

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS



INDO-PACIFIC FISHERIES COUNCIL

PROCEEDINGS

17TH SESSION

COLOMBO, SRI LANKA

27 OCTOBER — 5 NOVEMBER 1976

SECTION I

REPORT OF THE SESSION

AND OF THE

INDO-PACIFIC FISHERIES COUNCIL SYMPOSIUM ON

THE DEVELOPMENT AND UTILIZATION OF INLAND FISHERY RESOURCES

AND

SECTION II

REPORT OF THE

IPFC *AD HOC* SESSIONAL COMMITTEE ON RESEARCH

FAO Regional Office for Asia and the Far East

Bangkok 2, Thailand

1977

(i)

OFFICE-BEARERS OF THE INDO-PACIFIC FISHERIES COUNCIL

1976 - 1978

EXECUTIVE COMMITTEE

Chairman :	MR. F. R. GONZALES (PHILIPPINES)
Vice-Chairman :	MR. S. P. BALASUBRAMANIAM (INDIA)
Member :	MR. A. S. MENDIS (SRI LANKA)
*Secretary :	MR. D. D. TAPIADOR

* The Office of Secretary of the Council is currently held by the FAO Regional Fisheries Officer for Asia and the Far East.

(ii)

IPFC SUBSIDIARY BODIES, 1976 - 1978

EXECUTIVE COMMITTEE

SPECIAL COMMITTEE ON MANAGEMENT OF INDO-PACIFIC TUNA

CO-ORDINATING COMMITTEE FOR THE SOUTH CHINA SEA
FISHERIES DEVELOPMENT AND CO-ORDINATING PROGRAMME

STANDING COMMITTEE ON RESOURCES RESEARCH AND
DEVELOPMENT (SCRDD)

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

Working Party on Fish Technology and Marketing (18th Session Symposium)

Working Party on Aquaculture and Environment

Working Party of Experts on Inland Fisheries

Working Party of Experts on Central and Western Pacific Skipjack

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COUNCIL (IPFC)

AND

SYMPOSIUM ON THE DEVELOPMENT AND UTILIZATION OF INLAND
FISHERY RESOURCES

Colombo, Sri Lanka, 27 October — 5 November 1976

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SECTION I

REPORT OF THE SEVENTEENTH SESSION OF THE INDO-PACIFIC
FISHERIES COUNCIL (IPFC)

AND

SYMPOSIUM ON THE DEVELOPMENT AND UTILIZATION OF
INLAND FISHERY RESOURCES

COLOMBO, SRI LANKA, 27 OCTOBER—5 NOVEMBER 1976

OPENING OF THE SESSION

1. The Indo-Pacific Fisheries Council (IPFC) held its Seventeenth Session and Symposium from 27 October to 5 November 1976 at the Bandaranaike Memorial International Conference Hall, Colombo, Sri Lanka. The session, which was held on 1 - 5 November 1976, was attended by representatives of 16 Member Nations of the Council, and by representatives and observers from nine international and national organizations. A list of delegates and observers is given in Appendix B to this report.
2. The Council was welcomed in an opening address by the Chairman of IPFC, Mr. A. S. Mendis, (see Appendix C), by the Minister of Fisheries, Mr. S. D. R. Jayaratne (see Appendix D), and by the Secretary, Ministry of Fisheries, Mr. E. G. Goonewardene (see Appendix E). The Assistant to the Assistant Director-General (Fisheries) of FAO, Mr. L. I. J. Silva, replying to the Chairman of IPFC, to the Minister and to the Secretary in a statement (see Appendix F), outlined the tasks of the Council in relation to the future functions and responsibilities of the Council proposed by the *Ad Hoc* Committee which had been appointed by the Sixteenth Session and which had met in Bangkok in December 1975.

ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

3. It was agreed that agenda item 12 should be taken before agenda item 11. The Council noted that the opening ceremony had been held at the opening of the session which in fact excluded the Symposium from being an integral part of the session. The Council agreed to discuss the matter under an additional agenda item 9.3 entitled: "Relationship of symposia to sessions". The agenda as adopted appears in Appendix A.
4. The Council agreed to the appointment of a drafting committee consisting of the representatives of Australia, Bangladesh, Malaysia, Sri Lanka and the United States of America.

REPORT OF THE *AD HOC* COMMITTEE TO REVIEW THE FUNCTIONS AND RESPONSIBILITIES OF IPFC (INCLUDING PROPOSED AMENDMENTS TO THE AGREEMENT ESTABLISHING IPFC AND THE IPFC RULES OF PROCEDURE)

5. At its Sixteenth Session in October-November 1974, the IPFC considered its effectiveness as a fishery management and development body. It agreed that the time had come to undertake a thorough review of its functions and responsibilities, and decided to set up an *Ad Hoc* Committee to carry out this task. The *Ad Hoc* Committee met in December 1975.
6. In its report the *Ad Hoc* Committee to Review the Functions and Responsibilities of IPFC proposed a number of amendments to the IPFC Agreement and requested the Secretariat to draft appropriate amendments to the IPFC Rules of Procedure.
7. At its Fourth Session in March 1976, the Committee on Fisheries Sub-Committee on the Development of Co-operation with International Organizations Concerned with Fisheries, was informed that the General Fisheries Council for the Mediterranean (GFCM) had also decided to increase its effectiveness as a fishery management and development body. It was felt on that occasion that the proposed changes in the GFCM Agreement might serve as a model for IPFC and the suggestion was made that the IPFC should study closely the GFCM proposals when considering the recommendations of its *Ad Hoc* Committee.
8. At its Fifty-fourth Session, held on 26, 30 and 31 October 1976, the IPFC Executive Committee studied the two sets of proposed amendments, and did not find them entirely suited to the needs of a body that intended to become action-oriented. It therefore proposed a composite text of Article IV on Functions combining the version proposed by the *Ad Hoc* Committee with the solution adopted by the GFCM. The text of this version is to be found in the Report of the Executive Committee (Appendix G).

9. The Executive Committee also proposed other amendments to the Basic Texts of IPFC, including a change in the name of IPFC to the Indo-Pacific Fishery Commission and an increase in the membership of the Executive Committee from three to five, to enable it to undertake the increased functions and supplementary activities which would result from the proposed re-orientation of IPFC.

10. The Executive Committee also proposed that IPFC, in addition to the administrative expenses borne by FAO, should have both a separate budget based on mandatory membership contributions and a regional voluntary fund to which countries, bilateral and international funding agencies and other interested parties, could contribute. The Executive Committee therefore made concrete proposals to amend the agreement in this respect.

11. The IPFC examined these proposed amendments to its Agreement in the light of the reports of the *Ad Hoc* Committee, the GFCM and the Executive Committee.

12. Most delegations were unable to discuss any proposal for mandatory contributions as this subject had not been discussed by the *Ad Hoc* Committee in Bangkok and had not been submitted to the IPFC membership in any of the documents provided to them before the session. The IPFC therefore requested the Executive Committee to review the whole question of financing IPFC in the light of the current discussions and in consultation with all Member Governments. The Executive Committee should submit a report embodying its views and specific proposals to the next session of IPFC.

13. The IPFC held a broad discussion on the proposed amendments to its Basic Texts and reached general agreement in principle on a number of amendments, which are contained in document IPFC/76/4, Sup. 5. Under the Basic Texts of IPFC, adoption of these amendments required a two-thirds majority of the member of IPFC. A vote by roll-call was also required. The text of the proposed amendments and the results of the vote were as follows :

THE NAME OF IPFC

The name of the Indo-Pacific Fisheries Council should be changed to Indo-Pacific Fishery Commission.

Present : 16

The following 14 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

PROPOSED AMENDMENTS TO THE AGREEMENT

“PREAMBLE

The contracting Governments having a mutual interest in the development and proper utilization of the living aquatic resources of the Indo-Pacific area and desiring to further the attainment of these ends through international co operation by the establishment of an Indo-Pacific Fisheries Council, agree as follows:”

Present : 16

The following 14 Members voted in favour: Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against: Nil

Abstentions: Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

“ARTICLE I

The Council

2. The Members of the Council shall be such Member Nations and Associate Members of the Organization and such non-member nations of the Organization which are Members of the United Nations, or any of its Specialized Agencies or the International Atomic Energy Agency that accept this Agreement in accordance with the provisions of Article IX thereof”. (The rest without change).

Present: 16

The following 14 Members voted in favour: Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against: Nil

Abstentions: Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

“ARTICLE II

Organization

5. The seat of the Council shall be at the seat of the Regional Office of the Organization most conveniently situated within the area defined in Article V”.

Present: 16

The following 14 Members voted in favour: Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against: Nil

Abstentions: Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

“7. The Council may, by a two-thirds majority of its membership, adopt and amend its own Rules of Procedure which shall be consistent with the General Rules of the Organization. The Rules of Procedure of the Council and any amendments thereto shall come into force as from the date of approval by the Director-General of the Organization.”

Present: 16

The following 14 Members voted in favour: Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against: Nil

Abstentions: Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

“ARTICLE III

Committees and Working Parties

1. There shall be an Executive Committee consisting of the Chairman, the Vice-Chairman, the immediately retired Chairman and two members elected by the Council. In the unavoidable absence of one or two members of the Executive Committee from a Committee session, the Chairman shall have the power to co-opt the chairman of one or two of the committees which may from time to time be established in accordance with the Rules governing the procedure of the Council, at his discretion, to substitute the absent Committee member or members for that Committee session only, provided that two permanent members of the Executive Committee shall always be present and that the number of voting members attending the Committee session shall in no case exceed five.”

Present: 16

The following 13 Members voted in favour: Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United States of America.

Voted against: Nil

Abstentions: Malaysia, Socialist Republic of Viet Nam, United Kingdom.

The proposed amendment was adopted.

“ARTICLE IV

Functions

The purpose of the Council shall be to promote the full and proper utilization of living aquatic resources by the development and management of fishing and culture operations and by the development of related processing and marketing activities in conformity with the objectives of its Members, and to these ends it shall have the following functions and responsibilities:

- (a) to keep under review the state of these resources and of the industries based on them
- (b) to formulate and recommend measures and to initiate and carry out programmes or projects to
 - i. create new fisheries and increase the production, efficiency and productivity of existing fisheries
 - ii. conserve and manage resources
 - iii. protect resources from pollution
- (c) to keep under review the economic and social aspects of fishing and aquaculture industries and recommend measures aimed at improving the living and working conditions of fishermen and other workers in these industries and otherwise at improving the contribution of each fishery to social and economic goals

- (d) to encourage, recommend, co-ordinate and, as appropriate, undertake training and extension activities in all aspects of fisheries
- (e) to encourage, recommend, co-ordinate and, as appropriate, undertake research and development activities
- (f) to assemble, publish or otherwise disseminate information regarding the living aquatic resources and fisheries based on these resources
- (g) to carry out such other activities as may be necessary for the Council to achieve its purpose as defined above."

Present : 16

The following 12 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against : Nil

Abstentions : Japan, Korea (Republic of), Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted¹

The delegation of Australia made the following explanation of its vote :

"Australia has noted the assurance by the FAO Legal Advisor that there is no new financial obligation on the Members in accepting Article IV.

The financial situation in Australia is such that the Government must give careful consideration to the financial implications of any of its commitments. In fact, the assumption of new financial responsibilities must be approved by the Prime Minister and Treasurer. The Australian delegation cannot therefore, at this time, indicate any commitment by the Australian Government to additional expenditures in the 1976-77 financial year. The Government will also have to carefully examine the financial implications after that fiscal year."

The delegation of Japan made the following explanation of its vote :

"The Japanese delegation wishes to make the following statement concerning its abstention in the voting conducted just now on the proposed amendments to the Agreement of IPFC and its Rules of Procedure and also wishes to have it duly recorded in the report of the Council.

The Japanese Government, while fully agreeing with the efforts to be made for conservation of the living aquatic resources through IPFC, finds it unacceptable to amend the said Basic Texts of IPFC through an unsuitable manner in which consideration by the Members was limited within insufficient time for the final text of such an important issue concerning the "functions" of the IPFC as provided in Article IV.

Also is the reason for its abstention that the Government of Japan considers briefly as follows in respect of Article IV of the adopted amendment :

1. REGARDING ARTICLE IV 1(b) (iii)

Firstly, the function provided therein is the matter that should primarily be dealt with in other competent or more appropriate international fora such as IMCO and UNEP.

Secondly, should this function be taken up in this Agreement, definitive details should also be provided as to the specific objectives to which this stipulation applies such as coverage of water areas, and type of vessels to be restricted thereby and so on.

1. This was the result of a second vote taken after a motion for reconsideration had been accepted by IPFC.

2. REGARDING ARTICLE IV 1(c)

Firstly, the provisions therein are the matters that should better be primarily dealt with by ILO from a wider point of view taking into account all related aspects of the problems involved.

Secondly, the term "social" being used in this context of this provision appears to give wider interpretation in the legal sense as permitting possible deviation of the functions from the general purpose of this Agreement".

"NEW ARTICLE A

Recommendations on Management Measures

1. The recommendations referred to in Article IV, paragraph (b) (ii) shall be adopted by the Council by a two-thirds majority of the Members present and voting. The text of such recommendations shall be communicated by the Secretary of the Council to each Member.

2. Subject to the provisions of this Article, the Members of the Council undertake to give effect to any measures envisaged under Article IV, paragraph (b) (ii) and recommended pursuant to the provisions of the foregoing paragraph from the date determined by such recommendation which shall not be before the expiry of the period for objection provided for in this Article.

3. Any Member to whom a recommendation is addressed may, within one hundred and twenty days from the date of notification of a recommendation, object to it and in that event shall not be under any obligation to give effect to that recommendation. In the event of an objection being made within the one hundred and twenty days period, any other Member to whom the same recommendation is addressed, may similarly object at any time within a further period of sixty days. A Member may also at any time withdraw its objection and give effect to a recommendation.

4. If objections to a recommendation are made by such number of Members as may be specified in the recommendation, the other Members to whom the recommendation is addressed shall be relieved forthwith of any obligation to give effect to that recommendation; nevertheless any Members may agree among themselves to give effect to it.

5. The Secretary of the Council shall notify each Member immediately upon receipt of each objection or withdrawal of objection".

The vote was taken on Article A after IPFC had accepted Article IV above.

Present: 16

The following 10 Members voted in favour: Bangladesh, France, India, Indonesia, Japan, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against: Nil

Abstentions: Australia, Burma, Korea (Republic of), Malaysia, New Zealand, Socialist Republic of Viet Nam.

The proposed amendment was rejected.

"NEW ARTICLE B

Reports

The Council shall transmit after each session to the Director-General of the Organization a report embodying its views, recommendations and decisions, and make such other reports to the Director-General of the Organization as may seem to it necessary or desirable. Reports of the committees and working parties of the Council provided for in Article III of this Agreement shall be transmitted to the Director-General through the Council".

Present : 16

The following 14 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

"ARTICLE VII

Expenses

2. The expenses of the Secretariat, including publications and communications and of the Chairman, Vice-Chairman and the immediately retired Chairman of the Council and of the other two members of the Executive Committee when performing duties connected with the Council's work during intervals between its sessions, shall be determined and paid by the Organization, within the limits of a biennial budget prepared and approved in accordance with the Constitution, the General Rules and Financial Regulations of the Organization."

Present : 16

The following 13 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam, United Kingdom.

The proposed amendment was adopted.

"4. The expenses incurred in connection with activities undertaken in accordance with the provisions of Article IV." (The rest without change).

Present : 16

The following 13 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against : Nil

Abstentions : Korea (Republic of), Malaysia, Socialist Republic of Viet Nam, United Kingdom.

The proposed amendment was adopted.

"ARTICLE IX

Acceptance

2. The Council may, by a two-thirds majority of its membership, admit to membership such other States that are Members of the United Nations, of any of its Specialized Agencies or the International Atomic Energy Agency as have submitted an application for membership and a declaration made in a formal instrument that they accept this Agreement as in force at the time of admission". (The rest without change).

Present: 16

The following 14 Members voted in favour: Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against: Nil

Abstentions: Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

PROPOSED AMENDMENTS TO THE RULES OF PROCEDURE

"RULE III

Credentials

The rule should be deleted.

Present: 16

The following 14 Members voted in favour: Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against: Nil

Abstentions: Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

"RULE IV

Agenda

1. The agenda of each regular session shall include:

- (c) a report of the Executive Committee on its activities during the intersessional period, including a report of the work performed on behalf of the Council by the Secretariat
- (f) proposals for amendments, if any, to the Agreement, in accordance with Article VIII of the Agreement and the provisions of Rule XV of those Rules
- (g) applications for membership, if any, in accordance with Article IX—2 of the Agreement from nations which are not members of the Organization

- (j) items, if any, referred to the Indo-Pacific Fisheries Council by the Conference, Council or the Director-General of the Organization”.

Present : 16

The following 14 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

“RULE VII

Election of Chairman and Vice-Chairman and of Other Members of the Executive Committee

3. The Council shall, during each regular session, also elect the two members of the Executive Committee referred to in Article III-1 of the Agreement. Nominees shall be duly proposed and seconded from the floor and must be delegates or alternate delegates.”

Present : 16

The following 13 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam, United Kingdom.

The proposed amendment was adopted.

“RULE X

Committees

1. The Executive Committee shall consist of the Chairman, the Vice-Chairman, the immediately retired Chairman and two members elected by the Council.” (The rest without change).

Present : 16

The following 13 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam, United Kingdom.

The proposed amendment was adopted.

"RULE XI

Budget and Finance

2. A proposed budget of the Council for the next two succeeding financial years consisting of proposed expenses of the Secretariat, including publications and communications, and of the proposed travelling expenses of the Chairman, Vice-Chairman, the immediately retired Chairman and the two other members of the Executive Committee when engaged in the work of the Council between its sessions shall, after approval by the Council, be submitted to the Director-General for consideration in the preparation of the general budget estimates of the Organization."

Present : 16

The following 13 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam, United Kingdom.

The proposed amendment was adopted.

"RULE XII

Participation by Observers

2. States that are not Members of the Council, nor Members or Associated Members of the Organization, but are Members of the United Nations, of any of its Specialized Agencies or the International Atomic Energy Agency may....." (The rest without change).

Present : 16

The following 14 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

"RULE XIII

Reports and Recommendations"

Paragraphs 1 and 2 of this Rule should be deleted.

Present : 16

The following 14 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

“4. Subject to the provisions of new Article A of the Agreement, the conclusions and recommendations.....”
(The rest without change).

As the proposed new Article A was rejected no vote was taken on the above amendment.

“7. Pending the formal transmission of the reports of the committees and working parties as provided for in new Article B of the.....” (The rest without change).

Present : 16

The following 14 Members voted in favour : Australia, Bangladesh, Burma, France, India, Indonesia, Japan, Korea (Republic of), New Zealand, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America.

Voted against : Nil

Abstentions : Malaysia, Socialist Republic of Viet Nam.

The proposed amendment was adopted.

The Council noted that the adoption of these amendments would involve the renumbering of Articles and Rules. The Secretariat agreed to attend to this matter, including changes in cross references.

RESEARCH AND STATISTICS

14. In the statement made by the representative of the Director-General of FAO, at the opening of the session, a recommendation was made to establish two working parties. The Council, however, decided to establish an *Ad Hoc* Sessional Committee on Research and to refer the agenda item to it. The report of the *Ad Hoc* Sessional Committee is contained in Section II. The following recommendations concerning the future structure of the IPFC and its subsidiary bodies were made :

- (1) the establishment of a Sub-Committee on Statistics
- (2) the establishment of a working group to co-ordinate and stimulate skipjack research in the central and western Pacific
- (3) continuation of the work of the existing Working Party on Fish Technology and Marketing
- (4) continuation of the existing Working Party on Aquaculture and Environment

The decisions and details of these recommendations are given under item 8 of the agenda.

MANAGEMENT

15. The Council considered briefly the outline of the general problems of management, as set out in document IPFC/76/7. In addition to the narrow questions of direct controls on the fishery (limits on the size of fish landed, catch quotas, licence limitation, etc.) resource management in the wider sense includes all measures that can promote the rational utilization of the resource, and in particular the well-planned expansion and development of fisheries so that the problems of over-expansion, and fishing capacity can be avoided.

16. IPFC member countries were facing management problems even in the narrow sense in an increasing number of fisheries. Some of these (e.g. most shrimp resources) were confined to waters under the jurisdiction of a single country (particularly if there were as a result of the United Nations Conference on the Law of the Sea, a general expansion in the limits of jurisdiction). The IPFC could usefully discuss, in general terms, the problems facing these fisheries. In particular, the new Standing Committee on Resources Research and Development should be able to hold fruitful discussions on several of the technical aspects—data collection, resource assessment, and consideration of the biological and socio-economics of different measures—which were the necessary preliminary steps towards choosing, implementing, and enforcing management measures.

17. The Council paid particular attention to the problems of tuna management since co-ordinated international action would be necessary if the oceanic stocks of tuna were to be managed. It reviewed the report of the Fourth Joint Meeting of the IPFC Special Committee on Management of Indo-Pacific Tuna and the IOFC Committee on Management of Indian Ocean Tuna (IPFC/76/9), and of the reports of earlier related meetings (IPFC/76/8, IPFC/76/10) and of the studies prepared by FAO (IPFC/76/11), and of the comments thereon (IPFC/76/11, Sup. 1).

18. The Committee endorsed the general structure of a tuna management programme, as set out in the chart of Appendix D of IPFC/76/9, and, with reservations of minor detail, agreed with the estimates of the basic Secretariat activities, as given in IPFC/76/11 (particularly Annex 1 and 2). Though the basic activities, as outlined, were estimated to cost approximately U.S. \$300,000, the Committee, while expressing the view that such funding was most important, did feel that it was even more important that some start should be made to the programme even if this had to be at a lower level.

19. The suggestions of the Joint Meeting that funding of these Secretariat activities should be on the basis of "user pays" were endorsed and the Council *recommended* that the views of member countries should be solicited, perhaps by means of a questionnaire, as to how such funding, which might possibly be based on contributions in proportion to the annual catch, might best be ensured in the long term. It was stressed that so far as practicable, support should be sought from, and provided by, all countries fishing tuna in the Pacific and Indian Oceans, whether or not they were currently members of IPFC.

20. It was recognized that countries could not enter into firm commitments at the present time, but there was the feeling that long-term support of this proposal would be feasible. The Council therefore urged that FAO provide immediate short-term support, so that these activities, which were so important for management, could be started without undue delay. The Executive Committee was requested to consider this matter when making recommendations on funding of IPFC activities (see paragraph 12).

21. The problem of the skipjack fishery in the central and western Pacific were discussed at length. There was an urgent need for a better understanding of the stock structure of this species, which might be best achieved by a large scale tagging experiment. To ensure the release of large numbers of tagged fish in good condition, a commercial pole and line vessel could be chartered as suggested in document IPFC/76/5, Sup. 9.

22. This proposal, prepared under the auspices of the South Pacific Commission (SPC) had already been endorsed by the IPFC. It was noted that some countries had allocated funds for this tagging project, with the provision that it would also be supported by other countries. Some countries were planning tagging experiments which could be usefully integrated with the main project. There remained however the need for additional financial support to the project if it was to be carried out on the scale requested. The Council therefore strongly *recommended* that all countries concerned should give support to this project, and that the Chairman of IPFC should approach Member Governments individually drawing attention to the need for this financial support.

23. It was stressed that no effective tagging programme could be carried out without the collaboration of the countries in the central and western Pacific which were not members of IPFC. It was *recommended* that the Council should in the first instance contact the South Pacific Commission and, as appropriate, individual governments in the region to draw attention to the desire of the Council to collaborate with SPC in this tagging programme and establish effective coordination.

24. The tagging experiment and the general scientific studies of skipjack would require careful technical guidance. The Council therefore endorsed the recommendation by the Special Committee on Management of Indo-Pacific Tuna for the establishment of a Working Party of Experts on Central and Western Pacific Skipjack, as a subsidiary body of the Standing Committee on Resources Research and Development.

INCREASING PRODUCTION AND IMPROVING UTILIZATION AND DISTRIBUTION OF FISH IN THE IPFC REGION

25. The attention of the Council was drawn to paper IPFC/76/12 "Increasing Production and Improving Utilization and Distribution of Fish in the IPFC Region", which provided a comprehensive review of constraints to development both of small-scale and medium to large-scale fishing operations in the region.

26. Very high priority had been given to improving fish production and increasing utilization of fishery products in all IPFC countries. However, it was unlikely that catches could continue to increase at the current rate although demand was likely to increase substantially. It was therefore necessary to use available resources more wisely and to pay more attention to reducing waste and improving distribution. Currently waste could reach 30 percent. Reducing these levels could increase the amount of fish available. The best interests of the community would be served by utilizing the resources to provide food, employment and cash. Many improvements could be carried out at low cost, which at the same time could generate greater employment. This would require large training inputs and FAO was conscious of the need to increase training activities in the region. A number of new initiatives were being taken including the holding of a Workshop on Small-Scale Fishing Enterprises Management to follow the IPFC session which was being funded by Australia (ADAA). It was hoped to hold three Workshops on Fish Technology and Inspection which would be funded by the Danish International Development Agency DANIDA, a Workshop on Frog Leg Processing in Cochin when funds were available, and a Workshop on the Handling of Small Pelagic Fish to be funded by DANIDA is in the pipeline. In addition, the next IPFC Symposium 1978 would be on Fish Utilization Technology and Marketing.

27. Both small and large-scale industrial fisheries would be covered by these training proposals, but in view of the increased attention being paid to small-scale fisheries development, a paper, which included a list of small-scale fisheries projects in the region, had been prepared (IPFC/76/Inf. 15). These projects were directed to improvement of co-operatives, community development, providing for the credit needs of poor fishermen as a possible alternative to the middleman and providing extra-employment through training. To improve productivity, mechanization programmes were under way, better landing sites and methods were being developed and distribution techniques improved.

28. It was recognized that development of offshore fisheries would have to be supported by governments or big companies. The Department of Fisheries of FAO had established an industry group consisting of over 200 fishery industrialists from developed and developing countries, to exchange information and establish links with each other and with the Department of Fisheries on technical and economic matters. The Department had become significantly involved in joint venture work. The value of developing export products was noted although it must be appreciated that developing countries must attain international standards of acceptability.

29. More funding for investment and technical assistance in fisheries development would be available from the proposed International Fund for Agricultural Development (IFAD). In addition, the International Banks, the Arab Funds, the Kuwait Fund and the FAO Bankers' Group were becoming increasingly interested in fishery development.

30. FAO had set up a Technical Cooperation Programme (TCP) with a budget of U.S. \$18 million for the 1976/77 biennium. Amounts of up to U.S. \$250,000 could be considered for development projects which could be completed in one year. The criteria would seem to favour projects involving better utilization and distribution. It was intended to concentrate on projects designed to help the poorest sections of the agricultural and fisheries communities.

31. The continual problem of transfer of information (technology) was raised. The FAO approach was to hold workshops and training courses at a regional level and to create a cadre of people able to pass on the information to national level. In the small-scale fisheries sector information could be transferred by experiment and demonstrations. As expatriate expertise was becoming increasingly expensive, countries should make more use of national talent. In all joint venture prospects for offshore fisheries, it would be wise to consider building in a strong training component.

32. Particular reference was made to the problem of waste including by-catch which amounted to at least 1 million tons annually in the region. The delegate of the United Kingdom suggested a programme of action to reduce waste in dried fish; the programme could be based at the FAO/SIDA² Institute for Development and Marketing of Fish Products in Sri Lanka. The Council approved the initiative which was strongly supported by the delegate of Sri Lanka. As the project was in line with his country's technical assistance policy, the United Kingdom delegate stated that his Government would be prepared to consider proposals.

33. Siting such a project at the FAO/SIDA Institute would help it to develop into a regional, and subsequently international, fish technology institute.

34. The delegate from Bangladesh asked whether TCP funds would be available for rehabilitation of fresh water fish ponds in Bangladesh. He was informed that this concept appears to be in line with TCP criteria, but that a well-formulated project request would have to come from the country.

35. The delegate from India informed the Council that India was seeking joint venture partners to develop the offshore fishery. In the small-scale fishery sector, it was intended to mechanize the existing fleet gradually. Wastage would be reduced by improved transport and storage facilities. However, commercial assistance would be required. Also, greater impact on some problems could be made by regional collaboration.

36. The International Co-operative Alliance was mentioned as a source of assistance for fishery co-operatives. A joint programme with the FAO Department of Fisheries was under preparation.

NATIONAL AND INTER-GOVERNMENTAL ACTIVITIES IN THE REGION

37. The attention of the Council was drawn to documents IPFC/76/13 and 17 and IPFC/76/Inf. 9, Inf. 10, Inf. 11 and Inf. 14. It was pointed out that the activities could be broadly categorized into those of the Secretariat of IPFC, the Regular Programme and the Field Programme. The division was made for operational and administrative reasons. The paper was meant not only to provide information but also to obtain the views of the Council on the nature of activities the Department should undertake by itself and through national and regional projects. It also showed how activities at national and regional levels were being co-ordinated in order to ensure avoidance of waste of resources and duplication of effort.

38. Special attention was drawn to the activities of the inter-regional Indian Ocean Fishery Survey and Development Programme and the regional South China Sea Fisheries Development and Co-ordination Programme. The Indian Ocean Programme had been reviewed by a UNDP/FAO Mission which had recommended a third phase commencing in January 1977. While recognizing the value and importance of the basic work undertaken in the earlier phases, the Mission had recommended that greater emphasis should be placed on building up on this work in the form of investment proposals and practical action. The delegate from India described developments in the Bay of Bengal area triggered off by the FAO/SIDA Bay of Bengal Mission. He referred in particular to the Advisory Committee Meeting held recently to examine progress and obtain the views and support of interested countries for the major U.S. \$7 million development phase. So far no firm support had been forthcoming and the delegate of India made an appeal for favourable consideration particularly as these activities were designed specially for the small fishermen.

39. The leader of the South China Sea Programme provided information on the status of activities of the Programme. It was noted that the South China Sea Programme despite drastic reductions of UNDP funding had with Canadian support managed to maintain the main thrust of its activities. The Canadian donors had

2. SIDA = Swedish International Development Authority.

now completed their field evaluation of the programme's activities. They were now considering proposals to fund extension of the major portion of the project until mid 1977 based on the earlier proposal which had been submitted to the Canadian International Development Agency (CIDA) early in 1976 calling for an extension of the present Trust Fund supported aspects of the project with greater emphasis on small-scale fisheries. The remaining project activities and particularly those associated with aquaculture would be supported during 1977 from the UNDP contribution which although modest would be adequate.

40. The programme was optimistic that a third phase of the project would commence in mid-1977 reflecting the strong support of the participating countries for the high priority areas of small-scale fisheries and aquaculture which would receive support from the bilateral donor.

IPFC SUBSIDIARY BODIES

41. The IPFC noted that document IPFC/76/Inf. 18 gave details about the nine subsidiary bodies of IPFC, six of which had already met during the biennium. IPFC had already discussed the reports of three of these (the Executive Committee, the Co-ordinating Committee for the South China Sea Programme and the Special Committee on Management of Indo-Pacific Tuna) under other items of its agenda. It proceeded to consider the report of the Working Party on Aquaculture and Environment which had met in August/September 1976 and the reports of the Working Party on Fish Technology and Marketing and the Joint IPFC/IOFC Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics.

42. The IPFC approved these reports. In approving the report of the Working Party on Aquaculture and Environment, the IPFC approved in particular the recommendations appearing in Annex IV to the Working Party's report (IPFC/76/18).

43. The IPFC then studied the future structure of its subsidiary bodies in the light of the proposals made by the FAO Department of Fisheries at the opening of the session. The proposals were for the establishment of two special working parties—one of a scientific and the other of an administrative nature. In response to the request for the establishment of a scientific working party, the IPFC had as an interim measure set up the *Ad Hoc* Sessional Committee on Research and had, as a result of the proposals emanating from that sessional committee, agreed to the establishment of a Standing Committee on Resources Research and Development with the following terms of reference:

“There shall be a Standing Committee on Resources Research and Development, each member designating one expert who may be accompanied by advisers and alternates. The Committee shall advise the Council on scientific matters, relating to the development and rational utilization of the fish resources in the Indo-Pacific region. In particular it shall

- (a) advise on the state of resources and of the fisheries based on them
- (b) encourage research, in the fields of biology, technology, socio-economics, and related disciplines
- (c) encourage the improvement of national statistics in the region”.

44. The IPFC decided that two of its existing working parties, the Working Party on Coastal and High Seas Pelagic Resources and the *Ad Hoc* Working Party of Scientists on Stock Assessment of Tuna need no longer exist as separate bodies and they would be absorbed within the new Standing Committee.

45. The IPFC decided that three of its existing working parties should continue in existence as subsidiary bodies of the Standing Committee. These were the:

Working Party on Fish Technology and Marketing

Working Party on Aquaculture and Environment

Working Party on Statistics³

³ IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics.

46. The IPFC decided to establish two other working parties which would report to the Standing Committee. These were a new Working Party of Experts on Inland Fisheries and a new Working Party on Experts on Central and Western Pacific Skipjack. IPFC approved the following terms of reference for the Working Party of Experts on Inland Fisheries :

“To examine how the problems of inland fisheries can best be handled by IPFC, using the great range of expertise available within IPFC, including member countries and the Secretariat to identify activities requiring early implementation, and as far as possible, start their implementation, and to make proposals for a long-term structure for promoting the development of inland fisheries”.

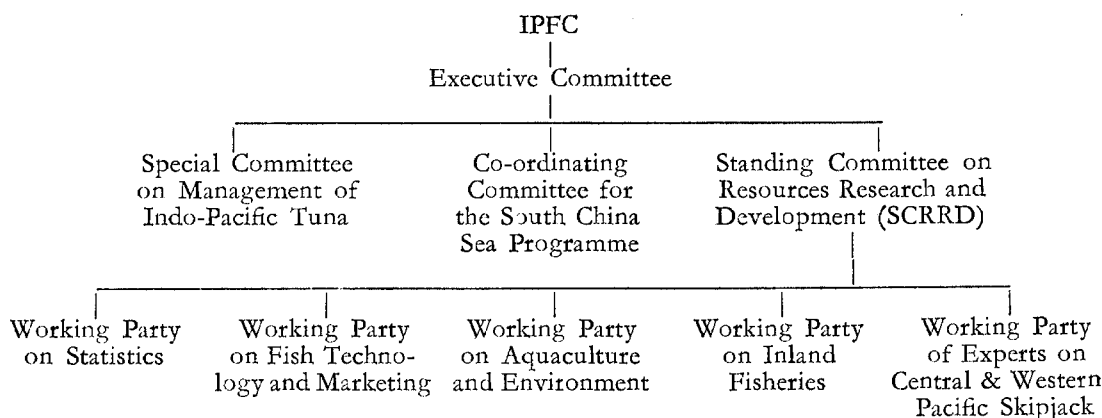
47. The IPFC approved the following terms of reference for the Working Party of Experts on Central and Western Pacific Skipjack;

- “(1) to facilitate the better identification of separate skipjack stock or stocks in the region by (a) an intensive tagging experiment, (b) genetic studies, and (c) other relevant studies
- (2) to investigate the feasibility of a Workshop on Skipjack Catch and Effort Data not later than two years hence”

“The group should also seek the active co-operation of other regional organizations interested in Tuna resources in the central and western Pacific, and serve as the scientific body for development and overview of any research projects that might be carried out under international funding, referring broad policy matters to the IPFC Special Committee on Management of Indo-Pacific Tuna.”

48. As to the second proposal by the Department of Fisheries to establish a special Working Party of an administrative nature, members felt it appropriate that the Executive Committee should carry out these functions for the time being. The establishment of such a working party or standing committee could be reconsidered by IPFC in the future. IPFC expressed the view that the Co-ordinating Committee for the South China Sea Programme and the Special Committee on Management of Indo-Pacific Tuna should report direct to the Executive Committee although they might in future report through the administrative standing committee as and when the need to establish it became apparent.

49. The following chart indicates the proposed structure of IPFC and its subsidiary bodies.



SYMPOSIA

Report of the Symposium on the Development and Utilization of Inland Fisheries Resources

50. The summary report of the Symposium on the Development and Utilization of Inland Fisheries Resources was endorsed by the Council with the following technical recommendations :

that the Chairman of IPFC should request Member Governments to give more attention to collecting, systematizing and distributing data on inland fisheries

that the establishment of a post for a fisheries statistician to advise Member Governments on the collection, analysis and interpretation of inland fishery data should be considered

that Member Governments ensure that fisheries interests are represented in any projected development by the inclusion of fishery managers in national planning bodies

that Member Governments seriously consider ways to increase the allocations of fertilizer and feed for inland fisheries, including the investigation of alternative sources for these commodities and also improve seed supplies.

Proposed subjects for future symposia

51. The IPFC approved a proposal of the Working Party on Fish Technology and Marketing which had been appointed to prepare the Symposium to be held in conjunction with the Eighteenth Session that the title of the Symposium should be changed to "Symposium on Fish Utilization Technology and Marketing in the IPFC Region."

52. The IPFC decided that the subject for the Symposium to be held in conjunction with its Nineteenth Session in 1980 should be "The Development and Management of Small-Scale Fisheries." It was agreed that Mr. A. B. O. Merican (Malaysia) should be the Convenor. It was felt that the subject originally proposed by the Secretariat for that Symposium (The Role of Agriculture and Land Use in Inland Fishery Development) would more usefully be dealt with at a Workshop on the Role of Agriculture and Water Uses in Inland Fisheries Development. The funding of such a workshop should be considered by the South China Sea Programme or the Indian Ocean Programme or both.

Relationship of symposia to sessions

53. The IPFC decided that in future the opening ceremony of the session should be held before the Symposium to ensure that this was recognized as an integral part of the session.

ANY OTHER MATTERS

54. None

DATE AND PLACE OF THE EIGHTEENTH SESSION

55. The IPFC accepted with pleasure the invitation of the Government of the Philippines to hold the Eighteenth Session in Manila preferably in the first half of 1978.

ELECTION OF OFFICERS

56. Mr. F. R. Gonzales of the Philippines and Mr. S. P. Balasubramaniam (India) were unanimously elected as Chairman and Vice-Chairman respectively.

ADOPTION OF THE REPORT

57. This report was adopted by IPFC on 5 November 1976.

AGENDA

1. Opening of the session
2. Adoption of the agenda and arrangements for the session
3. Report of the IPFC *Ad Hoc* Committee to Review the Functions and Responsibilities of IPFC (including proposed amendments to the Agreement establishing IPFC and the IPFC Rules of Procedure)
4. Research and statistics
5. Management
6. Increasing production and improving utilization and distribution of fish in the IPFC region
7. National and intergovernmental activities in the region
8. IPFC subsidiary bodies
9. Symposia
 - 9.1 Report of the Symposium on the Development and Utilization of Inland Fishery Resources
 - 9.2 Proposed subjects for future symposia
 - 9.3 Relationship of symposia to sessions
10. Any other matters
11. Date and place of the Eighteenth Session
12. Election of officers
13. Adoption of the report

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OPENING ADDRESS OF THE CHAIRMAN

(MR. A. S. MENDIS)

Honourable Minister, Excellencies, Distinguished Delegates and Guests,
Ladies and Gentlemen:

It is indeed a great honour and privilege for me to welcome such a distinguished gathering, to this the 17th Session of the Indo-Pacific Fisheries Council. Looking around, I notice that there are a few of you who came to Sri Lanka for the 8th Session of the Council in 1958. They will recall that we had conducted the 8th Session under makeshift arrangements using a school hall for the purpose. Today we are happy to provide you with up-to-date Conference facilities for the smooth conduct of this Session.

Let me place on record my humble thanks for the confidence and trust you placed on me in electing me your Chairman. During the last two years, it has been extremely encouraging for me to work with the members of the Executive Committee, although for the greater part of the biennium Admiral N. Zachman, in view of his retirement from fisheries service, could not participate fully. I must place on record the valuable contributions made by the ex-officio member of the Council—the Secretary of IPFC. He has worked extremely hard and shouldered the onerous responsibilities single handed from the Regional Office at Bangkok. For this he deserves the special thanks of the Council. We have in addition received substantial support from the FAO Headquarters Secretary. He too has been handicapped by a very stringent budget and by his having to service many other regional councils and committees besides ours.

In recent years the production of fish in the Indo-Pacific region has increased several fold. Forty percent of the world's total fish production from the marine and inland fisheries and more than 80 percent of the world's fish production through aquaculture is from this region. The recent steep increases in the fields of small-scale coastal fisheries and of aquaculture can be attributed to recommendations given to member countries by this Council. The role played by the Council, although of a passive nature, has been extremely useful. But, what of the future? Are we to be contented with playing a passive role—just making recommendations? Should we not wind up? These are some of the questions that need be given serious consideration.

During the past few Sessions we have been constantly reminded that the Council should drop its role of being a mere forum for discussions and that we should take a more action-oriented role in the development of fisheries in the region. This has been echoed at every recent Executive Committee meeting. The 13th FAO Regional Conference held this year in Manila recommended that "FAO should review the functioning of the existing Technical Bodies with a view to making them action-oriented by providing for procedural and fiscal autonomy". Earlier Member Governments were able to get such assistance from the Bangkok Secretariat. In the recent past this assistance has been curtailed due to depletion of staff at the Regional Office and due to inadequate funds. You will recall that at the Wellington Session in 1972, a recommendation was made that we set up a "Regional Voluntary Fund" for the purpose of undertaking appropriate projects under the auspices of this Council. The recommendation was re-echoed at our Session in Djakarta and the Secretary was requested to pursue the matter of initiating a Regional Voluntary Fund. He has done so, commencing initial discussions with Australia and New Zealand. The workshop on "Management of small-scale fishery enterprises" funded by Australia, which will take place in Colombo later this month, although not being held under the auspices of this Council, has been the direct result of discussions on the Regional Voluntary Fund.

The new Director-General of FAO, Dr. Saouma has indicated that he plans to de-Romanize FAO, and when his plan goes through I feel that the Regional Offices, where the action does take place, will be considerably strengthened at least in respect of Article XIV—Technical bodies like ours. He has also indicated that FAO should be action-oriented. We should have the Director-General's views in mind during our deliberations at this Session, particularly when it comes to the item on the Agenda dealing with the amending of the Agreement and Rules of Procedure of the Council. In this connection, I would like to refer you to the recently constituted "Animal Production and Health Commission for Asia, the Far East and South West Pacific" and possibly remodel our programme of work and budgeting on the lines of this new body.

At this Session we are breaking with tradition in several aspects. For instance, Symposia organised for respective Sessions in the past were held during the Session as an integral part of the Session and was included as an item on the Agenda for the Session. This year, the symposium on "Development and Utilization of Inland Fisheries Resources" was concluded last week. Then again, the Rules of Procedure of this Council list specific items to be included in the Agenda of each Session but the provisional Agenda submitted to Member Governments do not contain many of these items. These are a few of the matters that need attention and on which your views are solicited.

I trust that our deliberations at this Session will enable the Council to pave the way for a more positive approach to our future programmes of work.

I am extremely happy to have been afforded this opportunity to welcome you here this morning. I trust that the heavy work load lined up for you at this Session will not deter you from seeing as much of Sri Lanka as possible and what She has to offer. I sincerely hope that your stay with us will be enjoyable and rewarding.

Hon. Minister, whilst thanking you on behalf of the Council for taking time off from your State duties to grace this occasion, I take pleasure in inviting your Honour to declare open the 17th Session of the Indo-Pacific Fisheries Council.

Thank you.

OPENING ADDRESS OF THE MINISTER OF FISHERIES

(Mr. S. D. R. Jayaratne)

Mr. Chairman,
 Excellencies, Distinguished Delegates, Distinguished Guests,
 Ladies and Gentlemen:

It is my pleasant duty this morning to extend, on behalf of the Government and people of Sri Lanka, a cordial welcome to the delegates of the Member Countries of the Indo-Pacific Fisheries Council, to all others who are participating in this Session of the Council and to the distinguished guests who have accepted the invitation to grace the inauguration of this session.

Sri Lanka is, area wise, one of the smallest nations among the members of the IPFC. Our Island Republic has a fairly high per capita consumption of fish which provides no less than 70% of the animal protein in the diet of our people. We are however not yet self sufficient in fish and have to spend considerable amounts of scarce foreign exchange for the import of fish products.

The present Government, from the commencement of its term of office, has given high priority to fisheries development. In 1970 for the first time in our history a separate Ministry was created for Fisheries. The medium-term Fisheries Development Programme has an important place in the current Development Plan of this country. I am glad to be able to state that the deliberations at various past sessions of your Council and the recommendations made at these sessions have helped us in planning and implementing the programme of development of our Fisheries.

I recall that the last occasion on which we had the privilege of hosting the IPFC in this country was in 1958 when the 8th Session was held in Colombo. That Session appears to have been a happy augury for us. For, looking back on the history of fisheries development, that year marks the beginning of a period of rapid advance. The annual production from our marine fisheries, which then stood at about 40,000 tons has increased to about 115,000 tons, while the production from our inland fisheries has shown a spectacular of 44-fold increase from some 295 tons to its present level of 13,000 tons.

Sri Lanka is blessed by a geographical location which makes her ideally suited as a base for oceanic fishing operations. Yet we have so far made only little headway in this direction. This has been due largely to financial constraints, particularly constraints of foreign exchange. These constraints have influenced us to concentrate on the development of small-scale coastal and inland fisheries. At the same time, this concentration on the coastal and inland fisheries has been also due to deliberate national policies arising out of our socio-economic situation. Our coastal and inland fisheries are undoubtedly capable of further intensive development to provide substantial increases in production. Such development can not only bring greater benefits to our existing 58,000 fishermen but also provide gainful employment to a much larger number of people in a country where employment is a priority objective of national policy.

In the development of our small-scale coastal and inland fisheries, we have benefitted by accepting and implementing the advice and recommendations of various past sessions of your Council. The progress we have achieved in these spheres has been due, in some measure, to the large volume of assistance we have received in the past and continue to receive from multilateral agencies and from bilateral sources.

Mr. Chairman, distinguished delegates, I find it heartening to note that your Council is devoting so much attention to small-scale fisheries and to aquaculture. I believe I am correct in stating that the problems faced by the developing countries who are members of your council, are quite similar as far as these two sectors are concerned. Each of us has much to learn from the others. This makes it all the more important that this regional fisheries organization should continue, as in the past, to perform its important and useful service to the member nations.

Mr. Chairman, I understand that you have a very heavy and tight schedule of discussions lined up for this session. The Council has been responsible for a quarter century of extremely useful service in the development of fisheries in the region. I am glad to note that at the past few sessions you have been taking steps to make the Council's programme of work more action-oriented and that you are proposing to amend the Agreement and Rules of Procedure to achieve this objective. I wish you all success in your deliberations.

I trust that your stay in Sri Lanka will be enjoyable and rewarding. On behalf of the Government and the people of Sri Lanka, let me once again extend a cordial welcome and best wishes to all of you. It is my great privilege to declare open this 17th Session of the Indo-Pacific Fisheries Council.

Thank you.

OPENING ADDRESS
OF THE SECRETARY, MINISTRY OF FISHERIES

(Mr. E. G. Goonewardene)

Mr. Chairman,
Excellencies, Distinguished Delegates, Distinguished Guests,
Ladies and Gentlemen:

It gives me great pleasure to speak a few words on the occasion of the opening of the 17th Session of the IPFC by my Minister. We are happy that we have the privilege on this occasion of hosting this Session of the IPFC for the second time, the last being in 1958.

Our association with the IPFC has been a long and happy one and has made a definite contribution to fisheries development in this country. This has been particularly so in the fields of small-scale fisheries and aquaculture in which we have much in common with other developing fishing nations who are members of the IPFC.

The Government of the Republic of Sri Lanka places special emphasis on the development of fisheries in this country in view of the important contribution it makes to the food supply of the nation and to employment. I am happy to note that the IPFC is endeavouring to make itself a more action-oriented body and an even more valuable instrument in the development of fisheries in the region.

I do not propose to speak at length. On behalf of the Ministry of Fisheries I wish to extend to all distinguished delegates and participants a very warm welcome to Sri Lanka. I trust that the arrangements we have made for the Session meets with your approval and hope that you will not hesitate to let us know if there is anything more you would wish. We shall be pleased to do everything possible to make your stay in Sri Lanka a pleasant and memorable one.

I wish you all success in your deliberations.

Thank you, Mr. Chairman.

OPENING ADDRESS OF THE FAO DIRECTOR-GENERAL'S
REPRESENTATIVE

(L. I. J. Silva)

Honourable Minister, Distinguished Delegates,
Ladies and Gentlemen:

It gives me great pleasure to be present on this occasion and represent the Director-General of FAO and the Department of Fisheries at this meeting. In addition I am extremely pleased to see you, Sir, Honourable Minister, as I had the privilege of working with you in your Ministry of Fisheries some years ago.

In the 28 years in which the IPFC has been in existence, the technical discussions at the meetings of the Council and of its subsidiary bodies, the reviews of various subjects effected through the Council's symposia, the seminars and training centres conducted in the region at the Council's suggestion, and the many documents published on behalf of the Council or at its suggestion, have contributed significantly, and in many ways, to the development of Indo-Pacific fisheries. The exchanges effected through the machinery of the Council have assisted in the creation of scientific, technical, and administrative competence to carry out fisheries research, to plan and guide fisheries development, and to administer the industry. The very great range of documents, of local authorship, contributed to the Council's technical sessions and to its symposia are ample evidence of the industry of local personnel showing, across the years, a steady increase of individual competence and institutional efficiency.

FAO is especially proud of its role in promoting the establishment of the Council and in assisting its Member Governments, through the Secretariat, in the conduct of the affairs of the Council.

Over the 28 years of the life of the Council, considerable changes have taken place in the Indo-Pacific fisheries situation. These are perhaps most strikingly represented by the data on fish catches included in the publication "Twenty-five years of IPFC", which shows the catches taken by countries of the region to have increased, from 1950 to 1972, by a factor of 4.0; world total catch, at the same time, increased by a factor of 3.2.

Even if some important part of the increase of the Indo-Pacific countries catch was taken *outside* the Indo-Pacific region, which is certain, the Indo-Pacific fishery situation will have been affected in various ways by the total increase.

This change in production has been accomplished by changes in fishing fleets, gears, terminals and markets; it has been aided by research, administration and numerous forms of development promotion, and at the same time, has entrained development of research and administrative institutions as well as industrial and marketing organization.

Concurrently with these changes the IPFC was making recommendations on many subjects to its Member Governments. Undoubtedly many of the recommendations fell on deaf ears and many received scant attention. In retrospect, it appears that some were ill-timed, some were ill-framed and some were misdirected. Nevertheless, it is possible to discern a consistent evolutionary trend in these recommendations. At the beginning, the Council aimed at taking stock of the fishery situation of the area and at promoting the growth and development of research and administrative services in each member country. After a while, more attention was paid to the practical features of the industrial changes taking place, although sight was not lost of the earlier objectives. Attention then was turned to the problems of planning and promoting development. The lists of symposia and of training centres and seminars, in the 25-year document referred to, show the march of the Council's interest in research and statistics on the one hand and of technology and administration on the other. And, in the result, the Council's deliberations have contributed opportunely to governmental decision processes through these recommendations.

However, the trends of industrial changes in fisheries, of the consequences of developments of communications, of revision of living standards, of world perceptions of the nature and potentials of natural resources, and of world thinking on international relations (especially with respect to the oceans), are converging on a situation which stands far beyond the range of progressive change in which the Council has hitherto operated. Without attempting to forecast any particular consequence of the UNCLOS, it can be said that both the rights and responsibilities of coastal states, with respect to fishery resources off their coasts, are likely to be substantially different from what they have been in this and the preceding two decades. If that should be the case, the need for international machinery of the kind offered by the IPFC will be strengthened, rather than weakened, for the following reasons:

- (i) The coastal state will have a broader and more strongly secured economic base of natural resources upon which to plan its fishery industrial development; this will give it both the incentive and means to strengthen its fishery institutions.
- (ii) In exercise of its rights and discharge of its responsibilities, each coastal state will need much increased competence in fisheries research and monitoring, in the planning and promotion of development, and in the formulation and enforcement of regulations; the coastal states can be expected to recognize that important economies could be effected and gains in efficiency could be obtained from international collaboration and exchange.
- (iii) Insofar, as research becomes more effective, the need for comprehensive and reliable coverage of entire resource species, and even of entire ecosystems, will increase and hence there will be greater demand for exchange and pooling of data relating to resources and their exploitation; this will then be a self-promoting process: the improved quality of the contributions to the international bodies will increase the quality of the work of those bodies and that will induce still better contributions.
- (iv) In all cases of shared resources the need to share responsibility for control of exploitation will be heightened by the continuing increase in the efficiency of methods of fish-finding and catching.
- (v) From an ecosystem view of resources, which recognizes that exploitation of the stock of one species has effects on other species of the ecosystem, the sharing of an ecosystem by two or more coastal states will imply a need at least for consultations with respect to control of exploitation.
- (vi) The new international view of obligations with respect to protection and utilization of resources will make it advisable that exploitation plans should be brought into concert in an international forum; such concert should mean rationality in the utilization not only of each natural resource, but also of other resources (metals, fibres, etc.) in the exploitation operation, avoiding over-capitalization among other ill-effects.

In some respects, an even more forceful demand for strong and effective fishery councils and commissions will arise from the need to defend the claims of fisheries against the claims with respect to other resources and other uses of the seas; defence against pollution is a particularly serious issue which will continue to grow in importance.

Questions have been raised as to the ability of the IPFC machinery to accommodate the consultations, to effect the exchanges, and to promote the agreements that this new situation will demand. In the main, the differences between the past situation and the new are of degree rather than of kind; but it is certain that situations will arise in the Indo-Pacific area in which it will be advisable for two or more nations to come to agreement on a common plan for the exploitation of a particular resource. It is reasonable to think that such agreements could best be formulated within the IPFC machinery and according to principles established by the Council. Nor is it unreasonable to suppose that such agreements need not be limited to regulatory arrangements aimed at preventing overfishing but could be comprehensively framed so as to guide and co-ordinate growth of the industry, and eventually to control it in its fully developed state, in accord with rational principles relating to the characteristics of the particular resource, of the ecosystem to which it belongs, and of other affected resources, and to views of common needs which serve as bases for the specification of common objectives.

Whether IPFC could effectively take such an ambitious view of its responsibilities cannot be said, for the Council has not yet attempted, or been asked to attempt, to do so. It is possible that the Council's Agreement and Rules of Procedure would prove inadequate for this task and presumably it is the fear of this that led to the setting up of the *Ad Hoc* Committee, whose proposals are now before the Council. There are good arguments for the changes proposed, but there are also some reasons for doubting that it is necessary to amend Article IV of the Agreement at this time or, further, to amend the Rules of Procedure. These matters were discussed at length by the *Ad Hoc* Committee in Bangkok last December and the conclusion was reached that amendment of Article IV was advisable. Nevertheless, it should be noted that the changes that the *Ad Hoc* Committee considered necessary do not greatly change Article IV. Eight of the fourteen Member Governments which responded to the questionnaire, while considering that re-drafting of Article IV was necessary, were of the view that the proposed amendments to the IPFC Basic Texts should conform to the results of UNCLOS; one thought that such action was premature, while two others feared that this could prejudice the deliberations and outcome of the UN Conference.

On the other hand, since the Bangkok Meeting, the GFCM has made a similar study of its Agreement of which Article IV was identical with Article IV of the IPFC Agreement, and has decided upon amendments of that Article still more extensive than those proposed by the IPFC *Ad Hoc* Committee.

Thus, the situation is that Member Governments have now to decide :

- (i) whether, after due reflection, it would perhaps be advisable to defer a decision on what amendment, if any, should be made; or
- (ii) if amendment should be made now :
 - (a) whether the *Ad Hoc* Committee's proposal should be adopted; or
 - (b) the GFCM proposal would better serve the wishes of Member Governments; or
 - (c) some combination of the *Ad Hoc* Committee's proposal and the GFCM proposal would be best.

We consider that perhaps the solution (ii) (c) may correspond most closely to the view of Member Governments and would recommend, if that is the case, that at this Session the Council formulate and adopt a suitable version of Article IV. The Council's decision would then be communicated to the Director-General who, in accordance with established procedure, would submit the amendment to the FAO Council for approval. The Council may be encouraged in this course by the endorsement given by COFI and the FAO Council to the proposal to amend the Basic Texts.

It must be pointed out, however, that the Director-General, at the present time, must reserve his position concerning the financial implications on the Regular Programme of any changes in the functions of IPFC.

However, in order to prevent delay in Council work, FAO recommends that as interim measure the Council adopt the following immediate action plan :

- (i) Agreement on certain matters of principle, e.g.
 - (a) that pending the entry into force of the amendments to its Basic Texts that it may adopt at the session, the Council should make the best use of the powers and procedures available under existing texts and recommend any measures conducive to proper utilization;
 - (b) that principles of proper utilization should guide the growth and development of an industry as well as regulate its conduct when developed;
 - (c) that the principles of proper utilization extend beyond mere regulation of a fishery to prevent overfishing;

- (d) that the term "resource" is to be understood to signify more than the fishable stock of an exploited species;
 - (e) that the Council's responsibility is to assist its Member Governments to effect a comprehensive view of the proper utilization of all the resources of the Indo-Pacific region in conformity with the principles of the new economic order.
- (ii) Establishment of a special working party to collaborate with research workers in each country in diagnosing each of the existing fisheries; a diagnosis should have reference to the intensity of exploitation of resource, the efficiency of exploitation, the efficiency of utilization of catch, productivity of labour, living conditions of operatives and to other socio-economic aspects.
 - (iii) Establishment of a special working party to review, with fishery administrators of each country, existing arrangements for monitoring and regulating fisheries and to formulate, with those administrators, suggestions as to the procedures that might be followed in the co-ordination of management arrangements.

The Council will note that the foregoing action plan would, in fact, be valid and effective for whatever decision the Council might make.

Finally, there are two other matters to which attention should be directed. Of these, the first concerns the relations of IPFC with the Indian Ocean Fisheries Commission, International Indian Ocean Fishery Survey and Development Programme, South China Sea Fisheries Development and Co-ordinating Programme, South-east Asian Fisheries Development Centre, South Pacific Forum and the South Pacific Commission. FAO strongly recommends that, in the discussions during this session, and in the work of the two working groups proposed above, the need for co-operation and co-ordination between IPFC and the activities of these various bodies be carefully considered and the possibilities existing in this field fully studied. The second matter concerns inland fisheries and the proposed establishing of an inland fishery body for the Near East, Asia and the Far East. In view of the recommendations contained in paragraphs six and seven of the *Ad Hoc* Committee's report, and in the light of the Report of the Symposium on the Development and Utilization of Inland Fishery Resources, both to be discussed under item 9.1 of your Agenda, the Council will no doubt wish to consider IPFC's role in the future of inland fisheries.

FAO itself, under new direction, is re-examining its role and changes are being made to give its activities greater relevance and impact. In the same spirit you are assembled here today to re-examine the role of IPFC so that it should be a more active body. We have no doubt that the deliberations of this Council will result in useful decisions and we wish you well.

REPORT OF THE FIFTY-FOURTH SESSION OF THE EXECUTIVE
COMMITTEE OF IPFC

Colombo, Sri Lanka, 26, 30 and 31 October 1976

INTRODUCTION

1. The Executive Committee of IPFC held its Fifty-Fourth Session at the Bandaranaike Memorial International Conference Hall in Colombo on 26, 30 and 31 October 1976. The Session was attended by the Chairman and Vice-Chairman of the IPFC. A list of participants is given in Appendix G-II of this report.

ADOPTION OF THE AGENDA

2. The agenda was adopted as shown in Appendix G-I.

ARRANGEMENTS FOR THE SYMPOSIUM ON THE DEVELOPMENT AND
UTILIZATION OF INLAND FISHERY RESOURCES

3. The Executive Committee was informed of the arrangements for the Symposium. There would be four sessions: Session I—National perspectives of inland fisheries; Session II (i) Riverine and estuarine fisheries; (b) Lakes and reservoirs; (c) Culture fisheries; Session III Marketing and utilization; Session IV Conclusions and Recommendations. The Executive Committee noted that the recommendations emanating from the Symposium would be of direct relevance to the discussions at the IPFC itself when the Council reviewed its functions and responsibilities.

ARRANGEMENTS FOR THE SEVENTEENTH SESSION OF IPFC
AND RELATED MEETINGS

4. The Executive Committee reviewed in detail the arrangements for the 17th Session of the IPFC, including the organization of the opening ceremony which was to be held on Monday, 1 November 1976.

ALTERNATIVE APPROACHES TO THE AMENDMENT OF THE
BASIC TEXTS OF IPFC

5. The Executive Committee believed that the transformation of IPFC into an action-oriented body should be accompanied by a change in its name. The Executive Committee decided to propose that IPFC should in future be known as the Indo-Pacific Fishery Commission and felt strongly that the change in name should be symbolic of the beginning of a new era and that IPFC should thus have a new dynamic image.

6. The Executive Committee was provided with information on the alternative approaches to the amendment of the Basic Texts of IPFC as set out in document IPFC/76/4/Sup.2/Annex 3 and did not find them entirely suited to the needs of an action-oriented body. In its view, the functions of the IPFC should be redefined so as to encompass all aspects of management and development of fisheries. As this would involve amending Article IV of the 1948 Agreement in a manner different from the one proposed in the above document, the Executive Committee agreed to propose to IPFC the following redraft of Article IV:

“ARTICLE IV — Functions

The purpose of the Council shall be to promote the full and proper utilization and, where practicable, the development of living aquatic resources by management of fishing and culture operations and related processing and marketing activities in conformity with the objectives of its Members, and to these ends it shall have the following functions and responsibilities:

- (a) to keep under review the state of these resources and of the industries based on them
- (b) to formulate and recommend measures and to initiate and carry out programmes or projects to
 - i. create new fisheries and increase the production, efficiency and productivity of existing fisheries
 - ii. conserve and manage resources
 - iii. protect resources from pollution
- (c) to keep under review the economic and social aspects of fishing industries and recommend any measures aimed at improving the living and working conditions of fishermen and other workers in these industries and otherwise at improving the contribution of each fishery to social and economic goals
- (d) to encourage, recommend, co-ordinate and, as appropriate, undertake training and extension activities in all aspects of fisheries
- (e) to encourage, recommend, co-ordinate and, as appropriate, undertake research and development activities
- (f) to assemble, publish or otherwise disseminate information regarding the living aquatic resources and fisheries based on these resources
- (g) to carry out such other activities as may be necessary for the Council to achieve its purpose as defined above".

FINANCIAL MATTERS INCLUDING A PROPOSED REGIONAL VOLUNTARY FUND

7. The Executive Committee decided to make a general review of the finances of IPFC. It noted that the funds available to IPFC from the FAO Regular Budget covered only administrative expenses (staff, meeting costs, publications and travel). As the Executive Committee considered that the transformation of the IPFC into an action-oriented body would of necessity mean that IPFC should have a well-defined programme of work in addition to its normal meetings and that this would involve extra expenditure, provision should be made for finding additional finance. The Executive Committee therefore suggested that IPFC in addition to the administrative expenses borne by FAO should also have both a separate budget based on compulsory contributions by member countries and a regional voluntary fund to which countries, bilateral funding agencies, international financing agencies and all other interested parties could contribute.

8. The Executive Committee recognized that the establishment by IPFC of such a separate budget would be possible as IPFC is a body set up under Article XIV of the FAO Constitution but that it would require amending the provisions of Article VII of the 1948 Agreement relating to expenses. The Executive Committee felt that a separate budget need not be large but its very existence would be evidence of the interest of member countries in IPFC activities and would give the Council some funds, even if limited, which it could use as circumstances demanded.

9. The Executive Committee proposed to IPFC the insertion of the following new Article before the present Article VII:

Finance

- 1. Each member of the Council undertakes to contribute annually its share of the budget in accordance with a scale of contributions to be adopted by a two-thirds majority of the membership of the Council. Contributions by Members shall be made in cash.

2. The Council may also accept contributions and donations from organisations, individuals and other sources for purposes connected with the fulfilment of any of its functions including emergency action.
3. Contributions shall be payable in currencies, or in kind, to be determined by the Council with the concurrence of the Director-General of the Organization.
4. All contributions and donations received shall be placed in a Trust Fund administered by the Director-General of the Organization in conformity with the Financial Regulations of the Organization.
5. Supplementary contributions may be accepted from a Member or Members for emergency action or for the purpose of financing the programmes or projects referred to in Article IV above.
6. At the end of each financial year, any uncommitted balance of the Administrative Budget shall be placed in a Special Account to be available for the purposes outlined in Article IV.

10. The Executive Committee decided to recommend to IPFC the two following amendments to present Article VII. Firstly, Article VII(3) should be redrafted as follows :

Unless covered by the budget provided for in (NEW) Article VII(1), the expenses of research or development projects undertaken by individual Members of the Council, whether independently or upon the recommendation of the Council, shall be determined and paid by their respective governments.

Present Article VII(4) should be deleted.

Present Article VII(5) should be redrafted to read as follows :

The expenses of experts invited, with the concurrence of the Director-General, to attend meetings of the Council, committees or working parties in their individual capacity shall be borne by the separate budget in so far as these are not met by the Regular Budget of the Organization.

11. The Executive Committee also noted that the proposed amendments to the agreement would, if accepted, involve certain amendments to the Rules of Procedure of IPFC.

12. The Executive Committee decided that its Chairman would refer to this new approach in his opening statement and that the Vice-Chairman would deal with the matter in greater detail at the very beginning of the discussion on item 3 of the provisional agenda.

APPLICATIONS FOR MEMBERSHIP

13. The Executive Committee recognised that the effectiveness of IPFC would be enhanced by all countries in the area being members. Member countries and the Secretariat should make very effort to attract new members.

PROPOSED ENLARGEMENT OF THE EXECUTIVE COMMITTEE

14. In view of the proposed reorientation of the activities of the IPFC the Executive Committee would have increased responsibilities particularly for programmes and projects and there would be a need for broader representation of member countries. The Executive Committee accordingly decided to propose to the IPFC that the membership should be increased to five and should include two members elected by the IPFC. If the IPFC accepts this proposal, this would involve amendments to the Agreement and Rules of Procedure of the IPFC. The Executive Committee believed that the expenses of the two extra members of the Executive Committee should be borne by the IPFC's separate budget.

DATE AND PLACE OF THE EIGHTEENTH SESSION OF THE IPFC

15. The Vice-Chairman stated that he would officially inform the IPFC Session that the Philippines invited the Council to hold its Eighteenth Session in 1978 in Manila. So as to speed up formalities giving effect to the new orientation, the Executive Committee would propose to the IPFC that the Eighteenth Session should be held in early 1978, possibly in March.

16. The Executive Committee considered that item 12 of the provisional agenda of the IPFC (Date and place of the Eighteenth Session) should be taken before item 11 (Election of officers).

DATE AND PLACE OF THE FIFTY-FIFTH SESSION OF THE IPFC EXECUTIVE COMMITTEE

17. It was agreed to hold the following session some time in 1977 at a date to be determined through consultation between the Chairman and the IPFC Secretariat. The Vice-Chairman invited the Executive Committee to hold its next session in Manila.

ACTIVITIES OF SUBSIDIARY BODIES OF THE IPFC

IPFC/IOFC Joint Working Party of Experts and Indian Ocean and Western Pacific Fishery Statistics

18. The Executive Committee examined the Report of the Fourth Session of the Joint Working Party and noted with appreciation the wide range of recommendations.

19. The Committee in particular noted the action-oriented recommendations as follows:

- (a) that there will be a need for *ad hoc* regional working parties or committees to assist in the implementation of plans for the improvement of national and statistical systems of adjacent groups of countries.
- (b) that if the IPFC should decide to establish a standing committee on research and statistics this committee might include a sub-committee on statistics.

IPFC Special Committee on the Management of Indo-Pacific Tuna

20. The Committee reviewed the draft Report of the Fourth Joint Session of the IPFC Special Committee on Management of Indo-Pacific Tuna and IOFC Committee on Management of Indian Ocean Tuna. The Committee noted in particular the recommendations contained in paragraph 16 which involves financial implications for pursuing a tuna management programme.

IPFC Working Party on Fish Technology and Marketing

21. The Committee reviewed the Report of the Second Session of the Working Party and endorsed the recommendation to continue the Working Party beyond the 1978 symposium, as the Working Party will be responsible for co-ordinating the activities of the ongoing IPFC co-operative research programme and fish product development and marketing.

22. The Committee also endorsed the suggestion of the Working Party that the title of the 1978 symposium should be changed from "Fish Handling and Processing Technology and Marketing in the IPFC Region" to "Fish Utilization Technology and Marketing in the IPFC Region."

IPFC Working Party on Aquaculture and Environment

23. The Committee reviewed the Report of the Third Session of the Working Party and endorsed the recommendations as contained on page 16 of the report while at the same time realising the overall financial implications if and when the recommended projects are implemented in the future.

Committee for the South China Sea Fisheries Development and Co-ordinating Programme

24. The Committee reviewed the Report of the Second Session of the Co-ordinating Committee as contained in document IPFC/76/17 and took note with concern of the reduced contribution by UNDP to the South China Sea Fisheries Development and Co-ordinating Programme.

25. The Committee endorsed the recommendation of the Co-ordinating Committee to press the UNDP to honour its commitments to the programme.

Others

26. The Committee noted that the Working Party on Coastal and High Seas Pelagic Resources, the IPFC/IOFC *Ad Hoc* Working Party of Scientists on Stock Assessment of Tuna and the Working Party on the Development and Utilization of Inland Fishery Resources did not meet during the inter-sessional period.

General Remarks

27. Future reports of the IPFC subsidiary bodies where geographical areas are involved should be accompanied by relevant maps and charts.

28. In order for the Committee to be able to co-ordinate the work of the IPFC subsidiary bodies and for the Committee to be better able to review and examine the reports of such bodies in accordance with Rule X, paragraph 2(c) of the IPFC Rules of Procedure, the Committee requests that future reports of IPFC subsidiary bodies should always contain summary conclusions and recommendations. Furthermore, such reports should clearly call the attention of the Committee on matters particularly with policy and financial implications.

29. The Executive Committee reviewed the present and proposed structure of the IPFC in the light of the reports referred to above. It was of the opinion that ultimately the structure of the IPFC would depend on the outcome of the discussion at the session on the review of the functions and responsibilities of the Council. It was agreed, therefore, that the members of the Executive Committee would present proposals on these aspects, including their programme and financial implications, as soon as IPFC had redefined its functions.

ANY OTHER MATTERS

30. The Executive Committee took note of the action taken as a result of its discussions at the fifty-third session.

AGENDA

1. Adoption of the agenda.
2. Arrangements for the Symposium on the Development and Utilization of Inland Fishery Resources.
3. Arrangements for the Seventeenth Session of IPFC and related meetings.
4. Alternative approaches to the amendment of the basic texts of the IPFC.
5. Financial matters including a proposed regional voluntary fund.
6. Applications for membership.
7. Date and place of the Eighteenth Session of the IPFC.
8. Date and place of the Fifty-fifth Session of the IPFC Executive Committee.
9. Activities of subsidiary bodies.
10. Any other matters.

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Mr. D. James
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Dr. C. P. Pillai
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South-West Pacific (APHCA)

REPORT OF THE FIFTY-THIRD SESSION OF THE EXECUTIVE
COMMITTEE OF THE IPFC

Bangkok, Thailand, 15-16 December 1975

INTRODUCTION

1. The Executive Committee of the IPFC held its Fifty-Third Session at the FAO Regional Office for Asia and the Far East in Bangkok on 15 and 16 December 1975. The Session was attended by the Chairman and Vice-Chairman of the IPFC and by three observers from Member Countries of the IPFC. A list of participants is given in Appendix H-II of this report.

ADOPTION OF THE AGENDA

2. The Chairman of the IOFC *Ad Hoc* Committee of Nations on the Mechanics of Tuna Research and Management which had met in Bangkok on 12 and 13 December 1975 had accepted the Executive Committee's invitation to introduce the report of his *Ad Hoc* Committee. It was accordingly agreed that item 3 should be discussed before item 2. The agenda as shown in Appendix H-I was adopted without other amendments.

CONSIDERATION OF THE REPORT OF THE IOFC *AD HOC* COMMITTEE OF NATIONS ON THE MECHANICS OF TUNA RESEARCH AND MANAGEMENT

3. At the invitation of the Chairman, Mr. E. A. Purnell-Webb, Chairman of the IOFC *Ad Hoc* Committee of Nations on the Mechanics of Tuna Research and Management introduced the report of the *Ad Hoc* Committee (IPFC/ExCo 53/5). The Executive Committee noted that IOFC at its Fourth Session held in Mombasa June 1975 had, in setting up the *Ad Hoc* Committee, requested that the matters discussed by the *Ad Hoc* Committee be brought to the attention of the IPFC Executive Committee at its next session. The Chairman stated that the terms of reference of the IOFC *Ad Hoc* Committee had been:

- (i) to prepare statements on the functions and methods of operation of a joint-secretariat and standing committee or committees on statistics and scientific review, and on management advice
- (ii) to prepare a statement on the method of financing the management structure, in the short and long term.

The Executive Committee generally endorsed the report of the IOFC *Ad Hoc* Committee and requested that it should be submitted to the IPFC at its 17th Session in 1976. In endorsing the Report, the Executive Committee took note of a certain number of points and particularly the recommendation concerning financing to the effect that FAO should carry out a careful study of the possible tuna management programme for the immediate future (paras. 12 and 16 of the Report of the *Ad Hoc* Committee). The Executive Committee requested that the Secretariat should complete this study well ahead of time for the 17th Session and circulate it if possible six months in advance to member countries of the IPFC.

4. The Executive Committee felt that the skipjack survey and tagging project should be a co-operative activity between the IPFC and the South Pacific Commission, as proposed by the IOFC *Ad Hoc* Committee.

CONSIDERATION OF THE REPORT OF THE IPFC *AD HOC* COMMITTEE TO REVIEW THE FUNCTIONS AND RESPONSIBILITIES OF THE IPFC

5. The Committee found itself in agreement with all the conclusions and recommendations of the *Ad Hoc* Committee set up by the IPFC to review its functions and responsibilities. It, therefore, decided to endorse the report of the *Ad Hoc* Committee and forward it to the IPFC for favourable consideration.

REGIONAL VOLUNTARY FUND FOR THE IPFC PROGRAMMES

6. While no fund as such had been established, the Committee noted that Australia had agreed to make a voluntary contribution which would be used for organizing a Course on the Management of Small-Scale Fishery Enterprises in 1976. The course was to be held in Sri Lanka. No other voluntary contribution had been made during the present biennium. It was felt that an approach by the FAO Secretariat requesting a contribution should be made to Japan in the future.

CO-OPERATION WITH OTHER INTERNATIONAL AND REGIONAL ORGANIZATIONS

(a) IOC(CSK)/FAO(IPFC)/UNEP Workshop on Marine Pollution

7. The Secretariat referred to the IPFC's 16th Session endorsement of the holding of a regional workshop on marine pollution and for which the Secretary of IPFC was instructed to collaborate with FAO and IOC in preparations for the Workshop (Report of the IPFC 16th Session, p. 9, para. 58).

8. The United Nations Environment Programme (UNEP) is supporting the holding of the Workshop with a contribution of US \$ 50,000 to finance the attendance of selected participants from the region, including a few international specialists on marine pollution.

9. A Steering Committee for the Workshop was formed and met in Bangkok on 9-10 September 1975 to discuss specific agenda items for the Workshop and to identify possible selected participants.

10. The Workshop is scheduled to be held in Penang, Malaysia on 7-13 April 1976.

11. The Executive Committee took note that the Workshop will not only deal with marine pollution, per se, but will also cover inland aquatic pollution, e.g. pesticides, etc.

(b) Others

12. The Secretariat mentioned the recent International Conference on Marine Parks held in Tokyo and the consequent interest of some Member Countries of IPFC to follow up on the recommendations of the Conference. In fact, one IPFC member country has already suggested the inclusion of marine parks as an agenda item for the coming 17th Session of IPFC.

13. In view of the interest of several Member Countries of IPFC, the Secretariat was requested to explore with UNEP the possibility of providing assistance e.g. through a consultant to Member Countries in the establishment of marine parks, gardens and reserves.

14. The Committee was informed by the Secretariat that, as endorsed by the IPFC 16th Session in Jakarta the Government of Thailand will hold a National Workshop on Mangrove Ecology in January 1977, but that only a few participants from outside could be invited. In view of the interest expressed by many people in the Region to participate in the Workshop, the Committee considered recommending the holding of a "regional" workshop on mangrove ecology. The desirability of conducting more national workshops on mangrove ecology was, however, expressed. They could precede the regional workshop.

FOLLOW-UP TO SYMPOSIUM HELD IN CONJUNCTION WITH THE IPFC SIXTEENTH SESSION

15. The Executive Committee noted that the FAO Secretariat in Rome had formed an *Ad Hoc* Group to follow this matter up. The results of its work were outlined in document IPFC/ExCo 53/6. The Executive Committee generally endorsed the results of this work. It was agreed that FAO should elicit from member

countries in the region information on the various activities listed. For example, for the subject "Infrastructure", it was necessary to find out what the countries were doing themselves and what relationship this had to regional and inter-regional activities. For "Resource Assessment", the Committee requested that the Secretariat paper "Accuracy of Resource Data" should, when in final form, be made available to IPFC at its 17th Session.

16. The Committee heard a report from the Secretariat of the First Meeting of the IPFC Working Party on Fish Technology and Marketing that was held in Bangkok on 12-14 November 1975 and the Committee commended the Working Party for its good report as set out in document IPFC/ExCo 53/7. The Committee also endorsed the recommendations as set forth in the report.

PREPARATIONS FOR THE IPFC SEVENTEENTH SESSION SYMPOSIUM

17. The Committee took note of the rather poor response so far to the request for papers for the forthcoming IPFC 17th Session "Symposium on the Development and Utilization of Inland Fishery Resources" to be held in Colombo on 27-29 October 1976. Except for a few abstracts of papers received from the Philippines, none other had been received so far.

18. The Secretariat was requested to follow up with Member Countries and with selected potential authors with a view to the submission of papers, especially before the IPFC Working Party on the Development and Utilization of Inland Fishery Resources will meet in Bangkok in April 1976.

19. As far as the third topic of the Symposium is concerned, i.e. Marketing and Utilization of Inland Fish Catches including Economics of Capture and Inland Fishery Operations, the Committee was informed that the recent meeting of the IPFC Working Party on Fish Technology and Marketing had considered the matter and that an Indonesian author would be identified to prepare a Symposium paper which should reflect practices in other countries as well as Indonesia.

ARRANGEMENTS FOR THE SEVENTEENTH SESSION OF THE IPFC

20. The Committee discussed possible items that could be proposed for inclusion as Agenda Items for the IPFC 17th Session in Colombo. Reference was made to such subjects as a comparative analysis of rules and regulations as they relate to fisheries development and conservation and resolution of possible conflicts between national and local governments; and a proposal for the establishment in the region of an Asian Institute that would train high level experts on all aspects of fishery development, management, technology and aquaculture. As regards the first point, the Committee was informed by the Secretariat that a Workshop on the Legal and Institutional Aspects of Fishery Management and Development, sponsored by the South China Sea Fisheries Development and Co-ordinating Programme would be held in Manila on 16-19 February 1976. It was agreed that the report of this Workshop should be made available to the IPFC. As to the second point the Vice-Chairman indicated that he would submit a formal proposal.

APPLICATION FOR MEMBERSHIP

21. The Committee was informed that Nepal has indicated its interest in joining the IPFC.

22. The Committee noted that the IPFC could be expected to devote increasing attention to the living resources of the Western and Central Pacific, especially tuna. It requested the Secretariat to approach island States in the area that were not yet members of the IPFC and encourage them to join. As attendance at sessions could cause financial difficulties for those States, the Secretariat was also invited to study ways and means of facilitating participation.

ANY OTHER MATTERS

23. One member drew attention to the need for an information retrieval system for fisheries in the region. It was agreed that the Secretariat would examine the present situation and submit a report to the Executive Committee at its next session.

DATE AND PLACE OF THE NEXT MEETING OF THE IPFC
EXECUTIVE COMMITTEE

24. The Executive Committee noted that it would hold a session immediately before the next session of IPFC itself in October 1976. If an additional session was needed before then, this could be decided on, in consultation with the Chairman, in the light of circumstances.

AGENDA

1. Adoption of the agenda.
2. Consideration of the report of the IPFC *Ad Hoc* Committee to Review the Functions and Responsibilities of the IPFC.
3. Consideration of the Report of the IOFC *Ad Hoc* Committee of Nations on the Mechanics of Tuna Research and Management.
4. Regional voluntary fund for IPFC programmes.
5. Co-operation with other international and regional organizations.
 - (a) IOC(CSK)/FAO(IPFC)/UNEP Workshop on Marine Pollution
 - (b) Others
6. Follow-up to Symposium held in conjunction with IPFC Sixteenth Session.
7. Preparations for the IPFC Seventeenth Session Symposium.
8. Arrangements for the Seventeenth Session of IPFC.
9. Application for membership.
10. Any other matters.
11. Date and place of next meeting of the IPFC Executive Committee.

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REPORT
of the
IPFC *AD HOC* COMMITTEE TO
REVIEW THE FUNCTIONS AND RESPONSIBILITIES OF IPFC
Bangkok, Thailand, 8-11 December 1975

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 1976

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PREPARATION OF THIS REPORT

This is the final version of the report as approved by the IPFC *Ad Hoc* Committee to Review the Functions and Responsibilities of the IPFC. The draft amendments to the Rules of Procedure, referred to in paragraph 43, will be circulated to the IPFC member countries separately.

Distribution

Participants in the meeting
 Members of the IPFC
 Other interested nations and international organizations
 FAO Department of Fisheries
 Fishery Officers in FAO Regional Offices

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INTRODUCTION

1. The *Ad Hoc* Committee appointed by the Indo-Pacific Fisheries Council (IPFC) at its Sixteenth Session met at the FAO Regional Office for Asia and the Far East in Bangkok from 8 to 11 December 1975. The session was attended by 13 members of the Council and three observers from the Southeast Asian Fisheries Development Center, the Economic and Social Commission for Asia and the Pacific, and the United Nations Educational, Scientific and Cultural Organization/Intergovernmental Oceanographic Commission. A list of delegates and observers is given in Appendix A to this report.

2. The Chairman of IPFC, Mr. A. S. Mendis, made a brief opening statement (Appendix B). Delegates were welcomed in an opening address by His Excellency Dr. Prida Karnasut, Under-Secretary of State for Agriculture and Co-operatives, Ministry of Agriculture and Co-operatives (Appendix C). Mr. S. H. Prakoso, FAO, Deputy Regional Representative for Asia and the Far East replied in a statement appearing in Appendix D.

ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE MEETING

3. Certain amendments were proposed to the agenda. The amended agenda as adopted appears in Appendix E.

4. The documents before the *Ad Hoc* Committee are listed in Appendix F.

ELECTION OF THE CHAIRMAN

5. Acting on the proposal of the representative of Sri Lanka (Chairman of the IPFC) and supported by the representatives of the Philippines (Vice-Chairman) and Thailand, Mr. E. H. Nichols (United Kingdom) was unanimously elected Chairman of the *Ad Hoc* Committee as provided for in Rule X. 2 (b) of the Rules of Procedure of the IPFC.

REVIEW OF THE FUNCTIONS AND RESPONSIBILITIES OF THE IPFC

(a) *Functions of the IPFC with regard to subject matters*

(i) Inland fisheries

6. In discussing inland fisheries the *Ad Hoc* Committee recognized that the results of the Director-General's consultation requested by the Committee on Fisheries regarding the desirability of establishing an Inland Fisheries Body for the Near East, Asia and the Far East, sometimes cut across the replies to question 4 in the Questionnaire addressed to member countries of the IPFC. The present IPFC area did not, however, coincide with the area referred to in the Director-General's consultation. Some delegations expressed concern about the possibility of an additional cost in establishing a new body and the ability of the FAO Secretariat to deal with the extra work involved. It was recognized that there was a clear need for bodies to deal with inland fisheries in areas where there were common problems such as multiple-use of water or water quality control and common waters such as international lakes and rivers which call for joint action. These conditions existed in continental areas such as Africa and Europe where inland fishery bodies had been established. It was less certain that they applied to the Near East, Asia and the Far East as a whole. While it was clear that more work on inland fisheries in Asia was needed, particularly in the monsoon areas, the Committee considered that this problem did not call for the establishment of a new body.

7. It was agreed that the *Ad Hoc* Committee should recommend to the Council that the IPFC should continue to have responsibility for inland fisheries and that it should be in a position to devote more resources to this sector and to aquaculture generally.

(ii) Statistics.

8. The Committee was of the opinion that the IPFC, so as to provide a needed improved statistical basis for development and management action, should engage more fully in the following activities :

- (a) better identification of specific shortcomings in the present statistics,
- (b) review of current capacities to improve statistics,
- (c) preparation of action plans to achieve an improvement,
- (d) establishment of standard statistical definition and classification of areas, species, groups, etc.,
- (e) compilation of statistics in relation to resources of regional interest.

9. For this to be effective, additional resources would be required. Apart from the FAO regular programme itself, some additional statistical support could be available from the regional projects, including the South China Sea Programme and the Indian Ocean Programme. Both of these now had full-time fishery statisticians on their staff, though these statisticians also had other duties.

10. It was noted that several independent fishery bodies had found it necessary to employ more than one professional staff member to deal with statistics. The IPFC might therefore find further strengthening in statistics essential. The Committee believed that the IPFC should give careful consideration to possible sources of support, including direct contributions from member countries, to its increased statistical function.

11. Improvement of statistics also required regular monitoring and review of current statistical data by some permanent group or Standing Committee of scientists and others from member countries. The present IOFC/IPFC Working Party on Fishery Statistics could, within its existing terms of reference, carry out these tasks. So far it has concentrated on item (d) of paragraph 8 (standards and definitions). Though this work needs to be continued, and it was noted that changes were desirable on the proposed division in the South China Sea area, and in the ISSCAAP¹ species groupings, the group should widen its work to cover the other activities in paragraph 8. In particular it was recommended that the group should meet before (possibly immediately before) the next IPFC session to review the present state of statistics and to make action proposals for improvement, with the identification of priority areas.

12. The Committee considered the Working Party would require better support to enable it to meet more frequently.

13. The Committee believed that for the next session of the Working Party and of IPFC, FAO should prepare a draft regional statistical bulletin. This should be well annotated to show where significant deficiencies lay, and the kinds of assumptions that might have to be made to obtain useful first estimates to certain figures, particularly for important resources.

14. The Committee felt that any regional bulletin of this type should include data on all fisheries in the region. FAO and member governments should take steps to encourage all countries, including non-members of the IPFC that have important fisheries in the region, to join and to submit statistics. The Committee *recommended* that the Working Party should examine the situation and make practical proposals for obtaining statistics from non-member countries. The South Pacific Commission might serve as a focus for the compilation and reporting of statistics from some of the smaller countries in that part of the region, which might not wish to join the IPFC.

15. The Committee believed that all countries utilizing a resource should explicitly accept the responsibility of ensuring its proper conservation and management. This responsibility included the collection of adequate statistical and other data and the reporting of these data to the appropriate body. It therefore *recommended* that all necessary arrangements should be made by countries for the collection of statistics in adequate detail, precision and timeliness and for reporting these to IPFC

ISSCAAP = International Standard Statistical Classification of Aquatic Animals and Plants.

16. The action proposed by the Committee to improve the situation with regard to statistics in the light of this discussion is reported in paragraphs 24 and 32 (ii).

(iii) Assessment

17. Assessment of the resources is the essential step whereby the fishery statistics and other information is analysed and the results presented in such a way that decisions, on active promotion of development at one extreme or implementation of management measures at the other can be taken. It is therefore also a matter to which IPFC and member countries should give high priority. In particular all countries exploiting a stock must accept a responsibility for participating in the assessment of that resource.

18. Within the IPFC, the assessment of the resource required some formal and continuing arrangements, and the Committee therefore *recommended* the establishment of a Standing Committee on Research and Statistics, as discussed under "Management". The present IOFC/IPFC Working Party on Statistics might be absorbed within the Committee as a permanent sub-committee.

19. The Committee felt that this Standing Committee should be composed of member countries which would be represented by scientists. When dealing with specific stocks, it might need to establish *ad hoc* groups of countries directly concerned with those stocks. In addition it would, to be effective, require support from FAO and other sources both in terms of technical and scientific assistance in carrying out the actual activities (which might include preliminary analysis by the Secretariat), and in facilitating travel to meetings, training courses, etc. The Committee *recommended* that FAO should seek to identify possible sources of such support, whether from the Regular Programme, member countries or elsewhere.

(iv) Management

20. The *Ad Hoc* Committee examined this question in the light of the 13 replies sent by Member Governments to the part of the questionnaire dealing with management. In a general exchange of views on the various aspects of management, delegates stated their views on the extent to which they believed that IPFC should be involved in management. From the discussion it became clear that most members considered that it would be advisable to formulate more explicitly than at present the functions of the IPFC as regards the conservation and rational management of living aquatic resources. This should be done in a generic rather than a detailed way.

21. Some delegations stated a preference for restricting the role of the IPFC to a study of the general aspects of management and the provision of advice. They felt that the IPFC should simply provide a forum for discussion and the countries directly concerned should reach agreement on specific conservation measures outside the framework of the Council. The others were prepared to see the IPFC itself play a more important role in facilitating the adoption of specific management measures and in assisting the member countries concerned with the implementation of these measures. The *Ad Hoc* Committee decided to draft provisions that would empower the IPFC to work out recommendations for the rational management of fisheries.

22. The Committee *recommended* that the IPFC should recognize that its main purpose was to promote the development and proper utilization of the living aquatic resources of the region. It took the view that the development and utilization of these resources required their rational management. It agreed that the steps leading to management must emphasize both the preparation of scientific information and advice on the status of the stocks and a recognition of the self-determination and sovereignty of member countries in their quest to arrive at mutually satisfactory management decisions.

23. Accordingly the *Ad Hoc* Committee *recommended* the establishment of scientific and administrative subsidiary bodies to deal with the question of fishery management.

24. The *scientific body* would be constituted as a Standing Committee on Research and Statistics. This body would consist of a permanent sub-committee on statistics and several working groups. The sub-committee on statistics would define the type of essential statistics and other data to be provided by each member and make recommendations to the Council on the implementation of statistics collection procedures. The sub-committee should also endeavour to obtain statistics from non-member countries that fished in the region and in particular should develop a statistical programme for the region capable of being responsive to management needs.

The working groups would be established by the Standing Committee on Research and Statistics, either on its own initiative or at the request of one or more members, to focus upon particular fish stock assessment problems in the region. The terms of reference of the working groups would be worked out by the Council or by one or several of the member countries of the Council. The working groups would submit reports as directed either through the Standing Committee to the Council or direct to the one or several member countries that requested the advice of the Standing Committee. The Standing Committee itself would produce regular reports to the Council reviewing the current knowledge of the state of the stocks in the region, and setting out proposals for improving that knowledge.

25. Whenever administrative advice was requested, *administrative bodies* should also be set up by the Council on its own initiative or at the request of member countries. The administrative bodies would advise and make recommendations on management actions, taking into account the advice given by the Standing Committee, its working groups and other authorities as appropriate. The administrative bodies would be *ad hoc* committees dealing with the administrative issues of concern to the Council or to its member countries, and this would include, where appropriate, the formulation, adoption and implementation of management measures. Participation in the committees would not be obligatory on any of the member countries but the right to vote in the committees would be limited to those countries fishing the stocks or in whose jurisdiction the stocks occurred. Other interested countries could participate as observers. Each committee could define its own rules of operation within the IPFC Rules of Procedure. Countries should recognize that recommendations of the committee would not be binding unless decided otherwise in accordance with the "objection procedure" that each committee could outline for itself. The recommendations of the committee would be addressed to the Council, or if the committee was set up at the request of a group of countries, to the countries concerned; in the latter case, they could also be submitted to the Council for endorsement if so desired.

26. There was general agreement that the adoption of specific management measures should be subject to their approval by a specified majority, for example by a two-thirds majority of those present and voting.

(v) Development

27. As the statistical, assessment and management aspects of the overall development process were considered by the *Ad Hoc* Committee separately, the discussion on development was confined to those aspects of development concerned with the conversion of a fishery resource into food, employment and cash.

28. In answering the questionnaire, 12 countries had indicated that development should play an important role in the affairs of the IPFC. The replies also noted that the role of the IPFC should not be confined to that of a co-ordinator but that it should take initiatives particularly in the formulation of development-oriented projects and activities at a regional or sub-regional level.

29. While the Committee appreciated that development already played a part in the IPFC activities (largely by way of workshops and seminars), it was felt that this role should be considerably expanded in the light of changing circumstances whereby international funding agencies and bilateral programmes were more development-oriented and were giving increasing emphasis to social benefits particularly in the fields of small-scale fisheries and aquaculture.

30. Although not reporting to the IPFC, such regional and sub-regional programmes as the Indian Ocean Programme, the South China Sea Programme, the Small-scale Fisheries Project for West and South Asia and the proposed FAO/SIDA projects for the Bay of Bengal were all in a position to give considerable strength to the IPFC development activities. These programmes could be stimulated by an aggressive IPFC approach to the problem of development. Likewise, it was noted that the Regular Programme of the Department of Fisheries had a considerable input into the development activities of the region and also attended to inter-sessional follow-up on such IPFC activities as the 1974 Planning Symposium.

31. It was suggested that consideration be given to the establishment of a subsidiary body of the IPFC which would be specifically concerned with development and could identify appropriate projects and activities and would also possibly serve to strengthen the relationship with the Regional and Sub-Regional projects.

(b) *Geographical area of responsibility of the IPFC including future relations with other bodies*

32. The *Ad Hoc* Committee considered this item in the light of the replies received to the questionnaire and also on the basis of the document "Existing Institutional Arrangements in the Region". After a general exchange of views in which it was concluded that a precise definition of its general area was undesirable in view of the nature of its various activities, the Committee *recommended* that the definition of the area as contained in Article V be retained but that for administrative purposes the following guidelines be submitted to the Council for consideration :

- (i) for development purposes a precise definition of the IPFC area was not necessary because projects, both regional and country, were supported from different sources and they had their own objectives and areas of concern
- (ii) recognizing that effective management was dependent upon good basic data, the IPFC should undertake as a major responsibility the upgrading of statistics from areas 71 and 81 and the adjacent areas of 61 and 77, it being understood that IOFC had major responsibility for statistics in area 57
- (iii) for stock assessment purposes where the species under study overlapped into areas covered by other organizations, the Council should ensure that there was adequate dialogue with such organizations by way of joint meetings to ensure that realistic assessments were made of the stock over its whole range
- (iv) where particular stocks were exploited by several countries from more than one region the Council should ensure that there was adequate discussion with these countries and relevant regional organizations in order to formulate realistic management measures within specific areas

33. The IPFC was already responsible for inland fisheries but the area covered by the Council's operations should be confined to countries of the northwest, central and southwest Pacific and of the Indian sub-continent and eastern Indian Ocean.

(c) *Staff support to the IPFC*

34. Document IPFC:AHC/75/6 in respect of FAO Fishery Activities and Staff in the Region was summarized. Such support could be categorized as consisting of :

- (i) the IPFC Secretariat
- (ii) the Regular Programme contribution
- (iii) the Field Programme contribution

In the case of the IPFC Secretariat, the Fishery Officer in the FAO Regional Office for Asia and the Far East acted on an almost full time basis, despite many other calls, as Regional Secretary of the IPFC whilst a Headquarters Secretary, stationed in Rome, had the responsibility for the co-ordination of all the IPFC matters. However, it was noted that this officer had to accomplish the same task for some other FAO regional fishery bodies. The work in preparing the Council and other IPFC meetings alone amounted to some U.S. \$100,000 per biennium (without salary or servicing costs and without including the work of the technical divisions at Headquarters). The Regular Programme (Appendix 1 of the document) was substantial and covered all disciplines, involving many visits to, and much work in the region. It was also noted that many Regular Programme activities of a global nature did have a regional application. The expanding Field Programme (Appendix to document IPFC:AHC/75/6), currently employing 48 experts and many consultants within the region and amounting to about U.S. \$16 million for the period of their duration, provided a continuing on the spot multi-disciplinary input. The role of the several regional and sub-regional projects operating within the IPFC region was stressed.

35. The *Ad Hoc* Committee acknowledged and appreciated the significant and expanding efforts within the region but emphasized that if the hopes and objectives of the IPFC were to be achieved, further substantial support would be necessary despite the welcome addition of two fishery officers to the Regional Office in the 1976/77 budget. For example, if the assessment and management role was to be fully implemented additional

statistical assistance would be required in addition to the on-going activities of the statisticians already employed within the projects of the region. Methods of accomplishing the programme were considered including attracting funds from member countries and the use of associate experts and volunteers.

36. The funding of technical committees, symposia, workshops and training courses was discussed. It was pointed out that in several cases (e.g. the Small-Scale Fishery Enterprises Management Course to be funded by Australia and the Project Preparation and Evaluation Course to be funded by the Indian Ocean Programme), it was possible to provide finance to cover all costs. However, in other cases, where activities were of a continuing nature and when there was input from the Regular Programme, it was not possible to be so precise. For instance, it was noted that the cost of adequately servicing a Standing Committee on Research and Statistics would be of the order of U.S. \$70,000 per annum, which, as matters now stood, would have to come out of an already overstretched Regular Programme budget.

37. It was most difficult to increase Regular Programme budgets for secretariat functions. It was very difficult to attract funds from bilateral sources for such purposes as the bilateral agencies appeared to favour providing specific assistance. Also, the financing of field projects had much more appeal to funding agencies.

38. The need to define workload and priorities was stressed and the Secretariat was requested to prepare a document giving an assessment of the work to be carried out, the probable funding requirements, the possible funding methods and any other information which might allow the Council to assess the situation. The document should be presented at the 1976 Council session but should be available for prior consideration by member countries some months before the session. In preparing such a document, note should be taken of the possibility of obtaining funds for direct utilization by the IPFC as opposed to being routed through other programmes.

39. During consideration of Article II-5 of the Agreement by the *Ad Hoc* Committee, the possibility of relocating the Council's Secretariat more centrally within the area was mentioned. However, since the Committee did not have sufficient data to permit it to consider this suggestion substantively, it decided to request the FAO Secretariat to prepare for consideration by the Council at its next session, a document outlining the merits and demerits of relocating the Council's Secretariat to alternative convenient places.

(d) *Conclusion to item 3 of the agenda (review of functions and responsibilities of the IPFC)*

40. In reviewing the achievements and limitations of the IPFC since its inception, the Committee found it impossible to quantify these achievements but it considered that much of the progress that had taken place in fisheries within the region would either not have taken place in the absence of the IPFC or would have taken place more slowly and in a more haphazard fashion.

41. In concluding its discussions on the review of functions and responsibilities of the IPFC, the *Ad Hoc* Committee agreed to propose to the Council the following amendments to the 1948 Agreement establishing the IPFC and to the Rules of Procedure of the Council. It requested the Secretariat to edit the proposals before submission to the Council in order to introduce any necessary drafting changes and such other alterations as may be required to bring the text of the Agreement into line with the current provisions of the Basic Texts of the FAO.

42. *1948 Agreement Establishing the Indo-Pacific Fisheries Council*

Preamble

Redraft as follows:

“The contracting Governments having a mutual interest in the development and rational utilization of the living aquatic resources of the Indo-Pacific area and desiring to further the attainment of these ends through international co-operation by the establishment of an Indo-Pacific Fisheries Council, agree as follows :”

*Article II**Paragraph 5*

Delete the last sentence.

Paragraph 7

Redraft the last sentence as follows :

“The Rules of Procedure of the Council and any amendments thereto shall come into force as from the date of approval by the Director-General of the Organization”.

*Article III**Paragraph 1*

Redraft the last sentence as follows :

“In the unavoidable absence of one or two members of the Executive Committee from a Committee session, the Chairman shall have the power to co-opt the chairmen of one or two of the committees which may from time to time be established.....” (the rest without change).

Article IV

Redraft as follows :

“The purpose of the Council shall be to initiate and promote the development and rational utilization of living aquatic resources and to this end the Council shall :

- (a) formulate the oceanographical, biological, economic, social and technical aspects of the problems of development and rational utilization of living aquatic resources
- (b) encourage and co-ordinate research and application of improved methods in everyday practice
- (c) assemble, publish or otherwise disseminate oceanographical, biological, economic, social and technical information relating to living aquatic resources
- (d) recommend to Members such national or co-operative research and development projects as may appear necessary or desirable
- (e) propose, co-ordinate and undertake, where appropriate, co-operative research and development projects
- (f) propose, and where necessary adopt, measures to bring about the standardization of scientific equipment, techniques and nomenclature
- (g) foster training and extension work in all aspects of fisheries
- (h) carry out such other activities as may be necessary for the Council to achieve its purpose
- (i) report upon such questions relating to oceanographical, biological, economic, social and technical problems as may be recommended to it by Members or by the Organization and other international or private organizations with related interest
- (j) transmit biennially to the Director-General of the Organization a report embodying its views, recommendations and decisions, and make such other reports to the Director-General of the Organization as may seem to it necessary or desirable”.

43. *Rules of Procedure of the Indo-Pacific Fisheries Council*

- (i) The *Ad Hoc* Committee recognized that the recommendations it was submitting to the Council regarding the establishment of scientific and administrative subsidiary bodies to deal with the question of fishery management, would or might involve amending the Rules of Procedure of the Council. As a matter of policy, it considered that it was desirable to reflect these recommendations in the Rules of Procedure. It requested the Secretariat to work out the appropriate draft amendments; particular attention was drawn to Rule X which should make specific provision for the establishment of the subsidiary bodies proposed in the body of this report. The proposed draft amendments should be circulated to member countries of the IPFC together with the present report
- (ii) Having reviewed the present Rules of Procedure, the *Ad Hoc* Committee concluded that no other substantive changes were required

ANY OTHER MATTERS

None

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ADDRESS BY MR. A. S. MENDIS, CHAIRMAN OF THE
INDO-PACIFIC FISHERIES COUNCIL

As Chairman of the Indo-Pacific Fisheries Council it gives me great pleasure to make this very brief statement. It is heartening to note that representatives of nearly all the member states, the key officials of the Fisheries Department of FAO and observers from international organizations are present at this meeting.

The IPFC has effectively functioned for 25 years and at its last session in Jakarta it considered that it had performed, under the present Rules of Procedure, a considerable volume of service to member states. Many delegates at that session indicated that it was appropriate that we review the functions and responsibilities of the Council. It is now left for us to consider very carefully the role that the IPFC would play in the future, particularly in view of the fact that in recent years, the IPFC has been gradually breaking away from the old concept that the Council has served as a mere forum for exchange of views and information to an action-oriented fishery body. Our task during the next few days would therefore be to determine the role of the IPFC in the future and make recommendations to the next meeting of the Council on ways and means of fulfilling these functions. We have a very heavy programme before us and without taking any more of your time I will call upon His Excellency, Dr. Prida Karnasut, the Under-Secretary of State for Agriculture and Co-operatives of Thailand, who is an old friend of ours, to address you.

ADDRESS BY HIS EXCELLENCY DR. PRIDA KARNASUT,
UNDER-SECRETARY OF STATE FOR AGRICULTURE AND CO-OPERATIVES,
MINISTRY OF AGRICULTURE AND CO-OPERATIVES
OF THAILAND

Mr. Chairman, Mr. Popper, Mr. Prakoso,
Distinguished Delegates and Observers,
Ladies and Gentlemen,

I am certainly pleased to see many of my old friends and former colleagues in fisheries here today. It gives me great pleasure on behalf of my Government and the people of Thailand to welcome you all once again to Bangkok on the occasion of this important meeting of the IPFC *Ad Hoc* Committee to Review the Functions and Responsibilities of the IPFC.

As many of you know, I have had a long career and association in fisheries and at the 1st IPFC session, the fourteenth, that was held here in Bangkok five years ago at this very same hall, I was my country's representative.

I have followed with great interest the activities of the IPFC, both in my official and personal capacities, and I am glad that you are having this meeting now to review the functions and responsibilities of the IPFC.

The IPFC was formally established in November 1948 and, as of this month, it is now entering its twenty-eighth year. This is certainly a long period of existence for any organization and the very fact that the IPFC has survived through these years attests to the need of member countries for regional co-operation. There is no doubt that the IPFC has been of immense value to member countries since its establishment; in fact a recent publication entitled "Twenty-Five Years of IPFC" which is one of the information documents of your meeting, contains an impressive account of the past activities and accomplishments of the IPFC. On the other hand, in recent years, many people have begun to question the effectiveness of the IPFC. Naturally, and I think everyone of us will agree, the situation 27 years ago or even 15 or 10 years ago in the region is much different than it is now. In the light of the present situation, we need, therefore, a new perspective. I am glad to note that, since the Fifteenth Session in 1972, the IPFC has started to change from a mere forum of exchange of information, ideas and experiences into an "action-oriented" regional fishery body. Mr. Popper, I understand, highlighted this point at the Wellington Session in 1972. Nevertheless, the "action-oriented" principle of the IPFC still has to be translated into practical terms or into reality for the benefit of member countries in the region. While pursuing the spirit of regional co-operation, member countries must develop self-reliance to be able to better share their experiences and their knowledge with other countries. We have much to learn from each other within the region and we have no mechanism or institutional machinery yet, for example like an IPFC regional institute or regional centre. Having been a fisheries man myself and knowing the multi-disciplinary aspects of fisheries, I am disheartened by the fact that, for the IPFC region, there is only one regional fishery officer in the IPFC Secretariat in Bangkok. I sincerely hope that this unrealistic situation will not continue and I am glad to see that you have in your agenda an item "Staff support to the IPFC".

Much can and should be done to improve the IPFC, to accelerate fishery development in the region, especially in the field of aquaculture, and in fostering regional co-operation among the member countries.

As one of the countries in the region which receive great benefits from fisheries, Thailand has now undertaken various development and research programmes aiming at the conservation and rational utilization of the fish stocks. In the past, the development of our marine fishing industry was at a much faster rate than that of our research programmes; however, we will now concentrate on the management aspect to ensure a maximum sustained benefit from these resources. In the implementation of some of these programmes, we have followed several useful recommendations originating from the IPFC. Hence, my country would like to see that this regional fishery body continues to serve its member countries, with the strengthening of its action programmes.

I hope that you will have fruitful discussions and that as a result of this momentous meeting in the history of the IPFC we can look forward to a more progressive and enlightened fishery development in our region.

In closing, may I wish you a successful meeting and that you may have a pleasant and enjoyable stay in Bangkok in spite of possibly some inconveniences, like bad roads and bad transport caused by recent floods in the city.

ADDRESS BY MR. S. H. PRAKOSO, DEPUTY FAO REGIONAL
REPRESENTATIVE FOR ASIA AND
THE FAR EAST

Mr. Chairman, Your Excellency the Under-Secretary of State for Agriculture and Co-operatives,
Mr. Popper, Ladies and Gentlemen,

May I, on behalf of Dr. D. L. Umali, our Assistant Director-General/Regional Representative for Asia and the Far East, welcome you all to the FAO Regional Office on the occasion of this very important and crucial meeting of the Indo-Pacific Fisheries Council.

Dr. Umali deeply regrets that he is not in the position to be here this morning as he has to open another meeting at this very moment also here in Bangkok, which is the Joint FAO/WHO Food Standards Regional Conference for Asia. Nevertheless, Dr. Umali's absence is no reflection of his keen interest for fishery development in this region and in the activities of the IPFC. Only less than two months ago, we had here in the Regional Office a Fisheries Strategy Meeting on FAO's programme for the region and Mr. Popper himself, together with his senior officers from the FAO Headquarters, came and also the Project Managers of the regional fishery projects in the Indian Ocean as well as in South China Sea regions, plus representatives from UNDP Headquarters and the International Center for Living Aquatic Resources Management. And before that, we also had here an FAO/UNDP Regional Workshop on Aquaculture Planning and last week we just concluded a six-week FAO/DANIDA Workshop on Fish Handling, Plant Sanitation, Quality Control and Fish Inspection so that this IPFC *Ad Hoc* Committee Session is the fourth FAO fisheries meeting we are having here in Bangkok in a period of less than two and a half months.

This IPFC session will, I understand, be still followed by two more meetings, also here in the Regional Office, one the IOFC *Ad Hoc* Committee of Nations on the Mechanics of Tuna Research, on 12 and 13 December, and the other the IPFC Executive Committee on 15 and 16 December.

While we often hear of criticisms that there are so many meetings being held in the United Nations family, I would like to think that this series of fisheries meetings we are holding here in Bangkok is indicative of not only the complexity of problems in fisheries but also the keen interest of Member Nations in this important field. Fishery development problems and the approaches used are not only discipline-wise, but also region- and sub-region-wise. In fact, I understand that the Council of the Southeast Asian Fisheries Development Center will also meet here in Bangkok next week.

Your task here in this meeting to review the functions and responsibilities of the IPFC is, to my mind, a very timely one that could have a far-reaching impact on the future role not only of the IPFC itself but also of the FAO and Member Governments and on the effectiveness of regional co-operation in this part of the world where roughly 40 percent of the world's total fish production comes from and even more than 80 percent of the world's production in the case of aquaculture. On the subject of regional co-operation, particularly in aquaculture, we would hope that the People's Republic of China, which is the world's largest aquaculture producing country, would in the near future actively participate also in the IPFC.

In reviewing the functions and responsibilities of the IPFC, you will, I am sure, have a rich background of the experience of the 27 years of existence of the IPFC. No doubt, the IPFC in general has been valuable and useful to member countries in the region but, as the Council itself has decided in its last regular session held in Jakarta last year, it is now time to make a meaningful review of the IPFC's functions and responsibilities, in particular as these relate to fishery management and development. In addition, as your provisional agenda indicates, there are other important subjects like statistics, assessment and staff support to the IPFC. You will, I am sure, with your deliberations and collective wisdom, succeed in your task of reorienting the IPFC and shift it into a higher-powered gear so as to enable it to vigorously promote and accelerate fishery development and inter-country co-operation in the region.

In regard to regional co-operation, which I believe is the motivating spirit of the IPFC, the guiding principle should be the sharing of resources and experiences among the Member Nations for their mutual benefit. In other words, a member country which had good facilities and advanced expertise in a specific field that could be shared with the other member countries, would offer to make available these facilities and expertise. Thus, the facilities and experiences of an existing stronger institution could be fully harnessed on a sharing basis and the expertise of one country could be put to use in the interest of the other member countries. This concept of regional co-operation has naturally involved a great deal of sacrifice, magnanimity and generosity on the part of the participating countries.

I do hope that in your discussions and deliberations you may consider the various forms or mechanisms of regional co-operation in the field of fisheries. As I said earlier, since several member countries are specialized and have developed expertise in certain aspects of fisheries, it may be worthwhile to consider establishing a network of national institutions of excellence as reference centres for the region so that the countries can help each other and learn from each other. External support, if necessary, may be sought in order to supplement the combined resources so as to facilitate the proper operation of such a co-operative scheme.

Lastly, may I draw your attention to the new orientation called for by the Eleventh FAO Regional Conference held in New Delhi, 1972, namely that the development effort in the fisheries sector be focussed on the small producer's needs and problems, and therefore mainly on that area of meaningful and productive employment most likely to be hospitable to his situation and capabilities. The Twelfth FAO Regional Conference held in Tokyo, 1974, re-emphasized this priority area and special attention should be given to co-operative programmes and to the hitherto generally neglected sub-sector of aquaculture. Ninety percent of a potential area of about 20 million hectares suited for aquaculture still remains untapped. Production in the region from the existing aquaculture area alone could easily be increased by 100 percent through polyculture or fish stock manipulation; and by 300 percent and more with application of inputs such as fertilizer, pesticides and supplemental feeds. Aquaculture provides equally good opportunities for the small agricultural farmer to diversify his crop production. For example: paddy and fish, poultry and fish, ducks and fish, etc. In other words the combination of crop-livestock-fish production, which utilizes fully the waste products of each sub-sector to the optimum productivity of the whole scheme, deserves due attention. The forthcoming FAO Regional Conference to be held in October 1976, very likely in Indonesia, will deal with this very subject as one of the important items of the agenda.

By stressing the great importance of aquaculture, the technology of which has been fairly well developed in our region, I do not mean to decry the role and value of large-scale commercial marine fisheries; however, the picture that emerges from an objective assessment of the fisheries sector is a grossly unbalanced development, heavily weighted in favour of the marine and big entrepreneurial commercial aspects to the neglect of those areas of development which vitally affect the vast masses of producers and consumers in the region. Of the potential of about 40 million tons from marine fisheries, 25 million tons are currently exploited mainly by large-scale commercial operators. Yet 95 percent of the people directly engaged in fishing constitute one of the most impoverished and depressed sectors of the region's population. Aquaculture and fish farming modes of development, suited to the needs of this sector, urgently command high priority.

Dr. Umali and I will follow with great interest your deliberations and we wish you a successful and fruitful meeting.

AGENDA

1. Adoption of the agenda and arrangements for the meeting
2. Election of officers
3. Review of the functions and responsibilities of the IPFC
 - (a) Functions of the IPFC with regard to subject matters:
 - (i) inland fisheries
 - (ii) statistics
 - (iii) assessment
 - (iv) management
 - (v) development
 - (b) Geographical area of responsibility of the IPFC including future relations with other bodies
 - (c) Staff support to the IPFC
4. Any other matters
5. Adoption of the report

LIST OF DOCUMENTS

- | | |
|-------------------|---|
| IPFC:AHC:75/1 | Provisional agenda |
| 2 | Annotated provisional agenda |
| 3 | Provisional timetable |
| 4 | Review of functions and responsibilities of the IPFC
(replies of member countries to the questionnaire of 9 June 1975) |
| 5 | Existing and possible institutional arrangements in the region |
| 6 | FAO fishery activities and staff in the region |
| 7 | Proposed establishment of an inland fishery body for the Near East, Asia
and the Far East |
| IPFC:AHC/75/Inf.1 | List of documents |
| 2 | Indo-Pacific fishing areas: catch statistics and charts |
| 2, Sup.1 | Twenty-five years of the IPFC |
| 3 | |
| 4 | Report on FAO, the FAO Committee on Fisheries and International and
Regional Fishery Bodies |
| 5 | Information for participants |
| 6, Rev.1 | List of delegates and observers |
| 7 | Effectiveness of existing fisheries management machinery |
| 8 | Functions, methods of operation and financing of secretariat and committees |
| 9 | Order of the day — 8 December 1975 |
| 10 | Suggested changes to the IPFC (Australian views) |

SUMMARY REPORT OF THE IPFC SYMPOSIUM ON
THE DEVELOPMENT AND UTILIZATION OF INLAND FISHERY RESOURCES

Colombo, Sri Lanka, 27-29 October 1976

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1. OPENING ADDRESSES

Opening Address by Mr. A. S. Mendis

I am extremely happy to welcome you here today and to have been afforded this opportunity to say a few words by way of inauguration of this Symposium on the Development and Utilization of Inland Fishery Resources.

The region produces about 30 million tons of fish annually which is about 40 percent of the entire world's catch. The potential yield for the region is estimated to be higher, but I am sure a substantial increase than earlier forecast can be expected by resorting to aquaculture, particularly in freshwater.

In the region, fish constitutes the main form of protein intake in the diet of the people, and along with rice is the staple food. However, the consumption of fish by the majority of the people in the region is low and need be increased.

It is essential that all possible means be explored to increase the production of fish. From time immemorial people in south and southeast Asia have resorted to aquacultural practices. Today 80 percent of the world's fish production through such practices comes from this region. During the past 25 years or so production from inland fisheries in the region has increased tremendously. This has been made possible by intensifying traditional culture techniques, by making use of new technology such as the induced breeding of several varieties of fish and by the free transfer of technology and techniques from one sub-region to another. Much of this has been possible as a result of symposia such as the one being inaugurated today.

IPFC has organized two other symposia in the past devoted to development of inland fisheries. There was the symposium on "The Introduction and Transplantation of Fish" and there was the one on "Fish Culture in Rice Fields". We in Sri Lanka benefitted a great deal from these symposia. The one on introduction and transplantation of fish provided us with the impetus to develop our own freshwater fisheries. We have in Sri Lanka several thousand irrigation reservoirs scattered throughout the country. These reservoirs are being utilized for fish production through aquacultural practices. Desirable species of fish have been introduced into these waters and we are now producing about 15,000 tons of fish, whereas 20 years ago the production was almost nil. We have been able to do this without having to resort to construction of ponds but by using existing man-made reservoirs. Other countries in the region have made strides in increasing fish production through aquaculture practices in ponds. They too, I am sure, have profited from discussions and recommendations of past symposia and other technical programmes of IPFC. We have much to learn from each other. This symposium will no doubt provide information and know-how to accelerate development of inland fisheries. Such development will not only increase the quantity of fish available for the use of the ever-increasing masses of people in the region, but also provide gainful employment to some of them.

Ladies and gentlemen, without taking any more of your time, I will call upon Dr. Jhingran, the convenor of the symposium, and Dr. Welcomme, the Technical Secretary, to take over and outline the organization of this symposium during the next three days.

Whilst wishing the symposium every success, I trust that you will come up with concrete proposals possibly in the form of projects to be taken up by IPFC at regional or subregional level.

Thank you.

Opening Address by Dr. V. G. Jhingran, Chairman of the Symposium

Four years ago in Wellington, New Zealand, we felt that in view of the protracted neglect of the inland fishery resources of the countries of the Indo-Pacific Fisheries Council region, the Council needed to focus its attention on these varied resources with a view to (1) taking stock of the state of their development at the present point of time, (2) assessing the contribution the resources make on the national economies of the countries of the region, (3) deciphering their problems of research, development and utilization, so as to evolve a regional plan for augmenting their development and utilization to fullest possible extent.

The inland fishery resources of any country can be categorized into two types, capture and culture. Capture fishery resources are often defined as a resource where man only reaps without having to sow, and culture where one has not only to sow but also to nurse, tend, rear and then harvest. These two categories, as applied to inland fishery resources, probably now exist only in theory. In actual practice the development of conventional capture fishery waters like a river, an estuary, a lake or a reservoir brings to bear upon it the application of aquaculture techniques to a varying degree, ranging from artificially providing facilities for brood stock to spawn and for the spawn to survive so to help raise the rate of recruitment and reduce the natural mortality of the recruits, up to application of advanced aquacultural techniques like manuring, fertilizing and feeding to accelerate the growth rates of finfish and shellfish and of the populations based thereon. We, thus, emerge with a third category of resource, call it what you may, capture-cum-culture or by any other name, but nevertheless involving both capture and culture fishery practices. Perhaps a judicious merging of the two resources if applied for the development of this new category of resource would lead to maximizing of production from such water bodies.

An analysis of the components of capture and culture fishery resources immediately reveals that the former comprises rivers, estuaries, natural lakes and lagoons, man-made reservoirs and canals and the latter, ponds and tanks and perhaps swamps and marshes. The point where a man-made or a natural pond becomes a man-made reservoir or a natural lake, to steer clear through the controversy attached to definitions, is perhaps best decided arbitrarily. All large bodies of standing water may be regarded as lakes and small shallow bodies of standing water in which extensive occupancy by higher aquatic plants is a common characteristic as ponds. To arbitrate between large and small, and deep and shallow, we may consider introducing the concept of manageability of water bodies by applying accepted capture or culture fisheries methodologies. We might say that standing water bodies, which as a whole can be manually fertilized and/or manured to augment the bottom soil or water based biological productivity, are ponds and the rest, undoubtedly bigger water bodies, as reservoirs. In this manner we shall be formulating a fisheries definition of a standing water body, pond or reservoir, as distinct from a geographical or limnological definition. The word manual imparts to this arbitrary definition the artisanal, as against industrial, significance, as indeed aquaculture in the IPFC region at present largely is.

The above stated categories of inland fishery resources (viz., rivers, estuaries, natural lakes and lagoons, man-made reservoirs and canals, ponds and tanks, swamps and marshes) are not only common to the countries of the IPFC region but indeed to the whole world. Their extent, however, greatly varies and so do their limnology, ecology and species of fish that currently thrive or have the possibilities of thriving. In our discussions in this symposium, we shall undoubtedly strive to lay down the principles of development emphasizing more often common denominators in their generalities like the ratio and proportion of predator and prey species; of bottom, column or surface dwelling fish species and other organisms; of carnivores, herbivores, omnivores; of systems of capture and culture such as those for carp, milk fish fisheries, shrimp, *Macrobrachium*, paddy-cum-fish-culture, etc., rather than on site specific instances valid to individual countries. Special case histories of riverine and reservoir fisheries which we wish to be cited in this symposium would help us furnish guidelines in a general manner as to what concrete steps to take and what not to take for the development of water bodies of the countries of the region.

We shall be on the look out for common denominators, as indeed a regional body like the IPFC should be, if the inland fisheries of the countries of the region are to be developed to their legitimate ends. There are a large number of such areas which are to be considered by the symposium. Some of these areas are: the constraints in the development and utilization of inland fishery resources; patterns of fisheries administration; regulations pertaining to management of capture fisheries; pollution caused by domestic and industrial waste release and that by pesticides; eutrophication and attendant water hyacinth and salvinia problems; socio-economic status of inland fishermen; the importance national governments attach to inland fisheries development and so on.

The erratic behaviour of some of the marine fish populations (e.g., Peruvian anchovy) combined with escalation of cost of marine fishing operations due to global hike in oil prices, the incidence of marine pollution and destructiveness of some of the marine fishing operations, have given a fillip to the development of inland fisheries, especially aquaculture. Inland fisheries, especially aquaculture, is believed to be labour intensive and does not require much foreign exchange for its development. But this may as well be jumping from the frying-pan into the fire. The inland areas are, however, more prone to pollution than the sea and if some of the marine

fisheries are threatened by being overfished; the inland fisheries are apt to be exterminated altogether by pollution alone leaving aside the effects of destructive fishing practice. Extreme caution is, therefore, required in planning the development of inland fisheries and, I am sure, this symposium is going to consider some of these aspects in its attempts to evolve a regional plan for maximizing their development and utilization.

The inland fisheries sector unfortunately deals with a class of humanity which is the poorest amongst the poor and therefore the socio-economic aspects of inland fisheries development and utilization are perhaps of utmost importance. The Symposium on Economic and Social Aspects of National Fisheries Planning and Development, which was held in conjunction with the 16th Session of the IPFC at Jakarta, Indonesia, was good going and, I hope, that the present symposium, in association with the 17th Session of the IPFC at Colombo, Sri Lanka, will, apart from considering technical and administrative aspects of inland fisheries development and utilization, add further strength to this highly important socio-economic well-being of the presently down trodden inland fishermen of the IPFC region.

2. REPORTS OF SESSIONS

SESSION I

SUMMARY OF POINTS EMERGING FROM PRESENTATION
OF NATIONAL ABSTRACTS

Discussion Leader: V. G. Jhingran

Statements on national perspectives were presented by Bangladesh, India, Indonesia, Korea, Malaysia, New Zealand, the Philippines, Sri Lanka, Thailand, U.K. (Hong Kong) and U.S.A. The countries that gave accounts of their inland fisheries resources accounted for 2.16 million t. of inland fish production annually. Adding to these the recorded catch of Burma, Democratic Kampuchea, Pakistan and Viet-Nam, using FAO figures, the total production is 2.48 million t.

There is a general lack of reliable data in most of the countries of the region on the inland fishery resources. There is also a lack of inland fishery catch statistics and the breakdown of production according to habitat and species. In most cases, only estimates of marketed surplus are regularly known and these are total inland yields for inland waters. Lack of full and dependable knowledge of resources and catch statistics constitute a serious constraint in planning resource development and keeping a check on progress of development.

The potential for the development of inland fisheries in the IPFC region is tremendous, particularly through aquaculture, and, on full development, the resource can contribute substantially to meet the protein gap in the diet of the people and provide employment in the rural areas.

Some countries mentioned a lack of consumers preference for freshwater fish. This situation can be remedied by product development. Continued research within the region in developing technologies relevant to particular habitats will contribute substantially to the full utilization of inland fishery resources.

In many areas of research considerable expertise has already developed within this region, e.g., polyculture in India, bangus culture in the Philippines, *Macrobrachium* culture in Malaysia, *Clarias* culture in Thailand. Such knowledge should be made available for the benefit of all the countries of the region through exchange of experts and information within the region.

Water management, with due regard to needs of aquaculture in relation to agricultural and irrigational needs, was mentioned as a constraint to development of inland fisheries by some countries. This could be safeguarded by suitable legislative action. Recycling of wastes and the integrated rural development of aquaculture, agriculture, horticulture, duck rearing, sericulture and animal husbandry were considered highly desirable development tools for inland fisheries development.

Lack of instituted finance for inland fisheries development was mentioned as a constraint by many countries.

SESSION IIa

RIVERINE FISHERIES INCLUDING ESTUARIES AND
FLOODPLAINS

Discussion Leader: C. H. Fernando

Rapporteur: R. L. Welcomme

Review: R. L. Welcomme

In this discussion rivers are treated as total systems, including the main channel, the floodplains and the estuarine delta. The whole basin approach is probably the most satisfactory, as actions within any one part of the system are apt to affect those areas downstream. In addition, the biotic components of the riverine environment are often highly mobile, moving from one type of ecosystem to another.

The majority of inland capture fisheries in southeast Asia are perforce limited to the rivers as there are few natural lakes in the region. Several of the world's largest river systems drain the area and these are fringed, at least for part of their length, by floodplains. The extensive estuarine deltas, which are characteristic of most Asiatic rivers, are also seasonally submerged. This picture, in fact, should be presented in the past tense as land and water management in recent years had changed the nature of several of the river systems, converting some into a series of reservoirs and altering the flood regimes of others by drainage and flood control schemes. Stocks of riverine fish are utilized for two main purposes, firstly the capture of adult fish for immediate consumption and secondly the supply of alevins which serve as fish seed for the stocking of reservoirs, tanks and aquaculture ponds. Occasionally adults are captured for spawning purposes in species needing artificial propagation (see papers SYM/20, 36, 37).

It is difficult to assess the amount of fish actually caught from rivers. There is now considerable confusion between fish produced by capture and that arising from extensive culture. The practices tend to merge, especially where they are dependent on stocking of natural or even man-made waters, and much of the production assigned to aquaculture is still dependent on the maintenance of adequate quantity and quality in the natural waters as well as on the well-being of riverine fish stocks.

Few figures have been cited by contributors to this symposium for the production of river fisheries. Srinivasan and Sreenivasan (SYM/8) quote a catch of 16,000 t/year from the Cauvery River, a high figure for a river only 850 km in length when compared with rivers elsewhere in the world. However, the Cauvery has been more intensively dammed than any other river in India and has a fairly extensive deltaic floodplain from which much of the production comes. The figures for the Ganges given by Jhingran and Tripathi (SYM/53), on the other hand, are extremely low and one would expect far more than 890 kg/ha from a river of this size. Similarly the yield of 244 t from the 1,440 km. long Godavari system seems almost negligible even though Rao and Rajyalakshmi in their contribution (unprinted) have detected signs of overfishing even at this level of exploitation. Johar (SYM/17) quotes a production of 13,000 t. from the rivers and estuaries of Malaysia, and Susanto (SYM/49) records the remarkable catch of over 3,000 t. of *Microbrachium* from the rivers of Indonesia. Estuarine fisheries are little mentioned for although Paktasi and Ghosh (SYM/11) cite a catch of 12,000 t/year from the Hooghly-Matlah estuary which also has untapped potentials for the supply of mullet fry according to Gopalakrishnan and Ghosh (SYM/12), figures for the other deltas, those of the Ganges-Brahmaputra in Bangladesh, the Irrawaddy, the Chao Phya and the Mekong are unfortunately not available to this symposium except in summary form by Gopalakrishnan (SYM/13).

The apparent lack of adequate catch statistics from the major river systems of the area is extremely serious. Rivers and their floodplains are increasingly under pressure from many users other than fisheries, and the assessment of the effects of both fisheries and nonfisheries management measures within the individual river basins is of high priority if any production from these waters is to be maintained. Furthermore, in the absence of some form of standard based on statistics, the risk of taking inappropriate or destructive management decisions is considerably heightened. In Africa it has proved possible to generalize from catch statistics that the yield to be expected from a river, setting aside major floodplain areas, is about $1/500 L^2$ (Welcomme, SYM/48).

The catches from the major floodplain areas have been estimated at about 50 kg/ha, and what evidence we have from South America seems to indicate values of a similar order. It would be useful if similar generalizations could be made for the river systems of Asia. At present most figures quoted appear to be low compared with other tropical systems and the question obviously remains as to whether this is an artefact arising from the inadequacies of the statistics collected, the result of poor management or reflects a real difference in the productivity of the system.

In the detailed studies presented on the rivers of the Indian subcontinent, there appears to be cause for some concern. Environmental degradation is apparently being produced from two main sources. The barring of rivers by dams has resulted in the virtual disappearance of the *Hilsa* fishery from several rivers (see papers SYM/8 and SYM/1), although this has been compensated for by the increased potential of the reservoirs. Behavioural effects have been noted in the changed flow downstream of dams, and several species may have declined because of this. For instance, *Puntius dubius*, *Tor khudree* and *Barbus hexagonolepis* have nearly disappeared from the Cauvery system due to the extensive damming of the upper reaches of the Cauvery system (SYM/53). Further detrimental changes could possibly be traced to the failure to inundate the former floodplain or by deliberate drainage and flood control which have transformed the lakes and channels of the marshy plains into regulated rice fields. Some proposals have been made for the establishment of fish culture in such areas (SYM/1, SYM/2, SYM/47) although traditional fisheries are still of importance (Sym/10, SYM/53).

Several contributions mention the heavy pollution load that is now appearing in some Asian rivers. Boonsom (SYM/14) mentions the highly polluted conditions of the lower urbanized reaches of the Chao Phya River. Patil (SYM/42) and Jhingran (SYM/53) both list the deterioration in water quality in some Indian rivers. Pollution problems have also been reported from Indonesia (SYM/2). Many of the estuaries of the region are also in a difficult position with regard to industrial and domestic pollution as well as silting and sedimentation (SYM/13). Apart from major fish kills, migratory patterns are being disrupted and reproduction inhibited by physiological barriers created by the heavy concentration of pollutants in those rivers. Further problems are liable to be caused by the accumulation effects of heavy doses of insecticides and other preparations sprayed on agricultural lands adjacent to the waterways (SYM/3). That pollution need not constitute a serious problem is demonstrated by the Cauvery River where legislated control of the discharges is enabling the co-existence of industry and fisheries interests, although occasional mortalities still occur.

There are several indications that some stocks in the rivers of the region are overfished. Symptomatic of the fishing-up process is the disappearance of larger species such as *Probarbus jullieni* from the Mekong River and its tributaries noted by Sritongsock and Yoovetwatana (SYM/37). The disappearance of larger species or the larger individuals from the community is not necessarily a confirmation of too much fishing, as this is nearly always the consequence of fishing pressure of any kind. Indeed the basing of the fishery on only these large species which are usually most appreciated for food, is often wasteful in that for their proper management gear selectivities have to be maintained at a level that precludes the capture of many other species of potential value. This then becomes a problem in objectives, for where the maximization of protein production is required of the fishery, it is sometimes necessary to allow the systematic overfishing of a few of the larger species. More genuine evidence of overfishing is presented by Rao and Rajyalakshmi for the Godavari system. Here catches have declined overall despite an increase in effort. The decline is traced to the use of gear of small mesh size which is taking an excessive number of juveniles. The effects of the massive abstractions of fry and spawn for stocking dams and aquaculture ponds throughout the Indian subcontinent also remains to be assessed as do the dynamics and economics of such extensive stocking programmes as are practised. On the whole it is very difficult to separate the effects on the stock of overfishing from those produced by other stresses. It has been shown in North America, and is probably of general application, that loading on the fish community, whether it be pollution, overfishing, land management or any of the many other developmental manipulations of the environment, tends to produce a similar response. This involves a simplification of the fish community, usually with the loss of slower growing but larger species, a reduction in diversity and an increased production/biomass ratio. The overall fish yield is not generally reduced although its composition changes toward what are often regarded as undesirable species.

The management of river systems for fisheries presents interesting problems as this can only be carried out as part of the general developmental activities in any basin. The breaking up of rivers into a series of reservoirs is done for purposes other than fisheries, but is for the fisheries administrator to make the best of the situation.

This has apparently happened in the Cauvery River, where a programme of introductions has more than compensated for the fish lost from the river. Approaches to the problems of managing such reservoirs will be discussed in Session IIb of this Symposium. A further management technique which has gained widespread favour, is the conversion of the floodplain and estuarine lagoons and swamps into aquaculture ponds, usually coupled with the drainage or irrigation schemes associated with agricultural development. Such activities are proposed in Pakistan (Javaid, SYM/4 and Qureshi, SYM/1), India (Jhingran, SYM/53) and Indonesia (SYM/2 and SYM/47). Culture of fish under these circumstances will be further discussed in Session IIc of this symposium. A further activity which is essential for the conservation of both capture fisheries in lotic or lentic waters and culture fisheries is the maintenance of adequate water quality. However, all these activities depend on an adequate understanding of the functioning of the aquatic system as a whole. We should, therefore, aim to derive adequate techniques for the management of the aquatic system by full utilization of capture as well as culture fisheries. This requires statistics against which the performance of management measures can be assessed, as well as an understanding of the biology of the fish and the dynamics of their communities upon which management criteria can be based. With these elements the fisheries administrator can participate in the decision-making relative to river basins assuring fisheries its rightful place among the other disciplines using the water.

As a postscript, I feel that rivers will still remain relatively unconstrained for at least part of their length for many years. It is proving a hard lesson in many countries that the effects of flood control, irrigation and other practices are relatively short lived. Dam sites are a non-renewable resource and exceptional climatic events can produce the catastrophic destruction of modification taking many years to install. In short the natural system appears to restore itself in the long run especially in the larger flood rivers.

Summary of Discussions

Dr. Dehadrai supplemented the review by comments on the importance of permanent swamp areas which, because of their general nature, are not used by man and may thus be considered derelict. Several countries have areas of this type which can be used for fish culture and which are being rehabilitated for use for fisheries. However, some caution was expressed as to their complete conversion due to their ecological importance. They do serve as purifying mechanisms in a eutrophicated or polluted system, as well as providing breeding, feeding and shelter areas for many species of fish. In fact, in Indonesia, substantial swamp clearance programmes for rice culture have led to a complete change in the river fauna.

Fisheries administrators are able to participate in the policy decisions affecting the aquatic resource in several countries. This is a heartening trend as it does mean that previous tendencies toward piecemeal development of separate aspects of the resource, to the frequent detriment of fisheries, are to some degree being reversed. Such mechanisms as environment impact studies, and thorough economic analyses of alternative strategies are to a certain measure, protecting the fish stock in some areas. It is to be hoped and recommended that this approach gains wider acceptance in this region. However such alternatives cannot be examined without adequate biological and statistical data and it was repeatedly noted that such baseline information is sadly lacking throughout the IPFC region.

The effects of mismanagement have been noted in several areas. In Thailand for example the construction of large dams has reduced the area of floodplains drastically with a corresponding curtailment of fish yield. Similarly in Indonesia, a successfully developed floodplain has lost much of its earlier productivity through heavy silting and agricultural encroachment. Several migratory species have disappeared in Nepal due to dam construction and stocks have been destroyed in peninsular Malaysia and India by poisoning or dynamiting. In addition the widespread overfishing of many wild stocks is becoming obvious in many countries as indicated by falling catch per unit effort and total catch and disappearance of certain species.

It is certain that more attention needs to be directed to the maintenance of river fisheries and to the quality of the aquatic environment. For this reason increased activity at the national and international level for data collection and analysis on these topics is clearly desirable.

SESSION IIB
FISHERIES OF NATURAL LAKES AND MAN-MADE
RESERVOIRS

Discussion Leader: C. H. Fernando

Rapporteur: H. F. Henderson

Review: C. H. Fernando

The increasing importance of reservoir and lake fisheries in southeast Asia over the last 20 years or so is evident. A more substantial contribution to fish yields in the region can be made by lake and reservoir fisheries during the next decade or so.

One of the major problems facing fisheries scientists in this region is the paucity of reliable data on almost every aspect of lake and reservoir fisheries needed for a proper evaluation and the future planning of the fishery. We have seen that some data are available from the papers presented at this symposium. Some additional data are also available, scattered in a large number of publications. It is important at the present time to bring together the relevant data and make efforts to fill gaps essential to the assessment and planning of lake and reservoir fisheries. The paper by Dr. Welcomme presented at this symposium points out that reservoirs and lakes can be treated as sets of rapid evaluation. It is possible to use morpho-edaphic indices to evaluate potential productivity (yield) and estimate stocking rates for the maintenance of fish populations. I have myself in the paper presented at this symposium used the data on introduction of lacustrine cichlids from Africa to southeast Asia to suggest some future introductions which should be considered.

A few remarks on the history of fisheries in lakes and reservoirs in southeast Asia are, I think, relevant to the discussion. One of the important reasons for the paucity of data on lake and reservoir fisheries in southeast Asia has been the insignificant to low fish yields until quite recently except in a few flood lakes. Southeast Asia is also poorly endowed with natural lakes. However, lakes do exist in Sulawesi, Java, the Philippines and northern India. In addition flood lakes are found in many countries in the region, the best known being the Grand Lac in Democratic Kampuchea and the lakes of the Kapuas region in Kalimantan.

In southeast Asia reservoirs date back to the beginning of man's efforts to dam rivers for irrigation. Fisheries in reservoirs, however, are a recent phenomenon. To take one example, although the extent and density of ancient reservoirs was very great in Sri Lanka, no significant fishery existed in these reservoirs until after the introduction of *Tilapia mossambica*, a lacustrine African species. There was a spectacular increase in fish production from 400-10,000 t. in a period of about 10 years and fish yields in some shallow reservoirs are of the same high level as some African lakes and reservoirs. Further, the fish yields have been sustained over a period of about 25 years. This shows that some Asian reservoirs can be as productive as their African counterparts. Most reservoirs with proper management will give fish yields of similar high magnitude both in Asia and in Africa.

Besides the introduction of African cichlidae which has been done in Indonesia, Thailand and India, attempts have been made to use local herbivorous species and domesticated and semi-domesticated species for enhancing the fish yields of reservoirs. In India this approach has been used in the majority of large reservoirs. It is not possible to say that this method will be capable of producing high fish yields generally. Also the cost of stocking annually must be taken into account, not to mention the difficulty of reducing mortality due to fish predation. Where there is high predator pressure as in Sri Lanka stocking of common carp has been a dismal failure. In India, stocking with major carps seems more successful.

Fisheries and fisheries management in lakes and reservoirs have developed on different lines in different regions of southeast Asia. The flood lake fisheries in the Kapuas region in Kalimantan and the Grand Lac in Democratic Kampuchea are well established, highly productive fisheries. The fisheries in Lake Toba, Sumatra and Lake Lanao, Philippines have low yields apparently. In Sulawesi, lake-introduced fish have pushed up fish yields spectacularly in some lakes like Tempe and Limbotto, but major fluctuations in fish yields have been

noted over the last 25 years. Sulawesi has no true freshwater fishes in its indigenous fauna. In the rest of Indonesia high fish yields have been noted in reservoirs where African cichlids have been introduced. Elsewhere the yields have been low. Thailand, which has no natural lakes, has the largest reservoir area in southeast Asia. These newly constructed reservoirs have been colonized by the rich indigenous fish fauna. Fairly high yields have been recorded from the shallower reservoirs. Introduced African cichlids are reputed to be very popular but do not seem to have established themselves widely yet. If African cichlids are established only in some reservoirs of similar type, this might give us a clue as to the relative yields of indigenous and African lacustrine species. We have as yet no hard data on reservoir fish yields in the Philippines, Bangladesh, Burma, Viet-Nam, Democratic Kampuchea and Laos. This is due presumably to low yields and/or to the existence of only a few lakes and reservoirs. In Malaysia there are few reservoirs and fish yields are generally low. The figure of 1,100 t. from the three reservoirs noted in the paper presented seems to be on the high side.

As a first step in evaluating the potential for fish production from lakes and reservoirs the morpho-edaphic index will be a useful tool. The data required for this exercise are not very difficult, expensive or time consuming to obtain. Some data are already available from India, Indonesia, Thailand and Sri Lanka. The potential fish yields can then be compared throughout the region with the actual yields presently recorded. From the experience throughout the region fish stock improvement has been the major factor pushing up fish yields. Two basic approaches have been used in stock improvement. Indigenous or local herbivores have been introduced in large numbers as fry or juveniles to boost stocks on a more or less regular basis or foreign species, mainly lacustrine African Cichlidae, have been introduced. Of these two methods, the introduction of African Cichlidae has given greater increases in fish yields. Unfortunately we have no quantitative model for forecasting the effects of any one or a group of introduced species in a particular habitat. We can only use analogous deduction from the experience of reservoirs in the area. Two additional measures could yield good results in southeast Asia. The introduction of deepwater *Tilapia* species (or other Cichlidae) should be undertaken as at present the deeper reservoirs are relatively unproductive, and the introduced African Cichlidae have been mainly shallow-water inhabitants. Also, in seasonal reservoirs, stocking with fast growing herbivorous fish should be extended. Stocking rates can be calculated using a formula similar to that proposed by Dr. Welcomme. Unlike in large reservoirs, where predator control is impracticable, smaller seasonal reservoirs can be used almost in the same way as fishponds for culture. Cage culture in reservoirs has been quite successful when eutrophic reservoirs and suitable fish species are combined. I noted the mud carp being successfully raised (profitably, I hope) in Seletar reservoir, Singapore.

Fish introduction into reservoirs and lakes in southeast Asia has been haphazard. The claim that *Tilapia mossambica* was a wonder fish caused it to be introduced widely and indiscriminately throughout the region 25 years ago. The suspicion of foreign species has acted as a brake against unrestricted introduction. Simple non-availability of stock has prevented more varied and widespread introductions. The fish that have been introduced include African Cichlidae, mainly shallow-water dwelling estuarine species, domesticated and semi-domesticated carps, marsh inhabitants and estuarine species. Although the paucity of lacustrine species in southeast Asia is not so evident as in New Guinea, Hawaii or Sulawesi, yet indigenous fish faunas lack this element. The phenomenal success of African lacustrine Cichlidae cannot be explained in any other way especially in Indonesia and Sri Lanka. There is however a view that indigenous fish species must prove adequate for colonizing local lakes and that in the long run they will prove better and presumably more productive than foreign species. This view is not borne out by the experience of lake and reservoir fisheries in southeast Asia.

I must now turn to some other practical matters which have both short-term and long-term implications for fisheries in lakes and reservoirs in southeast Asia. There is the need for (a) accurate statistics on fish yields and the standardization of data reporting, (b) studies on water chemistry, lake morphometry and biology, (c) improvement of gear used in lakes and reservoirs, and (d) socio-economic measures to optimize fish effort, marketing, etc.

Statistics of reservoir areas, fish yields and composition, etc., are scarce and often fragmentary and unreliable. A sub-committee has been proposed for collecting and analysing such data. This would certainly make the job of evaluating reservoir and lakes fisheries and planning for the future a more realistic exercise. An attempt should be made to standardize data reporting, e.g., reservoir areas used in calculating fish yields vary from half full supply level. A more accurate measure would be to make a correction based on water level fluctuations in any particular year based on an area, depth curve. There is a great need first to collect and analyse and then to extend data on water chemistry throughout the region.

Any fishery scientist looking at the data on lake and reservoir biology is struck by their paucity. Even very basic knowledge is lacking in most fields and in many areas, in a broad sense. It is important to fisheries management that some relevant data on primary and secondary productivity both seasonally and in gross terms be available. There is some indication that following a rapid increase in phytoplankton biomass after rain, there is an almost immediate marked peak in zooplankton. This is followed by a rapid decline in biomass of zooplankton. Whether a second peak occurs between two rainy periods is not clear. Likely candidates for acclimatization in southeast Asian lakes and reservoirs are true zooplankton feeding species, like those found in the African Great Lakes, e.g., *Limnobotrissa* and *Stolobotrissa* (Clupeidae). We should know more about the productivity and seasonality of zooplankton before considering such introductions. My own studies show that limnetic zooplankton species are very few in southeast Asia as compared to temperate regions. Also the genus *Daphnia*, so prominent in temperate zooplankton, is insignificant in lakes and reservoirs generally. Studies on benthos of lakes and reservoirs in southeast Asia are in their infancy. Benthic sampling requires great ingenuity and is time consuming. A good knowledge of Chironomidae and Oligochaeta is necessary for the proper evaluation of results.

The introduction of invertebrate species to enhance food for fish has been mooted for southeast Asian reservoirs. This type of introduction has been practised widely in U.S.S.R. and U.S.A. The results have generally been favourable. In southeast Asia we know very little about the biology of the indigenous fauna except in a general way. There are some peculiarities in the faunal composition of tropical lakes and reservoirs besides the paucity of zooplankton species and the rarity of *Daphnia*. Free living Isopoda and Amphipoda are extremely rare. The reasons for these differences are not clear. Future studies should cast some light on these problems and enable manipulation of invertebrate species composition to enhance fish yields.

The ecology of a few reservoirs should be studied on a long-term basis. Some such studies are already in progress in India. Next year BIO TROP will be running a training course in Reservoir Fishery Management in Bogor, Indonesia. This will provide an opportunity to initiate some studies on reservoir biology. There is a rapidly expanding group of freshwater biologists working on reservoirs in southeast Asia. These numbers will grow as the economic importance of lakes and reservoirs as a fishery resource increases.

Fisheries in lakes and reservoirs in general are a recent undertaking in southeast Asia. There is a great deal to be done at the local level regarding suitable gear and cheap and serviceable craft. Socio-economic aspects of lake and reservoir fisheries will raise problems due to the fact that traditions are lacking unlike in marine fisheries. Considerable progress seems to have been made in gear design and in organizing self-help groups among fishermen.

In summary, lake and reservoir fisheries in southeast Asia are rapidly assuming more and more importance as a source of cheap and easily accessible protein throughout the region. At present, management practices are at a minimum in most areas but regular stocking of desirable herbivores and introduction of lacustrine African cichlids have raised fish production considerably. The use of the morpho-edaphic index will be possible when the necessary data are assembled and should give an estimate of the fishery potential. Choices can be made about regular stocking of indigenous fry or the introduction of foreign lacustrine species to enhance fish yields to desirable and economic levels. The lack of indigenous lacustrine fish species may prove to be a critical factor limiting fish yields from reservoirs and lakes throughout the region. This lack could be especially critical where deepwater species are concerned. African cichlids offer a wide range of deepwater lacustrine species. Perhaps some of them should be seriously considered for introduction into deep lakes and reservoirs in southeast Asia.

Summary of Discussions

As in other inland fisheries sectors, data are generally insufficient to judge the success or failure of current management policies. The small size of each fishery means that the amount of data required is very large relative to the catch when compared with marine fisheries. The best way of tackling this problem is probably the grouping of similar waters into sets, for which a more limited amount of data may be gathered permitting the formulation of conclusions applicable to other members of the set. Examples of such data are limited in Asia, although Sri Lanka has, by comprehensive inventory, gathered sufficient information for such an exercise. In some Indian waters too, good control of the statistics is maintained through a licensing and royalty system. However, the general lack of statistics emphasizes the need for some action in this field by member States.

As an extension of those approaches which estimate potential from the productivity of the water, there is a need to ensure that all trophic niches within the system are adequately filled. For this reason a policy of introduction and stocking has been pursued in several countries. In India, phytoplankton eating fish have been introduced into most reservoirs as this food source was not being utilized by indigenous species. Phytophagous species, particularly grass carp, were being introduced to utilize aquatic weed. However, the cold hypolimnion of deeper lakes remained unfilled and candidates for introduction into these regions are being sought. In Sri Lanka, the lack of indigenous fish suited to lacustrine habitats has been amply demonstrated after 1,500 years' failure to colonize impounded waters. Introduction of exotic lacustrine species was rapidly followed by an increase in production.

To gain the fullest benefit from reservoirs there is a need to prepare prospective lake sites beforehand. The existence of snags and rough bottoms can cause trouble with common capture methods, although in some parts of the world such obstructions may work to the fishermen's advantage. Clearing, however, can have unlooked-for consequences on health. In fact, there are several options open for the fishery management of such reservoirs, the most extreme of which, that of the Chinese, requiring complete preparation of the environment before flooding, even to grading the bottom. Management of lakes in this way should ultimately be extended beyond the confines of the aquatic system to take a whole basic approach. Co-operation between fishery workers and those of other disciplines is therefore a matter of the highest priority if the greatest benefit is to be obtained from the water resource.

Attempts to enrich the aquatic environment with autochthonous materials, rather than from the outside have been made. Raking the bottom of swamps releases nutrients from the silt into the water column, and this has been happening for many years in Laguna de Bay in the Philippines. Continued actions of this kind can eventually cause a decline in water quality provoked by a heightened BOD. Little is known as to the self-purifying capacity of lakes where this type of nutrient release occurs, or where organic pollutants are introduced from outside.

A special problem exists in the cold, high altitude lakes of the area. There are indigenous species of considerable value existing in high altitude streams and lakes such as the snow trout. Rainbow and brown trout have been introduced. Nevertheless, growth of all of the species is relatively poor, owing to the low temperatures and perhaps to the inherently low biological productivity of such waters. Several delegations were anxious to learn of other species which might be better adapted to these conditions. Sources of possible assistance were mentioned but the question could not be satisfactorily answered.

SESSION IIc

DEVELOPMENT AND MANAGEMENT OF THE CULTURE FISHERIES OF
FRESHWATER PONDS AND TANKS AND THOSE OF
SWAMPS AND MARSHES

Discussion Leader: Z. H. Shehadeh

Rapporteur: T. G. Pillai

1. *Sources and Supplies of Seed Stocks*—Z. H. Shehadeh

The initial basic requirement of aquatic husbandry, including aquaculture and the improvement of natural stocks through artificial recruitment, is an assured supply of good quality juvenile stocks (seed) in sufficient quantities at the right time. The steadily growing importance of aquaculture and inland fisheries, and the need to amplify their production of animal protein has placed pressure on production specialists to improve or develop methods for securing adequate supplies of seed for stocking purposes.

With respect to aquaculture, total world production of fish and shellfish has been estimated to be about 6 million t., of which 75 percent is produced in Asia. Carps (Cyprinidae) make up the bulk of the 4 million t. of finfish produced. The degree of self-sufficiency in carp seed supplies attained through seed *production* (as opposed to *collection* from natural waters) in the region varies with the species in question, as follows: common carp > Chinese carp > Indian carp. This is due to the fact that common carp breeds in captivity, while Chinese and Indian carp do not, and methods for their induced breeding were developed only recently—in the early and late 1960s respectively. However, the seed supply situation is in flux and the outlook for meeting carp fry demand through controlled breeding is very good for the near future.

At present Indonesia produces 87 percent (5,288 million) of the carp fry required for stocking ponds and rice fields; the rest is collected from natural waters. In India, demand for common carp fry is met by pond breeding but production of major carps contributes only 5-6 percent of total requirements; the large balance is made up from riverine sources. However, this is an *average* figure for the Indian subcontinent; in some states of India, controlled production of fry now supplies 90 percent of seed requirements. Both Hong Kong and Malaysia import fry of Chinese carps from China and/or Taiwan. The value of imports into Malaysia in 1974 was M. \$ 200,000.00, but efforts are underway at the MARDI station in Malacca to meet fry demand through local production. Hong Kong imports a total of 4.6 million fry of Chinese carps annually, but is self-sufficient in the production of common carp and edible goldfish (2.8 million annually). Artificial breeding and hatchery propagation is the only source of Chinese carp fry. Total annual production at present is 3.3 million fingerlings with a production target of 12.5 million by 1980. Artificial breeding of *Labeo rohita* (rohu) has been also carried out successfully and fry production will be expanded in the future.

Besides cyprinids, mullets, milkfish, sea bass (*Lates calcarifer*) and catfish (*Pangasius* sp., *Clarias* spp.) are also cultivated in freshwater impoundments. Mullet culture is of special significance in Hong Kong where annual fry requirements are about 25 million. The fry demand is met exclusively by collection from natural waters; this is also true of milkfish. The bulk of catfish and sea bass fry are presently collected from natural waters, but this situation is changing rapidly in Thailand. Methods for the artificial breeding of the catfish *Pangasius sutchi* have been developed and millions of fry are being produced under controlled conditions in ponds and cages. More recently, similar methods have been developed for the sea bass where the production of seed is expected to assume greater importance.

Where the dependence on natural seed stocks is still pronounced, as in the case of mullets and milkfish, annual variations in the availability of these stocks is reflected by marked fluctuations in fry costs. For example, in Hong Kong the price of mullet fry varies from HK. \$ 0.02-0.05/piece in times of plenty, to HK. \$ 0.2-0.3 in times of scarcity. Seed shortages are also reflected in decreased stocking densities in ponds and depressed production rates.

In the case of species that do not breed in captivity, hypophysation, using extracts or suspensions of homoplastic pituitaries, is the main technique used. Shortages of pituitary glands were not reported in information available to the symposium. Nepal imports 5,000 glands from Hungary annually; difficulties in securing carp pituitaries in some coastal areas of India has led to its successful substitution with pituitaries of a marine catfish, *Tachysurus* sp. Difficulties have been encountered in artificial spawning of Chinese carps when the latter were introduced into some countries. These problems have been attributed to climatic differences—lack of monsoon rains, constant high temperatures, etc. A major problem, reported in Malaysia, is the lack of synchronization in sexual maturation among individuals of captive parent stocks.

In general, techniques for the controlled breeding and mass propagation of freshwater fish are much more advanced than those for brackishwater and marine species. Although efforts are needed to standardize techniques, improve economic efficiency and augment production from nurseries, biotechnical breakthroughs in methodology are not essential in the immediate future. Dissemination of available techniques, training and attention to basic socio-economic constraints in the transfer of technology should be assigned highest priority. Attention should be focussed also on immediate management problems in fry production—upgrading of traditional techniques, prevention and treatment of diseases and parasites, control of predators and reduction of water turbidity.

2. Production and Management Aspects—T. G. Pillai

Fish farms in south Sulawesi (Indonesia) produce over 1,000 kg/ha by milkfish culture combined with shrimp (*Penaeus monodon*), while in East Java, more than 2,000 kg/ha are obtained in the polyculture of milkfish with Java carp (*Puntius gonionotus*). In West Java intensive culture of common carp has produced 4,000-6,000 kg/ha/year, while some farmers have even produced figures of 40,000 kg/ha/year by intensive culture in running-water ponds.

Hong Kong has obtained increases in average production of pond cultured fish from 1,532 kg/ha in 1965 to 3,116 kg/ha in 1975. A case study of a 6.5 ha farm using polyculture (with grey mullet, silver carp, big-head carp, grass carp and common carp as well as edible goldfish) demonstrated yields of 5,864 kg/ha.

India has demonstrated the feasibility of producing 9,000 kg/ha in one year using improved composite fish culture techniques, including higher stocking rates, feed, fertilizers and weed eradication.

Figures of 18-32 t/ha/crop have been obtained with snakehead culture and 7-14 t/ha/crop for catfish (*Clarias fuscus*) culture in Hong Kong using mono-culture systems.

In Thailand the production of catfish has reached up to 100,000 kg/ha/6 months.

In Hong Kong the traditional practice of farming ducks with fish is reported to be very productive, yielding up to 11,700 kg/ha of fish and duck meat. This is composed of up to 5,640 kg/ha of fish and 6,070 kg/ha of duck meat.

With regard to species used in composite fish culture, grass carp, big-head carp, silver carp, mud carp, common carp, edible goldfish and grey mullet are used in Hong Kong, while the Indian major carps *Catla catla*, *Cirrhina mrigala*, *Labeo rohita*, *Labeo calbasu* and *Labeo fimbriatus* are used in various combinations in India and neighbouring countries.

Experiments carried out in India on the salinity tolerance of grass carp and silver carp have shown them to grow well in waters of low salinity and slight alkalinity.

Monoculture appears to be only practised in small ponds less than 0.5 ha in Hong Kong, and this principally for catfish and snake heads. Although eel culture is quite advanced in Japan, it is only in the very early stages in New Zealand, the Philippines and Indonesia.

Work is being carried out in New Zealand on the culture of Parastacid crayfish, *Paranephrops planifrons* and *P. zealandicus*, while techniques are being perfected for the culture of *Macrobrachium* in several countries.

Some information has been furnished with regard to feeds used. In India grass carp of less than 150 mm. are fed with chopped vegetation, while larger fish are fed on submerged weeds such as *Hydrilla*, *Potamogeton* and *Valisneria*, with preference for *Hydrilla*. Plants like *Nymphaea*, *Eichornia*, *Ceratophyllum* and *Pistia* are never taken. Grass carp appear to be of doubtful utility in the control of marginal plants. A figure of 224 : 1 has been furnished for the conversion rate (wet weight) of plant material to grass carp. A study of the stomach contents of adult silver carp has shown that 80 percent consists of phytoplankton (especially microplankton), 10 percent zooplankton and 10 percent periplankton. In the absence of phytoplankton fish will even feed on vegetation and debris.

In Thailand higher production rates of *T. nilotica* were obtained by the use of animal protein pellets as compared with plant protein pellets. Among the feeds of vegetable origin used were fine rice, cassava and peanut mixed in various proportions. In India studies have been carried out on feeding common carp with pelleted feeds composed of rice bran (40 percent), oil cake (24 percent), fishmeal (25 percent), rice flour (10 percent) and mineral salts (1 percent).

In Hong Kong catfish are fed with peanut cake, rice bran and animal manure in addition to minced fish. Various supplementary feeds are given which include groundnut cake, rice or wheat bran, wheat, cornmeal, blackbean, sorghum and grass in various proportions. The feed is totally consumed by the fish and is given only once daily. In Bangkok, catfish are fed with trash fish and shrimp wastes from shrimp trawlers. The conversion ratio is about 6 : 1. In the case of snakehead culture in Hong Kong feed consists of minced fish. The conversion ratio varies from 6 : 1 to about 10 : 1. In Thailand the conversion ratio of trash fish to *Ophiocephalus* is approximately 8 : 1.

Work is now in progress in New Zealand with regard to feed composition for parastacid crayfish and eels. For crayfish various feeds are being tested including commercial trout feed, fresh shrimp, alfalfa, meatmeal and fishmeal. The latter two are mixed with potato starch as a binder. Regarding eels, one reason why eel culture in New Zealand has not yet proved economical is that feed prices are high and the conversion rate of feeds currently used is poor. Among the feeds successfully used in initiating feeding in glass eels are included minced fish and shellfish, freeze-dried *Tubifex* spp., minced liver, livermeal and skimmed milk. Adult eels require feed with a protein content of 50 percent and must be finely ground and doughy for rapid absorption and easy feeding respectively. A suitable compound diet is now produced in New Zealand which sells for about N.Z. \$ 620/t. Imported Japanese eel food costs approximately N.Z. \$ 900/t.

Very little information is available in the papers presented on the use of fertilizers. In Hong Kong, although inorganic manures are rarely used, it has been estimated that 20 t. of animal manure can be replaced by 60 lb. of inorganic fertilizer which is more easy to apply. Poultry, pig and cattle manures are generally used in Hong Kong where they are applied once or twice a fortnight.

Very little information has been presented on the control of diseases of farmed species. In India silver carp were found to be susceptible to argulosis while grass carp suffered from dermatomycosis, chilodontiasis (*Chilodon* sp.). In Indonesia a recent epidemic of *Lernae* in 1971 caused heavy losses of freshwater fish fry in farms and the Government had to implement a large-scale programme for its extermination with pesticides.

In New Zealand parastacid crayfish risks being affected fatally by the microsporidian parasite *Thelophania contageans*.

A problem with regard to eel culture in New Zealand is the persistent disease whitespot caused by *Ichthyophthirius multifiliis* which causes moderate mortalities in spring. Eels less than 5 g. are most affected. The most effective treatment (40 ppm formaldehyde and 1 ppm. methylene blue) killed the phytoplankton with subsequent water deoxygenation. It was found in general that outdoor eel culture in ponds suffered less disease problems than indoor culture for two reasons:

- (1) the naturally occurring fauna in ponds had some regulatory effect on disease organisms, and
- (2) in indoor tanks the stress caused by the unnatural environment and high stocking densities are believed to have a possible influence on their resistance to diseases.

A guide to the recognition of eel diseases in farms has been prepared in New Zealand.

Bacterial diseases pose a considerable threat to the highly intensive production of catfish in Thailand.

A special topic discussed at length was the possible utilization of certain swamp ecosystems for the cultivation of air breathing fishes (*Clarias* sp., *Ophiocephalus* sp., *Notopterus* sp., etc.). Considering the high market value of some of these species, their tolerance to poorly oxygenated waters and the low inputs required for their culture in such ecosystems, it was felt that such a culture system is worthy of special consideration. A viable system has been demonstrated in India.

SESSION III

MARKETING AND UTILIZATION OF INLAND

FISH CATCHES

Discussion Leader : F. Gonzales

Rapporteur : D. James

Review of Papers submitted — F. Gonzales

Six papers and one abstract were submitted on the marketing, utilization and economics of capture and culture operations. It was disappointing that no more papers were forthcoming. The session should highlight the following points :

- (1) The socio-economic and institutional aspects of marketing and utilization of inland fish catches.
- (2) General picture pattern of marketing system of inland fish landings.
- (3) Economics of capture and fishing operations.
- (4) Research and development problems of fish marketing.
- (5) Review of collection of economic data on fish marketing and utilization.
- (6) ACTIONS proposed to achieve an effective system of inland fish marketing and utilization.

The paper by M. Ben-Yami stresses the need for extension of capture methods and equipment. The choice of methods and equipment should depend on socio-economic as well as technical conditions. The important function of the fishing technologist should be to select the most appropriate fishing methods and gear for the different development levels. It is of no value to introduce sophisticated equipment unless both sufficient financial support and appropriate fish resources exist.

Ramadin describes the structure, capital and costs for existing cultural practices both in the public and private sectors. He points out that fish culture has yet to gain recognition as a risk-taking enterprise although high yields can be obtained. The problem is the available capital and resource base required to achieve higher production. There are indications that returns from aquaculture are comparable with those from agriculture, but fish farmers still operate with traditional methods.

There are also indications that best market returns are available for live fish but some countries, e.g. Australia, Japan, Philippines and Pakistan are encouraging the utilization of chilled and frozen fish. Ilyas and Rustami also give an idea of the limitations to expanding the distribution of live fish.

In the Philippines most of the milkfish is sold fresh, but attempts are being made to develop processing. Consumer demand for carp is also being stimulated by research and pilot production.

Summary of Discussions

After the discussion leading introduction contributions were sought from the floor. It was pointed out that in Sri Lanka the development of inland fisheries had been constrained by consumer preference for marine fish. Very little of the freshwater catch is retailed as fresh fish, but demonstration of methods of smoking and sun drying have extended the opportunities of utilization. It was suggested that fecal contamination of tanks and ponds may have discouraged consumers.

Developments in aquaculture which focussed only on increases in production were questioned. It was pointed out that if the total resource base (fertilizer, feed, etc.) was not sufficient then production methods

must be rationalized. In many instances it may be better to accept longer growth times at lower stocking rates rather than to intensify production. The integration of aquaculture into rural development as a sector of agriculture should be encouraged.

Consumers in most countries of the Region will pay significantly more for live freshwater fish. As there are often difficulties in getting live fish to the market there will be a necessity to attempt the introduction of chilled and frozen fish, if production increases significantly. Examples of the ease with which live air-breathing fishes could be transported with very small quantities of water and the packing of carp in salt and ice for transport were given.

One area singled out for development attention was planning and improvement of the transport network for freshwater fish. Bottlenecks in transport can have a severe effect although the situation may not be quite as difficult as the transport of marine fish. Under most circumstances the fish farmer can keep his crop alive until transport is available.

Public health hazards involved in the distribution and consumption of freshwater fish were considered to require more investigation. Pathogenic micro-organisms, viruses and parasites were all likely to be potential problems.

It was questioned whether fertilization of ponds with duck or pig manure had public health or consumer acceptance implications, but there were so far no clear indications of any such effects.

Development of new products was not seen as being a fruitful field for endeavour. The improvement of traditional products was more likely to be successful than new convenience packs which were expensive and depended on large resources. However, in developing countries, traditional products were often a source of food-borne diseases, and so significant improvements of production were required.

Successful product development efforts were noted from the Philippines with boneless milkfish. This problem had been solved in Malaysia by growing larger fish so that the meat/bone ratio was higher.

Culinary demonstrations could have a good effect on influencing consumer demand and should be encouraged. An example was given of the introduction of Gourami in Sarawak, coupled with demonstrations of Indonesian recipes.

SESSION IV

CONCLUSIONS AND RECOMMENDATIONS

Discussion Leader: V. G. Jhingran

It was concluded that efficient management of inland waters requires a large amount of information relative to the size of the resource. There is a lack of both basic catch statistics, biological data on the principal fish species, and ecological information on the major habitats in the majority of countries of the region. It was, therefore, repeatedly emphasized during the Symposium that there is a widespread need for more reliable data on all aspects of inland fisheries and their resources. It is thus recommended that the Chairman of the IPFC should request Member Governments to give more attention to collecting, systematizing and distributing data on inland fisheries. Governments should also be urged, through the IPFC or other available channels, to make generally available those data which are broadly applicable within the region. Furthermore, the Symposium recommends that the establishment of a post for a fisheries statistician to advise Member Governments on the collecting, analysis and interpretation of inland fishery data in the region be considered.

The discussions drew attention to the variety of purposes for which water is used, many of which affect the fishery resources adversely. It is suggested that Member Governments pay adequate attention to the water needs of inland fisheries, both in respect of quality and quantity. As any management measures within the drainage basin, including urbanization, irrigation, hydro-electric development, forestry and agriculture can affect fisheries it is recommended that Member Governments ensure that fisheries interests are represented in any projected development by the inclusion of fishery managers in national planning bodies. Such interventions could include the investigation of the feasibility of integrated uses of the water by including such activities as aquaculture, various forms of agriculture, animal husbandry, etc., together with capture fisheries. In this context, the Symposium strongly endorsed the Regional project for integrated Agro-aquaculture, which is aimed at serving the poorest individuals of the community, and is at present being circulated in draft form to Member Governments. Furthermore, considering the common nature of many pollution or environmental degradation problems arising from other uses of the aquatic systems in the various countries of the IPFC, it was concluded that more attention needs to be paid internationally to the conservation of the inland water environments.

Many world stocks of fish in both rivers and lakes are showing signs of depletion, possibly through over-exploitation. The correct management of these stocks by legislation based on scientific appraisal, the use of specific management strategies such as closed seasons or the establishment of reserve areas, or by stocking or appropriate introductions is essential if the present levels of catch and seed supply are to be sustained or augmented. Governments are, therefore, urged to place highest priority on resource management and to make data on actions in this field available to other countries of the region for utilization in similar ecological situations.

Discussion on pond ecosystems (including nutrient analysis and bio-energetics) made it clear that seed fertilizer and feed are of critical importance to intensive inland aquaculture. It is, therefore, recommended that Member Governments seriously consider ways to increase the allocations of fertilizer and feed for inland fisheries, including the investigation of alternative sources for these commodities and improve seed supplies. The development of such alternatives, including sewage, should be the subject of continuing studies. In this connection, it was also noted that, until now, most attention has been given to obtaining highest possible yields per hectare of water and the best returns for money invested, under a variety of culture systems. Less attention has been given to assessing at a national level, the feed, fertilizer and power resources available in relation to a full development of these intensive culture systems. As intensive culture is rapidly expanding in most of the region, the Symposium suggests that governments assess their national resources in relation to all types of food production requirements and consider how best to utilize these resources. Such assessment should then be used to guide national programmes and priorities in research and development on fish culture and on other food production activities.

It should be further considered that the most intensive aquaculture systems with high input requirements are often not suited to the needs of the small fish farmer. Continued attention must be given to the improvement of systems requiring only small investments in supplies and facilities.

Considerable success was reported in using various "air breathing" species, especially *Clarias*. Owing to their advantages in overcoming problems of swamp utilization, fish kills, and marketing live products, their generally favourable prices in the marketplace and useful feeding habits, participants are encouraged to consider culture of these species whenever the problems mentioned exist.

It was concluded that there was a need for increased sanitation in handling fishery products to avoid recurring human disease problems in certain areas. Similarly effective procedures for treating fish from polluted waters before they are marketed are also needed.

Fish diseases also present a serious limitation to intensive aquaculture and it was felt that measures for the control of the principal pathogenic organisms and parasites should be sought. As a corollary to this, the possibility of preventing the international spread of such diseases through the transport of live or dead fish should equally be investigated. Hygienic measures to reduce losses of fish products due to decomposition are also of high priority.

It was noted that much of the inland water fish produced in the region is preferred live in the markets and that special attention, therefore, should be given to problems of holding and transporting live fish.

In discussing problems of fish processing, it was noted that the needs of the region for fish products was such that improved processing methods to improve the quality of traditional products should be given more emphasis than the development of new products. New product development is sometimes necessary, however, where additional or novel fish resources are being exploited.

In view of the importance of inland fisheries in the IPFC region, as expressed in the above conclusions, the Symposium considers that increased activity in this field is needed to interchange ideas and technology on the numerous topics of common interest. It had been agreed in 1975 by the "*Ad Hoc* Committee to Review the Functions and Responsibilities of the IPFC", that the IPFC should continue to have responsibility for inland fisheries and that it should be in a position to devote more resources to this sector and to aquaculture generally. Assuming that this recommendations of the *Ad Hoc* Committee is endorsed, the Symposium *recommends* that the IPFC establish a Committee on inland fisheries open to all members, to facilitate the realization of their principle and to serve as a focus for these aspects of the work of the Council.

For the purposes of the Committee, inland fisheries should include both fresh and brackish waters.

The Committee is urged by the Symposium to examine the question of training and manpower among its first priorities.

3. SUMMARY OF PRINCIPAL RECOMMENDATIONS

It was recommended that the Chairman of the IPFC should request Member Governments to give more attention to collecting, systematizing and distributing data on inland fisheries.

It was recommended that the establishment of a post for a fisheries statistician to advise Member Governments on the collecting, analysis and interpretation of inland fishery data be considered.

It was recommended that Member Governments ensure that fisheries interests are represented in any projected development by the inclusion of fishery managers in national planning bodies.

It was recommended that Member Governments seriously consider ways to increase the allocations of fertilizer and feed for inland fisheries, including the investigation of alternative sources for these commodities, and improve seed supplies.

It was recommended that the IPFC establish a Committee on Inland Fisheries open to all members.

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LIST OF PAPERS¹

- IPFC/76/SYM/1 ... Development and Utilization of the Inland Fishery Resources of Pakistan, by M. R. Qureshi
- IPFC/76/SYM/2 ... Present Status of Inland Fisheries and its Potential in Indonesia, by Directorate General of Fisheries
- IPFC/76/SYM/3 ... Some Aspects on the Regulation of Agricultural Uses of Pesticides in Indonesia, with Reference to their Effects on Inland Fisheries, by S. Koesoemadinata and R. Djajadiredja
- IPFC/76/SYM/4 ... Strategy for Development of Inland Fisheries Resources of Pakistan, by M. Y. Javaid
- IPFC/76/SYM/5 ... National Perspective of Inland Fisheries in Hong Kong, by K. W. J. Cheng
- IPFC/76/SYM/7 ... Present Status of Potential for Development of Inland Fisheries in Malaysia, by Abdul Wahab Bin hj Mohd Johar
- IPFC/76/SYM/8 ... Fishery of the Cauvery River System, Tamilnadu, India, by R. Srinivasan and A. Sreenivasan
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- IPFC/76/SYM/13 ... Management of Estuarine Fisheries — A Co-ordinated Plan of Research and Development
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- IPFC/76/SYM/17 ... The Scope for Development and Management of Riverine and Estuarine Fisheries in Malaysia, by Abdul Wahab Bin hj Mohd Johar
- IPFC/76/SYM/18 ... Fisheries of Stanley Reservoir (Muttur Dam) and Three Other Reservoirs of Tamilnadu, India — A Case History, by A. Sreenivasan
- IPFC/76/SYM/19 ... Possible Effects of Altered Water Regime on Fish and Fisheries in Tarbela Lake (Pakistan), by M. A. Salem Ansari
- IPFC/76/SYM/20 ... Observations on the Commercial Breeding of Indian Carps by Hypophysation at Regional Fish Seed Farm, Hyderabad, Andhra Pradesh from 1967-70, by K. Madhusudhana and H. Krishna Rao

1. Contributions numbered SYM/6, 11, 15, 16, 31 are withdrawn.

- IPFC/76/SYM/21 ... Case Study of Gandhi Sagar Reservoir Madhya Pradesh, India, by G. P. Dubey and S. N. Chatterjee
- IPFC/76/SYM/22 ... Some Aspects of Fisheries and Their Development in Man-made Lakes in Indonesia with Special Reference to Lake Jatiluhur, West Java, by Achmad S. Sarnita
- IPFC/76/SYM/23 ... The Fisheries of Ubolratana Reservoir in the First Ten Years of Impoundment, by Thiraphan Bhukaswan and Saray Pholprasith
- IPFC/76/SYM/24 ... Annual Catch Statistics of Freshwater Fishes Taken from Seven Reservoirs in North eastern Thailand, by T. Chukajorn
- IPFC/76/SYM/25² ... The Possibilities for Development and Management of Fisheries Resources of Impounded Waters in Peninsular Malaysia, by Abdul Wahab Bin hj Moh Johar
- IPFC/76/SYM/26 ... Ecology and the State of Fishery Development in Some of the Man-made Reservoirs in India, by A. V. Natarajan
- IPFC/76/SYM/27 ... Cultural Prospects of Chinese Carps in Tamilnadu, by G. Prabhavathy and A. Sreenivasan
- IPFC/76/SYM/28 ... The Potential of the Cultivable Freshwater Fishery Resources of the Philippines, by B. Y. Datingaling
- IPFC/76/SYM/29 ... The Prospect of Lel Culture in the Philippines, by P. C. Gutierrez
- IPFC/76/SYM/30² ... Some Notes on the Occurrence and Control of Fish Parasites in Indonesian Freshwater Fish Culture, by S. Koesoemadinata
- IPFC/76/SYM/32 ... Problems in Freshwater Fish Breeding and Results of the Introduction of Improved Techniques in Indonesia, by A. Hardjamulia
- IPFC/76/SYM/33 ... The Farming of Freshwater Eels in New Zealand, by D. J. Jellyman and G. D. Coates
- IPFC/76/SYM/34 ... The Aquaculture Potential of the Two New Zealand Species of Freshwater Crayfish, *Paranephrops planifrons* and *P. zealandicus* (Parastacidae), by M. Shaddick
- IPFC/76/SYM/35² ... Economic Evaluation of Composite Fish Culture in Different Parts of India, by V. R. P. Sinha
- IPFC/76/SYM/36 ... Induced Breeding of *Pangasius sutchi* (Fowler), by M. Potaros and P. Sitasit
- IPFC/76/SYM/37 .. Induced Spawning of Pla Yee-Sok, *Probarbus jullieni* Sauvage by Chanintorn Sritongsook and Teinthong Yoovetwatana
- IPFC/76/SYM/38 .. Comparison of the Production of *Tilapia nilotica* Linn. Fed with Protein from Different Sources, by P. Sitasit and V. Sitasit
- IPFC/76/SYM/39 ... Status and Potential for Development of Freshwater Fish Culture in Malaysia, by Abdul Wahab Bin hj Moh Johar
- IPFC/76/SYM/40 ... Growth Response of the Common Carp, *Cyprinus carpio* var. *communis* to Protein-Rich Pelleted Feed, by T. J. Varghese *et al.*

2. Contributions presented in abstract only.

- IPFC/76/SYM/41 ... Induced Spawning of the Chinese Silver Carp, *Hypophthalmichthys molitrix* (C. and V.) and the Indian Major Carp, *Catla catla* (Ham.) Using Marine Catfish Pituitary Extract, by T. J. Varghese *et al.*
- IPFC/76/SYM/42 ... Pollutional Effects of Industrial Wastes on Riverine Fisheries of India, by M. R. Patil
- IPFC/76/SYM/43 ... Utilization and Processing of Carp, by G. Guevara, F. F. Abella and E. A. Marfori
- IPFC/76/SYM/44 ... Utilization and Marketing of Live and Chilled Freshwater Fish, by S. Iljas and R. Djajadiredja
- IPFC/76/SYM/45 ... Bangus (*Chanos chanos*) Marketing in the Philippines, by C. V. Guerrero
- IPFC/76/SYM/46 ... Reservoir Fisheries in South East Asia: Past, Present and Future, by C. H. Fernando
- IPFC/76/SYM/47 ... Reclamation of Marshland Along River Systems in Sumatra and Kalimantan and their Effects on Fisheries, by R. S. Prayitno
- IPFC/76/SYM/48 ... Approaches to Resource Evaluation and Management in Tropical Inland Waters, by R. L. Welcomme
- IPFC/76/SYM/49 ... Riverine Fishery for the Giant Freshwater Prawn, *Macrobrachium rosenbergii* in Indonesia, by V. Susanto *et al.*
- IPFC/76/SYM/50 ... The Role of Fishing Technology in the Development of Inland Fisheries, by M. Ben-Yami
- IPFC/76/SYM/51 ... Management Systems of Inland Fish Culture in Hong Kong, by A. W. Sin and K. W. J. Cheng
- IPFC/76/SYM/52 ... Marketing and Utilization of Inland Culture Fish in Hong Kong, by K. W. J. Cheng
- IPFC/76/SYM/53 ... National Perspective of Inland Fisheries of India, by V. G. Jhingran and S. D. Tripathi
- IPFC/76/SYM/54 ... The Role of Man-made Lakes in the Development of Freshwater Fisheries in Sri Lanka, by A. S. Mendis
- IPFC/76/SYM/55 ... Brackish Water Aquaculture in Sri Lanka, by Y. I. Raphael
- IPFC/76/SYM/56 ... The Future Outlook of Fresh Water Fisheries and Aquacultural Technology in Japan, by Y. Jatomi
- IPFC/76/SYM/57 ... Investigations on the Fisheries of River Godavari, Andhra Pradesh, by S. Rao and T. Rajyalakshmi
- IPFC/76/SYM/58 ... Development and Management of Tambaks in Hong Kong, by A. W. Sin
- IPFC/76/SYM/59 ... Utilization of Inland Swamps and Marshes for Aquaculture, by P. V. Dehadrai
- IPFC/76/SYM/60 ... Aquaculture Development in Bangladesh, by A. Islam
- IPFC/76/SYM/61 ... Development of Abandoned Tin Mining Pools in Indonesia, by R. Djajadiredja and A. Hardjumulia
- IPFC/76/SYM/62 ... The Status of Inland Fisheries in Korea, by Yeong Gong

Report of the Fourth Joint Meeting
of the
INDO-PACIFIC FISHERIES COUNCIL
Special Committee on Management of Indo-Pacific Tuna
Fourth Session
and the
INDIAN OCEAN FISHERY COMMISSION
Committee on Management of Indian Ocean Tuna
Fifth Session
Colombo, Sri Lanka, 29-30 October 1976

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 1977

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PREPARATION OF THIS REPORT

This is the final version of the report as approved by the Fourth Joint Meeting of the Indo-Pacific Fisheries Council Special Committee on Management of Indo-Pacific Tuna and the Indian Ocean Fishery Commission Committee on Management of Indian Ocean Tuna.

Distribution

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Members of the Committees
Other Interested Nations and International Organizations
FAO Department of Fisheries
Fishery Officers in FAO Regional Offices

Bibliographic Entry

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OPENING OF THE MEETING

1. The Fourth Joint Meeting of the IPFC Special Committee on Management of Indo-Pacific Tuna and of the IOFC Committee on Management of Indian Ocean Tuna was held at the Bandaranaike Memorial International Conference Hall, Colombo, Sri Lanka, on 29-30 October 1976. The meeting was attended by representatives from ten of the member countries. A list of delegates is given in Appendix K-I to this report.
2. In the absence of the Chairman, Mr. E. A. Purnell-Webb (Australia), Dr. J. A. Storer (U.S.A.) was elected as Acting Chairman for the period of the session.

ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE MEETING

3. The agenda as given in Appendix K-II was adopted. The documents considered by the Committees are listed in Appendix K-III.

STRUCTURE AND RESPONSIBILITIES OF SCIENTIFIC AND ADMINISTRATIVE BODIES

4. The Committees considered the proposal made in the report of the IOFC *Ad Hoc* Committee of Nations on Tuna Research and Management (IPFC/IOFC: TM/76/5), especially the structure shown in Appendix 3 to that report (it was noted that as printed the labelling of the lower boxes "*Ad Hoc* Scientific Group" and "*Ad Hoc* Sub-Committee" had been interchanged). The Committees also noted that closely related proposals had been made for research and management arrangements in general by the IPFC *Ad Hoc* Committee to Review the Functions and Responsibilities of IPFC (IPFC/IOFC:TM/76/Inf.5). The proposals would be discussed by IPFC at its Seventeenth Session which immediately follows the Committee's session. The decisions taken by IPFC would clearly influence the mechanisms that would be appropriate for tuna management. Though the proposals made by the IPFC *Ad Hoc* Committee for general research and management were consistent with the proposals for tuna, the Committee believed that it would not be useful to make firm detailed recommendations for structure to deal with tuna until the decisions of IPFC were known.
5. With this reservation concerning IPFC in mind, the Committee agreed with the separation of scientific and administrative functions, as illustrated by the right- and left-hand sides of the diagram in the *Ad Hoc* Committee's Report (a revised version of the diagram is given as Appendix K-IV of the present report). There should however be close links and consultations between scientists and administration at each stage.
6. There was considerable discussion about the direct links, shown by the left-hand side of the diagram between the *Ad Hoc* Sub-Committees, which would examine in detail the management problems relating to a specific stock (for example southern bluefin tuna), and member nations. It was stressed that this channel would not be used for formal recommendations which could be binding on Member Governments. These would be directed through the tuna management committees and IPFC or IOFC. However, the direct channel and a similar channel between nations and the *ad hoc* scientific groups, would be useful for less formal advice, which might be acted upon by Member Governments on a voluntary basis, as well as for directing enquiries by Member Governments to the sub-committees. These links would have the advantages of being quicker than the more formal links, though the present Committees, and IOFC or IPFC would be kept informed of enquiries made and advice given.
7. It was noted that the proposed organization represented a first step towards a management structure. It was very likely that this structure would need to be modified as experience was gained and that therefore the arrangements should be flexible.
8. The Committees reviewed the proposals made in document IPFC/IOFC : TM/76/4. They noted the help given by ICCAT¹ in preparing this document and this assistance was gratefully acknowledged. They agreed with the general outline of the management problem facing the tuna fisheries of the Indian Ocean and western

1. International Commission for the Conservation of Atlantic Tunas

Pacific, and of the responsibilities of the secretariat, but had a number of specific comments. These comments are given in the following sub-paragraphs, which should be read in conjunction with the basic document to provide a complete picture of the Committee's views on this important subject.

- (i) Management action for skipjack could possibly, as described in para (iii), consist of restraints on expansion, but these are only some among a range of possibilities, and the countries concerned might choose to implement other types of control.
- (ii) The figure of 600,000 tons used in para 20 should be regarded solely to illustrate the magnitude of the possible economic gains. It was not based on scientific assessments, and the potential yield of skipjack from the region could be slightly below, or considerably above, 600,000 tons.
- (iii) The Committees stressed that in the reference in para 20 to "preventing a build-up of excessive capacity in the skipjack fishery" the main emphasis was on the matters of *excess*. The current plans of many of the countries in the region to develop their local fisheries should be entirely consistent with this approach. Indeed it should be expected that any acceptable management scheme would lead to optimal benefits from the exploitation of the skipjack resources, for all the countries concerned.
- (iv) There was some discussion as to how the stock assessment and similar scientific work could be carried out. The prime responsibility for this should lie with Member Governments, and the secretariat would not be expected to take much active part in making stock assessment studies. It was however hoped that FAO staff would participate in stock assessment discussions, for instance in working groups, particularly with a view to assisting, in this and other ways, some Member Governments to increase their scientific capacities. It was hoped that the secretariat or FAO would assist in training scientists and others in some member countries to participate more actively in the collection, analysis and interpretation of detailed data.

9. The Committees stressed the importance of obtaining and compiling statistics from all countries participating in the tuna fisheries, whether or not they were members of IOFC and IPFC, and of ensuring the collaboration of all regional bodies and other institutions interested in the research and management of tuna.

FUNDING OF A CENTRAL SECRETARIAT

10. The Committees reviewed the estimates of staff, time (which concerned professional staff only) and costs given in Annex 1 and 2 of IPFC/IOFC: TM/76/4. It noted that some modifications could be suggested, for example, costs of offices, lighting, computer facilities had not been included, and the precise definition and qualifications of the professional staff could well be modified; for example, depending on the qualifications of the executive secretary, his senior assistant might be more usefully qualified as a statistician, rather than a research scientist. Also in Annex 1, several items (including 1, 2 and 3) would not be necessary after the first year, though experience of other bodies suggest that new activities would more than compensate for this.

11. The Committees agreed that these modifications would not seriously affect the total costs. For example, it would be virtually impossible to operate an effective secretariat with less than an executive secretary and a statistician. The total costs could not be expected to be substantially less than \$300,000.

12. The question of how the necessary funding should be obtained was discussed. Although some countries expressed the opinion that long-term funding should be provided by FAO or UNDP, there was general agreement that, in the long-term funding should be on the principle of "user pays". That is, the total costs would be divided among countries in proportion to their interest in the tuna fisheries as judged by, for example, the weight caught, the number of tonnage of tuna vessels, the number of stocks exploited, etc. The Committees therefore recommended to IPFC and IOFC that they should actively seek support from member countries for a tuna management programme, in accordance with these general principles.

13. It was expected that FAO would continue in the long term to give support to the programme, whether through staff time, provision of meeting facilities or any other appropriate ways. In addition, the Committees strongly recommended that, provided some reasonable assurance of long-term support was forthcoming, FAO should give the necessary short-term support to the programme, through its Regular Programme or other sources.

URGENT MATTERS CONCERNING TUNA RESEARCH AND MANAGEMENT

14. The skipjack catches in the western Pacific have recently been rapidly expanding, as described in documents IPFC/IOFC : TM/76/4 (paras 6-11) and IPFC/76/5, Sup. 19. This expansion cannot continue indefinitely. There is therefore an urgent need for scientific advice so that timely and appropriate measures are taken to avoid the growth of excessive capacity. A major problem in providing this advice is the lack of knowledge of the stock structure of skipjack, and hence of the degree of interaction between fisheries in different regions. The stock structure could be determined in a number of ways, of which a large-scale tagging experiment, as described in document IPFC/IOFC : TM/76/Inf.4 was one of the most promising. The Committees therefore recommended to countries interested in skipjack to support this programme, since this seemed to be the most effective way of tagging large numbers of fish, using the most effective techniques and carrying out the tagging over a wide area.

15. The Committees considered that arrangements should be made to promote and co-ordinate research into skipjack of the western Pacific, and accordingly made the following resolution :

“Recognizing the rapid expansion of the fisheries on skipjack in the southwest Pacific and the urgent need for scientific advice so that timely and appropriate decisions on management and development can be taken, the Special Committee on Management on Indo-Pacific Tuna recommends to IPFC to establish a subsidiary scientific body or group on western Pacific skipjack, with the following terms of reference :

In co-operation with the countries of the central and western Pacific, and appropriate regional organizations, to promote and co-ordinate those scientific research activities which will lead to a better understanding of the skipjack resources of the western Pacific, and which will enable proposals to be made for management and rational utilization of these resources, which can be implemented at the appropriate national or regional level.

In particular the group should endeavour to

1. facilitate the better identification of separate skipjack stock or stocks in the region by (a) intensive tagging experiment, (b) genetic studies, and (c) other relevant studies.
2. investigate the feasibility of a workshop on skipjack catch and effort data not later than two years hence.

The group should also seek the active co-operation of other regional organizations interested in tuna resources in the central and western Pacific, and serve as the scientific body for development and overview of any research projects that might be carried out under the international funding, referring broad policy matters to the IPFC Special Committee on Management of Indo-Pacific Tuna.”

16. It was expected that the subsidiary body referred to in this resolution would correspond to one of the scientific groups indicated in the diagram of IPFC/IOFC : TM/76/5, and might be a subsidiary body of the Standing Committee on Research and Statistics, if that were established. Since the IPFC had at the time of the Committees' session not decided on its new arrangements for research and management, the Committees proposed that the precise structure and status of the skipjack group should be decided by IPFC. The arrangements of the group should be such as to most effectively carry out the above terms of reference, and to facilitate the co-operation of all countries and institutions concerned with skipjack.

17. Information on the long-line fishery in the western and central Pacific for yellow fin and big eye was presented by Japanese scientists in accordance with the recommendation made at the Committees' Third Joint Session. This preliminary assessment showed that for both species the current levels of fishing intensity appear to be near or in excess of the levels giving the maximum sustainable yield from the traditional long-line fisheries (see Annex E).

18. It was noted that there appeared to have been changes in the method of operation of the long-lines used in the Indian Ocean. The effects of these changes on the status of stocks and the fisheries needs early attention.

19. In addition to the long-line fisheries, yellowfin, and to a lesser extent bigeye, are caught in a variety of other gears. The catches of small fish by some of the surface gears operating in the western Pacific appear to be increasing. There is an urgent need to assess the interaction between the surface and long-line fisheries, and the Committees therefore recommended that all institutions having information on these fisheries should collaborate in making this study, which should also continue the study on the long-line fishery using data on catches after 1974. The offer of the Honolulu Laboratory of the Southwest Center of the U.S. National Marine Fishery Service to arrange for such collaboration was welcomed.

OTHER MATTERS

20. The Committees discussed the species that should be included within their scope. They agreed that, in addition to the major commercial species (large tunas and skipjack), they were concerned with billfishes, and the smaller species of tuna-like fishes (*Euthynnus*, *Auxis*, etc.). There was some doubt whether Spanish mackerels (*Scomboromorus*) and similar species should be included, even though they were included with tunas in some broad classifications (for example, the ICCAT Convention). It was noted that there were some questions concerning the taxonomy of these species, and that this subject was under detailed review by Dr. B. Collette of NMFS¹ Washington. In view of the importance of these species in many parts of the Indo-Pacific region, the Committees urged that scientists and institutions in all member countries with significant fisheries on these species should assist in the taxonomic studies by facilitating the supply of material to Dr. Collette.

DATE AND PLACE OF NEXT MEETING

21. The Committees agreed that their next meeting should be held immediately preceding and at the same place as the next meeting of IOFC or IPFC. On the presumption that there would be substantive matters to discuss, the earlier meeting, probably of IOFC in October 1977, was preferable.

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Secretary

AGENDA

1. Opening of the meeting
2. Adoption of the agenda and arrangements for the meeting
3. Future arrangements for tuna management
 - (a) Structure and responsibilities of scientific and administrative bodies
 - (b) Immediate and long-term responsibilities of a central secretariat
 - (c) Funding of a central secretariat
4. Urgent matters concerning tuna research and management
5. Any other matters
6. Date and place of the next meeting
7. Adoption of the report

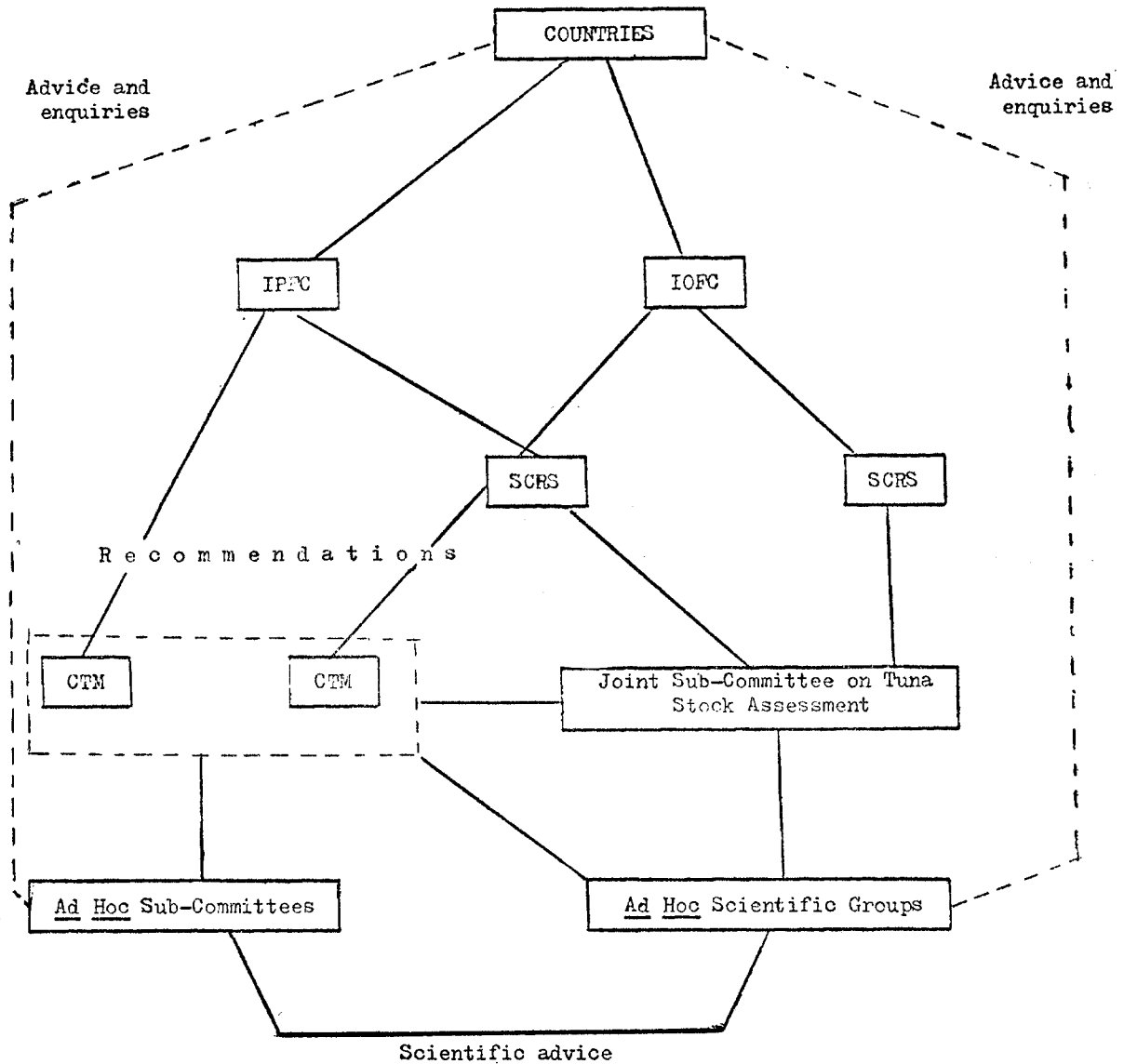
LIST OF DOCUMENTS

- IPFC/IOFC:TM/76/1 Provisional agenda
- 2 Annotated provisional agenda
- 3 Provisional timetable
- 4 An immediate management programme of tuna in the IPFC/IOFC region
- 4(C/1) Comments by Japan on an immediate management programme for tuna in the IPFC/IOFC region
- 5 Report of the IOFC *Ad Hoc* Committee of Nations on the Mechanics of Tuna Research and Management
- IPFC/IOFC:TM/76/Inf. 1 List of documents
Rev. 1
- 2 Information for participants
- 3 List of delegates and observers
- 4 A proposal for a skipjack survey and assessment programme in the central and western equatorial Pacific
- 5 Report of the IPFC *Ad Hoc* Committee to Review the Functions and Responsibilities of IPFC

OTHER RELEVANT DOCUMENTS

- IPFC/76/5, Sup. 8 Report of an *Ad Hoc* Committee Meeting of Specialists to Review the Biology and Status of Stocks of Small Tunas, Hawaii, December 1975
- 5, Sup. 19 Recent developments in research on skipjack (*Katsuwonus pelamis*) populations in Japan by T. Kawasaki, Tohoku University, Japan

CHART SHOWING CHANNELS OF COMMUNICATION BETWEEN PROPOSED BODIES TO BE SET UP UNDER IPFC AND IOFC TO DEAL WITH ADMINISTRATIVE AND SCIENTIFIC ASPECTS OF TUNA MANAGEMENT, RESEARCH AND STATISTICS



CTM = Committee on Tuna Management
 SCRS = Standing Committee on Research and Statistics

PRELIMINARY ANALYSIS OF CATCH AND EFFORT DATA OF THE
PACIFIC LONG-LINE FISHERIES 1952 - 1974¹

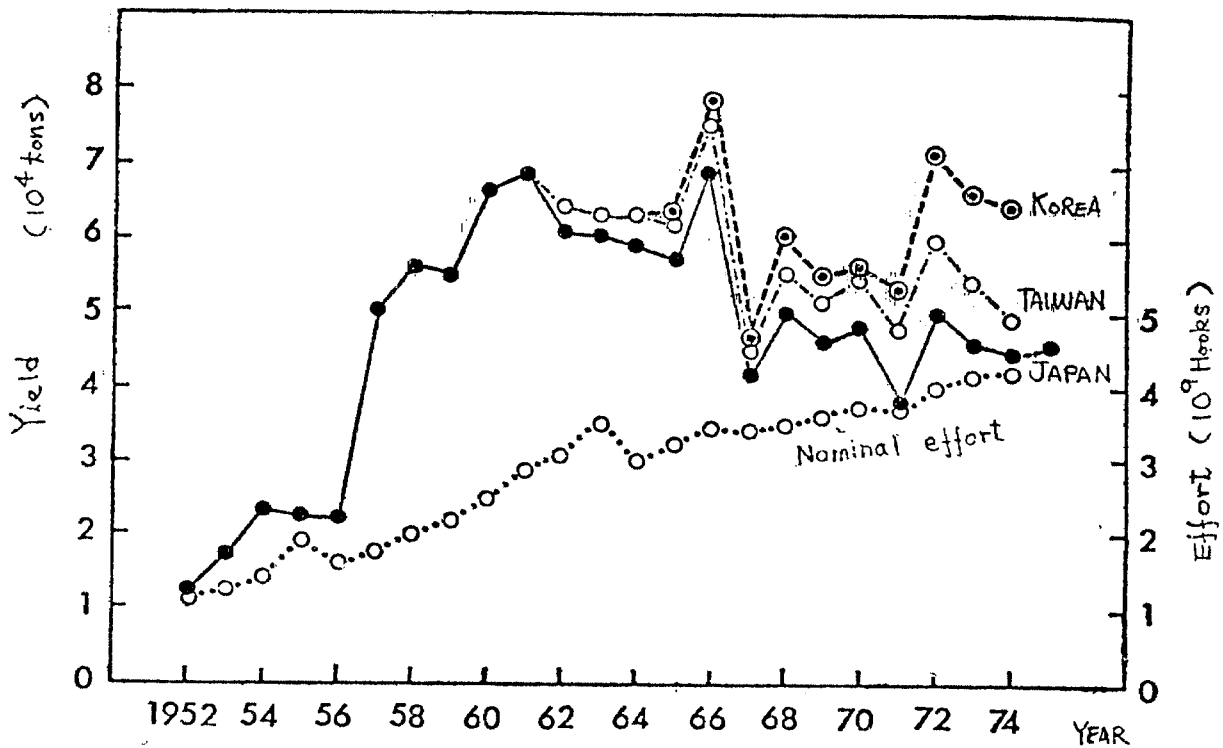


Fig. 1 Annual effort and catch of yellowfin tuna taken by long-line fleets in the Pacific Ocean.

1. Figures supplied by Dr. Ueyanagi, Far Seas Fisheries Research Laboratory, Japan. They will be included in a detailed report to be published in the Bulletin of the Laboratory.

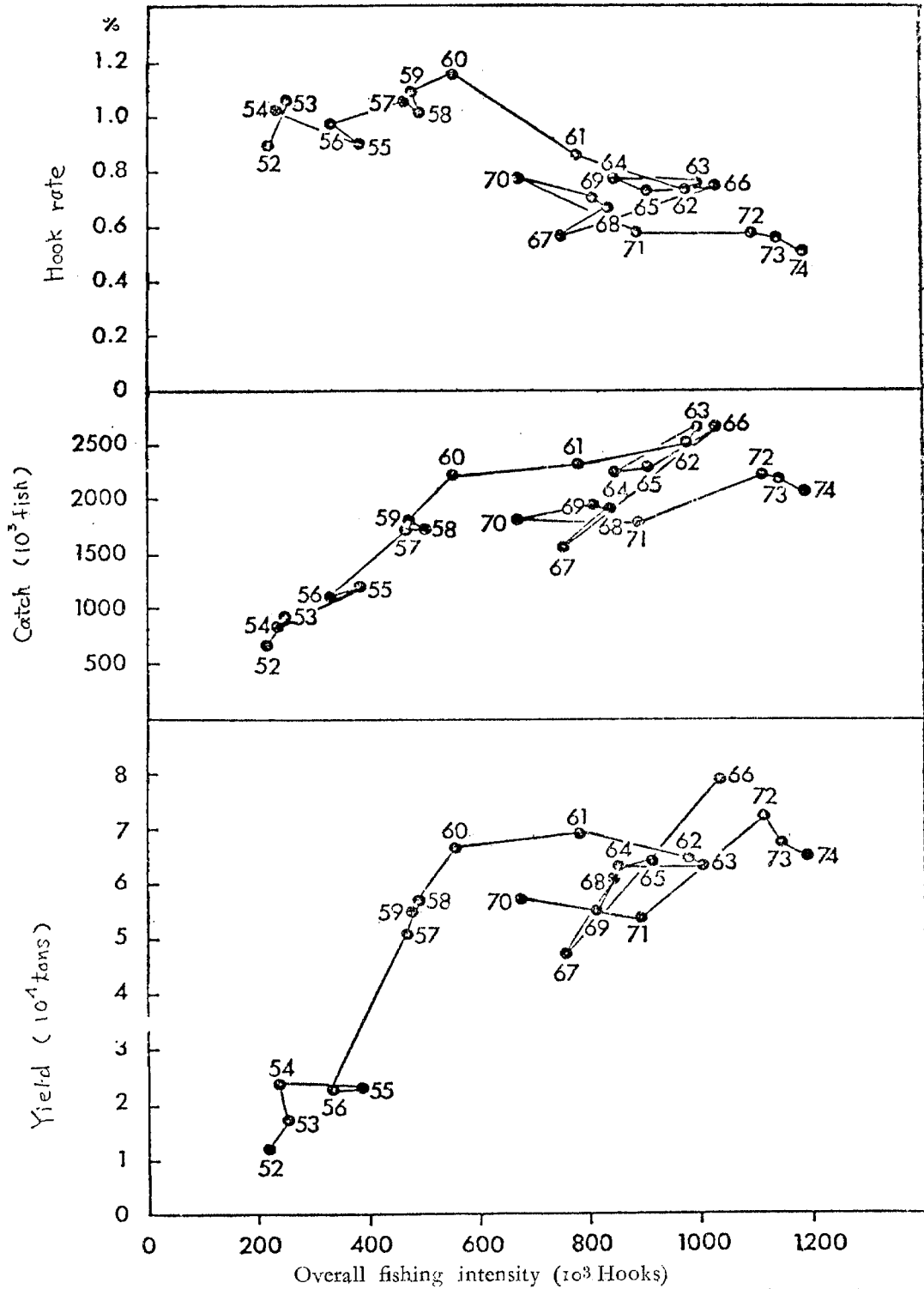


Fig. 2 Hook rate in percent (upper panel), catch in thousand fish (central panel) and yield in ten thousand tons (lower panel) of yellowfin tuna, plotted against overall fishing intensity in thousand hooks per 5° square in the Pacific long-line fishery

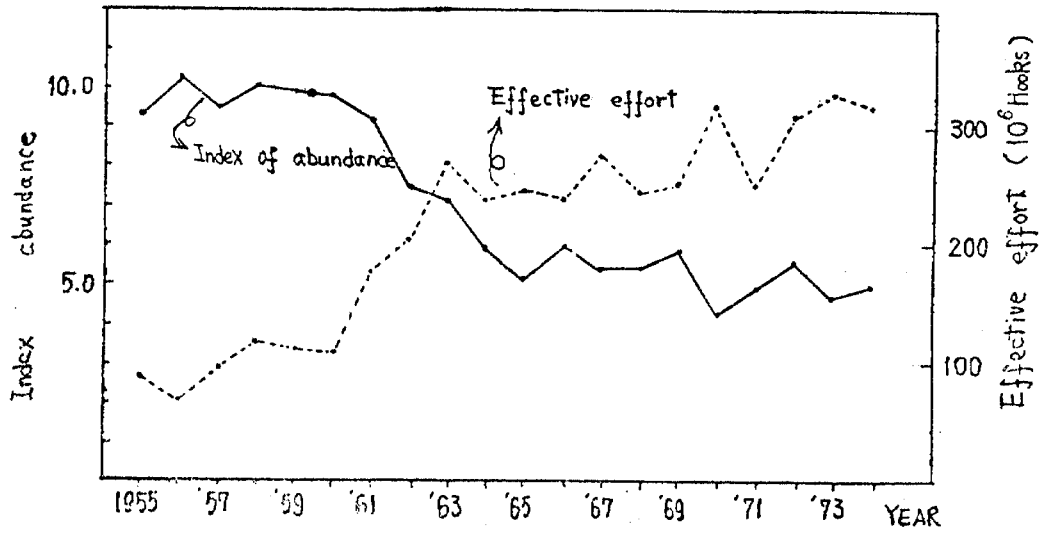


Fig. 3 Annual change in index of abundance and overall effective effort in number of hooks of bigeye tuna caught by whole long-line fishery in the Pacific Ocean (including Japanese, Taiwanese and Korean fleets)

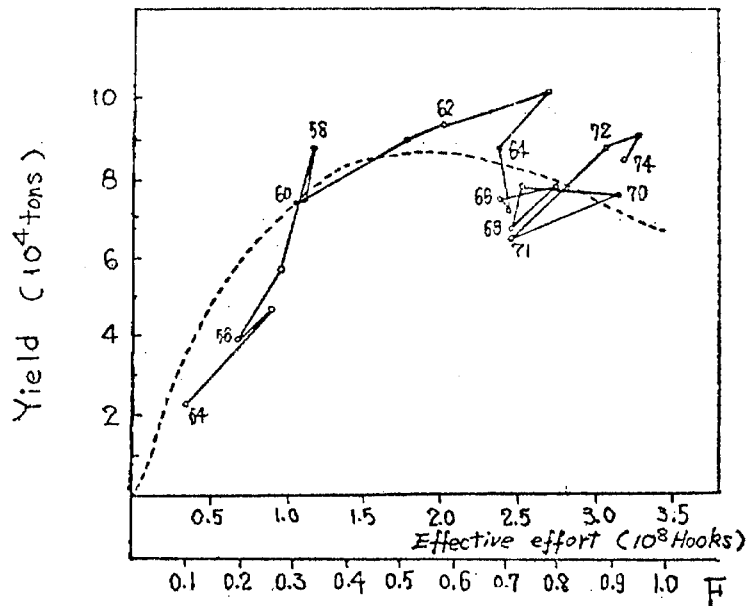


Fig. 4 The sustainable yield curve (dotted line) and the observed annual catches of Pacific bigeye tuna

REPORT OF THE SECOND SESSION OF THE IPFC WORKING PARTY ON
FISH TECHNOLOGY AND MARKETING

Colombo, Sri Lanka, 25-26 October 1976

OPENING OF THE MEETING

1. The meeting was held at the Bandaranaike Memorial International Conference Hall, Colombo, on 25 and 26 October 1976. Mr. A. S. Mendis, Deputy Director Fisheries (Research) opened the meeting on behalf of the host government.
2. A list of participants is given as Appendix L-I.
3. The meeting welcomed Mr. Mohamed Saeed Alharthy, Director of Fisheries, Dubai, U.A.E. as an observer and the participation of the staff from the FAO/SIDA Centre for Product Development and Marketing in Colombo.

ELECTION OF CHAIRMAN

4. Dr. Eduardo C. Sison of the Department of Food Science and Technology, University of the Philippines was elected Chairman and Dr. M. N. Moorjani of CFTRI, India, as rapporteur.

AGENDA

5. The agenda, attached as Appendix L-II was adopted.

REPORT BY SECRETARIAT

6. The Technical Secretary (D. James) presented a brief review of current activities of the Fish Production and Marketing Service of the FAO Department of Fisheries. He also reviewed progress with the Working Party's programme.
7. Although the previous twelve months had been a difficult period financially, FAO had continued to pay attention to the fields of fish handling, processing and marketing. The ongoing field programme in Southeast Asia, Africa and Latin America was described, with particular reference to the FAO/SIDA project in Sri Lanka, the FAO/DANIDA project for fish marketing in Bangladesh and the Integrated Project in Cochin, India, where a fish processing technologist has just been appointed. The prospect for implementation of trust fund and global projects to improve the utilization of small pelagic fish and their contribution to the Working Party's activities were also referred to. The Technical Secretary informed the group of publications in the field of fish technology which had been released in the preceding twelve months. Some of these were made available to the meeting :

Fisheries Technical Paper No. 152 International
Directory of Fish Technology Institutes
Fisheries Technical Paper No. 160 The Production of Dried Fish
Two other publications: The Production of Fish Meal and Oil
(FAO Fisheries Reports, No. 175), Expanding the Utilization of Marine Resources for Human
Consumption (Fisheries Report No. 175) and advisory notes on frog leg processing and clean
hands, were also mentioned.

8. The meeting was advised that during the next three years FAO would undertake many training activities and workshops. Plans were well advanced for three workshops on fish technology and inspection to be held in 1978, 1979 and 1980.

It is hoped that these will be funded by DANIDA and held in southwest Asia, the Middle East and Latin America. Workshops on the handling of small pelagic fish are being planned for the Arabian Sea and the West African regions and will be funded by DANIDA and CIDA respectively. A workshop on frog leg processing will be held in Cochin, India, as soon as funds are available. It was also hoped to arrange a number of quality control courses in different regions and to hold a Symposium on the Handling and Marketing of South American hake in Montevideo, Uruguay, late in 1977. It was felt that the holding of regional training activities and workshops to provide training for people at the medium level, who would then be able to initiate similar activities in their home countries, was more valuable than attempting to reach workers at the national level, with the limited funds and staff resource available. To assist in these training activities FAO would produce a series of film strips on various aspects of fish technology, inspection, quality control and marketing.

9. In 1977 it was also hoped to arrange a meeting of senior fish processing technologists from West Africa funded by CIDA. At this meeting the research needs and available facilities in the region would be discussed in the hope that it would be possible to start a similar programme of co-operative research to that of the IPFC Working Party. This initiative would be extended in the future to the Caribbean and Latin American areas.

10. The IPFC Working Party programme set up by the first meeting was not reviewed in detail as during the meeting technical discussion on all proposals was expected. However, it was pointed out that although no spectacular advances had been made in the last year the programme of the Working Party was advancing on a broad front. The coverage had been widened by the attendance of two more countries, and representatives from TPI, London. The Technical Secretary had found great interest in participating in co-operative activities from institutes in Europe and North America. It was suggested that the objective of establishing co-operative research programmes between institutes in the region was being achieved. The meeting was advised that the former Government Consultation on Codes of Practice felt that its work was well advanced, with the production of nine codes which were available to interested participants. At the meeting held in October 1976 the emphasis had been changed to consideration of tropical fish technology. This change was reflected in the retitling of the Consultation as the Government Consultation on Fish Technology (Codes of Practice). In the future this Consultation would act as an interface between fish technologists from developed and developing countries, thus providing an international forum to improve collaboration in research programmes and to assist in the transfer and application of technology.

THE TPI CONFERENCE

11. Mr. J. G. Disney of TPI, London, reported on the TPI Conference on Handling, Processing and Marketing of Tropical Fish, held in London 5-9 July 1976. He advised that more than 200 participants from 65 countries attended the Conference, a high proportion coming from developing countries. The proceedings, containing the 75 papers submitted, would be ready early in 1977.

12. Despite the high standard of the papers it was evident that there was a lack of information on tropical fish technology. The Working Party's programme would be useful in improving the situation. A bibliography on tropical fish technology would be prepared by TPI and CFTRI Mysore. The Conference had recommended that greater emphasis should be placed on development of small-scale fisheries as a means of improving the socio-economic conditions of the rural poor. It was also stressed that there was a need for further technological meetings, preferably at a regional level, to gather information and suggest means of improving the situation.

13. In discussion it was noted that the TPI Conference had been an extremely valuable experience and had advanced the status of tropical fish technology. The IPFC Symposium planned for 1978 would be timely as a regional follow-up to the Conference.

FISH SILAGE

14. Dr. J. L. Sumner of New Zealand introduced his Feasibility Study for Fish Silage Production in the IPFC region and commented that there had been great interest expressed both during and after his visit. Commercial trials for pig feeding had already started in New Zealand. Pig feeding trials in the Solomon Islands using waste from a tuna cannery were reported by TPI. The availability of raw material was discussed and potential sources considered. Present trash fish landings were unlikely to be available as they were used for fish meal, duck feeding, etc. The prospects of a silage industry would then depend on making use of trawler by-catches. The extent of dumping during the early stages of fishing trips and the possibility of on-board production would therefore have to be considered.

15. At a village level it was suggested that on-board production from species unsuitable for human food and use of offal onshore should also be investigated. Kitchen waste could also be added at the expense of producing a silage of unknown quality. The quality level and relative cost were considered particularly important for large-scale production. It was evident to the meeting that experimental production and test feeding would be required and all institutes were requested to co-operate in obtaining data. It was recommended that Dr. Sumner's report be revised and considered for publication as an IPFC Occasional Paper.

16. A further recommendation was that a project proposal should be prepared for financing by the international system (JNEI) in the following form:

- (a) Technical and economic assessment of production on large trawlers (Thailand)
- (b) Prospects of production in coastal fisheries (Malaysia)
- (c) Experimental preparation and test feeding to pigs, poultry and fish to determine potential problems in commercial production (Indonesia and all interested countries)

17. It was decided that work should continue in the interim period as the CSIRO Centre for Animal Research and Development in Bogor, Indonesia, had offered to undertake feeding studies. The Technical Secretary will try to meet with Mr. Sofyan Ilyas, Mr. Rustami (Research Institute for Inland Fisheries, Bogor) and the CSIRO Director in December to discuss immediate action. Further information will be sought from Denmark and Poland where silage has been used for many years. In addition it is hoped to have the results of the continuing programme of TPI made available.

HANDLING, PROCESSING, TRANSPORT AND DISTRIBUTION OF LIVESTOCK

18. Mr. Sofyan Ilyas introduced the paper he had prepared for the IPFC Symposium on this subject. The most salient feature was the high price obtainable for live freshwater compared with just dead or iced fish. It was decided that although investigation should be encouraged, the Working Party would not continue an active programme. Mr. Ilyas would remain as the central person for receipt and dissemination of information.

THE DRIED FISH TRADE IN SRI LANKA

19. Mr. Sachithanathan introduced the paper which he had prepared at the request of the Working Party. He was commended by the meeting for producing an excellent and exhaustive survey. The meeting was also informed of a survey of World Trade prepared by the TPI (copies available from Mr. Disney).

20. Mr. Sachithanathan's paper brought out the need for some degree of harmonization between dried fish standards. It was agreed that Dr. T. P. Gunawardena would identify someone from Sri Lanka to act as a focal point for collecting information on dried fish standards. Although it was accepted that a Codex Standard was not likely for dried fish this information could be used for a decision by future Working Party meetings as to whether an international standard for dried fish could be prepared. Alternatives were a buying specification or a code of practice for production. Because of the importance of the trade to India, Dr. Morjani would act as a reference point in that country and other members of the Working Party were asked to provide information. Other countries would also be asked for available standards and data.

21. It was also decided that efforts should be made in all institutes to improve dried fish production and prevention of wastage. The FAO/SIDA Centre in Sri Lanka undertook to be the focal point for activities directed to:

- (a) Economic investigations of the traditional process
- (b) Application of known improved techniques and their relative cost
- (c) The use of approved insecticides to control infestation.

22. It was recommended that Mr. Sachithanathan's paper be updated and considered for publication as an IPFC Occasional Paper.

PROGRESS WITH OTHER ACTION PLANS

23. (a) As requested by the participants of the first Working Party meeting, Dr. Taneko Suzuki had investigated the potential toxicity problems of fish from the IPFC region. She had consulted with Professor Y. Hashimoto of the Laboratory of Marine Biochemistry, University of Tokyo, and prepared a short review based on his work. Unfortunately the preparation of a technical paper was not possible as Professor Hashimoto had been in bad health and had recently died.

In discussing the constraints to fisheries development imposed by the problem of toxicity it was accepted that this was a very specialized field. It was generally agreed that as sufficient work was going on in the region, Dr. Suzuki's review should be updated and circulated and that Working Party members should attempt to keep up to date with new publications. If possible a paper should be prepared for the 1978 Symposium on this topic.

- (b) Dr. Suzuki had also prepared a review of progress in hydrolysate research in Japan at the request of the Technical Secretary. It had been suggested that hydrolysates would offer an alternative to silage production. In discussion it was agreed that production was unlikely to be commercially viable under current economic conditions. The Technical Secretary will monitor developments in other areas and keep the Working Party advised.
- (c) Information circulars had not been prepared on a regular basis due to lack of funds and the difficulties of obtaining information. Within the FAO Programme of Work it was intended to produce advisory notes, and topics of interest would be requested from members. After discussion it was decided that the Technical Secretary would attempt to produce an IPFC Technology Newsletter within the next six months for circulation in the Region and in other areas to provide information on the co-operative programme. This would consist of brief notes on ongoing programmes with signalling of future work and results from other parts of the world.
- (d) National training courses had been encouraged by the members and considered by the Technical Secretary in his review. Carrying the information to the local level from regional workshops and training courses should continue to be considered as a priority activity. It was also considered necessary to devote more attention to field workshops and assistance would be sought from the IPFC Secretariat.
- (e) Improvements in salted/dried fish production were dealt with in the proposals for investigation of standards and improvement of production. Mr. Ilyas advised that his work on the economic aspects of chill storage of salted and dried fish was in progress and Mr. Disney undertook to prepare advisory material on the technological significance of salt/water ratios in these products.
- (f) Low cost products from minced fish were reviewed by Dr. Moorjani and the availability of inexpensive varieties with relative costs was discussed. A number of different product approaches such as salted mince, minced whole fish and cereal/fish mixtures were considered. Dr. Olley described measurements of formaldehyde production during storage which indicated that careful screening was necessary before encouraging commercial production. Dr. Suzuki advised that experiments to separate light and dark meat from small fish were underway in Japan and undertook to keep the

group informed. The meeting requested Dr. Moorjani to complete his detailed review for circulation and suggested that papers on the topic should be sought for the 1978 Symposium. As no project proposals had been forwarded to the IDRC following the Bangkok Workshop in 1974, the Technical Secretary undertook to find out whether finance was still available and could be provided for alternative projects.

- (g) Microbial spoilage associations were also reviewed by Dr. Moorjani in a paper which he submitted. The previous comments on lack of available information relating to tropical conditions were reinforced although the comprehensive review prepared by Dr. Shewan for the TPI Conference was mentioned. The Working Party suggested that, if possible, a consultant should be engaged for further work.

FORMULATION OF NEW PROPOSALS FOR CO-OPERATIVE ACTIVITIES

24. The meeting was inclined to continue activities in some of the unresolved areas of the programme rather than to undertake major changes.

- (a) Evaluation of the prospects of fish silage production as a project activity has already been discussed but was accorded priority in future work. A project proposal will be prepared.
- (b) Improvement of salted/dried products was also accorded a high priority. An outline of the work to be undertaken with the FAO/SIDA Institute as the central point is attached in Appendix L-III. All institutes will collaborate in the programme.
- (c) In many small-scale coastal fisheries it is not possible to chill the fish properly on board, either for economic or practical reasons. Chilling to a temperature between ambient and melting ice, may, in some cases, provide sufficient extension of the storage life, to enable more distant markets to be reached. Dr. Olley has worked on relative spoilage rates of proteinaceous foods and would like to determine whether tropical fish species fit into the same general pattern as other foods. It is necessary that members of the Working Party provide results of the time to reach specific spoilage levels at a number of temperatures. More details are provided in Appendix L-III. Dr. Olley will provide information to those interested and act as a central point for information. When results are available they will be written up.
- (d) Utilization of seaweeds was chosen as a topic for investigation because of their abundance in the region. It was agreed that further information was required to promote their use for food or production of colloids. Dr. Suzuki will enlist the services of Dr. Hirao to collect information on species, technology of utilization and economics of production. The Technical Secretary will circulate an FAO commodity review on seaweeds when it is available.
- (e) The work on product development from underutilized species will continue in a number of institutes. To support this work and communicate results, Dr. Moorjani will update his report on minced fish for circulation.

ALLOCATION OF KEY ROLES

25. Improved communication was discussed at length. The general feeling was that within a small group it was possible to have an individual with a key function. These people would act as focal points for collection and dissemination of information on specific topics. It was pointed out that this approach had not worked on a worldwide scale but that this may be due to hesitancy in writing to unknown experts. As it was not possible to channel all information through the Technical Secretary, and as the key role system appeared to be working satisfactorily, it was decided to continue.

SYMPOSIUM FOR 18TH SESSION

26. In discussion it was pointed out that this was the first IPFC Symposium in the area of fish technology since 1964 and that the Working Party had a big responsibility in making it a success. Because of the impact of the TPI Conference in 1976 it was suggested that participation from outside the region should be encouraged.

27. In order that the Symposium should not be confused with the TPI Conference, it was recommended that the title be changed to Fish Utilization Technology and Marketing in the IPFC Region.

28. The Technical Secretary had drawn up a draft prospectus for the Symposium which would be given to members for comment as soon as possible. In order to obtain different information to that presented at the TPI Conference both product and process approaches had been avoided. The sessions along the following lines were suggested :

- (a) Background and status of the fish processing industry in IPFC countries;
- (b) Application of technology to the fishing industry, extension services and training programmes;
- (c) Equipment and techniques for processing and distribution of fish and fishery products;
- (d) By-products from marine sources and waste utilization in the fishing industry;
- (e) Fishery products and the consumer;
- (f) Conclusions and recommendations.

29. Members will comment on this prospectus in the shortest possible time so that it can be finalized, printed and widely distributed within three months. The prospectus would call for abstracts to be received about ten months before the Symposium and for papers to be received six months before. After all abstracts are available, it was felt necessary to have a Working Party meeting to make any necessary changes to the prospectus, to select discussion leaders and rapporteurs and to make the detailed preparation for the Symposium. It was suggested that this meeting might be held in Malaysia.

30. The Working Party Chairman (Dr. Sison) was given the responsibility of identifying a Convener for the Symposium. He will advise the Technical Secretary. Dr. Sison also undertook to arrange the preparation of a paper on the Status of Fisheries in the IPFC region and promised the Working Party to deliver a review of research management at the next meeting.

31. The importance of technical extension services in the region was discussed and in view of a strongly felt need for their upgrading, Mr. Disney undertook to identify an author for a paper on the subject.

CONCLUSIONS AND RECOMMENDATIONS

32. The subject of funding the co-operative research programme on a continued basis was discussed and, following more investigation, will be considered by the next Working Party meeting.

33. The Working Party meeting produced a number of decisions affecting the work programme and recommendations as to future action. These are listed below :

Decisions :

- (i) Mr. Sachithanathan's paper and Dr. Summer's paper to be revised and considered as IPFC Occasional Papers;
- (ii) Dr. Gunawardena from Sri Lanka will identify someone to collect worldwide information on standards for dried fish;

- (iii) A consultant should continue work on the microbiology of tropical fish;
- (iv) The other action plans in Appendix L-III to be pursued. These are in the field of:

Improvement of salted and dried fish
 The use of limited quantities of ice for chilling
 The availability and technology of seaweeds
 Continued product development from inexpensive varieties of fish
 Preparation of a project proposal for silage investigations;

- (v) Dr. Sison will identify a convener for the 1978 Symposium;
- (vi) Institutes would be encouraged to circulate annual reports and other information;
- (vii) The Technical Secretary will prepare a newsletter within six months.

34. Substantive recommendations to the Executive Committee affecting the future of the Working Party are as follows:

Recommendations:

- (i) The Working Party gave very strong support to the recommendation that its life should be continued beyond the 1978 Symposium to support the IPFC Co-operative Research Programme. The meetings to date were recognized by participants as a valuable forum for discussion and for promotion of technology within the region. Other opportunities for personal communication are very frequent.

It is therefore recommended that the Working Party be made a permanent feature of IPFC as a subsidiary body.

- (ii) The title of the 1978 Symposium should be changed to Fish Utilization Technology and Marketing in the IPFC Region.

DATE AND PLACE OF THE NEXT MEETING

35. It was decided that the next meeting should be held in Malaysia about six months before the 1978 Symposium.

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AGENDA

1. Opening of the meeting
2. Election of chairman
3. Adoption of agenda and timetable
4. Report by the Secretariat and review of FAO and Working Party activities during the year
5. Report and discussion of trends established by the TPI Conference on Handling, Processing and Marketing of Tropical Fish
6. Detailed discussion of the report by the fish silage consultant and decision on project proposal
7. Progress report on handling, transport, processing and distribution procedures for live fish
8. Review of paper on Dried Fish Trade of Sri Lanka
9. Reports and discussions on progress with other action plans of the Working Party
10. Formulation of new proposals for co-operative activities
11. Discussion of new proposals and allocation of key roles
12. Discussion of the Symposium topic for the 18th Session of IPFC in 1978
13. Preparation of the programme for the Symposium and assignment of responsibilities
14. Conclusions and recommendations
15. Time and place of next meeting

PRODUCTION OF FISH SILAGE IN SOUTH EAST ASIA

Background

The paper prepared by Dr. J. L. Sumner provides a background to the availability and potential for fish silage in the IPFC region. There are, however, many unanswered questions which must be resolved before fish silage can be considered as a viable means of using fish that cannot be otherwise turned into human food.

Purpose

To assess the technical and economic feasibility of fish silage production the following lines of investigation must be pursued:

- (a) The large-scale production on board trawlers using shrimp by-catch
- (b) Small-scale production on inshore trawlers
- (c) Experimental preparation and test feeding to pigs, poultry and fish to determine what potential problems could be faced under commercial conditions.

Objectives

1. PRODUCTION ON LARGE TRAWLERS

The first stage is to quantify how much fish is thrown overboard during the early stages of trips. Only if there is no other use for this fish should the project continue.

Under normal fishing conditions an assessment should be made of how much of the hold volume is occupied by the normal catch at the end of the fishing trip.

If sufficient raw material and a large enough space are available, investigation should then proceed to determine if there are any design constraints to separating part of the fish hold as a silage tank.

Design of grinding, conveying and pumping equipment should then be undertaken.

On the economic side, it would be necessary to determine what price the local market will pay for a silage product on a protein unit basis.

2. INSHORE TRAWLERS

The quantification of by-catch can be more easily carried out in the day fisheries but it would be more difficult to provide adequate storage space or to design equipment for efficient manufacture.

3. TEST FEEDING

Manufacture under the most favourable economic conditions, although on an experimental basis. Identification of institutes where diets for pigs, poultry and fish can be compounded. Animals should then be raised to market weight and their quality relative to the conventional diet determined.

LOCATION

The three phases of investigation could be carried out in the following countries, although parallel investigations in other countries would be most valuable.

1. Thailand large trawlers. Investigation on trawlers working in the Gulf of Thailand between Bangkok and Singapore.
2. Malaysia small inshore boats. Investigation on the west coast of Malaysia conducted by MARDI. Animal testing could possibly be arranged by MAJUIKAN.
3. Indonesia test feeding. Co-ordinated by the Technological Laboratory in Indonesia and run by the CSIRO Centre for Animal Research and Development for animal feeding and the Research Institute for Inland Fisheries, Bogor.

THE IMPROVEMENT OF SALTED/DRIED PRODUCTS IN THE IPFC REGION

Background

Despite the increased importance of fresh fish, salted/dried fish products continue to represent a major form of fish preservation in IPFC countries. The losses of salted/dried fish are difficult to estimate but at least 25 percent of wastage is generally considered to occur. This wastage is due to a number of factors, including mechanical breakage, microbial spoilage and insect attack, the latter possibly being the more serious. The traditional methods of processing also result in a low quality product which is often contaminated with sand.

Purpose

A project is proposed for a specified country within the region to quantify these losses and to investigate possible solutions. Two possible solutions should be pursued, namely, the use of approved insecticides to prevent insect damage and the use of improved hygiene and processing conditions to control spoilage and insect attack.

Objectives

The project should investigate the technical and economic feasibility of controlling losses of salted/dried fish arising from microbial and insect attack. A comparison of three alternatives is proposed as follows:

1. The traditional process—to include the cost of materials, profit and the extent of wastage under normal commercial conditions
2. The application of known improved techniques. This would include improved hygiene, drying on racks above the ground, use of good packaging, etc. The financial benefit to the processor of these improved techniques would also be assessed.
3. The use of approved insecticides to control insect infestation. Spraying and dipping would be investigated and the preferred method would be compared with the first two techniques. The work would also need analytical support to determine insecticide residues in the final product.

The shelf life of the products from each treatment should be assessed and ways and means of extending storage life investigated.

STORAGE OF TROPICAL FISH AT INTERMEDIATE TEMPERATURES

Background

It is well known that many tropical fish species can be stored in ice for considerably longer than temperate water species. The possibility of using limited quantities of ice, to reduce the temperature to an intermediate

level rather than to 0°C should be investigated. If the constant relationship between temperature and storage life, which has been observed in other proteinaceous foods, holds good for tropical fish, then storage life at intermediate temperatures could be predicted. The economic implications for holding and transport at sea would be considerable.

To set about finding out, it is necessary to be familiar with the spoilage characteristics of tropical species and to identify, for each species, specific spoilage characteristics which can be simply identified. Any specific spoilage characteristic, visual, organoleptic or chemical can be termed a specified spoilage level. The spoilage rate then becomes the reciprocal of the time to reach this level.

$$\text{Spoilage rate} = \frac{1}{\text{time to reach specified spoilage level (in days)}}$$

Investigation

Determine the specified spoilage level at a number of temperatures, e.g., 4°C, 8°C and 20°C.

The relationship between temperature and spoilage for many proteinaceous foods has been established and the rate at 0°C can be compared with the rate at any given temperature 0°C by the following equation:

$$\text{The rate at a specified temperature } 0^{\circ}\text{C} = \text{Rate at } 0^{\circ} (1 + 0.25 \theta)$$

$$\begin{aligned} \text{For example the rate at } 4^{\circ}\text{C} &= \text{Rate at } 0^{\circ} (1 + 0.25 \times 4) \\ &= \text{Rate at } 0^{\circ} \times 2 \end{aligned}$$

$$\begin{aligned} \text{Similarly, the rate at } 8^{\circ}\text{C} &\text{ would be } = \text{Rate at } 0^{\circ} \times 3 \\ \text{The rate at } 20^{\circ}\text{C} &\text{ would be } = \text{Rate at } 0^{\circ} \times 6 \end{aligned}$$

To interpret these different rates, imagine a species which takes 10 days to reach a specified spoilage level in ice.

$$\begin{aligned} \text{The rate at } 0^{\circ}\text{C} &\text{ is then } = 1/10 \text{ or } 0.1 \\ \text{The rate at } 4^{\circ}\text{C} &\text{ would be } = \text{Rate at } 0^{\circ} \times 2 = 0.2 \\ \text{The rate at } 8^{\circ}\text{C} &\text{ would be } = \text{Rate at } 0^{\circ} \times 3 = 0.3 \\ \text{The rate at } 20^{\circ}\text{C} &\text{ would be } = \text{Rate at } 0^{\circ} \times 6 = 0.6 \end{aligned}$$

To determine the storage life in days from the rate equation:

$$\begin{aligned} \text{at } 4^{\circ}\text{C, } 0.2 &= \frac{1}{\text{time in days}} \\ &= 5 \text{ days} \\ \text{at } 8^{\circ}\text{C, it would be} &= 3.33 \text{ days} \\ \text{and at } 20^{\circ}\text{C} &= 1.66 \text{ days} \end{aligned}$$

Therefore reducing the temperature from 20°C to 8°C by the use of a limited quantity of ice would double the storage life.

Experiments are needed to determine whether tropical fish species fit into this concept. Literature search may also turn up results which can be used as the basis for calculations.

For advice write to Dr. June Olley at the address below and send, if possible, data on the times to reach specific spoilage levels.

Examples of spoilage levels which can be determined for each species are :

Oil sardine	...	percentage of burst bellies
Shark	...	ammonia development
Shrimp	...	total volatile base (TVB)

Organoleptic and visual characteristics, such as the appearance of the eyes or the smell and colour of the gills can be used for most species.

For further information write to :

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PROJECT

UTILIZATION OF INEXPENSIVE VARIETIES OF FISH FOR SEPARATION OF MEAT AND ITS PROCESSING IN VARIOUS FORMS TECHNICAL FEASIBILITY

In some countries huge quantities of inexpensive varieties of fish are caught during the glut season. These are small in size, contain a lot of bones, and are not very attractive. FAO has estimated that an annual potential of 40 million tonnes of underutilized fish could be made available in the form of separated meat for use in a variety of products. With the increased catch of trawler fish, the availability of inexpensive varieties of fish is to increase considerably.

Programme of Action

1. Suitable methods of preserving surplus and huge quantities of inexpensive fish
2. Suitability of various species
3. Disseminating knowledge with actual live demonstrations on acceptable type products from these fish to the member countries as the progress of work has been slow
4. Economics of separated meats versus fish fillets and dressed fish
5. Shelf life of separated meat
6. Utilization of by-products (skin, bone, etc.)

For information and advice write to—

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UTILIZATION OF SEAWEEDS IN THE IPFC REGION

Background

A very large quantity of seaweed is available in the IPFC Region and is consumed as food and used for industrial products in a number of countries. A programme of investigation and dissemination of information could result in seaweed consumption in countries where it is not used or establishment of export opportunities.

Purpose

To develop effective methods for utilization of seaweeds in all IPFC countries.

Objectives

1. To study the species available and determine possible end uses.
2. To compile a comprehensive bibliography on the technology of seaweed utilization.
3. To determine what modifications are necessary to the available technology for its incorporation in the IPFC Region, bearing in mind the local raw material and the need for low cost technology.

REPORT
of the
FOURTH SESSION OF THE IPFC/IOFC JOINT WORKING PARTY OF EXPERTS ON
INDIAN OCEAN AND WESTERN PACIFIC FISHERY STATISTICS

Colombo, Sri Lanka, 25-28 October 1976

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, January 1977

PREPARATION OF THIS REPORT

At its First Session in Rome, 16-20 September 1968, the Indian Ocean Fishery Commission (IOFC) decided to propose to the Indo-Pacific Fisheries Council (IPFC) the establishment of a joint working party to stimulate the development of fishery statistics within the Indo-Pacific Region. The Council, at its Thirteenth Session held in Brisbane, 14-25 October 1968, agreed to this proposal.

The Working Party has since then met four times. These sessions are as follows :

First Session, Bangkok, Thailand, 1-5 December 1969: *FAO Fisheries Reports No. 85*
 Second Session, Bangkok, Thailand, 13-17 December 1971: *FAO Fisheries Reports No. 120*
 Third Session, Jakarta, Indonesia, 25-30 October 1974: *FAO Fisheries Reports No. 157*
 Fourth Session, Colombo, Sri Lanka, 25-28 October 1976: The present document is the Report of this Session

Statements in this report do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

Distribution

Members of the Indo-Pacific Fisheries Council
 Members of the Indian Ocean Fishery Commission
 Members of the Working Party
 FAO Department of Fisheries
 Fishery Officers in FAO Regional Offices

Bibliographic Entry

IPFC/IOFC Joint Working Party of Experts on
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 (1977)
FAO Fish. Rep., (189): 15 p.
 Report of the fourth session of the

Conferences-Colombo (Sri Lanka). Reports.
 Fishery statistics. Fishermen statistics.
 Fishing vessel statistics. Catch statistics. Data
 acquisition. Fishing grounds. Commercial species.
 Fish handling. Trash fish. ISW. ISEW.

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1. PROCEDURAL AND ORGANIZATIONAL MATTERS

1.1 The Fourth Session of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics took place from 25 October through 28 October 1976 at the Bandaranaike Memorial Conference Hall, Colombo, Sri Lanka.

1.2 A list of the members of the Working Party and of the other participants in the Fourth Session is given in Appendix III.

1.3 Mr. M. Unar, nominated at the preceding session, acted as Convener and Mr. I. Yamanaka as Vice-Convener.

1.4 The Working Party adopted the Agenda presented as Appendix M-I.

1.5 The documents presented to the Fourth Session of the Working Party are listed in Appendix M-II.

1.6 The Working Party appointed the following rapporteurs :

Agenda Item 1 :

Agenda Item 2 :

Agenda Item 3 : Mr. L. P. D. Gertenbach

Agenda Item 4 :

Agenda Item 5 : Mr. S. K. Banerji

Agenda Item 6 : Mr. D. Chakraborty

Agenda Item 7 : Dr. G. Murphy

Agenda Item 8 : Mr. L. P. D. Gertenbach

2. DEMARCATION OF BOUNDARIES OF FISHERY STATISTICAL AREAS IN THE INDIAN OCEAN AND WESTERN PACIFIC

2.1 *The boundary between the Western Indian Ocean (Major Fishing Area 51) and the Antarctic Indian Ocean (Major Fishing Area 58)*

2.1.1 The Working Party considered document IPFC/IOFC:ST4/76/3D, in conjunction with document IPFC/IOFC:ST4/76/3A, in which it was proposed to move the boundary separating Major Fishing Areas 51 and 58 northwards from 50°00' South Latitude to 40°00' South Latitude.

2.1.2 The Working Party noted the proposal endorsed by the meeting of the SCAR group of specialists on the living resources of the Southern Ocean, held in Woods Hole, USA, in August 1976, that the southern boundary of Area 51 should be moved north from 50°00' South Latitude to 40°00' South Latitude. This would ensure that the catches round Kerguelen, and other sub-antarctic islands would be included in Area 58. The group agreed with the intention of their proposal but it was felt that the move to 40°00' South Latitude was too great, since some of the fishing grounds of the southern bluefin tuna would then be included in Area 58. A dividing line at 45°00' South Latitude would be sufficient to include Kerguelen and other islands in the Southern area.

2.1.3 The Working Party therefore recommended that the southern boundary of the Western Indian Ocean should be moved, and that it should be at 45°00' South Latitude.

2.1.4 It further suggested that it would be more appropriate to refer to the Southern Area 58 as Southern Ocean (Indian Ocean sector) rather than Antarctic since it included the sub-Antarctic. This northward shift in the southern boundary of the Western Indian Ocean obviates the need for maintaining a separate Sub-area 8.1 and it is recommended that the waters of this former sub-area lying between 40°00' and 45°00' South Latitude and between 30°00' and 40°00' East Longitude be included in Division 8.2. Division 8.1 (called the

Marion-Edward Division) should now be eliminated from all descriptions and charts of the Western Indian Ocean (see Section 2.4.2 on page 3 and Appendix 2 of Documents IPFC/IOFC:ST4/76/2C and Section 1, paragraph 1.4 and Chart 4 of IPFC/IOFC:ST4/76/3B).

2.2 *Revision of the boundaries of the statistical area covering the waters around Sri Lanka*

2.2.1 The Working Party considered the proposals made in Document IPFC/IOFC:ST4/76/3E and agreed that a new division (4.1) forming part of Sub-area 4 of Major Fishing Area 51 (Western Indian Ocean) should be established.

2.2.2 The Working Party recommended that the boundaries of this new Division 4.1 should be as follows:

A rhumb line drawn in a northeasterly direction from Point Calimere on the east coast of India to a point at 82°00' East Longitude at 11°00' North Latitude, thence due east to 85°00' East Longitude, thence due south to 3°00' North Latitude, thence due west to 76°00' East Longitude, thence due north to 7°00' North Latitude, thence along a rhumb line in a northeasterly direction to the coast of India where the boundary between the States of Kerala and Madras meet at the sea, thence in a northeasterly direction along the Coast of India to the original point at Point Calimere.

2.2.3 The Working Party noted that the introduction of this new Division 4.1 within Sub-area 4 of Major Fishing Area 51 requires a revision of the present description of that part of the boundary between the Western Indian Ocean (Major Fishing Area 51) and the Eastern Indian Ocean (Major Fishing Area 57) lying north of 3°00' North Latitude. The boundary separating Major Fishing Areas 51 and 57 should now be described as follows:

A line drawn northwards from 45°00' South Latitude, along 80°00' East Longitude to 3°00' North Latitude, thence due east to 85°00' East Longitude, thence due north to 11°00' North Latitude, thence due west to 82°00' East Longitude, thence in a south-westerly direction to Point Calimere on the east coast of India.

2.2.4 The Working Party also considered the proposal to transfer this new statistical division, covering the waters around Sri Lanka, from the Western Indian Ocean (Major Fishing Area 51) to the Eastern Indian Ocean (Major Fishing Area 57) but concluded that it should, with its amended boundaries, remain part of the Western Indian Ocean (Major Fishing Area 51).

2.3 *Revision of the boundary between Major Fishing Area 71 (Western Central Pacific) and Major Fishing Area 61 (Northwestern Pacific)*

2.3.1 The participants from the FAO/SCS presented various proposals for amending and improving the boundary, in the vicinity of Hainan Island, between Major Fishing Area 71 (Western Central Pacific) and Major Fishing Area 61 (Northwestern Pacific).

2.3.2 Several alternative solutions were considered to avoid drawing this boundary all along 20°00' North Latitude from 175°00' West Longitude to the coast of Hainan and thereby divide important shelf fisheries in the vicinity of Hainan.

2.3.3 The Working Party was of the opinion that the boundary between Major Fishing Areas 61 and 71 near Hainan Island could be conveniently established at or near 15°00' North Latitude because in that locality the continental shelf is particularly narrow and the demersal fisheries less important further north or south. This 15°00' line is also consistent with one of the general principles (for drawing the boundaries between Major Fishing Areas for statistical purposes) established by the Working Party at its Second Session.

2.3.4 The Working Party accordingly recommended that between 115°00' East Longitude and 175°00' West Longitude, the present boundary line remains as drawn along 20°00' North Latitude.

2.3.5 The Working Party also recommended that West of 115°00' East Longitude the line is drawn as follows:

From a point at 20°00' North Latitude and 115°00' East Longitude the line is drawn due south along 115°00' East Longitude to 15°00' North Latitude, thence due west to 110°00' East Longitude and thence further westwards to the coast of the Asian Mainland.

2.3.6 The Working Party recommended that FAO consult with the Socialist Republic of Vietnam on the precise drawing of this line westward from the point at 15°00' North Latitude and 110°00' East Longitude to the Asian Mainland taking into account geographical and administrative boundaries.

2.4 *Other boundary issues in the region*

2.4.1 The Working Party noted that the boundary between Sub-areas 2 and 3 of Major Fishing Area 71 (Western Central Pacific) possibly requires some clarification when drawn along 115°00' East Longitude further south than 6°00' North Latitude before reaching the coast of the Island of Borneo. The Working Party recommends that FAO/SCS secretariat, in consultation with the governments concerned, establish a precise description of this boundary in the vicinity of Labuan Island.

2.4.2 The Working Party noted that Singapore has informed FAO that it is agreeable to establishing the boundary between Sub-areas 1 and 2 of Major Fishing Area 71 (Western Central Pacific) as described in section 2.4.4 on page 6 of the Report of its Third Session. The Working Party noted that Malaysia is still to express its agreement to this proposal. In noting the remarks in paragraph 2.4 and Appendix 4 of the document IPFC/IOFC: ST4/76/3G the Working Party suggested that the Secretariat of the FAO/SCS should discuss these issues with the two countries concerned to arrive at a mutually acceptable and precisely described boundary line between Sub-areas 1 and 2 of Major Fishing Area 71.

2.5 *The introduction of codes for graticular quadrangles*

2.5.1 The Working Party received an explanation of the system developed by FAO for worldwide use to code quadrangles based on the graticule, using the latitudinal and longitudinal descriptors. These details, extracted from the Reports of the Seventh (1971) and Eighth (1974) Sessions of the Co-ordinating Working Party on Atlantic Fishery Statistics (CWP), are reproduced in Document IPFC/IOFC: ST4/76/3C. The Working Party recommends the use of this coding practice by all national and regional programmes concerned with the identification of statistical quadrangles based on the graticule.

2.6 *The timing of the implementation of these aforementioned boundary changes*

2.6.1 The Working Party noted that the old boundaries will be maintained in the World Chart to be published in Volume 40 of the Yearbook of Fishery Statistics but that these changes will be reflected in not only the chart but also the statistical series to be published at the end of 1977 in Volume 42 of the Yearbook.

3. SPECIES ITEMS IN FISHERY STATISTICAL SYSTEMS FOR THE INDIAN OCEAN AND WESTERN PACIFIC AREAS

3.1 *Species item*

The Working Party reviewed briefly the lists of species items for statistical purposes provided in various documents prepared for the Fourth Session. It agreed that all countries, in studying and analyzing carefully all these documents IPFC/IOFC: ST4/76/2B, 2C, 4C, 4D, 4E, 6A, 6B, 6C, 6D, etc., now have enough technical details available to serve as provisional indicators to ensure that properly detailed national list of species items for statistical purposes could be identified. These would be reflected in national tables meeting national needs directly and also indirectly through inclusion in regional and international publications.

3.1.2 The Working Party noted that eventually certain modifications, including a careful selective increase in the number of divisions and groups of FAO's International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP), might become necessary. However, it recommended that this should be preceded by a lengthy period of careful evaluation of any proposals to change it on a worldwide basis.

3.1.3 The Working Party was also of the opinion that more work must first be done to improve the breakdown by national species items throughout its region before adequate and final proposals from the region could be made to revise the present ISSCAAP. Nevertheless, all regional working parties and training centres, and similar activities concerned with the grouping of species items within international or inter-regional groupings, might usefully review the situation and refer any such provisional suggestions to FAO along the lines suggested, for example, in Document IPFC/IOFC: ST4/76/4B.

3.2 Conversion factors

3.2.1 An increasing proportion of the fish catch in the IPFC/IOFC region is processed at sea in one way or another before being landed. An extreme example occurs when only the fins of sharks are landed. More common are the removal of heads from shrimps, gutting of many fish and drying of low quality fish. The weight at the time of landing (and presumably also the time at which the weight can first be conveniently observed for statistical purposes) needs to be adjusted by the use of the appropriate conversion factors.

3.2.2 In order that a better general view of the problem in the IPFC/IOFC region can be obtained, and appropriate action taken to improve the situation where this is needed, FAO was requested to make a survey of the occurrence of treatment of the catch before landing. This should cover, for each important fishery, the broad groups of fish involved (e.g. mackerels, shrimps, trash fish), the nature of the treatment (gutting, heading, etc.) and the conversion factors used.

3.3 Discards

3.3.1 In a number of the industrial shrimp fisheries in the region—and possibly in some other fisheries—large quantities of fish, up to 90% of the total catch, may be discarded at sea. These may include small individuals of large commercially valuable species, fully grown individuals of smaller species that are still suitable for human consumption, and inedible species.

3.3.2 Some knowledge of the magnitude of these discards is essential in understanding what is happening to the stocks, as well as providing information on the extent to which better use of these fish could increase the supply of protein without changing the removals from the sea.

3.3.3 It seems that it would be difficult to include reliable information on discards within the normal system of collecting and reporting statistics. Reliable discard data requires close contact and understanding between the fishermen and those collecting the information. It is therefore recommended that countries should make estimates of the discards in those fisheries where discards may be important, and those estimates should be produced by an appropriate independent procedure.

4. STATISTICAL CLASSIFICATIONS OF FISHING CRAFT, FISHING GEAR AND FISHERMEN

4.1 Fishing craft statistics

4.1.1 The Working Party studied the document IPFC/IOFC: ST4/76/5C and noted that there are only minor discrepancies between the revised ISSCFV (International Standard Statistical Classification for Fishing Vessels) recently developed and revised by FAO in co-operation with OECD, EUROSTAT, ICNAF, ICES, etc. and the vessel classifications developed for the IOFC/IPFC region.

4.1.2 It suggested that the ISSCFV given as Appendix II of the SEAFDEC's document ST/76/W-3 presented as IPFC/IOFC: ST4/76/5C should be amended by introducing a new division which will cover groups 51 and 52, i.e. this new division will cover boats of 150-249.9 gross register tons while the remainder of the former division will cover vessels of 250-499.9 gross register tons.

4.1.3 The Working Group also noted the report of an *Ad Hoc* Working Group on Fishing Fleet Statistics in Paris, September 1976, and took into account that agencies such as IMCO and other organizations are now searching for means to measure and to express size classes of fishing craft other than by means of the generally

used but not satisfactorily standardized gross register ton concept. The Working Party proposed that all countries should continue to proceed with the present system of gross register tons as a size measure until another alternative is generally and definitely adopted on a worldwide basis.

4.1.4 The Working Party also received from the Secretary a Report on the Inter-Agency Programme (FAO, EUROSTAT, OECD, etc.) to establish and maintain a world-register of fishing vessels of 100 gross register tons. The Working Party noted the many difficulties, particularly lack of standard methods of measuring GRT for fishing boats. Nevertheless, the Working Party recommends that despite their difficulties and many basic inadequacies FAO should stress the GRT units in its attempt to collect and publish national fleet statistics tables which should be comparable to the extent convenient and feasible.

4.1.5 The Working Party also noted that the *Ad Hoc* meeting in Paris and the EUROSTAT indicated the need in fishing fleet statistics to make provision for a classification by age groups. It recommended that consideration be given to the details reflected in part 6.0 of Part A of Document IPFC/IOFC: ST4/76/5A as revised in Appendix 2 of Document 5F.

4.2 *Fishing gear statistics*

4.2.1 The Working Party considered document IPFC/IOFC: ST4/76/5A and 5D and noted that nearly all discrepancies have been eliminated and recommends that FAO's ISSCFG could be reviewed to ascertain to what extent minor modifications could be introduced to enable it to become almost identical with a quite similar gear classification which SEAFDEC has developed on the basis of FAO's original ISSCFG as first formulated for the region.

4.3 *Fishermen statistics*

4.3.1 The Working Group considered the document IPFC/IOFC: ST4/76/5A and considered that no changes should be made in section 2.2 on page G.3 covering the classification and definition of fishermen. The Working Party nevertheless recognizes a need to expand the definitions to cover "fishing populations" as wider than merely the individuals active in actual fishing activities and operations.

5. REGIONAL FISHERY STATISTICAL BULLETIN

5.1 For many purposes, especially for the analysis of stocks and corresponding fisheries, compilations of international catch statistics are required in considerable detail (by species or groups of species, by sub-area or even smaller sub-divisions, possibly by fishery) along with information on fishing effort. The current publications of fishery statistics, by FAO, e.g. the Yearbooks and Area Statistical Tables, do not include all the detail required for such purposes. The Third Session of the Working Party stated that one of its important aims was to promote the production of Regional Statistical Bulletins for each of the major statistical areas. It was suggested that FAO prepare draft regional statistical bulletins for various statistical areas of the IPFC incorporating the details mentioned above.

5.2 The document IPFC/IOFC: ST4/76/6F prepared for the purpose by FAO for Statistical Area 57 was placed before the Working Party. A review of the tables shows that the position with regard to data on effort is not very satisfactory. Further, full coverage has not been attained because of lack of data. However, there are several important commercial fisheries in the region, e.g. shrimp fisheries in India, shrimp fisheries in Cilacap in Indonesia, demersal trawl fisheries in India, for which it is possible that good data on catch and effort are available.

5.3 The proposed present draft bulletin is therefore not suitable for direct use for stock assessment purposes. For these purposes much more detailed breakdown, especially by area, is needed. It would probably not be feasible to include such detail in a regional statistical publication, nor would this, in many cases, be necessary since many stocks are confined to a single national jurisdiction.

5.4 However, there is a wide and general regional interest in having annual nominal catch statistics in more detail than the broad major fishing areas now used by FAO for statistical purposes in the Yearbook of

Fishery Statistics and supplementary publications. The Working Party therefore recommended that FAO should undertake the regular publication of regional statistical bulletins giving data by species items and by the Sub-areas and such Divisions as might already be established.

5.5 Data on fishing effort and other matters are to be omitted for at least the first two years after which the statistical publications programme would be reviewed.

6. STANDARD QUESTIONNAIRE AND RELATED QUESTIONS

6.1 Following the suggestion to proceed with the full implementation of the recommendations of the Third Session of the Working Party (paragraph 8.2 of the Report) over the next two years, i.e. to produce regional reports of total catch by species and sub-areas, deferring the matter of effort for two years, the Working Party considered the matter of obtaining the data from the countries in the region.

6.2.1 The data collection form that had been prepared by the Secretariat and the related instructions were reviewed in detail. (Documents ST4/76/7A and B).

6.2.2 The form met with general approval, as did the instructions. The exception was paragraph 3.1 with respect to which the use of the term "subsistence fishing" was questioned. The Secretariat was asked to modify the paragraph in such a way that it was clear that "subsistence fishing" was included in the concept of "small-scale" or artisanal fisheries.

6.3.1 The question of the catch of recreational fisheries was raised. It was pointed out that in some countries, like Kenya and Japan, recreational landings are becoming significant, especially with respect to certain types such as bill-fishes. Finally, it was noted that some countries were including the recreational catches in their annual data reported to FAO for the Yearbook of Fishery Statistics.

6.3.2 It was observed that for some purposes, e.g. stock assessment, the total removal from the sea is the pertinent statistic. For other purposes, only the amount of fish finding its way into commercial channels was relevant. It was also observed that some unknown fraction of the recreational catch appeared in the market place.

6.3.3 It was suggested that because of the significance of the recreational landings and the complexity of the problem, FAO should consider launching a worldwide enquiry with the tentative objective of producing information on sports (recreational) catches and deciding how these should be treated in regular statistical publications.

7. IMPROVEMENT OF NATIONAL FISHERY STATISTICAL SYSTEM

7.1 The Working Party reviewed the current status of fishery statistics, especially those of catch by species and by areas in the countries of the Indian Ocean and Western Pacific regions. Except for some countries such statistics are now available for most of the countries in the Western Pacific region, although substantial improvement in the adequacy, accuracy and timeliness of such data is still necessary. In respect of the Indian Ocean countries such data are still not available for a large number of countries.

7.2 The Working Party also reviewed the current national and international activities with the aim of improving such statistics. The work carried out by the two regional projects, i.e. the Indian Ocean Programme and the South China Sea Programme, in their respective areas, was noted. The effort to improve Indonesian statistics by the FAO Statistician attached to that country was also noted. In view of the wide area and the large number of countries in the region, however, more concerted action is necessary to bring about improvements in the quality of statistics available in both regions.

7.3 With a view to recommending measures for effecting improvements in fishery statistics by introducing proper scientific survey systems, the Working Party examined the constraints for introducing such systems. These can be classified under four main groups, i.e. financial, technical, operational and institutional.

7.4 The Working Party emphasized that the collection of statistics is a national responsibility. As collection of statistics through proper scientific survey systems involves more expenditure, unless individual countries are willing to provide the minimum necessary funds in their budget, no improvements in fishery statistics will be attainable in the near future. The Working Party, therefore, emphasized that IPFC and IOFC should strongly recommend that its member countries should make appropriate budgetary provision for establishing objective survey systems for obtaining reliable fishery statistics. In this connection, Article XI, paragraph 2, of the FAO Convention obliging member countries to collect and provide statistics, may be brought to their attention.

7.5 The Working Party suggested that to increase the understanding of the role and importance of good statistics by planners and those responsible for financial allocation in fisheries, separate short-term seminars should be organized by FAO for the countries of the IPFC and IOFC regions.

7.6 Improvement of statistics involves two main stages: the preparation of national statistical standards and establishing a sampling frame; and the construction of the survey plan and implementation.

7.7 Absence of national standards in respect of species items, craft, gear and areas, and sampling frames, in many countries have often hampered the speedy introduction of effective survey systems or have resulted in the production of unreliable statistics. The Working Party was convinced that some international expert assistance in setting up national standards and frames would considerably accelerate the process of establishing a proper scientific statistical system in the two regions. It was estimated by the Working Party that about 24 m/m of expert service would be required during the next 3 to 4 years for the purpose. The Working Party, therefore, recommended that the IPFC/IOFC should strongly urge FAO to provide for this assistance during the next 3 to 4 years for the two regions.

7.8 The operational constraints refer to lack of trained personnel in the countries of the region. The Working Party recognized that trained personnel are required at three levels for the establishment and conduct of objective statistical systems. They are :

- (a) Personnel required to plan, design and organize statistical surveys;
- (b) Personnel required for collection of data in the field;
- (c) Personnel required for processing and analyzing the data.

The training of persons in the first category is a long-term measure. For speedy implementation of the establishment of statistical systems in countries, a two-fold approach is thus inevitable.

7.9 The Working Party recommended that for training national officials responsible for statistical programmes in their respective countries, FAO or its regional projects should, as soon as possible organize regional training courses in fishery statistics in the two regions so that national personnel can be trained to follow up and execute plans laid down by the international experts.

7.10 The Working Party, however, believed that in the immediate future, assistance of first class international experts should be provided on request to priority countries. Priority countries in this respect would be those (i) where budgetary provisions are available for statistical surveys; and (ii) where large-scale fisheries development plans are in operation or in hand but no statistics are yet available. In short, the priority countries are those which are in a position to receive and make use of international assistance. It is estimated that about 36 m/m service during the next 3 to 4 years would be required for such assistance in the two regions in addition to the assistance that is being rendered by the Indian Ocean Programme, the South China Sea Programme and other regional institutions.

7.11 The Working Party also recommended that FAO or its two regional projects must arrange national training courses for the other two levels of personnel where required at appropriate times.

7.12 The Working Party also recognized that certain institutional constraints such as transfer of trained personnel, the division of responsibility between national, state or provincial authorities, or the fact that res-

possibilities for statistics, research, and administration and planning, are carried out by separate Ministries, departments, bureaux, etc. often greatly affect the quality of statistics and urged that countries should, as far as possible, remove such constraints and ensure proper co-ordination of all their fisheries statistical activities.

8. OTHER MATTERS—FUTURE ACTIVITIES

8.1 The Working Party noted the suggestion made in paragraph 10 of the Report of the Tenth Session of the FAO Committee on Fisheries, that the CWP (Co-ordinating Working Party on Atlantic Fishery Statistics) might extend its scope to other parts of the world.

8.2 The Working Party unanimously recommended that FAO reconstruct the CWP as a worldwide fishery body to be specifically responsible for the continued establishment and refinement of fishery statistical standards of global standards (e.g. standard concepts, standard definitions, standard classifications, standard methods, publications and tabular presentations, etc.). It should, in undertaking the tasks and responsibilities noted above, ensure the worldwide nature of these issues.

8.3 The Working Party fully agreed that the IPFC and the IOFC should ensure that they participate fully and actively in the programmes and meetings of this newly proposed expanded version of the former CWP.

8.4 The Working Party noted that these international standards should be sufficiently broad and detailed while retaining flexibility, to facilitate their easy modification and adaptation to regional and national requirements.

8.5 The Working Party agreed that while considerable progress had been made in some of its fields of work, for example, in regional standardization, very much more needs to be done. Some of this work may best be done at the regional (IPFC or IOFC) level, or jointly as an IPFC/IOFC activity to assist countries in the Western and Eastern Indian Ocean and in the Western Central and South Eastern Pacific to raise the coverage quality and timeliness of their national fishery collection, processing and publications systems.

8.6 It noted that there would be a need for *ad hoc* regional working parties or committees, to assist in the implementation of plans for the improvement of national statistical systems of adjacent groups of countries.

8.7 It also noted that if the IPFC should decide to establish a Standing Committee which might include a sub-committee on statistics, that the latter should confine its activities for the IPFC region in ways to eliminate duplication of IOFC activities.

8.8 The Working Party recommended, subject to decisions to be taken by PFC at its 17th Session, that its Fifth Session be organized during the 18th Session of the IPFC and in the city where the latter will be held.

AGENDA

1. Procedural and Organizational matters.
2. Demarcation of boundaries of fishery statistical areas in the Indian Ocean and Western Pacific.
3. Species items in fishery statistical systems for the Indian Ocean and Western Pacific statistical areas.
4. Statistical classifications of fishing craft, fishing gear and fishermen.
5. Statistical tabulations in regional summary papers and in proposed IPFC and IOFC statistical bulletins.
6. Standard questionnaires and related instructions.
7. Improvement of national fishery statistical systems.
8. Other matters.
9. Adoption of the Report of the Fourth Session.

LIST OF DOCUMENTS*

1. *General*
 - 1A Provisional Agenda
 - 1B Annotated Provisional Agenda and Proposed Schedule of Work
 - 1C Provisional List of Documents
 - 1D Provisional List of Participants
2. *Reports of Previous Sessions*
 - 2A Report of the First Session of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics, Bangkok 1-5 December 1969 (*Fish. Rep.* 85)
 - 2B Report of the Second Session of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics, Bangkok 13-17 December 1971 (*Fish. Rep.* 120)
 - 2C Report of the Third Session of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics, Jakarta 25-30 October 1974 (*Fish. Rep.* 157)
3. *Fishing Areas for Statistical Purposes*
 - 3A World Chart: Major fishing areas for statistical purposes (*Fish. Circ.* 420 Rev. 1)
 - 3B Descriptions of FAO Fishing Areas 51, 57, 71 and 81 (*Fish. Circ.* 637)
 - 3C A Compendium of notes on an international standard classification of Fishing Areas for statistical purposes—Revised draft of First Part (*Fish. Circ.* 372 Rev. 1)
 - 3D A proposed international statistical system for the Antarctic Fisheries FAO Fishing Areas 48, 58 and 88 (*Fish. Circ.* 608)
 - 3E FAO Fishing Areas 51 and 57: Revision of the boundaries of statistical areas in the waters around Sri Lanka
 - 3F
 - 3G Major statistical sea and sub-area (*SEAFDEC: ST/76/W-6*)
4. *Species Items and Their Groupings*
 - 4A "Nominal Catches" and "Landings": Definitions and notes (*Fish. Circ.* 428)
 - 4B Proposals for a revision of the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP) (*Fish. Circ.* 379)
 - 4C Western Indian Ocean (Area 51)—Classification of aquatic animals and plants for statistical purposes (*Fish. Circ.* 521 Rev. 1)
 - 4D Eastern Indian Ocean (Area 57)—Classification of aquatic animals and plants for statistical purposes (*Fish. Circ.* 531)
 - 4E Proposed Regional Statistical List of Species (*SEAFDEC: ST/76/W-5*)
5. *Fishing Craft and Fleets, Gear and Fishermen*
 - 5A Notes on international classifications and definitions used in fishing fleet, fishing gear and fishing effort statistics (*Fish. Circ.* 429 Rev. 1)
 - 5B Report of *Ad Hoc* Inter-Agency Consultation on fishing fleet, fishing gear and fishermen statistics, Paris, September 1976

* All documents prefixed by: IPFC/IOFC: STA/76/

- 5C Statistical Classification of Fishing Craft (*SEAFDEC:ST/76/W-3*)
- 5D Proposed Statistical Classification of Fishing Gear (*SEAFDEC:ST/76/W-4*)
- 5E Standardization of Fishing Effort (*SEAFDEC:ST/76/W-7*)
6. *Statistical Tabulations for Fishing Areas 51, 57, 61, 71 and 80*
- 6A Indian Ocean, Western (Fishing Area 51) Nominal catches by countries and species, 1970-74 (*Fish. Circ. 620 Rev. 1*)
- 6B Indian Ocean, Eastern (Fishing Area 57) Nominal catches by countries and species, 1970-74 (*Fish. Circ. 621 Rev. 1*)
- 6C Pacific, Western Central (Fishing Area 71) Nominal catches by countries and species, 1970-74 (*Fish. Circ. 624 Rev. 1*)
- 6D Pacific, Southwest (Fishing Area 81) Nominal catches by countries and species, 1970-74 (*Fish. Circ. 626 Rev. 1*)
- 6E Pacific, Northwest (Fishing Area 61) Nominal catches by countries and species, 1970-74 (*Fish. Circ. 622 Rev. 1*)
- 6F Draft IOFC Statistical Bulletin
- 6G Statistical table for regional comparison (*SEAFDEC:ST/76/W-2*)
7. *Statistical Questionnaires and related Instructions*
- 7A Notes for the completion of Form FISHSTAT 51A (*Fish. Circ. 522 Rev. 1*)
FAO Statistical Fishing Area 51—Western Indian Ocean: Catch Summary (and Form)
- 7B Notes for the completion of Form FISHSTAT 57A (*Fish. Circ. 532*)
FAO Statistical Fishing Area 57—Eastern Indian Ocean: Catch Summary (and Form)
8. *Need for Fishery Statistics and Related Purposes and Methods*
- 8A Notes on the "Fishery Section of statistical series for the use of less developed countries in programmes of economic and social development". (*Fish. Circ. 629*)
- 8B Fishery statistics needed for development planning (*Fish. Circ. 630*)
- 8C Improvement of national fishery statistics (*IOFC/DEV/75/41*)
- 8D Frame surveys and associated sample survey designs for the assessment of marine fish landings. (*IOFC/DEV/74/39*)
- 8E Guidelines for collection and compilation of fishery statistics (*Fish. Tech. Paper FIRS/T148*)
- 8F Recent development of fisheries statistics in the Region (*SEAFDEC:ST/76/W-8*)
9. *Indian Ocean Programme on National Statistical Systems in the Western Indian Ocean*
- 9A A report on the building up of a statistical system for the collection of marine fisheries statistics in the United Arab Emirates (*IOP/TECH/75/4*)
- 9B Statistical system of marine fisheries in Mauritius (*IOP/TECH/76/7*)
- 9C Fishery statistical system in Sri Lanka (*IOP/TECH/76/10*)
10. *South China Sea Fisheries Development and Co-ordinating Programme Reports on National Statistical Systems in the Western Central Pacific*
- 10A Preliminary Observations and Recommendations concerning the Fisheries Statistics Programme of Peninsular Malaysia
- 10B Observations and Recommendations concerning the Fisheries Statistics Programme of Hong Kong (*SCS*)
- 10C Preliminary Observations and Recommendations concerning the Fisheries Statistics Programmes of Singapore (*SCS/76/WP/32*)

- 10D Fisheries Statistics in the Philippines—a plan for a new and expanded data collection programme (SCS/76/WP/44)
- 10E Observations and Recommendations concerning the Inland Fisheries Statistics Programme of Thailand (SCS)

11. *Additional Papers*

- 11A Report of the IPFC *Ad Hoc* Committee to Review the Functions and Responsibilities of IPFC (Fish. Rep. 181 and IPFC/76/4)

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REPORT OF THE IPFC WORKING PARTY ON
AQUACULTURE AND ENVIRONMENT
(Third Session)

Summary

The IPFC Working Party on Aquaculture and Environment held its Third Session at the FAO Regional Office for Asia and the Far East, Bangkok, from 31 August to 3 September 1976. The Working Party considered the Report of the IOC/FAO (IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters, held in Penang, Malaysia, from 7 to 13 April 1976, and recommended to IPFC follow-up action on specific projects of relevance to the protection of living aquatic resources and fisheries, including aquaculture. In particular, it proposed 7 pilot projects on research and monitoring to be executed under the auspices of IPFC and prepared short project outlines. This document is submitted to IPFC for consideration and approval.

PREPARATION OF THIS REPORT

This Report was prepared as part of a co-operative project of the United Nations Environment Programme entitled—

Regional Co-operation on Protection of Living Resources from Pollution and Basis for Biological Monitoring

with the Food and Agriculture Organization of the United Nations as co-operating agency

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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1. OPENING OF THE SESSION

The Third Session of the IPFC Working Party on Aquaculture and Environment was held in Bangkok, Thailand, from 31 August to 3 September 1976, at the FAO Regional Office for Asia and the Far East.

Dr. D. L. Umali, Regional Representative of FAO for Asia and the Far East, welcomed the participants and opened the Session.

Dr. K. Kaneko, Deputy Director of the UNEP Regional Office for Asia and the Pacific, outlined UNEP's views on actions to be taken on marine pollution in the East Asian Region.

Mr. G. D. Waugh chaired the Session. Mr. A. A. Jothy was appointed Rapporteur.

A list of participants is given in Appendix N-I.

2. ADOPTION OF AGENDA

The Agenda of the Session (Appendix N-II) was adopted without change.

3. ORGANIZATION OF THE SESSION

The group noted that in view of follow-up actions that were required as a result of the IOC/FAO(IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters, held in Penang in April 1976, this Session of the Working Party was entirely dedicated to marine pollution problems.

The group understood that it was expected to propose regional and sub-regional projects on marine pollution relevant to the protection of living aquatic resources and fisheries, including aquaculture.

4. IOC/FAO(IPFC)/UNEP INTERNATIONAL WORKSHOP ON MARINE POLLUTION IN EAST ASIAN WATERS, PENANG, MALAYSIA, 7-13 APRIL 1976

The Report of the above Workshop (Document No. 5) was briefly discussed so that participants would have an opportunity to consider the details of specific proposals at a later stage of the Session (see 6). In discussing Chapter 3.5 of the Workshop Report (General conclusions and recommendations on pollutants) the Working Party was doubtful about the desirability of applying standardized methods with the particular view of adopting modern methods, often involving sophisticated equipment. It was felt that such equipment should be used only where adequate technical maintenance could be assured by the supplier. The Working Party, however, emphasized the essential need for an intercalibration exercise to precede the actual analyses of samples.

With reference to Chapter 4 of the Workshop Report (Arrangements for data exchange) it was recommended that existing or future national and regional data centres should, besides oceanographic data, store pollution data and maintain data inventories in the case of biological data. The Working Party noted that for the purpose of pollution projects to be executed through IPFC no adequate facilities for data handling existed in the region. Data should, therefore, be collated, interpreted and disseminated by the relevant regional activity centres mentioned in Chapter 5 of the Workshop Report (Proposals for Pilot Projects).

5. REVIEW OF THE STATE OF POLLUTION IN EAST ASIAN WATERS

Document No. 6 was discussed in the light of one of the aims of the Workshop, which was to define the present problems of marine pollution in the East Asian Region, and to identify the main gaps in the present knowledge. In this respect the Working Party felt that additional information on the status of marine pollution in the region was required including information on pollution by radiation energy and on pollutants introduced into the marine environment through atmospheric transport. It was felt that member countries should be contacted in order to ensure that all relevant information was available on the state of pollution in the waters of the area. (Recommendation No. 1, see Appendix N-IV).

It was felt that this information could best be obtained through scientists serving as contact officers in their respective countries. A preliminary list including suggested scientific contact officers for some countries was left with the Secretariat.

6. WORKSHOP PROPOSALS ON REGIONAL AND SUB-REGIONAL PROJECTS

6.1 *Regional Projects*

The Working Party considered the four regional pilot projects recommended by the Workshop in the light of the role of FAO and IPFC in dealing with aquatic pollution related to the protection of living aquatic resources and fisheries, including aquaculture. It agreed on proposing one regional pilot project to be executed, namely the Regional Project 2 of the Workshop (Comparative study on metals using oysters as indicators).

With regard to the other three Regional Projects, the Working Party felt that the project on a study of physical dispersal processes in coastal waters (Regional Project 4 of the Workshop) should be considered more appropriately by the Intergovernmental Oceanographic Commission (IOC).

Recognizing that red tide phenomena, the study of which was proposed under Regional Project 3 of the Workshop, are transient and that in any case there is insufficient knowledge to prevent their occurrence, the Working Party felt that it was important that national authorities should be aware of the problem. The Working Party therefore suggested that Member Nations of IPFC should carry out studies on the phenomena as and when appropriate, in order to build up baseline data. However, recognizing the economic and social consequences of these phenomena, it would be desirable to have national capabilities and/or the ability to call in foreign expertise in order to identify plankton species and to determine the spatial extent of the problem and its likely duration.

The project on mangrove ecosystems as sewage and sediment buffer zones (Regional Project 1 of the Workshop) required detailed, in-depth studies, and therefore should be tackled at a sub-regional level where effort could be more intensive and more effective.

6.2 *Sub-regional Projects*

The Working Party considered the proposals for sub-regional pilot projects proposed in the Workshop Report. On the basis of the mandate which FAO and IPFC hold in dealing with marine pollution problems as related to the protection of living aquatic resources and fisheries, including aquaculture, the Working Party identified 14 sub-regional projects as being of relevance to IPFC. It was the understanding of the Working Party that projects proposed at the Workshop, not directly related to the protection of living aquatic resources would be dealt with by other appropriate agencies. After thorough discussion, the Working Party felt it was important that studies should be initiated in each of the sub-regions. Recognizing that some of the topics tended to overlap between sub-regions, it then selected for each of the six sub-regions one pilot project to which it attached priority (underlined):

Sub-region 1: Bay of Bengal

Project 1 — Assessment of the levels of DDT and heavy metals (especially cadmium) and arsenic in sediments and estuarine organisms (especially molluscs) (Workshop Priority No. 1)

Project 2 — Pollution problems in the coastal areas of the Bay of Bengal due to siltation and its effect on fishes of commercial importance (Workshop Priority No. 3)

Priority was given to project 2 over project 1 in the light of the fact that a great part of the objectives of the project, namely the analysis of metals in molluscs, had been incorporated in the regional project, comparative study on metals using oysters as indicators.

Sub-region 2 : Malacca Straits

Project 3 — Assessment of oil pollution and its impact on living resources (Workshop Priority No. 1)

Project 4 — Assessment of sedimentation levels and their effect on the environment (Workshop Priority No. 2)

Project 5 — Monitoring of selected metals (Workshop Priority No. 3)

Since oil pollution is of paramount importance in this sub-region, priority was given to project 3, whereas it was assumed that the objectives of project 5 would be dealt with in the regional pilot project. Project 4 was not given priority, since a similar project had been selected in the Bay of Bengal which could serve as a pilot project on this topic and would also be relevant to other sub-regions.

Sub-region 3 : Gulf of Thailand

Project 6 — Thermal effect studies on some marine organisms of the Gulf of Thailand (Workshop Priority No. 1)

Project 7 — Effects of some agro-industrial wastes on the coastal ecosystem (Workshop Priority No. 2)

Project 7 was given priority over project 6 since the Working Party learned that a small research project on the impact of thermal discharges into the Gulf of Thailand was already being carried out in Thailand. In addition, it was noted that the IMCO/FAO/Unesco/WMO/WHO/IAEA/UN Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) had at its 8th Session, Rome, 21-27 April 1976, established a Working Group on Biological Effects of Thermal Effluents in the Marine Environment which would summarize and critically review the existing knowledge in this field. The Working Party welcomed this initiative of GESAMP and invited GESAMP through its Working Group on Biological Effects of Thermal Effluents in the Marine Environment to include tropical areas such as the Gulf of Thailand in its work programme.

Sub-region 4 : South China Sea

Project 8 — The impact of pollution on the mangrove ecosystem and its productivity (Workshop Priority No. 1)

Project 9 — Levels of toxic metals in the living resources of the South China Sea (Workshop Priority No. 2)

Project 10 — The effect of siltation on the biota of estuaries and marine coastal areas (Workshop Priority No. 3)

Project 11 — The effect of oil on the marine biota of the South China Sea, with particular emphasis on coastal resources (Workshop Priority No. 4)

Project 8 was given high priority because of its extreme importance for the whole region. The objectives of project 9 were considered to be covered by the regional pilot project, whereas projects 2 and 3 would be of relevance to the objectives envisaged under projects 10 and 11 respectively.

Sub-region 5 : Sea of Japan, Yellow Sea, East China Sea

Project 12 — Distribution of heavy metals and organochlorines in marine organisms, sediments and waters (Workshop Priority No. 1)

Project 12 had been identified to be of relevance to the protection of living aquatic resources. It was noted that from part of the area relevant data were already being collected by Japan and it was proposed that initiative should be taken to seek co-operation between all countries in the sub-region,

Sub-region 6: Eastern Archipelago

Project 13 — Mangrove ecosystems as sewage buffer zones (Workshop Priority No. 1)

Project 14 — Impact of sedimentation and coral exploitation on reef and adjacent communities and the shoreline (Workshop Priority No. 2)

Project 14 was given priority since it concerned the unique ecosystem of coral reefs. Information relevant to project 13 was expected to result from project 8.

7. PRIORITY RATING FOR THE PROPOSED PROJECTS

The Working Party established the following criteria for priority rating of the proposed projects :

- (i) degree of importance of the project for the region;
- (ii) avoidance of duplication of effort;
- (iii) ease of implementation;
- (iv) frequency of occurrence of the problem in the region;
- (v) relevance to potentials of aquaculture development.

On the basis of these criteria, the Working Party agreed on the following order of priority for the projects proposed :

1. MALACCA STRAITS :
Assessment of oil pollution and its impact on living resources.
2. SOUTH CHINA SEA :
The impact of pollution on the mangrove ecosystem and its productivity.
3. REGIONAL PROJECT :
Comparative study on metals using oysters as indicators.
4. BAY OF BENGAL :
Pollution problems in the coastal areas of the Bay of Bengal due to siltation and its effect on fishes of commercial importance.
5. GULF OF THAILAND :
Effects of some agro-industrial wastes on the coastal ecosystem.
6. SEA OF JAPAN, YELLOW SEA, EAST CHINA SEA :
Distribution of heavy metals and organochlorines in marine organisms, sediments and waters.
7. EASTERN ARCHIPELAGO :
Impact of sedimentation and coral exploitation on reef and adjacent communities and the shorelines.

It should be noted that the Working Party was of the opinion that, in the light of the criteria used, the projects listed as priorities 4 and 5 were virtually of the same order of importance to the region; a differentiation into priorities was only made for reasons of consistency in approach.

The Working Party recommended that IPFC should take immediate steps towards the implementation of these 7 projects (Recommendation 2, Appendix.N-IV).

The Working Party then discussed in detail these 7 projects. Project outlines were drafted, sometimes involving a slight change in the title of projects.

The Working Party proposed to start one pilot project on each major topic identified by the Workshop and relevant to the protection of living aquatic resources and fisheries, including aquaculture. Six of the projects were for implementation in the six different sub-regions and one to be carried out in the whole region.

It was pointed out that the sub-regional projects should be designed so that other sub-regions, where similar pollution problems existed, could benefit from the results of the project, thus enabling those sub-regions to carry out such projects on their own at a later stage.

In this context the Working Party again stressed the general importance of all 14 sub-regional projects initially identified and noted that the other projects should be taken up at a later stage of development of research and monitoring of marine pollution in the region.

8. FUTURE ACTIVITIES OF THE WORKING PARTY CONCERNING POLLUTION MATTERS

The Working Party noted that at its 14th Session, the Indo-Pacific Fisheries Council had recognized that aquatic pollution was seriously limiting the expansion of aquaculture and the major conflicts in land and water use were affecting aquaculture development in many countries of the region. The Council, recognizing the need to promote appropriate studies, had therefore reconstituted the Working Party on Coastal Aquaculture as a Working Party on Aquaculture and Environment.

The new Working Party first met in October 1972 and, at that time, was primarily concerned with recommendations relating to the advancement of aquaculture technology and with obtaining information on the economics of aquaculture via the Economics Working Party which subsequently merged with it in 1973. However, it also took note of comments on pollution made at the 15th Session of the Council.

At the 16th Session of IPFC the major emphasis was placed on progress in the Co-operative Research Programme on Coastal Aquaculture and the need for training but, at the same time, the need for information on the effects of pesticide pollution on aquaculture was also stressed.

It was therefore appropriate that, at its Third Session in Bangkok, from 31 August to 3 September 1976, the Working Party should address itself more specifically to marine pollution and its effects on the coastal environment and on aquaculture. The main purpose of the meeting was to consider the Report of the IOC/FAO(IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters and to recommend to IPFC follow-up action on specific projects of relevance to IPFC interests.

To facilitate the work of the group, pollution experts, some of whom had been present at the Workshop, were invited to join the Working Party.

In discussing the future activities and the role of the Working Party on Aquaculture and Environment, the group recognized the divergence of expertise required to deal with the many and varied aspects of aquaculture in coastal, brackish and inland waters. However, it felt that it should nevertheless continue to be the main source for information and discussion of topics of interest or of concern to the member countries and should be able to take a positive role in developing action plans for all aspects related to aquaculture.

In order to satisfy this role and to provide the necessary continuity of purpose which is to protect, encourage and develop aquaculture in the region, members felt that it was essential to have available a core of designated experts versed in aquaculture techniques, economics, environmental planning and pollution. Depending upon the particular topics selected for discussion or action by the Working Party, appropriate experts should then be called upon to serve. It was recognized that this would mean that for each meeting of the Working Party the main theme or range of topics would have to be carefully defined (Recommendation 3, Appendix N-IV).

9. OTHER MATTERS

The Representative of UNEP referred to the Revised Outline of Regional Action Plans, originating from the Inter-agency Meeting on Regional Seas, Paris, 16-18 June 1976, organized by UNEP and asked the Working Party for its comments on Chapter V, East Asian Waters, Straits of Malacca in particular.

The Working Party examined this Outline and was of the opinion that, with regard to the time plan worked out for activities in the Malacca Straits, every effort should be made to enter into an action-oriented phase as soon as possible and certainly much earlier than November/December 1977.

The Working Party also expressed great concern about the fact that no preparatory activities were envisaged in that Outline for other sub-regions besides the Malacca Straits, before 1978, thus suggesting that positive action would be delayed until much later.

The Working Party stressed the need to take simultaneous action in various sub-regions, thus covering the whole East Asian Seas Area.

It was recommended that IPFC, in keeping with its desire to become an action-oriented Council, should direct its efforts to an early implementation of marine pollution pilot projects in East Asian waters.

The Working Party expressed the wish that other agencies and bodies concerned with marine pollution in the region should become aware of its proposals in that field and proposed to make its report available to relevant agencies and bodies, possibly through communication channels established by UNEP.

10. ADOPTION OF THE REPORT AND CLOSING OF THE SESSION

The Report was adopted on 3 September 1976. Mr. D. D. Tapiador, the Regional Secretary of IPFC, thanked the participants for their work and valuable contributions and closed the Session on 3 September 1976.

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AGENDA

1. Opening of the Session
2. Adoption of the Agenda
3. Organization of the Session
4. IOC/FAO(IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters, Penang, Malaysia, 7-13 April 1976
5. Review of the State of Pollution in East Asian Waters
 - 5.1 Physical pollution
 - 5.2 Organic and biological pollutants
 - 5.3 Pesticides and inorganic pollution
 - 5.4 Oil
 - 5.5 Damage to aquatic organisms
6. Workshop Proposals on Regional Pilot Projects
7. Workshop Proposal on Sub-regional Pilot Projects
8. Future Activities of the Working Party Concerning Pollution Matters
9. Other Matters
10. Adoption of the Report

LIST OF DOCUMENTS

IPFC/AQE/76/1	Agenda
2	Timetable
3	List of Participants
4	List of Documents
5	Report of the IOC/FAO(IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters
6	Preliminary Review on the State of Marine Pollution in East Asian Waters
7	A Regional Bibliography on Oceanography and Marine Pollution
8	Information on IPFC Activities Related to Marine Pollution
9	Report

RECOMMENDATIONS

Recommendation 1

REVIEW OF THE STATE OF POLLUTION IN EAST ASIAN WATERS

The Working Party,

having received the document "Review of the State of Pollution in South East Asian Waters", originally presented by the FAO/IPFC Secretariat to the IOC/FAO(IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters,

recognizing that it served as a useful preliminary document at the Workshop,

stressing the need for a comprehensive document of this kind describing the state of marine pollution in the region, and

noting that the information in the Review is not as complete as could be desired,

recommends that the 17th Session of the IPFC take the necessary initiative to ensure updating the completion of that Review using appropriate governmental scientific contacts in the countries concerned, and finally arrange for publication of that Review.

Recommendation 2

PILOT PROJECTS ON MARINE POLLUTION IN EAST ASIAN WATERS

The Working Party,

having received the Report of the IOC/FAO(IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters, which includes four regional and 20 sub-regional pilot project proposals;

keeping in mind FAO's and IPFC's responsibility for the protection of living aquatic resources and fisheries, including aquaculture, from the effects of pollution

identified the following seven pilot projects listed in order of priority, to which it attaches high importance:

1. Assessment of Oil Pollution and its Impact on Living Aquatic Resources in the Malacca Straits
2. The Impact of Pollution on the Mangrove Ecosystem and its Productivity in the South China Sea
3. Regional Pilot Project on the Baseline Study on Levels of Metals in Shellfish of Commercial Importance, Particularly in Oysters
4. Pollution Problems in the Coastal Areas of the Bay of Bengal due to Siltation and its Effect on Fishes of Commercial Importance
5. Agro-industrial Wastes and their Effects on the Coastal Ecosystems in the Gulf of Thailand

6. Distribution of Heavy Metals and Organochlorines, including PCBs, in Marine Organisms, Sediments and Water in the Sea of Japan, Yellow Sea and East China Sea
7. The Impact of Sedimentation and Coral Exploitation on Reefs and on Coastal Fisheries and Aquaculture Development in the Eastern Archipelago,

recommends that IPFC

- take immediate steps towards the implementation of these projects so that they commence as soon as possible;
- invite Member Nations to actively co-operate in these projects when established;
- become responsible for the proper execution of the proposed project wherever appropriate;
- secure within the projects an adequate training component and provide for outside expertise whenever necessary;
- make provision in each of the sub-regional projects for appropriate participation of countries from other sub-regions, should they so desire;
- ensure appropriate dissemination throughout the whole region of data and results of all projects.

Recommendation 3

COMPOSITION OF THE WORKING PARTY ON AQUACULTURE
AND ENVIRONMENT

The Working Party,

noting the multidisciplinary nature of aquaculture involving problems of technology, economics, environmental planning and pollution, in freshwater, brackish water and marine environments,

stressed the need for one co-ordinating group which could ensure that aquaculture is encouraged, developed and protected in the Region, and therefore,

recommends

- that IPFC expand the membership of the Working Party by designating a group of experts who are versed in aquaculture techniques, economics, environmental planning and pollution;
- that, depending upon the topics to be discussed or the projects to be developed, appropriate experts be called upon to serve on the Working Party;
- that, in developing the programme for each meeting of the Working Party, the main theme or range of topics be carefully defined.

LIST OF DOCUMENTS

WORKING PAPERS

IPFC/76/1	Provisional agenda
2	Annotated provisional agenda
3	Provisional timetable
3 Rev. 1	Ditto (revised)
3 Rev. 2	Ditto (revised)
4	Report of the IPFC <i>Ad Hoc</i> Committee to Review the Functions and Responsibilities of IPFC, Bangkok, Thailand, 8-11 December 1975
4 Sup. 1	Steps needed to amend the Basic Texts of IPFC
4 Sup. 2 with Annexes 1 and 2	Proposed amendments to the Basic Texts of IPFC
4 Sup. 2 with Annex 3	Agreement and Rules of Procedure (Proposed amendments)
4 Sup. 3	Staff support to IPFC and a Regional voluntary fund
4 Sup. 4	Proposal to move the IPFC Secretariat
4 Sup. 5	Proposed amendments to the Basic Texts of IPFC on which general agreement in principle has been reached in Plenary
5	Report of the IPFC/IOFC Joint Working Party of Experts on Indian Ocean and Western Pacific Fishery Statistics (4th Session), Colombo, Sri Lanka, 25-28 October 1976
5 Sup. 1	Provisional agenda (of the proposed Standing Committee on Research and Statistics)
5 Sup. 2	Annotated provisional agenda
5 Sup. 3	List of documents
5 Sup. 3	Ditto (revised)
Rev. 1	
IPFC/76/5 Sup. 4	Possible methods of work of the Standing Committee on Research and Statistics
5 Sup. 5	Accuracy of resource data
5 Sup. 6	The current state of fish stocks in the IPFC region

- 5 Sup. 7 Workshop on the Fisheries Resources of the Malacca Straits, Jakarta, Indonesia, 29 March - 2 April 1976
- 5 Sup. 8 Report of an *Ad Hoc* Committee Meeting of Specialists to Review the Biology and Status of Stocks of Small Tunas, Hawaii, U.S.A., 15 - 18 December 1975
- 5 Sup. 9 A proposal for a skipjack survey and assessment programme in the central and western equatorial Pacific Ocean
- 5 Sup. 10 Information needs in the IPFC region
- 5 Sup. 11 Mesh regulation in the demersal fisheries of the South China Sea area
- 5 Sup. 12 Description of the shrimp fishery in West Irian waters, and its maximum sustainable yield by (Indonesia)
- 5 Sup. 13 Management of the Australian northern prawn fishery by (Australia)
- 5 Sup. 14 A note on the squid stock and fishery round New Zealand by T. Kawakami
- 5 Sup. 15 The Sabah shrimp fishery by (SCSP)
- 5 Sup. 16 The shrimp fisheries of India by (India)
- 5 Sup. 17 Some aspects of the dynamics of the Australian fishery for southern bluefin tuna by G. I. Murphy
- 5 Sup. 18 New Zealand resource studies by D. Eggleston
- 5 Sup. 19 Recent developments in research on skipjack (*Katsuwonus pelamis*) populations in Japan by T. Kawasaki
- 5 Sup. 20 Situation report—southern bluefin tuna by J. S. Hynd and G. I. Murphy
- 5 Sup. 21 *Arripis trutta* (Australian salmon) by (Australia)
- IPFC/76/5 Sup. 22 The south eastern shark fishery by (Australia)
- 5 Sup. 23 The Cilacap, Java, shrimp fishery by N. P. van Zalinge and N. Naamin
- 6 Report of the *Ad Hoc* Sessional Committee on Research, Colombo, Sri Lanka, 1 - 2 November 1976
- 7 Current management problems in the IPFC area
- 8 Report of the Third Joint Meeting of the IPFC Special Committee on Management of Indo-Pacific Tuna and the IOFC Committee on Management of Indian Ocean Tuna, Mombasa, Kenya, 18 - 19 July 1975
- 9 Report of the Fourth Joint Meeting of the IPFC Special Committee on Management of Indo-Pacific Tuna and the IOFC Committee on Management of Indian Ocean Tuna, Colombo, Sri Lanka, 29 - 30 October 1976
- 10 Report of the Second Session of the IOFC *Ad Hoc* Committee of Nations on the Mechanics of Tuna Research and Management, Bangkok, Thailand, 12 - 13 December 1975

- 11 An immediate management programme for tuna in the IPFC/IOFC region
- 11 Sup. 1 Comments by Japan on an immediate management programme for tuna in the IPFC/IOFC region
- 12 Increasing production and improving utilization and distribution of fish in the IPFC region
- 13 National and intergovernmental activities in the IPFC region
- 13 Add. 1 Ditto—summary of FAO activities at a national level in Bangladesh, India, Pakistan and Sri Lanka
- 14 Report of the 53rd Session of the IPFC Executive Committee, Bangkok, Thailand, 15 -16 December 1975
- 15 Report of the 54th Session of the IPFC Executive Committee, Colombo, Sri Lanka, 26, 30 and 31 October 1976
- 15 Rev. 1 Corrigendum to the above
- IPFC/76/16 Report of the IPFC Working Party on Fish Technology and Marketing (Second Session), Colombo, Sri Lanka, 25 - 26 October 1976
- 17 Report of the Second Session of the Co-ordinating Committee of the South China Sea Fisheries Development and Co-ordinating Programme, Manila, Philippines, 9 April 1976
- 18 Report of the Working Party on Aquaculture and Environment (Third Session), Bangkok, Thailand, 31 August - 3 September 1976
- 19 Report of the Symposium on the Development and Utilization of Inland Fishery Resources, Colombo, Sri Lanka, 27 - 29 October 1976
- 20 Proposed subjects for future symposia
- 21 Composition and Draft Terms of Reference of the proposed Standing Committee on Resources Research and Development.
- 22 Indicative IPFC Budget 1978 - 79

INFORMATION PAPERS

- IPFC/76/Inf.1 List of documents
- 2 Information for participants
- 3 Provisional list of delegates and observers
- 3 Rev. 1 Ditto (revised)
- 4 Report of the Tenth Session of the Committee on Fisheries, Rome, Italy, 3 - 10 June 1975
- 5 Report of the COFI Sub-Committee on the Development of Co-operation with International Organizations concerned with Fisheries (Fourth Session), Lisbon, Portugal, 8 - 12 March 1976

- 6 Functions, methods of operation and financing of Secretariat and Committees (as submitted to the IOFC *Ad Hoc* Committee of Nations on the Mechanics of Tuna Research and Management, Bangkok, Thailand, 12 - 13 December 1975)
- IPFC/76/Inf.7 Report of the Workshop on the Legal and Institutional Aspects of Fishery Resources Management and Development, Manila, Philippines, 5 - 8 April 1976
- 8 Report of the Fourth Session of Indian Ocean Fishery Commission, Mombasa, Kenya, 21 - 25 July 1975
- 9 Report of the IOFC Executive Committee for the Implementation of the International Indian Ocean Fishery, Survey and Development Programme, (Fifth Session), Rome, Italy, 12 - 14 April 1976
- 10 UNDP/FAO Training Course on the Management of Small-Scale Fishery Enterprises, Kuala Trengganu, Malaysia, 25 August - 26 September 1975
- 11 Report of the IOC/FAO(IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters, Penang, Malaysia, 7 - 13 April 1976
- 12 Report of the General Fisheries Council for the Mediterranean (GFCM), Thirteenth Session, Rome, Italy, 28 June - 2 July 1976
- 13 Report of the GFCM Committee on Resource Management (First Session), Rome, Italy, 24 - 27 February 1976
- 14 South China Sea Fisheries Development and Co-ordinating Programme. Report on the Status of the Project (1976)
- 15 Small-Scale Fisheries
- 16 Summary Report of the FAO Technical Conference on Aquaculture, Kyoto, Japan, 26 May - 2 June 1976
- 17 Asia (Fishing Area 04), nominal catches by countries and species, 1970 - 74
- 18 Directory of Subsidiary Bodies of the Indo-Pacific Fisheries Council (during the Intersessional Period 1974 - 76)
- 19 General Information
- 20 Postal Information
- 21 Statement (of the Vice-Chairman) — Delegate for the Philippines
- 22 IPFC Administrative Correspondents (for period between 17 - 18 Sessions, October 1976 - 1978)

COUNTRY STATEMENT: Replies to the Questionnaire requesting Information on National Fishery Activities.

- IPFC/76/C.1 By New Zealand
- 2 By Japan
- 3 By Thailand
- 4 By Indonesia

- 5 By Hong Kong
- 6 By USA
- 7 By Pakistan
- 8 By Sri Lanka
- 9 By Philippines

SPEECHES

- IPFC/76/P 1 Address by the Chairman (Mr. A. S. Mendis) of the Indo-Pacific Fisheries Council
- 2 Address by the Minister of Fisheries, Mr. S. D. R. Jayaratne
- 3 Address by the Secretary, Ministry of Fisheries, Mr. E. G. Goonewardene
- 4 Statement on behalf of the Director-General, FAO, Rome