

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS



**INDO-PACIFIC FISHERIES COUNCIL
PROCEEDINGS**

14th SESSION

Bangkok, Thailand

18-27 November 1970

SECTION I

REPORT OF THE SESSION

**FAO Regional Office for Asia and the Far East
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OFFICE BEARERS OF THE INDO-PACIFIC FISHERIES COUNCIL

1970 - 1972

EXECUTIVE COMMITTEE

Chairman:	<i>Mr. B.T. Cunningham (New Zealand)</i>
Vice-Chairman:	<i>Dr. P. Karnasut (Thailand)</i>
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* The Office of Secretary to the Council is currently held by the
FAO Regional Fisheries Officer for Asia and the Far East.

IPFC WORKING PARTIES, 1970 - 1972

1. WORKING PARTY ON TRAWLING
2. WORKING PARTY ON COASTAL AND HIGH SEAS PELAGIC RESOURCES
3. WORKING PARTY ON COASTAL AQUACULTURE AND ENVIRONMENT
4. WORKING PARTY ON ECONOMICS OF AQUACULTURE
5. IPFC/IOFC JOINT WORKING PARTY OF EXPERTS ON INDIAN OCEAN AND WESTERN PACIFIC FISHERY STATISTICS
6. WORKING PARTY ON ECONOMIC AND SOCIAL ASPECTS OF NATIONAL FISHERIES PLANNING AND DEVELOPMENT

(16th Session Symposium)

Convenor: *Dr. J.A. Storer (FAO)*
Mr. L.I.J. Silva (Ceylon)
Dr. A. Sribhibhadh (Thailand)
Mr. I. Petersen (U.K.)
Prof. B.J. Rothschild (U.S.A.)

A. INTRODUCTORY AND PROCEDURAL MATTERS

I. OPENING OF THE SESSION

1. The Fourteenth Session of the Council was opened by His Excellency the Honourable M.R. Chakratong Tongyai, Minister of Agriculture, Thailand. The text of his address and that of others delivered at the Opening of the Session are reproduced in Appendix II to this report.

II. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

2. A new item "Inter-relationship between IPFC and IOFC" was included in the Provisional Agenda, as suggested by the Delegate from the United States of America. The Agenda as adopted by the Council is given in Appendix I to this report. The documents which were before the Council are listed in Appendix IV.

3. As recommended by the Council's Executive Committee at its Forty-fifth and Forty-sixth Meetings and in concurrence with the Director-General of FAO and the Member Governments, the Fourteenth Session of the Council was held from 18 to 27 November 1970 at the FAO Regional Office for Asia and the Far East, Bangkok, Thailand. A list of participants to the Session is given in Appendix III to this report.

B. TECHNICAL SCIENTIFIC MATTERS

III. SYMPOSIUM ON COASTAL AQUACULTURE

Origin, Objectives and Organization

4. The Symposium on Coastal Aquaculture was organized in accordance with the recommendations of the 12th Session of the IPFC at Honolulu (U.S.A.), 3-17 October 1966 and the 13th Session of the Council at Brisbane (Australia), 14-25 October 1968. The objectives of the Symposium were "to review the present status of coastal zone aquaculture in brackish and marine waters of the Indo-Pacific region in all of its aspects, technical, scientific and economic". In fulfilling these, the Symposium covered the status potential and problems of coastal aquaculture in the member countries of the Council, the taxonomy and biology of cultivable organisms, the culture techniques, and the conflicts in the use of the coastal zone in relation to aquaculture development.

5. The 52 scientific documents that formed the basis of discussions at the Symposium are listed in Appendix IV. They consist of (i) country reports prepared on the basis of information collected through a questionnaire on the status and potential for aquaculture development in the region, (ii) country and regional reviews of existing information on selected topics prepared by invited specialists and (iii) experience papers describing the results of original studies prepared by volunteering scientists.

6. The IPFC Working Party on Coastal Aquaculture was responsible for the organization of the Symposium and its Convenor Dr. Lucian Sprague acted as its Chairman. The Symposium encompassed six meetings as follows:

Meeting I - Status of Aquaculture in the Coastal Zone.

Meeting II - Species Suitable for Aquaculture.

Meeting III - Aquaculture Techniques - Culture of Vertebrates.

Meeting IV - Aquaculture Techniques - Culture of Invertebrates and Seaweeds.

Meeting V - Aquaculture Development in Relation to Conflicting Uses of the Coastal Zone.

Meeting VI - Conclusions and Recommendations.

7. Discussion Leaders designated for each meeting summarized the papers relevant to the meeting and organized the discussions on the topic. They were assisted by Rapporteurs in the preparation of the report of the meetings. In the formulation of the recommendations the Symposium was assisted by two ad hoc Working Groups.

REPORT OF MEETING I - STATUS OF AQUACULTURE
IN THE COASTAL ZONE

Discussion Leader : S.W. Ling

Rapporteur : V.G. Jhingran

Documents: IPFC/C70/SYM

6	17	41
10	20	45
12	28	48
13	39	

8. The Discussion Leader presented a historical review of the status of coastal aquaculture in the Indo-Pacific Region. He dealt with the acreage available for coastal aquaculture in different countries of the region; the species of finfish, crustaceans, molluscs and algae that are cultured; the source of seed of cultivable species; the management techniques adopted and the potentials, economics and problems of coastal aquaculture. He pointed out that in countries having vast land and water resources, cheaper labour but weak finance, farming techniques that are able to produce fish at low cost of production such as those involved in milkfish and mullet culture deserved attention, whereas in developed countries, more sophisticated techniques such as those of cage culture of carnivore fishes like yellowtail, involving high cost of production per unit weight, are more suitable. The more important problems facing the aquaculture industry among others are: lack of basic scientific knowledge on culture techniques and management practices; lack of knowledge on large scale production of seed under controlled conditions; pollution and conflict with other interests; lack of suitably trained technical personnel, well equipped centres for conducting research and dissemination of technical information.

9. The delegates from different countries then described the status and problems of coastal aquaculture of their respective countries.

10. In the discussions that followed, the points highlighted were the following:

(a) Need for market survey on a global basis and the development of new uses of coastal aquaculture products to avoid surpluses resulting in economic distress as was the case in respect of cockle production in Malaysia. Such steps would also enable issue of guide lines for planned production, consumption and export of products.

(b) Need to carry out research on methods of increasing production in coastal aquaculture, training of personnel in research methods, training of extension staff for the spread of technical knowledge.

11. It was noted that the Working Party on Economics of Fish Culture had developed proformae for collection of data both for freshwater and brackish-water culture operations. National data collected so far along those lines indicate the possibility of comparing the economics of aquaculture with agriculture, silviculture, etc., in different countries.

12. It was felt necessary to ensure the availability of fertilizers and manures for the purpose of aquaculture since in many countries aquaculturists were unable to procure them easily and at reasonable price.

13. It was noted that apart from industrial effluents and domestic wastes, agricultural fungicides and pesticides were causing great harm to aquaculture and hence it is necessary to devise steps to prevent such damage.

REPORT OF MEETING II - SPECIES SUITABLE FOR CULTURE

Discussion Leader : Tham Ah Kow

Rapporteur : T.G. Pillai

Documents: IPFC/C70/SYM

3 36 44

30 37 45

33 40 50

14. The meeting examined a list of species of prawns, molluscs and fish suitable for culture, and considered the advantages of culturing local species over the introduction of proven exotic species. Criteria which might be used in the selection of species for culture, such as high market value, capability of rapid growth in impounded waters, high conversion ratio, high fecundity, ease of breeding, ready availability of wild seed, high survival rate of the young and disease resistance were studied, and an ad hoc Working Group was established to consider the problem of the selection of species in greater detail.

15. It was noted that, having selected the species, the cost of production could be worked out on a pilot scale, and the extent of commercial cultivation could be decided on the basis of available markets.

16. The ad hoc Working Group on Species Selection was of the opinion that local species in the region should be selected for experimental studies, and noted that there were two types of criteria that can be used (and at least two stages) in the final selection of species to be cultured:

(i) Criteria which can be based largely on existing knowledge.

- (a) Market ability (which includes such factors as high market value and local consumer preferences).
- (b) High fecundity or ready availability of wild seed.
- (c) The species should be preferably a herbivore or an omnivore.
- (d) The species should be hardy.

(ii) Criteria which require experimental determination.

- (a) Capability for rapid growth in impounded waters coupled with a high food conversion ratio, if necessary, on cheap artificial foods.

- (b) Ease of breeding, if necessary by artificial inducement.
- (c) High survival rate of young which must be amenable to transportation.
- (d) High resistance to disease.
- (e) Behavioural patterns facilitating culture.
- (f) High rate of crop turn-over coupled with profitability.

17. The Meeting reviewed the papers presented at the Symposium from which it appeared that there are still many gaps in our knowledge of the biology of species suitable for coastal aquaculture. For instance, the ecology of the various life history stages of many of the cultured species of shrimps is still little known. A study of the ecology and especially ecological energetics of those species would furnish the answers to many questions which confront the coastal aquaculturist, for instance : the most efficient feed to be used; intensity of feeding without polluting the waters; limits of environmental characteristics tolerated by different stages in the life history of the cultured organism; growth rates for each species under specified conditions; stocking rate in relation to growth rate and optimum yield.

18. During the discussion the need for the setting up of a regional research centre in the area was raised. Several opinions were expressed and another ad hoc Working Group was formed to consider this question further.

19. The ad hoc Working Group briefly considered the aquaculture problem requiring regional action and generally agreed that for the immediate future these problems could be studied by those existing national institutions with adequate facilities. To this end, the meeting felt that it was necessary to enlarge the technical staff available to the region through multilateral or bilateral funding. This would constitute one of the measures that must be taken to narrow the gap in the knowledge within the region on aquaculture resource, techniques of culture and related subjects.

20. The question of induced spawning of the milkfish, *Chanos chanos*, was discussed and it was reported by the Philippine Delegate that studies have been made on the breeding behaviour of the species in nature and induced spawning of the species should be attempted.

21. The need for clarifying the taxonomy of certain culturable species of shrimps, molluscs and mullets, and the question of introducing new species into a country were among the other subjects considered by the meeting. It was pointed out that FAO has recommended to its Member Governments that the introduction of species should not take place unless there is a definite need for it and the possible effects of such introduction are fully examined.

REPORT OF MEETING III - AQUACULTURE TECHNIQUES - CULTURE OF VERTEBRATES

Discussion Leader : V. Gopalakrishnan

Rapporteur : G.A. Prowse

Documents: IPFC/C70/SYM

2	7	12	23	30	38	51
4	9	14	25	31	39	
5	10	19	26	32	45	
6	11	22	29	34	47	

22. In reviewing the papers concerned, the Discussion Leader dealt with the subject under five major headings, viz. (1) fish seed production, (2) stock manipulation, (3) fertilization and feeding, (4) diseases and predators, and (5) pond construction and engineering.

Fish seed production

23. Two aspects of the problem, viz. the collection of natural seed, and the production of seed by induced spawning were considered. In view of the estimated demand for large quantities of seed to bring under culture the potential coastal zone areas, it was felt that there is a need for more comprehensive statistics of the collection of natural seed.

24. More intensive studies are required on the biology of the cultivated species particularly their natural spawning. Losses due to disease and mortality need to be minimized through further studies. It was noted that Ceylon, where milkfish is cultured for tuna bait has approximately 21,000 hectares available for culture but can only obtain enough seed for 41 hectares from the present area of collection.

25. Experience in India seems to indicate the need for the establishment of a brackishwater fish seed industry. Concern was expressed that repeated harvesting of natural seed might damage the brood stocks and subsequent commercial fishing; the need for information on the subject was recognized.

26. The review of existing information on induced breeding outlined the use of photoperiodic manipulation and massive dosages of mammalian chorionic gonadotropin in spawning of mullets. It was suggested that these techniques should be applied to *Chanos chanos* and other species.

27. The usefulness of a pituitary bank for induced breeding was recognized. It was noted that India already has such an arrangement for the distribution of homogenised pituitary in ampoules.

28. Stress was laid on the need for more studies on the feeding of larval stages, even in *Mugil cephalus* which had been successfully spawned in Taiwan, besides the control of parasites, particularly *Argulus*.

Stock manipulation

29. The main contribution to the consideration of the subject was on explanation of methods used in Taiwan, where there is multiple stocking of different age groups, and harvesting at different intervals. It was stressed that the total weight of fish at any one time is the optimum carrying capacity of the pond. Thus large fish are harvested and fresh stock of small size is stocked to replace these. With repeated harvesting and repeated stocking very large crops could be obtained.

Fertilization and feeding

30. It was observed that in brackishwater culture of *Chanos chanos*, which is mainly a benthic feeder, fertilizers are used to promote the growth of bottom algae, unlike in freshwater fish culture, where plankton feeders are used. Superphosphate and urea have been used in Taiwan for alluvial soils, but organic manures are also used in traditional milkfish culture. In the use of fertilizers, the method of application, the prior treatment of soil, the eradication of predators and the nature of waste products likely to be produced by the fish are of special importance.

31. In the Indo-Pacific Region, complete feeds are seldom used and instead supplemental feeding is adopted. From the discussion it became clear that the supplementary foods varied from country to country. In Taiwan, wheat flour and oil cake are used when there is a shortage of algae for milkfish.

32. Complete feeds are considered necessary for maximum fish production. Conversion efficiencies must be as high as possible to reduce the amount of accumulating waste material, which can lead to algal blooms and oxygen imbalance. Opinions were expressed on the need to study the amino-acid, essential fats and vitamin requirements etc. for each species of fish. It was stressed that some animal protein was necessary in the diet, and recommended that investigations should be made on local materials to produce an adequate diet. Polyculture can overcome some of the difficulties of algal blooms, and increase the total crop of fish.

Diseases and predators

33. Available information on this subject was reviewed. In the discussion that followed concern was expressed that chemicals used to eradicate pests and predators might leak out from coastal ponds into neighbouring waters.

Concern was also expressed that some synthetic pesticides might have residual effects. There was a lively discussion concerning the dangers to coastal aquaculture from agricultural pesticides and it was recommended that more discussion should take place between agriculturists and fish culturists, possibly under the auspices of FAO. Attention was drawn to the forthcoming FAO Technical Conference on Marine Pollution and its Effects on Living Resources and Fishing.

Pond construction and engineering

34. The importance of appropriate pond construction techniques for each type of locality was stressed, but it became clear that there is a lack of technical knowledge on this in the region. It was pointed out that cooperation between engineers and biologists could be very beneficial in this respect. The need for training opportunities in aquaculture engineering was specially emphasized in pond engineering. In this connection attention was drawn to the proposed FAO Group Fellowship Study Tour on Fish Farm Engineering in the U.S.S.R. in 1971 or 1972.

REPORT OF MEETING IV - AQUACULTURE TECHNIQUE -
CULTURE OF INVERTEBRATES AND SEAWEEDS

Discussion Leader : T. Ino

Rapporteur : T.P. Chen

Documents: IPFC/C70/SYM

3	8	13	19	29	45	53
4	9	14	21	35	46	54
5	10	16	24	39	47	
6	11	18	27	41	49	
	12			43	52	

35. The Discussion Leader first summarized the papers pertaining to the subject and suggested the main topics for discussion such as seed production, fertilization, feeding, diseases and parasites etc., as well as the list of important cultivable species. Data presented at the meeting related to three groups: viz., Crustacea, Mollusca and seaweeds. As seaweeds (mainly *Porphyra* and *Gracilaria*) are cultured in only a few of the countries represented, no detailed discussion was held on this group.

36. For the culture of shrimps and prawns, in some countries of the IPFC area seed is collected from natural waters. Though found adequate in some areas, this means of supply of seed is usually uncertain and not suitable for "true culture". The problems encountered in the collection and transport of spawners for artificial propagation were discussed in some detail. To obtain live spawners, arrangements have to be made to keep the catches alive in containers in which the sea water is aerated and to deliver them quickly to the hatcheries. Observations were also made on the nature of habitats of adult prawns (especially bottom conditions and depth) and lunar periodicity in their breeding behaviour. Considerable discussion took place on the food for the larvae in different stages of development, especially on the culture of *Skeletonema* and other planktonic organisms. The possibility of culturing of *Artemia* was also discussed.

37. *Penaeus japonicus* is propagated on a fairly large scale in Japan and *P. monodon* in Taiwan and in the Philippines. Korea has also started the propagation of *P. japonicus*. Mention was made of the use of saponin and rotenone to eradicate fish and predators in prawn ponds. The construction of ponds for prawn culture was also briefly discussed.

38. The progress of studies on the culture of *Macrobrachium* in some countries of the region and the efforts to reduce the cost of their production were reviewed.

39. The method of intensive culture of oysters on the New England coast of U.S.A. was reported and the study on cross fertilization to produce a larger species discussed.

40. Based on the discussions the following future actions were recommended:

- (i) The organization of appropriate training facilities for coastal aquaculture.
- (ii) Increased attention to the study of the basic biology of cultivated species.
- (iii) Preparation of handbooks on the culture of selected species.
- (iv) Promotion of civil engineering studies concerning coastal aquaculture.
- (v) Establishment of appropriate cooperation with agricultural agencies to prevent damage to aquaculture through indiscriminate use of pesticides and other toxic substances.
- (vi) Promotion of studies on the economics of coastal aquaculture.

REPORT OF MEETING V - AQUACULTURE DEVELOPMENT
IN RELATION TO CONFLICTING USES OF THE COASTAL
ZONE

Discussion Leader : V.R. Pantulu

Rapporteur : Z.H. Shehadeh

41. No paper had been submitted for discussion at this meeting. The Discussion Leader delineated the areas of major conflict with agriculture, capture and sport fisheries, industry, water resource development, residential development and recreation, and suggested possible resource use compromise. The discussions that followed reflected the general concern about the seriousness of the environmental problems affecting coastal aquaculture. Two major areas of conflict received particular attention, viz. agriculture operations and disposal of industrial effluents. The Symposium noted with apprehension the lack of an integrated ecological approach to the development of coastal zone areas and the resultant loss of opportunities for aquaculture. Public understanding and governmental action are essential to ensure the protection and orderly development of aquaculture industry. In the case of pollution it was agreed that;

- (i) Immediate action be taken to protect existing aquaculture sites from sources of pollution,
- (ii) maps detailing areas suitable for aquaculture be prepared to permit proper zoning where industrial and agricultural development are contemplated,
- (iii) the use of treated sewage and industrial warm water effluents for aquaculture in the region be investigated, and
- (iv) governments and planning authorities be made aware of the need for proper monitoring and control of aquatic pollution to protect coastal aquaculture.

42. It was recognized that all the essential data for the integration of aquaculture inland and water development planning are not readily available. However, on the basis of existing information "desk studies" can be prepared and this would greatly facilitate appropriate consideration of coastal aquaculture vis a vis agriculture, commercial and sport fishing and other conflicting uses of resources. The need for economic data for such desk studies was emphasised and, in this connection, it was suggested that the terms of reference of the IPFC Working Party on the Economics of Fish Culture be broadened to include coastal aquaculture.

43. The need was expressed, particularly with respect to mangrove areas for ecological and economic studies as a basis for decision-making regarding the future use of such areas.

44. It was concluded that where conflict already exists, compromises should be sought. Future planning should be along the lines of compatible multiple use of the coastal zone, including aquaculture.

REPORT OF MEETING VI - CONCLUSIONS AND
RECOMMENDATIONS

Discussion Leader : L.M. Sprague

45. The Discussion Leader very briefly summarized the main findings of the Symposium and referred to some of the major gaps in our knowledge relating to coastal aquaculture. While the contribution of capture fisheries in national economic development in the region has been fairly well recognized, culture fisheries have not yet received the attention they deserve in most countries at policy levels. The Symposium urged Member Governments to integrate aquaculture development and preservation of environmental quality in the coastal zones in their national development plans. The need for economic studies in this field for resolving conflicts in land and water use in the coastal zone was emphasized.
46. The role of market surveys in the development of coastal aquaculture was recognized and criteria for selecting species, as well as procedures for testing technical and economic feasibility for culture, formulated. The importance of site selection methods and fish farm engineering was underlined during the discussions. The need for strengthening of national research institutions and the organization of cooperative programmes in the region to achieve rapid progress in research, was pointed out.
47. There is an urgent need for the organization of training centres in the field of coastal aquaculture and improved facilities for the collection and dissemination of information.

IV. REPORT OF THE TECHNICAL/SCIENTIFIC MEETING ON MANAGEMENT OF COMMON-USE RESOURCES AND DEVELOPMENT OF FISHING POTENTIAL

48. This meeting was held on 26 and 27 November 1970 under the chairmanship of Dr. Arporna Sribhibhadh, with Mr. J.A. Gulland as Discussion Leader. The meeting was divided into four sessions, with Dr. Deb Menasveta, A.S. Mendis, F. Nagasaki, and B. Rothschild as Rapporteurs.

49. The first session discussed the general consideration related to management and development. Three papers (IPFC/C70/SCI 5,6,9) were presented during the session.

50. Fishery management as practised in fisheries in several parts of the world is still confined to a narrow interpretation centering around the concept of maximum sustained harvest from the individual exploited stocks. In order to arrive at this goal, restrictive regulations are often established. These may or may not fulfill the wider goals of a management programme aimed at the best possible use of all available resources of fish stocks and of capital and manpower.

51. The current concept of management encompasses a broader view taking into account several pertinent factors including social and economic factors, the demand for protein food from the sea, the problems of enforcement, etc. Thus, fishery management should provide the institution concerned with ways and means of improving the social values of the people, the quality of life, etc. Furthermore, a sound management should be flexible, and should lead to the proper utilization of the resources.

52. Management in this sense is part of a comprehensive plan of development of a fishery, and should be considered in even the early stages of the fishery.

53. If a certain stock of fish is fully exploited, and increased fishing intensity would soon lead to over-fishing, a set of regulations may be imposed upon the exploitation of such resources. In formulating these regulations, the following criteria should be considered:

- (i) The majority of the fishermen should be willing to cooperate with the authority concerned to conduct their fishing in accordance with these regulations. This means that the fishermen should be educated about the bases on which these regulations are formulated.
- (ii) In the case of restrictive regulations, the regulations should only be introduced in response to a real need.
- (iii) The regulations should be formulated in such a way that they can be effectively enforced.
- (iv) Once the regulations are introduced, they should be regularly amended or revised in order that the fishermen can reap maximum benefit from the use of the resources.

54. It should be noticed, however, that regulations may be established in the absence of the need to conserve the resources being harvested. The establishment of this type of regulations arises from various types of conflicts as outlined by Kesteven and Williams (IPFC/C70/SCI6).

55. A sound management programme certainly needs information on the existing status of the resources harvested. In his paper, Gulland (IPFC/C70/SCI5) outlined techniques used in the stock assessment. The best known methods currently in use involve the estimation of various biological constants or parameters including growth, mortality (fishing and natural), recruitment, length and age at first capture, etc. during various phases of the life span of fish, and by putting these parameters together, the yield from various patterns of fishing can be ascertained.

56. Other assessment techniques use the data on catch, and catch per unit of effort obtained from a fishery to estimate the potential yield from that fishery. This technique may be particularly useful in the case of multi-species fishery. However, caution should be practised, with respect to the underlying assumptions, when presenting the results or recommendations based on this type of assessment to the authority concerned.

57. Special techniques of assessment may be employed to obtain early estimates of the standing biomass of the resources to be harvested. These techniques, as crude as they may be, are of value in the planning, the rational development and management of a fishery, especially in the developing countries. These techniques include the estimation of the biomass from the data on trawl dimensions, catch per unit area, and total area in which trawl fishing could be operated; estimation using echo survey; and the independent estimates of stock using the egg survey data.

58. The useful data which one should have available are catch per unit of effort of a fishery, size compositions of the species exploited, and preferably age compositions. For accurate assessment and management in the well developed fishery it is essential that these data be collected in the earliest stages of the fishery, before the stock is reduced. The data collected may be put in storage until the fishery develops; then they could be brought into use.

59. Due to the complexities of fishery management in a modern sense as indicated earlier, a new approach to solving various problems in respect to sound management, referred to as "the Systems Approach" was introduced. This involves, as described by Rothschild (IPFC/C70/SCI9), using analysis to ask the right questions by "cycling through the iterative process beginning with (1) defining objectives, (2) designing alternative systems to achieve these objectives, (3) evaluating the alternative in terms of cost and effectiveness, (4) questioning the objectives and other assumptions underlying the analysis, (5) using this examination to open new alternatives and (6) establishing new objectives. Once they are established, the cycle is re-entered at step (1) and continues until a satisfactory interpretation of the problem solution is needed".

60. To keep pace with the rapid development of fisheries and to seek the right solution with regard to the problems of fishery management in the modern sense, advantage should be taken of technological advances such as those in the field of computer science, to assist in seeking the right solution.

61. In the second session, four papers (IPFC/C70/SCI3, 7, 8, 10) were presented describing the state of some of the major fish stocks in the IPFC area. Dr. Shindo's paper (IPFC/C70/SCI3), described the stocks in the East China Sea and Yellow Sea. In this area the various demersal fishes make up some 80% of the total catches. These stocks are very heavily fished and it appears that the level of fishing effort is now beyond that giving the maximum sustained yield. There are agreements between Japan and Mainland China, and between Japan and the Republic of Korea to conserve the demersal fish stocks. The pelagic stocks appear less heavily exploited, but there have been marked changes in the dominant species in the pelagic catches. In discussion it was pointed out that similar changes had occurred in pelagic fisheries in several other parts of the world. This had sometimes led to the collapse of the fishery, especially when the fishery was for one species only.

62. The paper by Isarankura (IPFC/C70/SCI7) described the trawl resources in the Gulf of Thailand. Analysis of the data from commercial catches, and from research surveys showed that the stocks were heavily exploited. The maximum yield was about 450,000 tons. This level was approached by 1966, when fishing effort has further increased. Catches in the most recent years have been substantially higher, but this is believed to be due to the large quantities coming from outside the Gulf of Thailand. The importance was stressed of adequate statistics on the area of capture, to stock assessment and management. Action is being taken to limit the size and number of boats operating in the Gulf, to promote offshore trawl fisheries, and to intensify biological studies.

63. The fishery for chub mackerel in the Gulf of Thailand was analysed in the paper by Kurogane et al. (IPFC/C70/SCI8). They used detailed data on the growth and mortality of the fish, and showed that the present fishery is utilizing the mackerel resources at about the optimum level.

64. Dr. Suda (IPFC/C70/SCI10) described the tuna resources in the IPFC area. The stocks of larger tuna (yellowfin, albacore, bigeye and bluefin) exploited by the long-line fisheries are heavily fished and little or no increase in yield from these fisheries can be expected. On the other hand, catches of some species of smaller tuna, such as skipjack could be increased. It was noted that the surface fisheries (using live-bait, purse-seine etc.) will interact with the long-line fisheries, and that the interaction might be quite complex e.g. the long-line fishery catches large bill-fishes which feed on young skipjack.

65. In a general discussion of these papers it was pointed out that most of the stocks reported on are being heavily fished, but that in the region as a whole there were considerable opportunities for expanding catches. The present was therefore an appropriate time for IPFC and its member countries to consider management problems in detail, especially if management was treated as an integral part of fishery development, and the rational utilization of the resources.

66. The third session was concerned with reviewing the practical application of management measures in various parts of the IPFC area. Bowen (IPFC/C70/SCI11) described the management of the West Australian rock lobster fishery, for which the first measures (size limit) had been introduced in 1894. Present measures include size limits, and restrictions on the number and size of vessels and on the number of pots that can be carried.
67. In the New Zealand fisheries, described by Cunningham and Waugh (IPFC/C70/SCI11), a similar range of regulations have, at some time or other, been in force. There is at present no restriction on the number of licences in most fisheries.
68. There was considerable discussion in the use of licence limitation as a tool in management. In fisheries on valuable species which can be quite readily caught the right to have a licence may become very valuable. The allocation of licences can therefore involve difficult decisions. One solution suggested would be to charge a high licence fee, though some people considered that this would raise other difficult problems.
69. The work of various International Commissions concerned with management was discussed, particularly in relation to Dr. Graham's paper (IPFC/C70/SCI2) about the N.W. Atlantic. Present Commissions are of two broad types - those with a small secretariat, relying on national action for research and proposals for management action, and those with larger staffs (e.g. I-ATTC)^{1/} which carry out their own research. Management of international fisheries raise even more difficult problems than national management, due to the different interests and objectives involved. To some extent this may be minimized by the allocation of national quotas. Then each country would be able to manage its fisheries, within the constraints set by the quota, so as to best achieve its national objectives. The question of allocation would remain, and this raises particular problems in the IPFC area in which many countries are wishing to develop their fisheries. International management schemes should be so arranged as to afford countries the opportunity to develop their fisheries and so be able to associate themselves effectively with problems of rational utilization of the resources.
70. Three topics were considered in the fourth section of the scientific symposium. These concerned the role of IPFC in the fields of 1) statistics; 2) biological data and assessment; 3) the choice of management actions and problems of their implementation.
71. With respect to statistics it was noted that this is a subject of fundamental importance. Because of the importance of statistics it is necessary to go beyond simply stating that "statistics need to be improved". Instead, specific actions need to be taken. Definite proposals for the improvement of national statistics are outlined in the Report of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics (IPFC/C70/WP7). Adherence to the recommendations in this report will alleviate some of the statistical problems of the region.

^{1/} Inter-American Tropical Tuna Commission.

72. Specific aspects in which improvement is particularly required to enable better assessments to be made, are:

- (a) Better classification of the catches, if not by species, at least by groups of species.
- (b) Determination of the area of capture of vessels making long trips.

73. It will be increasingly valuable to further coordinate the collection and dissemination of statistics in the region and this can be accomplished by the institution of a regional statistical bulletin. The production of the trial initial issue of this bulletin should proceed as rapidly as possible and great concern should not be attached, at least initially, to various details such as accurate taxonomic definitions of all of the fish in the region.

74. With respect to the second topic of consideration - biological data and assessments - consideration was given to ways in which IPFC could assist member countries in their activities in this field, as well as to the assessment of the stocks of fish which are the subject of international fisheries.

75. Regarding the former, it was pointed out that another stock assessment training center would be useful and there was a reasonable possibility that this center could be held in connection with the next IPFC Session. The delegate from New Zealand expressed the interest of his country in hosting the center and many of the delegates spoke in favor of holding another stock assessment training center. There was an expression of interest in widening the scope of the center to consider quick assessment, egg surveys, and general management approach.

76. Another opportunity which the various countries have available is the assistance of those FAO staff members who are expert in stock assessment. Though this assistance has in principle been made available by FAO in accordance with the request of IPFC at its 13th Session, the opportunities have not been followed up by member countries.

77. IPFC and FAO can serve to coordinate assessment studies on stocks that are fished by several nations. In particular the demersal stocks of the South China Sea and the tuna stocks of the region were considered. With respect to the former it was suggested that a consultant should prepare necessary background material which then could be reviewed by a larger group. It was also suggested that the Working Party on Trawling be reactivated possibly with a smaller membership, to carry out this review.

78. With respect to the tuna, some of the stocks of which were the subject of international fisheries, and appeared to be presently in need of management, it was suggested that IPFC formulate a special committee for tuna with the following suggested possible terms of reference:

- (i) a review of the state of the stocks;
- (ii) definition of the IPFC area;
- (iii) review of possible management measures;
- (iv) arrangements to assume continuity in the research and assessment of the stocks and finally;
- (v) coordination of the special committee with other groups such as those of the IOFC which are also involved in considering the tuna stocks.

This proposal was referred to the IPFC plenary for consideration and possible action.

79. The session concluded by noting that a changing view of management was conveyed to the participants and this changing view included the planned utilization of resources. The important role of rapid assessment was emphasized as well as the need to begin to think of various modern techniques such as systems analyses.

80. Management should be considered as a major element in any overall fishery planning, and was likely to play an increasingly important role in the fisheries of the IPFC region. Without management there was the danger of lasting damage to the fish stocks through over-exploitation, as well as of considerable economic loss through wasteful over-investment of scarce capital and other resources. Such damage has already occurred in several fisheries in the region. To avoid this it is essential that those concerned with taking decisions on fishery planning and development have available to them the best possible information on the resources. At first this information might be rather simple and crude, though still useful in terms of decision - making. Later better information should and could be made available, but would require the backing of adequate research and other facilities.

V. COOPERATIVE STUDY OF THE KUROSHIO

81. The Council was informed that the Proceedings of the First CSK Symposium have been published by the East-West Center Honolulu. The Council was further informed of the results of the Sixth Meeting of the International Coordination Group for the Co-operative Study of the Kuroshio and Adjacent Regions (ICG/CSK) held in Paris in September 1969. At this meeting, a proposed plan for a synoptic survey of the South China Sea under the CSK program prepared by the National Coordinator for Thailand was submitted to the Group. This proposed plan was later approved by the IOC^{1/} at its Sixth Session in Paris, France. The plan called for systematic oceanographic and fishery observations to be made in the two monsoon seasons in two consecutive years (four surveys); these cooperative surveys would commence in the fall

^{1/} Intergovernmental Oceanographic Commission.

of 1970 and would end in the spring of 1972. The following year would be devoted to data analysis and this would be followed by a symposium on the results.

82. Invitations were extended to SEAFDEC^{1/}, and other fisheries development projects in the region to participate in this Cooperative South China Sea Survey Program.

83. The results of the Second CSK Symposium and the Seventh Meeting of the ICG/CSK held in Tokyo, Japan during 28 September - 3 October 1970 were reported by Dr. Deb Menasveta, CSK National Coordinator for Thailand, and concurrently the South China Sea Co-ordinator. The Council was informed that more than 50 technical papers covering the fields of oceanography, marine biology, and fisheries were presented at this symposium. The recommendations derived from the Symposium were incorporated as part of the recommendations of the ICG/CSK. It was stated that during the coming 2-3 years, efforts would be concentrated on the systematic survey of the South China Sea. Nevertheless, several developing countries in the South China Sea region could not comply with the proposed plan as approved at the Sixth Meeting of the ICG/CSK because of the lack of funds, facilities, and technical personnel. The Group urged the CSK participating countries to comply as much as possible to the agreed plan.

84. Malaysia and SEAFDEC have expressed their intention to participate in the South China Sea survey under the CSK program; their participation would be limited to the scope of their programs of activity.

85. In this connection, Malaysia and Thailand have planned to undertake comparative fishing experiments on the research trawlers of the two countries around April 1971. The ICG/CSK requested interested participating countries or organizations to join in this cooperative exercise.

86. Progress has been made with respect to the activity of the UNESCO Regional Marine Biological Center at Singapore. Since UNESCO planned to set up an advisory panel for the Center and the Indian Ocean Biological Center at Cochin, India, the Group recommended that a CSK Group of Senior Specialists be appointed to advise the Panel with regards to the international collection of plankton kept at the Center in Singapore.

87. With respect to the fisheries aspect of CSK, three more groups of species of fish were added to the CSK selected list, namely *Polynemus spp.*, *Thunnus albacares* and *Lutianus spp.* The Group requested the assistance of FAO in the preparation of species synopsis on *Decapterus spp.*, *Polynemus spp.* and *Lutianus spp.* in the South China Sea. The Group also reaffirmed the necessity of initiating and/or improving the stock assessment programs on commercially important species of fish in the region. Although the status of trawl fisheries resources in the South China Sea and adjacent waters should be reevaluated, the initiation of a pelagic resources survey in the South China Sea was recommended.

^{1/} Southeast Asian Fisheries Development Center.

88. With respect to marine pollution, the ICG/CSK recommended that IPFC consider marine pollution as a subject matter for its future symposium.

89. The ICG/CSK wished to express its gratefulness to Mr. John C. Marr for his excellent services and contributions to the CSK as the Assistant International Coordinator for Fisheries. Since Mr. Marr has resigned from this position, Mr. I. Ronquillo of the Philippines was elected by ICG/CSK in his stead.

90. With respect to the Cooperative Study of the Kuroshio, the Council recommended that FAO in collaboration with UNESCO explore the possibilities of providing the IPFC Secretariat with accumulated data from the CSK program which are of interest to the fisheries development in the region.

91. With regard to marine pollution, the Council recommended that research institutions in the region devote efforts to train microbiologists for pollution control in tropical waters, and further recommended that FAO in consultation with UNESCO explore the possibility of assisting the countries in the region in their programmes of control of pollution affecting fishery resources.

VI. INTERNATIONAL INDIAN OCEAN FISHERY SURVEY AND DEVELOPMENT PROGRAMME

92. The Council heard a progress report by Mr. John C. Marr, Programme Leader. At its first session in 1968, the Indian Ocean Fishery Commission had requested FAO to prepare and submit on its behalf to UNDP a proposal for the Programme. This proved to be more time consuming than anticipated and the Programme Leader did not take up his duties until the end of January 1970.

93. The objective of the Programme is fishery development in a broad sense and possibilities for development anywhere in the Indian Ocean are being considered during the initial planning phase. Fishery development may (1) contribute to general economic growth, (2) provide a source of protein, (3) provide a source of foreign exchange, and (4) contribute to the solution of social problems. One of the reasons for a regional programme is to arrange on a regional or sub-regional basis for facilities or activities which cannot be provided in each country. In promoting fishery development in the Indian Ocean, use should be made of existing institutions and facilities.

94. Sixteen subject areas ranging from Resource Inventory to Economic Planning for Fishery Development have been defined for which summary review reports are needed and consultants are preparing such reports. These should be in hand by the end of November. On the basis of these reports, information available in FAO, and information furnished by Indian Ocean countries, a draft plan for fishery development in the Indian Ocean will be prepared in January. After appropriate reviews, it will be presented to the Executive Committee of the Indian Ocean Fishery Commission in April 1971. Following these, the plan will go to Governments, UNDP, World Bank, Regional Banks and other institutions. In the normal course of events new projects would not become operational until late 1972.

95. In an operational sense it is anticipated that the Programme would (1) coordinate existing UNDP and other projects in the region, (2) stimulate the formation of new projects, technical assistance, and business ventures and (3) function as the technical staff for the Indian Ocean Fishery Commission.

96. Development possibilities which might facilitate the ability of Indian Ocean countries to utilize the fishery resources of the Indian Ocean are: (1) initial preference for Indian Ocean countries in a fishery in which there was a quota; (2) joint ventures; (3) participation by non-Indian Ocean countries at a secondary level as suppliers of equipment; and (4) through the establishment of a Regional Fishery Development Agency.

VII. SOUTH CHINA SEA FISHERY DEVELOPMENT AND COORDINATING PROGRAMME

97. The Secretariat introduced this item by referring to the Thirteenth Session of the Council which had "noted the activities of the countries bordering the South China Sea designed to increase supplies of fishery resources available to them and also noted the need for a coordinating mechanism to ensure that the most efficient use is made of the limited national and international funding available for this purpose. The Council believed that it could provide the mechanism to coordinate and implement the existing programmes in the South China Sea, which includes national programmes, UNDP programmes, bi- or multilateral programmes, such as the South East Asia Fishery Development Center, and international cooperative programmes such as the CSK, provided that adequate support could be made available through the UNDP or other sources of international assistance.

98. The Council requested the Director-General of FAO to arrange, in consultation with the members of the Council and with the UNDP, for a request, on behalf of the Council, for UNDP assistance in planning to that end. The strong interest of FAO in this request was emphasized.

99. However, it was also pointed out that it has not yet been possible to prepare the programme for submission to UNDP since priority had been given by UNDP to the Indian Ocean Fishery Survey and Development Programme. The unique aspect of this project in terms of, its scope and the utilization of an international commission as a coordinating mechanism made it necessary that the UNDP have some reasonably clear notion of its progress and its future before considering a second proposal of a similar character. It was also noted that several members of the IPFC were already benefiting from the Indian Ocean Programme by virtue of their memberships in IOFC.

100. The Secretariat felt, however, that now it was possible to make further progress on the South China Sea proposal and suggested that the discussion and consultations with the Member Governments interested in the fisheries in this region as well as with project managers and counterpart directors of existing UNDP projects in the region should take place. The Programme Leader for the Indian Ocean Fishery Survey and Development Programme had agreed to take the initiative and to carry out a coordinating

role in these discussions and consultations for FAO. On the basis of this activity a proposal can be developed which will be reported back in about a year to the Executive Committee of the IPFC. By this time, also, it is hoped that the situation vis-a-vis the UNDP will be clarified. In the discussion that followed support was indicated for the proposed course of action suggested by the Secretariat.

101. The delegations of Japan and the United Kingdom reported the availability of data relevant to fish stock and fishing activities in the region and all countries were requested to make relevant data available to the IPFC.

102. There was some discussion concerning the need for coordination and for utilizing the staff of the IPFC Secretariat. It was agreed that in the course of the Programme Leader's discussions further steps including the desirability for any coordinating mechanism be considered. It was further suggested that it might be appropriate for SEAFDEC or some other regional body to organize a technical seminar on matters pertaining to the South China Sea. Any results arising from such efforts should be made available to the IPFC.

C. OPERATIONAL AND ADMINISTRATIVE MATTERS

VIII. INTERRELATIONSHIP BETWEEN IPFC AND IOFC

103. The Council noted that fourteen of its member nations are also members of the Indian Ocean Fishery Commission (IOFC) and reaffirmed its desire to continue its close cooperation with the Commission. It agreed that the practice of establishing joint working parties to study common problems should be pursued and that the boundaries between the two bodies should remain flexible.

IX. APPLICATIONS FOR MEMBERSHIP

104. The Secretary reported that there were no applications for membership of the Council during the intersession period.

X. REPORT OF THE EXECUTIVE COMMITTEE

(a) Review of the activities of the Working Parties

105. The Chairman of the Working Party on Economics of Fish Culture reviewed the work carried out by the Working Party, particularly the preparation of proformae for collection of economic data. The Council agreed that the Working Party should continue its work and that its terms of reference should be enlarged to include mariculture and coastal aquaculture. It was also agreed that the name of the Working Party be changed to Working Party on Economics of Aquaculture. The Council complimented the Working Party on its achievement.

106. The Council was informed that FAO hopes to make available the services of a consultant to assist the Working Party in the organization of data collection and their analysis and interpretation.

107. The activities of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics was reviewed by its secretary.

108. Some of the boundaries of the statistical areas were considered and it was agreed that the matter should be further discussed by the Second Session of the Working Party to be convened during the first half of 1971. The publication of a Regional Fishery Statistics Bulletin proposed by the Secretariat was supported by the Council.

109. Regarding the Working Party on Rastrelliger, the importance of this species for many countries in the area was strongly emphasized but it was agreed by the Council that future studies of Rastrelliger should be carried out by the Working Party on Coastal and High Seas Pelagic Resources. The Council therefore agreed to discontinue the Working Party on Rastrelliger.

110. The Council also agreed that the Working Party on Pelagic High Seas Resources had completed its tasks and decided to discontinue it.

111. As a result of the decisions of the Council the following Working Parties will continue their activities during the intersessional period:

(i) Trawling

(ii) Coastal and High Seas Pelagic Resources

(iii) Coastal Aquaculture and Environment

(iv) Economics of Aquaculture

(v) IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics.

112. The following Working Parties were discontinued:

Fisheries Aspects of the Cooperative Study of the Kuroshio.

Pelagic High Seas Resources.

Rastrelliger.

(b) Country statements

113. It was agreed that the country statements need not be further reproduced but extra copies would be available for the Delegations, if required. It was also agreed that the present format should be used for the preparation of the statements for the 15th Session of the Council.

(c) Budget estimates

114. The budget statements for the intersession period covering the last two years and the budget estimates covering the years 1971-72 were presented by the Secretary and adopted by the Council.

(d) Publications

115. The desirability of making available some of the important working papers to the Governments well before the Sessions was emphasized. The Council approved the current publications programme of the Council.

XI. MATTERS REFERRED BY THE COUNCIL

(a) To Member Governments

116. There were no comments.

(b) To FAO

117. The Council was informed that funds in the FAO Regular Programme were not available for the establishment of the post of a Regional Boat Design and Construction Specialist. It was suggested that interested Member Governments make provision in their UNDP/TA allocations so that the necessary man/months for the post could be pooled from several countries concerned.

118. A Seminar on Ferro-cement Fishing Craft is being planned by FAO, to take place possibly at Hong Kong, during 1972-73.

119. Noting the keen interest of the Governments in fish harbour development, FAO has approached several donor countries for possible assistance on a bilateral basis for organizing a Regional Seminar. The Governments will be informed about further developments.

120. It is hoped that NORAD ^{1/} who is cooperating with FAO in the organization of a training centre in Latin America on fish detection by acoustic methods would also assist in a similar centre in the Indo-Pacific Region to be held possibly in 1973.

121. With respect to fish utilization and marketing development in the IPFC region, the Secretariat reported that the recently established Fishery Industries Division of the Department of Fisheries was anxious to provide assistance and manuals that would lead to the introduction of suitable methods and equipment for the modern handling, processing and distribution of fish to meet the local and export demand and to prevent wastage. Various measures for attaining greater progress in these fields were discussed including the suggestion that countries should take steps to initiate requests for technical assistance under their overall UNDP/TA allocation. The

^{1/} Norwegian Agency for International Development

possibility of holding a seminar on this subject in connection with one of the forthcoming sessions of the IPFC was deferred to the appropriate item on the agenda. It was also noted that a seminar on fish processing and marketing supported by bilateral funding is being planned for 1972 in the region.

122. Many delegates indicated their support for other seminars and training centres on fish processing and marketing that might be organized within the region.

123. The Secretariat also noted the study carried out on Fishermen's Credit Needs in South-East Asia which soon will be available to the countries and it was hoped that a seminar or workshop concerning this subject as it relates to the needs of artisanal fishermen could be held in the region during the 1970-73 biennium.

XII. MATTERS ARISING FROM THE REPORT OF THE FIFTH SESSION OF THE COMMITTEE ON FISHERIES

(a) Marine pollution

124. The Council was informed by the Secretariat of the activities of FAO in the field of pollution. Specific reference was made to the FAO Technical Conference on Marine Pollution and its effects on living resources and fishing to be held at FAO Headquarters in Rome from 9 to 18 December 1970. The member nations and individual scientists were urged to attend the Conference.

125. The Council was also informed by the Secretariat that negotiations are underway to hold a Training Course on Marine Pollution Control in 1971 in collaboration with the Swedish International Development Agency (SIDA).

126. The effects of pollution on coastal aquaculture were considered and it was agreed that they should be looked into by the Working Party on Coastal Aquaculture and Environment.

127. The Working Party will prepare for a detailed scientific technical discussion on the subject at the next session of the Council.

(b) Fishery education and training

128. Delegates were informed of the preparation of the FAO Directory of Fishery Training Institutions which would enable countries to be aware of existing training facilities and their programmes. In order to take full advantage of these institutions, the importance of increased fellowship support was noted. It was reported that FAO would make every effort to obtain outside funding to expand the number of available fellowships.

129. The Council noted that the necessity for giving increased attention to the special needs of artisanal fishermen was emphasized by the Fifth Session of the Committee on Fisheries. The particular importance of dealing with this problem in the IPFC region was also stressed, both in terms of providing suitable teaching aids for these fishermen and in training extension workers to work with them.

130. The Secretariat indicated that preparations were under way for the FAO Technical Conference on Fishery Education and Training to be held in 1972 and urged that member countries of IPFC send qualified persons to the Conference.

131. In the discussion, support was expressed for the emphasis FAO was placing upon education and training. It was also noted that progress was being made in the United Kingdom on the preparation of a Guide on Fishery Education and Training based on the IPFC Symposium held at the Twelfth Session in Honolulu.

XIII. SYMPOSIA

(a) Arrangements for the 15th Session Symposium

132. The Council heard a report from the Convenor of the 15th Session Symposium on Coastal and High Seas Pelagic Resources. It is proposed to finalize the Prospectus of the Symposium early in 1971 and it is hoped that contributions of papers are to be received by April 1972. It was suggested that economics of fisheries development should also be considered by the Symposium.

(b) Symposium Subject for the 16th Session

133. The Council decided that the Symposium Subject for the IPFC 16th Session should be: Economic and Social Aspects of National Fisheries Planning and Development. The scope of the subject would cover planning, taking into account likely future developments with respect to resource potentials, economic trends and social development such as manpower utilization as well as training individuals in fishery planning concepts. The Symposium might consider placing some emphasis on such topics as for example, resource development and utilization; markets and product development; the role of aquaculture, and the establishment of priorities among fisheries programmes. Of especial importance would be the consideration of methods and procedures for country planning which would be related to UNDP programming. Thought should be given to conducting the Symposium after the fashion of the technical proceedings of the 14th Session during which there were a small number of detailed review papers given by selected experts preceded by a session which would include papers on planning topics of interest. A Working Party consisting of the following members should be convened to consider details, conduct and planning for the Symposium during the intersession period:

Convenor: Dr. J.A. Storer (FAO)
Mr. L.I.J. Silva (Ceylon)
Dr. A. Sribhibhadh (Thailand)
Mr. I. Petersen (U.K.)
Prof. B.J. Rothschild (U.S.A.)

134. The Council would facilitate communications between the Working Party and the various countries for the purpose of assembling various documentation which might be reviewed at the 15th Session.

XIV. ANY OTHER MATTERS

135. The Council noted with satisfaction the progress being made by the Scripps Institution of Oceanography in the preparation of reports based on the results of the NAGA expedition and recommended that steps should be taken by the Secretariat to secure copies of these reports to be distributed to the Member Nations of IPFC.

136. The Council noted with appreciation the offer made by the Korean delegation to train fishermen of the region at the Deep Sea Fishermen's Training Center in Pusan.

D. RECOMMENDATIONS

XV. SYMPOSIUM ON COASTAL AQUACULTURE

137. The Symposium adopted the following recommendations:

Recommendation 1

(a) Status of Coastal Aquaculture in National Planning

The Council

Recognizing that the Indo-Pacific region contributes the major share of present world production from aquaculture and offers great potential for future development,

Noting that aquaculture development has not received the attention it deserves in most national economic development plans,

Emphasizing the contribution that present and future aquaculture efforts can make to an increase in high quality protein production and to the earning and saving of foreign exchange,

Further noting that enhanced financial and institutional support is essential for the rational development of coastal aquaculture,

Recommends that Member Governments take necessary steps to ensure that appropriate provision is made for research, development, and training in coastal aquaculture in national economic development plans.

Recommendation 2

(b) Cooperative Research Programme

The Council,

Taking into account that there are major gaps in our knowledge of coastal aquaculture resources, techniques of culture and related subjects,

Noting that during the discussions a number of problems requiring research for solution have been indentified and,

Considering the limitations of facilities and research personnel available in the region,

Recommends that the IPFC Secretariat explore the possibilities of establishing a cooperative programme of research on coastal aquaculture among the national and international institutions in the region.

It further recommends that if it is found feasible to organize the programme, the Secretariat should take steps to initiate it as soon as possible and make a report on it to the IPFC Working Party on Coastal Aquaculture and Environment.

It further recommends that the present Working Party on Coastal Aquaculture (hereafter to be called Working Party on Coastal Aquaculture and Environment) be reconstituted to function as the coordinating body for such a cooperative programme, as well as for following up the other recommendations of the Council in regard to coastal aquaculture.

Recommendation 3

(c) Economics of Coastal Aquaculture

The Council,

Recognizing the importance of economic studies on coastal aquaculture in the optimum development of the industry and in decision-making where conflicts in the use of coastal zone areas exist,

Noting that the IPFC Working Party on the Economics of Fish Culture dealing with freshwater fish culture, has made considerable progress in the preparation of suitable proformae for the collection of data for economic analysis and formulated procedures for appropriate cost and earnings surveys,

Further noting that these proformae and procedures are directly applicable in studies on coastal aquaculture,

Recommends that the terms of reference of the Working Party on the Economics of Fish Culture be amended to include studies on coastal aquaculture as well.

Recommendation 4

(d) Coastal Zone Problems and Aquaculture

The Council,

Having reviewed the status and potentials for aquaculture development in the coastal areas of the Indo-Pacific region,

Noting that aquatic pollution and its rapid rate of increase are serious problems facing the expansion of aquaculture, and that major conflicts in land and water use affect aquacultural development in most countries of the region,

Recognizing the scarcity of information and of critical studies of the problem,

Recommends that the Member Governments undertake appropriate pollution studies and action relevant to the problems of coastal aquaculture

It further recommends that the Council through the proposed Working Party on Coastal Aquaculture (see Recommendation 2) promote studies on this subject and prepare for a detailed discussion at the scientific/technical meeting of the Council's 15th Session.

Recommendation 5

(e) Training of Personnel

The Council,

Recognizing that the lack of adequately trained personnel is one of the major problems facing the development of coastal aquaculture in the region,

Aware that inadequacy of trained personnel is more pronounced in developing countries of the region, where there is an urgent need for the development of coastal aquaculture,

Recommends that FAO organize a training centre on coastal aquaculture in a country well advanced in this industry, and further,

Recommends that Member Governments establish national training programmes for, extension personnel, with the assistance of available bilateral and international aid-giving agencies, where required.

Recommendation 6

(f) Cooperation with other bodies

The Council,

Recognizing that other regional bodies of FAO like the General Fisheries Council for the Mediterranean (GFCM) and non-Government bodies such as the International Biological Programme (IBP - particularly the Section on Productivity Marine - IBP/PM) UNESCO, SEAFDEC, BIOTROP are keenly interested in the development of coastal aquaculture and basic research relating to it,

Aware that GFCM has an active Working Party on Aquaculture and Fisheries in Brackish Waters, that IBP/PM is promoting studies on the grey mullets, mussels and cultivation of marine organisms,

Convinced that close cooperation of IPFC with these bodies could contribute substantially to the advancement of basic research and experimental studies on the subject,

Recommends that the Secretariat make efforts to promote cooperation between the national institutes of the region GFCM, IBP/PM, UNESCO, SEAFDEC, BIOTROP and other bodies interested in the Council's activities relating to coastal aquaculture.

Recommendation 7

(g) Strengthening of Technical Services

The Council,

Recognizing the need to avoid overlapping and duplication of research projects and so ensure that the widest possible investigations be undertaken,

Considering the earlier recommendations relating to the need for co-operation with other bodies and the need for narrowing the gaps in our knowledge on coastal aquaculture,

Noting the need for adequate compilation and dissemination of information including the results of research,

Recommends to FAO that it investigate ways and means, either under its regular programme or under other programmes, of providing adequate technical staff to the IPFC Secretariat so as to meet the increasing demands on professional staff arising from the expanding activities in coastal aquaculture in the region.

XVI. TECHNICAL/SCIENTIFIC MEETING ON MANAGEMENT OF COMMON-USE
RESOURCES AND DEVELOPMENT OF FISHING POTENTIAL

138. According to the proposal made by the Technical-Scientific Meeting on Management of Common-Use Resources and Development of Fishing Potential, the Council approved the following recommendation:

Recommendation 8

Committee on Management of Tuna in the Indo-Pacific Region

Recognizing the importance of the rational exploitation of the fisheries resources of tuna in the Indo-Pacific Region.

The Indo-Pacific Fisheries Council hereby establishes "A Special Committee on Management of Indo-Pacific Tuna", according to Article III of the IPFC Agreement and pursuant to Rule X-3 of its Rules of Procedure.

Terms of Reference

The terms of reference for the Committee are:

- (a) to review the state of the stocks of tuna in the Indo-Pacific area, in relation to the present level of exploitation and likely future developments;
- (b) to consider the boundaries of the area that have to be taken into account in any future management of tuna in the Western Pacific, considering the movements of fish and fishing vessels;
- (c) to review for purposes of discussion and information measures that might be considered for management and development planning of the tuna fisheries in the IPFC area, and to suggest the administrative and other actions that would be required to put such measures into effect;
- (d) to consider arrangements for ensuring the continuation and coordination of the necessary research and the continuing re-assessment of the state of the stocks.

Membership

The membership of the Committee should be designated by the Director-General of FAO in consultation with the Chairman of the IPFC from Member Nations of the IPFC who have an interest or have indicated to FAO their present or future interest in tuna fisheries in the region.

Observer Participation

The Committee may include the participation of nations having an interest in tuna fisheries in the region who have on Observer status with IPFC and those nations that are not members of the IPFC or of FAO but are members of the U.N. or of its specialized agencies.

Organization and Procedure

The Committee will select a Chairman from among its members.

In the course of its activities, and in view of the migratory nature of the species involved, the mobility of tuna fleets, and to avoid duplication, the Committee shall take steps to meet jointly with the IOFC Committee on Management of Indian Ocean Tuna and shall coordinate its activities with other appropriate bodies.

The Committee shall report to the Council not later than the 15th Session which may review the activities and terms of reference of the Committee.

The delegation of Japan reserved its position regarding this recommendation.

XVII. REPORT OF THE EXECUTIVE COMMITTEE

139. The Council welcomed the assistance that may be given by one or more of its Member Nations by making available the services of a fishery statistician and a biologist to work together with the regional fishery statistician and approved a resolution to that effect.

Recommendation 9

The Council:-

"Recognizing the importance of strengthening the staff of the FAO Regional Office that can assist in the development of fisheries statistical systems of the member countries, especially relating to the carrying out of the fisheries census in the region as recommended at the 11th Session of the IPFC.

And having been informed of the contents of the Secretary's circular letter of 22 June 1970 (IPFC/Tech.Circ.70/10) to certain IPFC Administrative Correspondents on the subject of the appointment of two experts to assist the FAO Regional Fisheries Statistician, Bangkok.

And further noting the support expressed for the proposal in the circular letter,

Recommends that the Director-General investigate the possibility of such assistance being provided by donor countries, and arrange for the two experts required to be attached to the FAO Regional Office for Asia and the Far East, to work under the supervision of the Regional Fisheries Statistician."

In noting the work on the preparation of an illustrated check list of the important commercial species which may be undertaken by the biologist referred to in the above paragraph the Council expressed its gratitude for the work done by Mr. Chan of the Fisheries Research Station of Hong Kong and hoped that Mr. Chan would continue to be associated himself with this work.

E. CONCLUDING MATTERS

XVIII. ELECTION OF OFFICERS

140. Mr. B.T. Cunningham of New Zealand and Dr. Prida Karnasut of Thailand were unanimously elected as Chairman and Vice-Chairman respectively.

XIX. NOMINATIONS

141. The Council agreed to hold in suspense its two Technical Committees until its Fifteenth Session and decided that nominations for those Committees would stand.

142. The Council requested all its members to nominate Administrative Correspondents.

XX. DATE AND PLACE OF THE NEXT SESSION

143. The Council welcomed the kind offer of New Zealand to host the Fifteenth Session in 1972 at Wellington.

Appendix I

AGENDA

A. INTRODUCTORY AND PROCEDURAL MATTERS

1. Opening of the Session
2. Adoption of the Agenda and arrangements for the Session

B. TECHNICAL-SCIENTIFIC MATTERS

3. Symposium on coastal aquaculture
4. Fundamental problems in the management of common-use aquatic resources including resource assessment and rate of development of fishing potential
 - (a) general considerations
 - (b) case studies in the IPFC region
 - (c) management problems
5. Cooperative Study of the Kuroshio and Adjacent Regions (CSK)/IPFC Project
6. Indian Ocean Fishery Survey and Development Programme
7. South China Sea Fishery Development and Co-ordinating Programme

C. OPERATIONAL AND ADMINISTRATIVE MATTERS

8. Interrelationship between IPFC and IOFC
9. Applications for membership
10. Report of the Executive Committee
 - (a) Review of the activities of the working parties
 - (b) Country statements
 - (c) Budget estimates

- (d) Publications
- (e) Matters referred by the Council
- (f) Others
- 11. Matters referred by the Council to
 - (a) Member Governments
 - (b) FAO
- 12. Matters arising from the Report of the Committee on Fisheries
 - (a) Marine Pollution
 - (b) Fishery education and training
- 13. Symposia
 - (a) Arrangements for the Fifteenth Session Symposium
 - (b) Symposium subject for the Sixteenth Session
- 14. Any other matters

D. CONCLUDING MATTERS

- 15. Election of officers
- 16. Nominations
- 17. Date and place of next session
- 18. Adoption of report

OPENING SPEECH

BY

HIS EXCELLENCY THE MINISTER OF AGRICULTURE

HON. M.R. CHAKRATONG TONGYAI

Distinguished Delegates, Ladies and Gentlemen,

On behalf of my Government and the people of Thailand, I welcome you to Thailand. It is a pleasure to have the Indo-Pacific Fisheries Council meet in Thailand once again after a lapse of some sixteen years. I hope not only that you will enjoy your stay in this country but also that you will be able to accomplish productive work in your various fields. We have here a gathering of high-level specialists from all over the world and we all expect to benefit from such an august gathering of fisheries scientists and administrators. We hope that by mutual exchange of information, solutions to problems facing the fishing industry in member countries may be suggested.

During the last few years, the fishing industry in Thailand has undergone a revolution. A large number of trawlers have replaced the older type two-boat purse seiners used mainly to fish for Pla-thu or *Chub mackerel*. These trawlers have brought to the surface untapped resource, which have immensely benefited the economy and national food supply. Presently the resources in the Gulf of Thailand are under heavy fishing pressure and the industry is now looking into the possibility of extending the operations further into South China Sea in the East and the Andaman Sea and Bay of Bengal in the West. A precise knowledge of the potential demersal as well as pelagic resources of these waters is not available and this lack of knowledge is hampering the development of the industry. My Government would like to support any regional project for a preinvestment survey of the resources of these waters. Such preinvestment surveys are essential. The development of an ocean-going fishing fleet and ancillaries are an expensive business, and an investment should be made only if there is a reasonable assurance of adequate returns on the investment. During recent years, there has been a considerable expansion in Thailand's export of fisheries products, which is contributing significantly to the foreign exchange earnings of this country. We would like to improve the quality of the merchandize, particularly that of the frozen prawn exported and the Government is considering the introduction of quality control regulations. We would also like to diversify the exports with the development of new products.

I note from the Agenda that the 14th Session of the Council will be somewhat different from the earlier Sessions and the discussions will be centered on only two major topics; one, Management of Common-use resources and Development of Fisheries Potential; and the other, Coastal Aquaculture. The first topic is of great importance not only to us but to other countries whose marine fisheries are expanding into international waters, the resources of which are common property. International co-operation is essential to ensure a wise exploitation and management of these resources. One of the problems facing us is the management of the resources of the Gulf of Thailand.

The other subject on which a Symposium is also to be held is Coastal Aquaculture. Thailand has a vast area of coastal swamps, some 162,000 hectares in extent, which are potentially capable of being developed for fish cultural purposes. Salt water fish culture is not new in Thailand and is not new in this Region where many species, such as milkfish and shrimps, have for some time been cultured in salt water impoundments, but application of modern technology is lacking. It is hoped that the deliberations of the Symposium on this subject will benefit the fish culturists by bringing out the latest technological developments in this field. Whereas fishing is essentially hunting, development of coastal aquaculture, which is extremely important for this Region, brings us nearer to fish husbandry under control by man.

Among the other items on the Agenda, I note that the Indian Ocean Fishery Survey and Development Programme is to be discussed and also the survey and development of the resources of the South China Sea, a subject which I have already touched upon. Thailand is extremely interested in both, and it is hoped that some concrete proposals will result from the deliberations of this conference.

Finally, I would once again like to convey to the Director-General of FAO my Government's pleasure and satisfaction that the 14th Session of the IPFC is being held in Bangkok, and I trust that the deliberations of this meeting will be rewarding and bring closer to realization the aspirations of all the Members of the Council.

I now have the great pleasure of declaring open the 14th Session of the Indo-Pacific Fisheries Council.

STATEMENT

BY

THE ACTING REGIONAL REPRESENTATIVE

Your Excellency, Distinguished Delegates, Ladies and Gentlemen,

It is my great pleasure to welcome you to the FAO Regional Office the 14th Session of the Indo-Pacific Fisheries Council on behalf of the Director-General, Mr. A.H. Boerma, and his Regional Representatives for Asia and the Far East, Mr. Ahsan-ud-Din, and to convey to you their best wishes for the success of the conference.

Mr. Boerma asked me to express his appreciation to the Royal Government of Thailand, through you Mr. Minister, for its generous contribution to this Session of the Council.

During the 10th FAO Regional Conference held in Australia in August/September this year, fisheries development in this area received important consideration and among the recommendations made are the following:

"Urgent action should be initiated regarding the management of the aquatic resources in the Indo-Pacific Region to safeguard the interest of the developing countries of the Region. The Conference also noted that there was considerable wastage in fisheries products due to spoilage and inefficient handling and processing. The Conference recommended that systematic survey on losses of the fisheries products occurring in different sectors should be undertaken by FAO and the Member Governments and a suitable statistical methodology for estimating the losses should be developed.

Recognizing the urgent need to develop products which can be made from fish, not presently utilized, the Conference suggested that there should be more emphasis on product development in the FAO Regular Programme, and the countries should examine their own capabilities in fish processing and product development and, where appropriate, request assistance and advice in improving their utilization of this most important resource."

I hope that the Council will also consider these recommendations in planning its work for the next biennium.

We greatly appreciate the work of the Council in the development of the fishing industry in the Indo-Pacific Region and be assured that we in FAO will do our best to render our advice and services wherever we are called upon.

In the end may I wish you all success with this 14th Session and fruitful deliberations and also a happy stay in this charming city of Bangkok.

ADDRESS

BY

CHAIRMAN

INDO-PACIFIC FISHERIES COUNCIL

Your Excellency, Distinguished Visitors, Delegates, Ladies and Gentlemen,

As Chairman of the Indo-Pacific Fisheries Council I wish to express the deep appreciation of the Council in being able to hold this session in the FAO Regional Office. We sincerely thank the FAO Regional Representative, Mr. Ahsan-ud-Din who unfortunately cannot be with us today, but I am sure that his Deputy, Mr. Prakoso, will pass on our thanks.

I must also thank the Government of Thailand, which, although not officially the host country, has been so helpful in arranging for this meeting. I thank you Mr. Minister, your Director-General, Dr. Prida, and his staff for what has already been done and for what I am sure will be done during our stay in Bangkok to make the 14th Session of the Indo-Pacific Fisheries Council an outstanding success. In addition, I thank you Mr. Minister for giving up so much of your valuable time to come here today to open the 14th Session of the IPFC.

Since its inauguration in 1948 the IPFC has provided the main forum of discussion and cooperation in the region and this cooperation is needed as much today as it was at that time. Although a great deal has been achieved in the development of fisheries in the region we should not relax our efforts to promote the industry in the future.

Changes have been made in the organization of the Regional Office and it is proposed that FAO Headquarters in Rome will play an increasing role in the provision of technical service to the Region. In addition, the break through achieved on behalf of the Indian Ocean Fisheries Commission in securing the cooperation and active financial assistance of the UNDP, to carry out a feasibility study of the development prospects in the Indian Ocean has created a precedent, which should be of considerable importance to the IPFC.

Whilst there is room for major technical developments in this region I would remind delegates of the need to continue to examine the role of the very large number of subsistence fishermen in the region. In my opinion there is tremendous scope for increased production in the proper use of the manpower resource available.

Although the Executive Committee has decided to reduce the number of meeting days for this session it has decided to rearrange the programme so that the session can concentrate on two major topics, which are of very great importance in this region. I certainly hope that this experiment will prove successful and that the Executive Committee's aims will be achieved by this new arrangement.

In assuming the Chair for this session I feel as though I am a usurper, because this meeting should have been chaired by our very good friend, Mr. Jack Marr. As you no doubt all know Mr. Marr will be more than fully occupied in his work in connection with the Indian Ocean, and I hope and I feel sure that he will maintain his great interest in the work of the IPFC, in which he has played an extremely important role. It is indeed a pleasure that he is able to be with us on this occasion.

Although as I have said, I feel that I should not be in this chair today, it is certainly a great honour both to me personally and to my country.

Again, let me thank the Regional Representative for his cooperation and the Government of Thailand for its most valuable assistance in the organization of this meeting. I welcome all Representatives of Member Countries and all Observers here today and hope that we will have a most successful meeting.

Now I have much pleasure in calling on Dr. Storer, Director, Fisheries Economics and Institutions Division, Department of Fisheries, Rome.

ADDRESS

BY

DR. JAMES A. STORER
DIRECTOR, FISHERY ECONOMICS AND INSTITUTIONS DIVISION,
FISHERIES DEPARTMENT
FAO, ROME

Excellency, Mr. Chairman, Ladies and Gentlemen,

It is my privilege to convey to you, first of all, the best wishes of the Director-General, Mr. A.H. Boerma, for a very successful session. Mr. Boerma asked me to express his appreciation to the Government of Thailand for its generous contribution to this Session of the Council which is being held in the Asia and the Far East Regional Office of FAO.

The other message I have to convey to you comes from Mr. Roy I. Jackson, Assistant Director-General (Fisheries), who deeply regrets that he is unable to attend this Session since the Fifth-Fifth Session of the FAO Council is at present taking place in Rome. He sends his best regards to his many friends here and wishes you a very fruitful session.

It is a great pleasure to me to attend for the first time a Session of this Council, especially this one, which, I understand, has as its aims the development of a new pattern for the future work of the Council so as to bring it closer to the problems of common interest to all its members.

The Provisional Agenda that you have in front of you, as you know, Mr. Chairman, has been carefully prepared by the Secretariat in close consultation with the Executive Committee of the Council. It is intended to focus the work of this Session and the future activities of the Council on a few selected subjects of immediate interest to all its members. In this regard, Mr. Chairman, I would like to comment on points 4 and 7 of the Agenda, which are of particular importance in this respect.

In regard to point 4, the need for the proper utilization of the living aquatic resources in the Indo-Pacific area has been considered in the past by this Council, but no concerted action has yet been taken to assess the state of these resources and their potential with a view to their rational exploitation. It is possible that some of the resources are already over-exploited and their fisheries are in need of being regulated. As a result of the debate that will take place during this Session, Mr. Chairman, it is hoped that a programme for the evaluation of some of the important resources of the Council's area will be initiated with a view to identifying management requirements and management measures which may be recommended by this Council to its members. Progress will be continued towards evaluating the resources of the Council's area, and determining and identifying management actions which could, when necessary, enable a more rational use to be made of these resources. This could assist decisions either at the national level or for international fisheries in waters beyond national jurisdiction, and lead to concerted action - possibly through the Council.

I would now like to turn to point 7. As you may remember this Council at its last Session (and here I quote from its proceedings):-

"noted the activities of the countries bordering the South China Sea designed to increase supplies of fishery resources available to them and also noted the need for a co-ordinating mechanism to ensure that the most efficient use is made of the limited national and international funding available for this purpose. The Council believed that it could provide the mechanism to co-ordinate and implement the existing programmes in the South China Sea, which includes national programmes, UNDP programmes, bi- or multi-lateral programmes, such as the South East Asia Fishery Development Center, and international co-operative programmes such as the CSK, provided that adequate support could be made available through the UNDP or other sources of international assistance. The Council requested the Director-General of FAO to arrange, in consultation with the members of the Council and with the UNDP, for a request, on behalf of the Council, for UNDP assistance in planning to that end".

Although this request was considered with great interest by FAO, it has not yet been possible to implement the wishes of the Council because a similar request was previously made by your sister organization, the IOFC, to which first priority was given by the UNDP. I should point out that several members of this Council are also members of IOFC and are benefiting from the project in question.

It is hoped, Mr. Chairman, that after further consideration of the matter by this Session arrangements may be made to initiate work leading to the eventual preparation of a project proposal.

The Council will be further informed on this Project during the discussion of point 6 of the Agenda.

Another important item of your Agenda is, of course, the Symposium on Coastal Aquaculture. As you know, Mr. Chairman, arrangements for the Symposium have been carefully made by the Working Party responsible for its organization. I am sure that this Symposium will consider the potentials for aquacultural development in the coastal areas and review the status of our knowledge on the technology involved. I have every hope that this will lead to national and regional actions for removing the existing constraints to the expansion and intensification of coastal aquaculture in the region.

As a final comment on your Agenda, I would like to refer to the important work initiated since the last Session of this Council by the Working Party on Economics of Fish Culture and the Joint IOFC/IPFC Working Party on Statistics. We shall deal with the activities of these Working Parties in more detail during the Session, but here I would like to remark that the Report of the Joint Working Party on Statistics was considered at the Second Session of the Indian Ocean Fishery Commission, held in Rome in October 1970 and hence some of us present today have already covered this ground once. This, however, is perhaps all to the good, since it will assist us here in reaching conclusions that will not conflict too much with those of the Commission. In particular, I am thinking of the boundary between the Eastern Indian Ocean Statistical Area and that of Western Central Pacific. Another point of great interest is the possibility of strengthening the office of the Regional Fishery Statistician. We shall return to the Report of this Working Party in due course, when I hope guidance will be given as to its future activities.

As to the Working Party on Economics of Fish Culture, I was fortunate enough to be able to participate in the work of its second meeting and am pleased to note that in the frank and informal discussions that took place substantial progress was made on both conceptual and procedural levels with respect to the efforts to obtain data and carry out the necessary analyses concerning the economics of fish culture operations. It is our hope that in the budget of the next biennium some additional support can be given by the Department to assist these investigations.

Quite apart from the Agenda itself, I would like to mention that earlier this year the Department of Fisheries engaged Mrs. Rowena Lawson, Senior Research Fellow at the University of Leeds, England, to perform a study on Fishermen's Credit Needs in South-East Asia, limited to the following countries: Ceylon, Hong Kong, India, Indonesia, Malaysia, Philippines, Singapore and Thailand.

The study, which has now been submitted to FAO for review and any possible revision, encompasses a detailed analysis of the problems involved in credit to small-scale fishermen in the region with special emphasis on the considerable widespread indebtedness of fishermen to middlemen and merchants. The study also includes a survey of fishermen's small-savings movements, government and co-operative credit organizations, commercial banking structures, government plans for fisheries development and problems of the international development banks and funding agencies in credit operations involving fishermen.

In the conclusions, Mrs. Lawson stresses inter alia the importance of building up an intensive and co-ordinated package of institutional services and conditions essential to enable the local fishermen to increase their production and incomes, adequate credit facilities being an integral part of this institutional package. The most urgent and essential precondition for the development of artisanal fisheries in the region is considered to be the establishment of a suitable planning mechanism. This should be preceded by a regional workshop or seminar to discuss the problems of developing and implementing artisanal fisheries planning (embracing credit). FAO attaches great importance to this matter and has included the convening of such a workshop in the proposed Programme of Work and Budget for 1972/73.

May I conclude these remarks by once again wishing all of you, on behalf of Mr. Boerma, Mr. Jackson and the staff of the Department of Fisheries a successful Session of the Indo-Pacific Fisheries Council.

Appendix III

LIST OF DELEGATES AND OBSERVERS

MEMBER GOVERNMENTS

	<u>Name</u>	<u>Designation</u>	<u>Address</u>
AUSTRALIA	Mr. C.G. Setter (Delegate)	First Asst. Secretary	Fisheries Division Department of Primary Industry, Barton Canberra A.C.T. 2600 Australia
	Mr. A.G. Bollen (Alternate)	Asst. Secretary	Fisheries Division Department of Primary Industry, Barton Canberra A.C.T. 2600 Australia
	Mr. J.C. Lamrock (Adviser)	Asst. Director	Department of Agriculture, Stock and Fisheries TPNG Administration Port Moresby, Territory of Papua and New Guinea
	Mr. A. Vala (Adviser)	Rural Development Officer	Department of Agriculture, Stock and Fisheries TPNG Administration Port Moresby, Territory of Papua and New Guinea
CEYLON	Mr. L.I.J. Silva (Delegate)	General Manager	Ceylon Fisheries Corp. Rock House Lane Colombo 15, Ceylon
	Mr. A.S. Mendis (Alternate)	Deputy Director Fishery Research	Department of Fisheries P.O. Box 531, Colombo, Ceylon
FRANCE	Mr. M. Legand (Delegate)	Directeur du Laboratoire d'Océanographie	ORSTOM, B.P. No. 4 Noumea, New Caledonia

INDIA	Dr. V.G. Jhingran (Delegate)	Director	Inland Fisheries Research Institute Barrackpore via Calcutta West Bengal, India
	Dr. V. Gopalakrishnan (Alternate)	Head, Estuarine Division	Central Inland Fisheries Research Institute Barrackpore via Calcutta West Bengal, India
INDONESIA	Mr. M. Unar (Delegate)	Director	Marine Fisheries Research Institute Djalan Kerapu 12 Djakarta - Kota Indonesia
	Mr. R. Soekarno (Delegate)	Director of Inland Fisheries (Extension Service)	Directorate-General of Fisheries Salemba Raya 16, Djakarta, Indonesia
JAPAN	Dr. F. Nagasaki (Delegate)	Chief Scientist	Far Seas Fisheries Research Laboratory Orido 1000 Shimizu Shizuoka Prefecture Japan
KOREA	Dr. Dong Hwan Bae (Delegate)	Director, Production Bureau Office of Fisheries	Production Bureau Office of Fisheries 111 - Hap Dong, Soedaemun-ku Seoul, Korea
	Mr. Kim Kyun Hyun (Alternate)	Section Chief	Inland Fisheries Section, Bureau of Promotion Office of Fisheries 111 - Hap Dong, Soedaemun-ku Seoul, Korea
MALAYSIA	Tengku Ubaidillah bin Abdul Kadir (Delegate)	Acting Director- General Fisheries	Fisheries Division Ministry of Agriculture and Lands Jalan Swettenham Kuala Lumpur, Malaysia
	Mr. A.B.O. Merican (Alternate)	Acting Senior Research Officer	Fisheries Division Ministry of Agriculture and Lands Jalan Swettenham Kuala Lumpur, Malaysia

MALAYSIA (Contd.)	Mr. Chin Phui Kong (Adviser)	State Fisheries Officer (Sabah)	Department of Fisheries P.O. Box 1064 Kota Kinabalu, Sabah East Malaysia
	Mr. Shaari bin Sam Abdul Latif (Adviser)	Fisheries Officer	Fisheries Research Institute Glugor, Penang West Malaysia
	Mr. Ong Kee Bian (Adviser)	Fisheries Officer (Inland Fisheries Division-Sarawak)	Department of Agriculture Kuching, Sarawak East Malaysia
NEW ZEALAND	Mr. B.T. Cunningham (Delegate)	Director of Fisheries	Fisheries Division Marine Department P.O. Box 10142 Wellington, The Terrace New Zealand
	Mr. J.S. Campbell (Alternate)	General Manager	Fishing Industry Board P.O. Box 9232 Wellington, New Zealand
PAKISTAN	Mr. A.K.M. Farooq	Second Secretary	Pakistan Embassy Bangkok, Thailand
PHILIPPINES	MR. A.M. MANE (Delegate)	Commissioner of Fisheries	Philippine Fisheries Commission P.O. Box 623 Intramuros, Manila Philippines
	Prof. D. Villaluz (Alternate)	Professor	College of Fisheries Mindanao State University Marawi City, Philippines
	Mrs. M.N. Delmendo (Adviser)	Regional Fishery Development Officer	UNDP Laguna Lake Feasibility Study Rizal Provincial Capital Building Pasig, Rizal, Philippines
REPUBLIC OF KHMER	Mr. Tiann Song Hong (Delegate)	Commissaire General Chasse et Peches	Phnom Penh, Republic of Khmer
	Mr. Suon Saroeung (Alternate)	Chief	Service des Peches B.P. 46 Phnom Penh Republic of Khmer

THAILAND	Dr. Frida Karnasut (Delegate)	Director-General	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Sant Bandhukul (Alternate)	Deputy Director-General	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Chertchai Amatayakul (Adviser)	Director of Inland Fisheries Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Sanan Ruamragsa (Adviser)	Senior Fisheries Biologist	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Klan Suwanrat (Adviser)	Chief, Fisheries Administration Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	H.S.R. Prince Kosolsuriyathit Suriyong (Adviser)	Senior Fisheries Biologist	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Ariya Sidhimunka (Adviser)	Senior Fisheries Biologist	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Dr. Deb Menasveta (Adviser)	Senior Fisheries Biologist	Marine Fisheries Laboratory 89/1 Soi Sapan Pla, Yanawa Bangkok 12, Thailand
	Cmdr. Swarng Charernphol (Adviser)	Special Grade Fisheries Biologist	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Dr. Arporna Sribhibhadh (Adviser)	Senior Fisheries Biologist	Marine Fisheries Laboratory 89/1 Soi Sapan Pla, Yanawa Bangkok 12, Thailand

UNITED KINGDOM	Dr. D.N.F. Hall (Delegate)	Fisheries Adviser	Overseas Development Administration Foreign and Commonwealth Office Eland House Stag Place London S.W. 1, U.K.
	Mr. I. Petersen (Alternate)	Assistant Director (Fisheries)	Agriculture and Fisheries Department *Cambridge Court 84 Waterloo Road, 2nd Floor Kowloon, Hong Kong
	Dr. J.C.D. Watts (Adviser)	Research Officer	Fisheries Research Station Shek Pai Wan Road, Aberdeen, Hong Kong
	Dr. G.A. Prowse (Adviser)	Director	Tropical Fish Culture Research Institute Batu Berendam, Malacca West Malaysia
U.S.A.	Mr. R.S. Shomura (Delegate)	Associate Regional Director for Resource Programs	National Marine Fisheries Service, Department of Commerce Room 2016 300 South Ferry St. Terminal Island California 90731, U.S.A.
	Dr. M.A. Steinberg (Alternate)	Director Technological Laboratory	National Marine Fisheries Service, Department of Commerce 2725 Montlake Blvd. E. Seattle, Washington U.S.A. 98102
	Mr. G.D. Ginnelly (Adviser)	Fisheries Biologist University of Kentucky Team	USOM/Agriculture Centre North East, Khon Kaen Thailand
	Dr. K.F. Lagler (Adviser)	Professor of Fisheries and Zoology	University of Michigan Ann Arbor, Michigan U.S.A.
	Mr. P.W. Ruppert (Adviser)	Regional Indus- trial Enterprise Officer	Office of Regional Development American Embassy Bangkok, Thailand

*Address since changed to: Canton Road Govt. Offices
393 Canton Road
12-14th Floors
Kowloon, Hong Kong

U.S.A. (Contd.)	Mr. O.E. Kearns (Adviser)	Fisheries Biologist	Bumble Bee Seafoods Box 30, University Station, Seattle Washington, 98105 U.S.A.
	Prof. B.J. Rothschild (Adviser)	Associate Professor	Centre for Quantitative Science Fisheries Research Institute University of Washington Seattle, Washington, 98105 U.S.A.
	Dr. S. Comitini (Adviser)	Associate Professor of Economics	Economic Research Center University of Hawaii Honolulu, Hawaii 96822 U.S.A.

OBSERVER GOVERNMENT

REPUBLIC OF CHINA	Mr. T.P. Chen (Observer)	Chief	Fisheries Division J.C.R.R. 37 Nanhai Road Taipei, Taiwan Republic of China
	Dr. I.C. Liao (Observer)	Director	Tungkang Marine Laboratory 67 Feng Yu Li Tungkang, Pingtung Taiwan, Republic of China

OBSERVER ORGANIZATIONS

CHULALONGKORN UNIVERSITY	Dr. Twesukdi Piyakarnchana (Observer)	Marine Biologist	Department of Marine Science Chulalongkorn University Phya Thai Road Bangkok, Thailand
ECAFE MEKONG COMMISSION	Dr. V.R. Pantulu (Observer)	Fishery Expert Committee for Co- ordination of Investigations of Lower Mekong Basin	Mekong Secretariat ECAFE Sala Santitham Bangkok, Thailand

FISH MARKETING ORGANIZATION THAILAND (FMO)	Mr. Udom Mahawangswat (Observer)	Deputy Director	Fish Marketing Organization Yanawa, Bangkok 12, Thailand
	Mr. Earn Sakhapinda (Observer)	Chief	Wholesale Market Division Fish Marketing Organization Yanawa, Bangkok 12, Thailand
GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN (GFCM)	Mr. H. Rosa, Jr. (Observer)	Chief, Fishery Liaison Office Dept. of Fisheries	FAO of the United Nations Via delle Terme di Caracalla Rome, Italy
INDIAN OCEAN FISHERY COMMISSION (IOFC)	Mr. H. Rosa, Jr. (Observer)	Secretary, Indian Ocean Fishery Commission	FAO of the United Nations Via delle Terme di Caracalla Rome, Italy
INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC)	Dr. R. Serene (Observer)	UNESCO Marine Sciences Regional Expert for SEA	c/o National Museum Stamford Road Singapore 6.
INTERNATIONAL BIOLOGICAL PROGRAMME (IBP)	Dr. P. Dohrn (Observer)	M.A.M.B.O. Secretary	Naples - Zoological Station 80121 Napoli Italy
KASETSART UNIVERSITY	Mr. Mek Boonbrahm (Observer)	Lecturer	Head, Department of Fisheries, Faculty of Fisheries Kasetsart University Bangkhen, Bangkok 9, Thailand
SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTRE (SEAFDEC)	Mr. Tuanthai Bamrajarinpai (Observer)	Secretary- General	Southeast Asian Fisheries Development Centre R.S. Hotel 169 Larn Luang Road Bangkok, Thailand
	Dr. T. Ino (Observer)	Deputy Secretary-General	Southeast Asian Fisheries Development Centre R.S. Hotel 169 Larn Luang Road Bangkok, Thailand
	Mr. M. Nomura (Observer)	Chief of Training Division	Southeast Asian Fisheries Development Centre R.S. Hotel 169 Larn Luang Road Bangkok, Thailand

SOUTH PACIFIC COMMISSION (SPC)	Mr. J.C. Lamrock (Observer)	Assistant Director	Department of Agriculture, Stock and Fisheries TPNG Administration Port Moresby, Territory of Papua and New Guinea
THAI FISHERIES DEPARTMENT	Mr. Vanij Vareekul (Observer)	Officer Inland- Fisheries Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Manu Podharos (Observer)	Officer Inland- Fisheries Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Cherdchan Ummatayakul (Observer)	Officer Inland- Fisheries Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Plodprasope Surasvadee (Observer)	Officer Inland- Fisheries Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Danai Limpadanai (Observer)	Officer Inland- Fisheries Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Yashima Nakayama (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Banchong Tiensongrasamee (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Pairoj Prohmanonda (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Sucharti Vichiensan (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand

THAI FISHERIES DEPARTMENT (Contd.)	Mr. Swasdi Vongsomnuk (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Miss Pusadee Vanichkul (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Poonsakdhi Kaonukul (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Manas Potaros (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Uaychai Khannapa (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
	Mr. Uthai Patanaporn (Observer)	Officer Investiga- tion Division	Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
UNESCO	Dr. R. Serene (Observer)	UNESCO/Marine Sciences Regional Expert for SEA	c/o National Museum Stamford Road Singapore 6

IPFC SECRETARIAT

Dr. G.N. Subba Rao	Acting Secretary of IPFC	Fisheries Officer FAO Regional Office for Asia and the Far East Maliwan Mansion Phra Atit Road Bangkok 2, Thailand
Dr. S.W. Ling	FAO/UNDP (TA) Regional Fish Culturist	FAO Regional Office for Asia and the Far East Maliwan Mansion Phra Atit Road Bangkok 2, Thailand

Dr. T. Yamamoto	FAO/UNDP (TA) Regional Fisheries Statistician	FAO Regional Office for Asia and the Far East Maliwan Mansion Phra Atit Road Bangkok 2, Thailand
Mr. H. Rosa, Jr.	Chief, Fishery Liaison Office	Department of Fisheries FAO of the United Nations Viale delle Terme di Caracalla Rome, Italy
Dr. T.V.R. Pillay	Chief, Fish Culture Section, Inland Fisheries Resources Branch	Fishery Resources Division Department of Fisheries FAO of the United Nations Viale delle Terme di Caracalla Rome, Italy
Mr. J.A. Gulland	Chief, Fishery Statistics and Economic Data Branch	Fishery Economics and Institutions Division Department of Fisheries FAO of the United Nations Viale delle Terme di Caracalla Rome, Italy
Dr. L. Sprague	Consultant (Symposium Discussion Leader)	Director International Centre for Marine Resource Development University of Rhode Island Kingston, Rhode Island U.S.A. 02881
Dr. Tham Ah Kow	Consultant (Symposium Discussion Leader)	Director Regional Marine Biological Centre University of Singapore Bukit Timah Road, Singapore
Dr. V. Gopalakrishnan	Consultant (Symposium Discussion Leader)	Head Estuarine Division Central Inland Fisheries Research Institute Barrackpore via Calcutta West Bengal, India
Miss A. Jiannee	Conference Officer	Technical Assistant (Fisheries) FAO Regional Office for Asia and the Far East Maliwan Mansion Phra Atit Road Bangkok 2, Thailand

Mr. F. Hurdie Jones	Interpreter	Corso Vittorio Emanuele 284 00186 Rome, Italy
Mrs. Gerda Whyte	Interpreter	Castel di Decima 00129 Rome, Italy

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

<u>Name</u>	<u>Designation</u>	<u>Address</u>
Dr. J.A. Storer	Director	Fishery Economics and Institutions Division Department of Fisheries FAO of the United Nations Viale delle Terme di Caracalla Rome, Italy
Mr. J.C. Marr	Programme Leader	International Indian Ocean Fishery Survey and Development Programme Department of Fisheries FAO of the United Nations Viale delle Terme di Caracalla Rome, Italy
Mr. S. Olsen	Project Manager Designate	India Pelagic Fishery Investigation Project Cochin, India
Mr. J.K. Smart	Project Manager	UNSF Pre-investment Survey for the Development of Fisheries in East Pakistan P.O. Box 234, Chittagong East Pakistan
Dr. D.A. Shubnikov	Fisheries Biologist	UNSF Pre-investment Survey for the Development of Fisheries in East Pakistan P.O. Box 234, Chittagong East Pakistan
Dr. T.G. Pillai	Project Manager	FAO/FUNDWI Inland Fisheries Project c/o UNDP, Box 2338 Djakarta, Indonesia

<u>Name</u>	<u>Designation</u>	<u>Address</u>
Mr. P. Howgate	UNDP/TA Fish Processing and Handling Technologist	Fisheries Technological Laboratory c/o Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok, Thailand
VISITORS		
Mr. Chen Foo Yan	Senior Scientific Officer	Primary Production Department Ministry of National Development, National Development Bld. Maxwell Road, 7th Floor Singapore 2.
Dr. H. Ziad Shehadeh	Director, Food from the Sea Division	Oceanic Institute Waimanalo Hawaii, U.S.A. 96795
Dr. H.H. Webber	President	Groton Associates Inc. P.O. Box 517 Groton, Mass., 01450 U.S.A.
Dr. H.R. Allison	Associate Professor	Auburn University Department of Fisheries Auburn, Ala. 36830 U.S.A.
Dr. H.S. Swingle	Director	International Centre for Aquaculture Auburn University Auburn, Ala. 36830 U.S.A.
Mr. T. Fujimura	Aquatic Biologist	Division of Fish and Game Honolulu, Hawaii
Dr. G. Phillips	Project Manager, Fish Farm Design Studies	Unilever Research Laboratory Greyhope Road Aberdeen, Torry AB 9 2JA, Scotland, U.K.
Dr. V. Hansen	Director	Phuket Marine Biological Centre, Phuket Phuket Province P.O. Box 200, South Thailand

Appendix IV

LIST OF DOCUMENTS

WORKING PAPERS:

- IPFC/C70/WP 1 Provisional Agenda
 1(Fr) Ordre du Jour Provisoire
 1(Rev.1) Agenda
- 2 Inter-sessional Report of the IPFC Executive
 Committee 1969 - 1970
- 3 Extracts from Report of the Tenth FAO Regional Conference
 for Asia and the Far East, Canberra, Australia, 27 August -
 8 September 1970
- 4 Agencies dealing with regulations relating to import
 of Fishery Products
- 5A Report of the First Meeting of the IPFC Working Party
 on Coastal Aquaculture, Bangkok, Thailand, December 15 -
 17, 1969
- 5B Report of the Second Meeting of the IPFC Working Party
 on Coastal Aquaculture, Bangkok, Thailand, September 21 -
 25, 1970
- 6A Report of the First Meeting of the IPFC Working Party
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- 6B Report of the Second Meeting of the IPFC Working Party
 on Economics of Fish Culture, Bangkok, Thailand,
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- 7* Report of the First Session IPFC/IOFC Joint Working Party
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- 8 Fishery Statistics in the Indo-Pacific Fisheries Council
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- 9 Matters arising from the Fifth Session of the Committee
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- 11 Coastal and high-seas pelagic fishery resources of
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 by R.S. Shomura, A. Suda, T. Otsu and V. Encina

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- IPFC/C70/INC 1 Provisional Programme
 1(Fr) Programme Provisoire
- 2 Provisional List of Delegates and Observers
- 3 Provisional Programme of the Technical/Scientific Meeting
 3(Fr) Programme Provisoire de la reunion Technique/Scientifique
- 4 Provisional List of Documents
- 5 Nominations for period between 14th and 15th Sessions
 (1970-72) to IPFC
- 6 Order of the day, Wednesday, 18 November 1970
 6(Rev.1) - ditto -
- 7 Boat trip, Sunday, 22 November 1970
- 8 Order of the Day, Thurs. 19 November 1970
- 9 " " " , Fri. 20 November 1970
 9(Rev.1) " " , Fri. 20 and Sat. 21 November 1970
- 10 Mailing
- 11 Visit to the Bangkok Wholesale Fish Market,
 27 November 1970
- 12 Group Photograph
- 13 Order of the Day, Monday, 23 November 1970
- 14 Order of the Day, Tuesday, 24 November 1970
- 15 Transport to Airport
- 16 Order of the Day, Wed.-Fri., 25-27 November 1970
- 17 Draft Resolution 14th Session -- Committee on Management
 of Tuna in the Indo-Pacific Region
- 18 Draft Recommendations to the 14th Session on Coastal
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COUNTRY STATEMENTS:

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SYMPOSIUM PAPERS: "Coastal Aquaculture"

IPFC/C70/SYM	1	IPFC Symposium on Coastal Aquaculture (Prospectus)
	2	Controlled Breeding of Culturable species of fish - A review of progress and current problems by Z.H. Shedadeh
	3	Indo-west Pacific Penaeid Prawns species of commercial importance by A.A. Racek

- IPFC/C70/SYM 4 The Status of Fish Seed Production in the Philippines
by M.N. Delmendo
- 5 Fertilization and Feeding in Coastal Fish Farm in Taiwan
by T.P. Chen
- 6 Present Status and Problems of Coastal Aquaculture in
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by Office of Fisheries, Seoul, Korea
- 7 Milkfish production in a newly reclaimed Tidal Land
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by Jium-Kuo Liang and Chin-Yun Huang
- 8 Problems of Prawn Culture in Japan
by K. Shigeno
- 9 Fish seed production for intensive coastal aquaculture
in the Indo-Pacific Region
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- 10 Status and problems of coastal aquaculture in the
Philippines
by G.J. Blanco
- 11 Economic trends of coastal aquaculture in the
Philippines
by G.J. Blanco
- 12 Status and Problems of Coastal Aquaculture in Taiwan
by T.P. Chen
- 13 The Status and Problems of Coastal Aquaculture in Australia
- 14 On the experimental culture of Milkfish (*Chanos chanos*
Forsk.) as Tuna bait in Ceylon
by J.I. Samarakoon
- 15 Some Aspects of Coastal Aquaculture in Singapore
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- 16 Production of Seed Oysters (*Crassostrea virginica*) in a
Brackish water Pond
by G.C. Matthiessen
- 17 Status and Problems of Coastal Aquaculture in Ceylon
by Dept. of Fisheries, Colombo, Ceylon
- 18 On the Culture Potential of the Marine Mussel,
Mytilus, in the Indian Region
by S. Jones

- IPFC/C70/SYM
- 19 Review of the Backwater Fisheries and Brackish water Fish Culture in Kerala State
by A.I. George and M.J. Sebastian
 - 20 The Prawn Fisheries of Kerala Backwaters - Problems and Prospects with special reference to Aquaculture
by A.I. George and M.J. Sebastian
 - 21 A Preliminary Report on the Brackishwater pond culture of *Scylla serrata* Forskal in Ceylon
by Y.I. Raphael
 - 22 Pests and Predators in Coastal Aquaculture systems of the Indo-Pacific Region
by T.G. Pillai
 - 23 On the collection, transport and acclimatization of the fry of *Chanos chanos* (Forsk.) for brackishwater pond culture
by S. Ramanathan and D.E.S. Jayamaha
 - 24 Experiments on Propagation and Culture of Prawns in Taiwan
by I.C. Liao and T.L. Huang
 - 25 Experiments on Induced Breeding of the Grey Mullet *Mugil cephalus* Linnaeus
by I.C. Liao, Y.J. Lu, T.L. Huang and M.C. Lin
 - 26 Construction of ponds for Aquaculture
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 - 27 On the availability of Seed of Culturable Shrimp in the Negambo Lagoon
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 - 28 Coastal Aquaculture in Vietnam
by Le Van Dang
 - 29 Role of Chilka Lake Fisheries in the Development of Coastal Aquaculture in Eastern India
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 - 30 On the Seasonal Abundance of Larvae and Juveniles of cultivable Brackish Water Fish in the Pulicat Lake
by A.V. Prabhakara Rao
 - 31 Methodology for Survey of Brackishwater Area in India for Coastal Aquaculture
by V.G. Jhingran, V. Gopalakrishnan, P. Ray and A. Ghosh

- IPFC/C70/SYM 32 Experimental Observations on the Food Requirement of Fry of *Mugil parsia* Ham.
by A.N. Ghosh, P.R. Das and L.K. Das
- 33 Observations on the post larval Prawns of the Roopnarayan Estuary
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- 34 Observations in Pilot Fish Farm Leading to large scale development of Brackish water fish farming in Lower Sunderbans
by V.G. Jhingran, F.F. Pakasi, R.K. Banerjee and A. Moitra
- 35 Controlled Breeding of Molluscs
by Takashi Ino
- 36 Some Observations on the Larval Growth of the commercially important Penaeid Prawns of Southwest Coast of India
by P. Vedavyasa Rao
- 37 Taxonomy and biology of fin fish of Temperate waters in Japan
by J. Tanaka
- 38 Requirements for successful fertilization in increasing Milkfish production
by R. Djajadiredja and A. Poernomo
- 39 Review of recent progress in Coastal Aquaculture in the United States
by R.N. Uchida
- 40 On the food and feeding habits of *Metapenaeus monoceros* (Fabricius)
by M.J. George
- 41 Review of Status of Coastal Aquaculture in Malaysia
by Fisheries Division, Ministry of Agriculture and Cooperatives, Kuala Lumpur, Malaysia
- 42 Preliminary experiments in marking penaeid prawns contributing to the backwater fishery of the south-west coast of India
by M.J. George
- 43 Observations on the culture of Alimango at Camarines Norts
by R. Pagcatipunan
- 44 Taxonomy and Biology of fin-fish for Tropical Coastal Aquaculture
by V. Gopalakrishnan

- IPFC/C70/SYM 45 A review of the status and problems of coastal aquaculture of the Indo-Pacific region
by S.W. Ling
- 46 A Report on experiments in the culture of the mud crab (*Scylla serrata*)
by G.L. Escritor
- 47 Present status of major Japanese Marine Aquaculture
by A. Furukawa
- 48 Status and problems of coastal aquaculture in Thailand
by A. Sribhibhadh
- 49 Preliminary experiment on pond rearing and some biological studies of *Scylla serrata* Forskal
by V. Varikul, S. Phumiphol and M. Hongpronyart
- 50 Experimental study on larval development of *Metapenaeus ensis* (de Haan, 1844)
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- 51 Stock manipulation of coastal fish farms
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- 52 Development of Rock Oyster Farming in New Zealand
by L. Curtain
- 53 Notes on Progress made in Developing a Mass Culturing Technique for *Macrobrachium rosenbergii* in Hawaii
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- 54 Documents for the Symposium on Coastal Aquaculture
- 55 Symposium on Coastal Aquaculture - Provisional Programme
- 56 Symposium Papers - Withdrawal of IPFC/C70/SYM 4 and IPFC/C70/SYM 26 (later reinstated)
- 57 Report of the IPFC Symposium on Coastal Aquaculture, 18-21 November 1970

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Fundamental problems in the management of common-use aquatic resources including resources assessment and rate of development of fish potential

- IPFC/C70/SCI
- 1 Special session on Management - New Zealand experience of Management Problems
by G.D. Waugh and B.T. Cunningham
 - 2 Management of the Groundfish Fisheries of the Northwest Atlantic
by H.W. Graham
 - 3 On the Fisheries Management in the East China Sea and the Yellow Sea
by S. Shindo
 - 4 Use of the Beach seine data in the assessment of stocks of the *Anchoviella* species in the coastal waters around Ceylon
by P. Canagaratnam
 - 5 An introduction to stock assessment techniques
by J.A. Gulland
 - 6 Fishing regulations - conflicts in exploitation of fishery resources
by G.L. Kesteven and G.R. Williams
 - 7 Present status of trawl fisheries resources in the Gulf of Thailand and the Management Program
by A.P. Isarankura
 - 8 On the Population Dynamics of the Indo-Pacific mackerel (*Rastrelliger neglectus* van Kampen) of the Gulf of Thailand
by K. Kurogane, U. Sriruangcheep, C. Tantisawetrat, S. Chulasorn, S. Supongpan and U. Boonprakob
 - 9 A systems view of fishery management with some notes on the Tuna Fisheries
by B.J. Rothschild
 - 10 Tuna Fisheries and their resources in the IPFC Area
by Akira Suda
 - 11 Management of the Western Rock Lobster (*Panulirus longipipes eygnus* George
by B.K. Bowen
 - 12 Management of Indo-Pacific Tuna

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 - 14 Report of the IOFC Working Party on Stock Assessment in relation to immediate problems of management in the Indian Ocean, FAO, Rome. 30 September - 3 October 1969. FAO. Fish. Rept., 82: 25 pp., 1969.
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 - 18 The Advent of 86 feet Ferro-cement stern Trawlers in Hong Kong.
 - 19 An Economic report of world trends in Fisheries Development with broad implications for the Indo-Pacific Region by S. Comitini
 - 20 Recommendations of the Fourth Technical Meeting on Fisheries, South Pacific Commission, Noumea, New Caledonia.
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SPEECHES:

- IPFC/C70/P
- 1 Address by Dr. James A. Storer, Director, Fishery Economics and Institutions Division, Department of Fisheries, FAO, Rome.
 - 2 Opening Speech of His Excellency the Minister of Agriculture,
Hon. M.R. Chakratong Tongyai
 - 3 Address by Mr. C.G. Setter
Chairman, Indo-Pacific Fisheries Council
 - 4 Statement by the Acting Regional Representative at the Opening Ceremony of the 14th Session of the Indo-Pacific Fisheries Council.

Appendix V

NOMINATIONS FOR PERIOD BETWEEN 14th AND 15th SESSIONS (1970-72) TO IPFC

(Note*: Where fresh nominations have not been received, those for the period between 13th and 14th Sessions have been carried over).

Member Governments

Administrative Correspondent

AUSTRALIA

First Assistant Secretary (Fisheries)
Department of Primary Industry
Canberra, A.C.T. 2600
Australia

BURMA

*The Secretary to the Govt. of the
Union of Burma
Ministry of Agriculture and Forests
Rangoon, Burma

CEYLON

Permanent Secretary
Ministry of Fisheries
Department of Fisheries
P.O. Box 531
Colombo-3, Ceylon

FRANCE

Monsieur Lagarde
Direction des Peches maritimes,
3 Place de Fontenoy
75 - Paris 7eme
France

INDIA

Dr. G.N. Mitra
Joint Commissioner (Fisheries)
Ministry of Food, Agriculture,
C.D. and Co-operation
(Department of Agriculture)
New Delhi-1, India

INDONESIA

Mr. Soekoesnoe Mangundjojo
Senior Officer
Directorate-General of Fisheries
Djl. Salemba Raya No. 16
Djakarta, Indonesia

Member Governments

JAPAN

KOREA

MALAYSIA

NETHERLANDS

NEW ZEALAND

PAKISTAN
(For West and East)

PHILIPPINES

REPUBLIC OF KHMER

Administrative Correspondent

Mr. Ken Ikebe
Head, Specialized Agencies Division
United Nations Bureau
Ministry of Foreign Affairs
2-1, 2-Chome, Kasumigaseki
Chiyoda-Ku, Tokyo, Japan

Mr. Kim, Han Mo
Chief, International Cooperation
Section
Office of Fisheries of the Govt.
of the Republic of Korea
111 Hap-dong, Suh-daemoonku
Seoul, Korea

Principal Assistant Secretary
Ministry of Agriculture and Lands
Swettenham Road
Kuala Lumpur, Malaysia

Miss P.F.M. van der Togt
Liaison Officer for FAO Affairs
Ministry of Agriculture and Fisheries
1st v.d. Boschstraat 4
The Hague, Netherlands

Mr. B.T. Cunningham
Director of Fisheries
Marine Department
P.O. Box 10142
The Terrace
Wellington, New Zealand

Mr. M.A. Burney
Deputy Director
Marine Fisheries Department
Fish Harbour, West Wharf
Karachi-2, West Pakistan

Mrs. P. Caces-Borja
Supervising Fishery Biologist
Philippine Fisheries Commission
P.O. Box 623
Intromuros, Manila
Philippines

Mr. Tiann Song Hong
Commissaire General
Chasse and Peches
Phnom Penh, Republic of Khmer

Member Governments

THAILAND

U.K.
(For Hong Kong)

U.K.
(For London)

U.S.A.

VIETNAM

Administrative Correspondent

Dr. Arporn Sribhibhadh
Senior Fisheries Biologist
Marine Fisheries Laboratory
89/1 Soi Span Pla
Yanawa, Bangkok 12, Thailand

Director
Agriculture and Fisheries Dept.
Cambridge Court, 2nd Floor
84 Waterloo Road
Kowloon, Hong Kong

U.K. Liaison Officer with U.N.
Organizations
British Embassy
Ploenchit Road
Bangkok, Thailand

Dr. R.W. Phillips
Director,
International Organizations Staff
Office of Assistant Secretary
U.S. Department of Agriculture
Washington, D.C. 20250
U.S.A.

Mr. Do Thuc Vinh
Secrétaire General
Ministère de la Réforme Agraire
et du Développement de
l'Agriculture et des Pêches
P.O. Box 289
Saigon, Vietnam

Appendix VI

NOMINATIONS FOR PERIOD BETWEEN 14th AND 15th SESSION (1970-72) TO IPFC

(Note: *Where fresh nominations have not been received, those for the period between 13th and 14th Sessions have been carried over).

<u>Member Governments</u>	<u>IPFC Technical Committee I</u>	<u>IPFC Technical Committee II</u>
AUSTRALIA	*Dr. G.F. Humphrey Chief, Division of Fisheries and Oceanography CSIRO, P.O. Box 21 Cronulla, N.S.W. 2230 Australia	*Mr. T.W. Burdon Assistant Director Fisheries Branch Department of Primary Industry Canberra, A.C.T. 2600 Australia *Dr. G.S. Sidhu Division of Food Preservation, CSIRO, Box 43, P.O. Ryde, N.S.W. 2112, Australia
BURMA	* _____	* _____
CEYLON	Mr. A.S. Mendis Deputy Director (Research) Department of Fisheries P.O. Box 531 Colombo-3, Ceylon	Permanent Secretary Ministry of Fisheries P.O. Box 531 Galle Face Colombo-3, Ceylon
FRANCE	Monsieur M. Legand Chef de la Section d'Océano- graphie du Centre ORSTOM a Noumea, B.P. No. 4 Nouvelle-Calédonie	Monsieur M. Legand Chef de la Section d'Océano- graphie du Centre ORSTOM a Noumea, B.P. No. 4 Nouvelle-Calédonie
INDIA	Mr. K. Chidambaram Deputy Commissioner (Fisheries Plan) Ministry of Food, Agri- culture, C.D. and Cooperation (Department of Agriculture) New Delhi-1, India	Prof. P.C. George Deputy Commissioner (Education and Trade) Ministry of Food, Agriculture, C.D. and Cooperation (Department of Agriculture) New Delhi-1, India

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INDONESIA	*Mr. M. Unar Director, Institute of Marine Fisheries Research 12, Djalan Kerapu Djakarta, Indonesia	*Ir. Sofjan Iljas Director Institute of Fisheries Technology Pasar Minggu. Djakarta, Indonesia
JAPAN	Mr. Toshiyuki Hirano Special Assistant Research Department Fishery Agency Ministry of Agriculture and Forestry 2-1, 1-Chome Kasumigaseki Chiyoda-ku, Tokyo, Japan	Mr. Hidekazu Hirao Chief, Biochemical Research Unit Tokai Regional Fisheries Laboratory Fishery Agency 5-1, 5-Chome Kachidoki, Chuo-ku, Tokyo, Japan
REPUBLIC OF KHMER	*Mr. Suon-Saroeung Inspecteur des Peches Institut d'Océanographie Kompong Som Ville Republic of Khmer	*Mr. Sva-Kret Inspecteur Technique des Peches Direction du Service des Peches B.P. 46 Phnom-Penh, Republic of Khmer
KOREA	Mr. Suh, Hak Keun Chief of Technological Management Section Fisheries Development and Research Agency Pusan, Korea	Mr. Kim, Kyun Hyun Chief, Inland Development Sect., Office of Fisheries of the Government of the Rep. of Korea 111 Hap-dong, Suh-daemoonku, Seoul, Korea
MALAYSIA	Mr. D. Pathansali Senior Fisheries Research Officer, Fisheries Research Institute, Glugor Penang, West Malaysia	Tengku Ubaidillah bin Tengku Abdul Kadir Acting Director-General Fisheries Division Ministry of Agriculture and Lands Swettenham Road Kuala Lumpur, Malaysia
NETHERLANDS	Dr. J.J. Schuurman Reader on Pisciculture Agricultural University Van Iddekingeweg 56 Groningen, Netherlands	Mr. J.G. de Wit Chief, Technological Research Branch Fisheries Division Ministry of Agriculture and Fisheries Havenkade 19, Ijmuiden Netherlands

<u>Member Governments</u>	<u>IPFC Technical Committee I</u>	<u>IPFC Technical Committee II</u>
NEW ZEALAND	Mr. G.D. Waugh Director of Fisheries Research Marine Department P.O. Box 19062 Te Aro, Wellington New Zealand	Mr. B.T. Cunningham Director of Fisheries Marine Department P.O. Box 10142 The Terrace, Wellington New Zealand
PAKISTAN (For West and East)	Dr. Yusuf Ali Director of Fisheries East Pakistan Eden Building, Ramna Dacca, East Pakistan	Mr. S.A. Jaleel Director, Marine Fisheries Department Fish Harbour, West Wharf Karachi-2, West Pakistan
PHILIPPINES	Mr. I.A. Ronquillo Chief, Marine Fisheries Biology Division Philippine Fisheries Commission, P.O. Box 623 Intramuros, Manila Philippines	Mr. F.R. Gonzales Supervising Fishery Technologist Philippine Fisheries Commission P.O. Box 623, Intramuros, Manila, Philippines
THAILAND	Dr. Deb Menasveta Senior Fisheries Biologist, Marine Fisheries Laboratory 89/1 Soi Sapan Pla Yanawa, Bangkok 12, Thailand.	Mr. Sant Bandhukul Deputy Director-General Department of Fisheries Ministry of Agriculture Rajdamnern Avenue Bangkok 2, Thailand
U.K.	Director, Agriculture and Fisheries (Attention: Senior Research Officer) Agriculture and Fisheries Department Cambridge Court, 2nd Floor 84 Waterloo Road Kowloon, Hong Kong	Director, Agriculture and Fisheries, (Attention: Senior Fisheries Officer, Extension and Development), Agriculture and Fisheries Dept. Cambridge Court, 2nd Floor 84 Waterloo Road Kowloon, Hong Kong

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IPFC Technical Committee I

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U.S.A.

Mr. R.S. Shomura
Associate Regional Director
for Resource Programs
National Marine Fisheries
Service
Department of Commerce
Room 2016
300 South Ferry Street
Terminal Island
California 90731
U.S.A.

Dr. M.A. Steinberg
National Marine Fisheries
Service
Department of Commerce
2725 Montlake Blvd. E.
Seattle, Washington
U.S.A. 98102

VIETNAM

Mr. Le Van Dang
Assistant Directeur des
Peches
Chef du Service des
Peches Continentales
P.O. Box 340
Saigon, Vietnam

Mr. Tran Van Tri
Directeur des Peches
P.O. Box 340
Saigon, Vietnam