture for diversification of the fishing industry. He suggested taking up of a national fishery infrastructure development programme. Touching upon the management of resources, he suggested minimizing control and regulation and a thrust for technological upgradation. For this purpose he suggested that the Government of India establish a Fisheries Guidance Bureau for transfer of innovative technology, rendering the valuable to the industry on various aspects.

Mr. S. M. Shukla, Managing Director, Golden Fisheries Limited, New Delhi, presented his critical view points of the industry. He was of the view that the country had not developed a national fishery policy which could form the back bone of the growth of the industry. The policies evolved so far had been basically on ad hoc basis and interpretation of these policies had been largely in the hands of not-so-well-informed bureaucrats. He stated that the funds India allotted for fisheries development during successive Five Year Plans had been very paltry, compared to other countries like Taiwan, S. Korea, Thailand or Sri Lanka.

Mentioning the advantages of the policy of chartering vessels, he opined that the chartering scheme resulted in new experiences such as on working on long voyages, leadership coordination, team work for optimum utilization of plants and equipments, coordination of navigational aspects while harvesting fish during rough weather, and the confidence and experience necessary for the companies for new types of fishing operations. However, he stated, the industry had not registered the anticipated growth for want of sound technologies, information on economics of operation and adequate infrastructure for storage and marketing.

Mr. Shukla also added that, taking into account the national objectives, talent available and financial resources, we could safely state that the potential resources could be profitably exploited in the first phase in the 20-40 fathoms zone, which would give better economic returns. He was of the opinion that increased production could also be obtained by round-the-clock utilization of traditional and small mechanized boats by renovation and upgrading of craft and gear. He urged that better infrastructural facilities such as cold-storage, handling equipments, refrigerated cargo vessels, supply of ship stores and ship maintenance facilities be provided in the near future at a number of fish landing centres over the coastline and pointed out the need for a declared support price for fish as was in agriculture. In conclusion, he called for a coordinated effort from all fisheries Institutes and decision-making bodies for aiming at a target-oriented, time-bound national fishery policy.

Session-III

UTILIZATION OF RESOURCES

Two papers were presented at the session. In the first paper, on the utilization of the potential marine fishery resources, by Shri M.R. Nair and Shri T.K. Govindan of CIFT (read by Dr. P.V. Prabhu), the most important methods of utilization of fish in our

country at present were outlined. It was pointed out that 87% of the catches were utilized in fresh, salt-cured and dry conditions. Only 5% were utilized for freezing for export and for reduction into fish meal, and a very small percentage for canning and other purposes. With the anticipated introduction of more fishing craft and gear and modern methods of fishing, a major portion of our potential resources was expected to be available for utilization without wastage, a purpose aiming at which the CIFT had carried out researches on post-harvest technology. Improved methods of curing, prevention of bacterial attack, fast methods of freezing and prevention of wastage in processing were some of the methods highlighted as suitable. Researches carried out on recently introduced fishery products, such as cuttlefish and squids, had resulted in the development of proper technical know-hows for the utilization of such nonconventional resources. Further, several of the less popular varieties commonly referred to as trash fishes were yet to find better utilization, and technology were being developed to make use of them for many diversified products. The Kheema developed out of this had found greater accessibility. Fish protein concentrate was another product, which could be added without disfavour in many Indian traditional recipes. Lastly, there was the need for more effective utilization of the industrial waste products, such as prawn shell and wastes, discarded by processing industries in large quantities.

In the second paper, by T. K. A. Nair of MPEDA, read by Dr. K. P. P. Nambiar, attention was drawn to the existing gap between potential resources and the present yield from pelagic, demersal, crustaceans and other ancillary resources. Considering the fact that more than 67% of the total catches were still made by traditional fishermen and 32% by the small mechanized crafts, the production by the larger trawlers was very meagre. He pointed out the present stagnation in yield from the presently exploited grounds, the stagnation in marine products exports and the low per capita consumption of fish. Stressing the need for intensifying our fishing efforts in deeper waters, he listed the major constraints such as the absence of reliable data on the resources

in the deeper areas; lack of specific information about the suitable types of vessels and gear required; lack of technical skills to conduct different types of fishing; and absence of basic infrastructure and marketing outlets. Commercial fishing in deep sea waters was capital intensive, technology-oriented and risk-prone. It would be unrealistic to expect the traditional sector to contribute significantly to the exploitation of potential deepsea resources and therefore organized effort with adequate financial, managerial and technological backing would have to be made for tapping the available resources. He drew attention to the urgent need for diversifying our export products in view of the limited scope for increasing shrimp catches.

After identifying new fishery items that could be exploited on commercial scale, strategies and specific plans aimed at finding suitable international markets for them would have to be evolved. The MPEDA, with its experience in marketing promotion, would be the appropriate body for finding the scope of export of diversified products. Side by side with creation of a domestic marketing chain, it was suggested, plans should be developed for the involvement of the fishermen community in the development of fishery sector, in the context of emerging technological and socio-economic compulsions.

Session IV

MANAGEMENT OF POTENTIAL MARINE FISHERY RESOURCES

The session was presided over by Dr S. Jones, former Director of CMFRI. In his opening remarks he pointed out that the management of marine fishery resources was an extremely difficult job and expressed his hope that the seminar would bring out some new ideas.

In the absence of Shri R. C. Choudhury (Secretary, Department of Public Works, Fisheries and Ports, Govt. of Kerala)

Shri. K. Appukuttan, (Project Chief, Fisheries and Port Department, Govt. of Kerala), presented the paper on the "Management of Potential Fishery Resources".

The paper emphasized the point that, while a number of estimates were available in regard to potential resources, no accurate micro-level estimates were available depthwise and regionwise. It stressed the need for sufficient coordination between the research institutes and state departments of fisheries so that the accumulated information got translated into realistic policy measures; so also the need for considering the complexities of the larger political and economic systems to which the fisheries sector was integrally linked while framing Management policies. It also pointed out the need for diversification of fishing in the deeper areas and for development of culture fisheries to augment fish production.

In the absence of Shri K. Chidambaram, Mtsyasagar Consultancy Services Pvt. Ltd., Madras), the paper on "Management of Potential Fishery Resources" prepared by him was presented by Dr. P. V. Rao, Senior Scientist, CMFRI, Cochin. The paper dealt with aspects such as Exclusive Economic Zone, Indian fishery resources, traditional fishery, mechanized fishery, development of deep sea tuna fishery, national policy on fisheries, etc. He pointed out that commercial exploitation of the important fisheries in the EEZ was a specialized and capital-intensive venture and could be effectively initiated only through joint ventures. He spelt out a number of points like collaborative programmes, proper monitoring of operations, exploitation of deep-sea demersal and midwater fisheries through charter of fishing vessels and development of processing technology to suit domestic and export markets. He suggested the formation of a National Fisheries Development Board, which would be responsible for deciding and implementing inter-dependent programmes involving production, consumption and marketing of marine fish.

The Chairman in his concluding remarks pointed out that the management of fishery resources was not as simple as many thought and stressed the need for concerted efforts jointly by the concerned agencies to arrive at viable policy decisions.

PLENARY SESSION

In the plenary session Dr. P. S. B. R. James, Director, CMFRI, summed up the proceedings and the important points that had been raised in the course of the different sessions. He said that the potential resources of our country had been surveyed by different Institutes at different times and valuable information had been gathered. The resources which were considered as under exploited were those of anchovies, catfishes, perches, etc. The resources which were unexploited were the deep-sea crus-taceans, lizard fishes, bulls-eye, Psenes, oceanic tunas and squids. The resources of Wadge Bank had been studied more intensively and the next approach would be to provide quantitative estimates of the resources in different regions and depth zones.

The exploratory surveys of the deepsea resources of the EEZ called for intensive effort by the scientists and staff of many Institutions, and, in this context, adequate incentives should be given to the scientists to undertake the hard work at sea. The potentials of the east coast had to be explored, for which the surveys such as the industrial fisheries survey by M.T. MURENA conducted along the north-west coast would be very useful. The industry would be pressing for cost-benefit ratios before venturing to exploit the deepsea resources. The State Governments and Union Territories would need sound advice on the resources both exploited and unexploited and on production means to harvest such resources.

Fisheries management involved better utilization of the mechanized sector, better storage and marketing facilities, avoiding wastage of the existing infrastructure such as idling of freezing plants, and building up of sound data base on fishery resources and related environmental factors.

The CMFRI had evolved sound scientific bases for resources assessment, acquisition of data from various sources, and their analysis and speedy dissemination. The Institute had laid stress on vessel-based programmes, especially with the advent of the scientific cruises of Saga, Sampada, and would strive to work side by side with the exploratory and commercial operations carried out by the Government of India Institutions and the industry.

The immediate task before the industry was to handle efficiently the already established resources and for this purpose they should have a meaningful dialogue at different levels with various organizations engaged in research, planning and development. Exploiting the deepsea resources called for such heavy capital investments that the industry would naturally shy from the idea of venturing, especially if proper methods of utilization of the new resources were not available. The industry should gradually switch from their emphasis on shrimp to other resources and they should find ways and means of stabilizing the domestic market by developing better marketing facilities to take the products to the interior regions and develop better consumer acceptance.

There was a general feeling that, as there was shortage of protein-rich food, the weaker sections would welcome availability of fish food in remote places as well. So fish stalls should be established like milk booths in different parts of the country. In our effort to harvest the only high unit-value groups, such as shrimp, many of the trawl operators used to discard the accompanying miscellaneous small fish in the sea itself as trash. It would be a national waste if this protein rich fish were not utilized too for human consumption. Those representing the industry suggested for establishment of a Fisheries Guidance Bureau and for export promotion of non-conventional products. The Institutions engaged in harvest and post-harvest technologies, such as CIFT had important role to play in this regard, in the utilization of different resources. Even the processing of krill, so abundant in the Antarctic region, should be explored.

In our effort to utilize potential resources, the large population of traditional fishermen should also be enlisted for cooperation

and involvement. Fisheries extension and transfer of technologies developed at different institutions were important to be considered. The most important thing was that there should be coordinated effort by all the institutions and organizations, pooling of the infrastructure facilities, manpower and expertise to tackle the problem of exploration, exploitation and utilization of the potential resources.

After further discussions by different participants a number of important points were raised, by Dr. Jones, Dr. Dwivedi, Shri Nambiar, Shri U. K. Gopalan, Shri V. C. Shukla, Dr. Lal Mohan, Mr. Verma and others. The Director, CMFRI, then placed before the Seminar the draft recommendations, which was later approved by the different chairmen participants.

RECOMMENDATIONS OF THE SEMINAR

The text of the recommendations of the seminar is as follows:

The Seminar, (a) having taken into consideration the total potential marine fishery resources of the country in the EEZ at the estimated level of 4.5 million tonnes and the present stagnation in the production around 1.4 million tonnes. (b) being concerned about the urgent need to bridge the gap between the potential and the present yield, (c) realizing the immediate need for:

- i. necessary impetus for future development of fisheries,
- ii. action needed for increasing production,
- iii. safeguarding the interests of fishermen and
- iv. exploiting the deepsea resources,

and (d) in consideration of the view points expressed by the participants, recommends that:

1. Surveys of the potential resources with related environmental factors on an area-wise, depth-wise and season-wise basis be carried out on a continuous basis in the waters of the EEZ, and for this purpose the vessel facilities, manpower and

other infrastructure be pooled together and a *co-ordinated action plan* be developed.

2. Comprehensive reports on the information available at present in respect of unexploited resources be prepared for each of the maritime States and Union Territories and made available for developing suitable exploitation and utilization strategies.
3. Economic viability of exploitable resources in the offshore and deeper sea region be worked out by conducting simulated commercial fishing and the data be made available to the industry so as to facilitate acceleration of deep-sea fishing and its establishment on a sound basis.
4. The data collected by the exploratory, experimental and commercial fishing operations be made available to the NMLRDC of CMFRI for analysis and speedy dissemination.
5. Immediate steps be taken by introducing suitable craft and gear to exploit the already established fishery resources such as anchovies, coastal tunas, seefishes, pomfrets, trevalis, etc. available in the continental shelf region, for realizing increase in their production.
6. The introduction of medium-size vessel, of about 15 m, which could operate up to 200 m depth zone, should be encouraged for harvesting various identified potential resources.
7. Suitable management measures such as regulation of introduction of additional crafts and conservation of stocks of young fish resources be evolved in the currently exploited inshore waters and the suggested regulations be implemented.
8. Suitable boat and gear combination with adequate storage facilities on board be developed and introduced for exploitation of the resources in the areas beyond the traditional exploited zone and the deep sea.
9. Adequate infrastructure facilities such as berthing, handling, storage, ice production and marketing at the fishing harbours and proper distribution mechanism and storage facilities at major terminal markets be established not only

for better utilization of production but also for ensuring remunerative price to the producer.

10. As the resources to be exploited from the offshore and deep-sea regions form largely unconventional resources at present, a viable marketing system and consumer acceptance of these new resources be developed.
11. In view of the distinct advantages of chartering vessels and collaborative joint ventures in the present context of development of deepsea fishing, the policy regarding these be reviewed and viable procedures be formulated and implemented till such time that the national agencies establish the deepsea fishing industry.
12. The deepsea fishing being capital intensive, necessary incentives be provided to attract entrepreneurs and for the accelerated establishment of this sector.
13. Sufficient incentives be provided to scientists participating in the cruises of research and survey vessels, by way of hardship allowance or Triple Daily allowance.
14. As the marine fisheries of the country, from the research, development and administrative aspects, have considerably changed over the years to become a multi-disciplinary subject involving inputs from different organizations and agencies, an organizational set up of the fisheries in the country linking with different sectors be reconsidered and suitably evolved to provide the thrust and emphasis required for sustained development and expansion.
15. As, with the declaration of EEZ, the exploitation of living resources has become an imperative need not only to meet the increased proteinous food requirement of the growing population of the country, to obtain valuable foreign exchange and to uplift the economy of the fisherman and coastal rural population, but also to avoid wastage of the resources, a pragmatic national policy for the development of marine fisheries of the country in general and deepsea resources in particular be developed.