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SEVENTH TECHNICAL MEETING ON FISHERIES

Nuku'alofa, Tonga

15 - 19 July 1974

REPORT

Noumea, New Caledonia  
August 1974

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## INTRODUCTION

1. The Sixth Technical Meeting on Fisheries which took place in Suva, Fiji, in July 1973, recommended,

- (a) the establishment of a region-wide skipjack resource assessment programme;
- (b) the establishment of an SPC sponsored standing committee on Tropical Pacific Skipjack Resources; such committee to include tuna specialists from SPC territories and countries and other outside specialists as needed. The Commission should determine the composition of the Committee, with an SPC officer serving as Executive Secretary. The role of the Standing Committee shall include formulation, implementation and evaluation of the skipjack resource assessment programme;
- (c) that funds be made available in January 1974 for the initial meeting of the Standing Committee and for preliminary implementation of the programme.

2. The Meeting also recommended that Fisheries Technical Meetings should in future be held annually in order to assess progress on the proposed long-term projects and to facilitate exchange of information. The Meeting further recommended that future meetings be held whenever possible in territories with fisheries programmes of interest.

3. The Thirteenth South Pacific Conference and Thirty-sixth Session in Guam in September and October 1973 supported these recommendations. Subsequently a meeting of the Expert Committee on Tropical Skipjack was held in Papeete in February 1974 at the invitation of the Government of French Polynesia and of the Centre National pour l'Exploitation des Océans (CNEXO).

4. At the invitation of the Government of the Kingdom of Tonga, the Seventh Technical Meeting on Fisheries was held at Nuku'alofa from 15 to 19 July 1974.

5. Delegates were officially welcomed by H.R.H. Prince Tu'ipelehake, Minister of Agriculture and Fisheries, Kingdom of Tonga. Mr Alan Harris, Programme Director (Economic), South Pacific Commission, responded to Prince Tu'ipelehake's remarks, and read a message from Mr G.F.D. Betham, Secretary General of the South Pacific Commission.

6. Mr Tomasini Simiki, Director of Agriculture, Tonga, was unanimously elected Chairman of the Meeting, and Mr William Wilkinson, Fisheries Officer, Tonga, was elected Vice-Chairman. Messrs A.L. MacDonald (Gilbert and Ellice Islands Colony), R. Kearney (Papua New Guinea) and J. McVey (Trust Territory of the Pacific Islands) were selected as the Drafting Committee.

7. The draft Agenda which had been circulated was considered and a revised Agenda prepared and adopted.

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## COUNTRY STATEMENTS: RECENT DEVELOPMENTS AND FUTURE PLANS

### American Samoa

8. The Government of American Samoa is continuing work on six discreet, but inter-related, fisheries development projects.

9. Small Boat Fisheries: This project, initiated in 1972, has produced twenty-three 24' boats powered by various petrol engines. A high incidence of engine failure has contributed to a 50% decline in landings, and has led to the imminent replacement of all power units by diesel engines. Experienced crews will be encouraged to expand their efforts through use of mechanized gurdies and live bait gear.

10. Tuna Development: Skipjack and bait fish resource assessment surveys have been completed, and project efforts are now directed towards a demonstration of cost-effectiveness of pole-and-line skipjack fishing. A 50' live bait vessel is being utilised in the fishing operations.

11. Bait fish Culture: Preliminary field trials of the "mollie" (Poecillia mexicana) as live bait for skipjack have encouraged expansion of culture facilities and intensified field trials in 1975.

12. Fisheries Training: The first class of a one-year Commercial Fishermen's Training Programme has graduated, and immediate expansion of class size and facilities is anticipated. Three biologists and two extension agents will shortly receive overseas training.

13. Statistical Analysis: Compilation and analysis of cannery and local commercial fishery data continues, but efforts to obtain subsistence catch data have been abandoned.

14. Inshore and Pelagic Fish Surveys: The inshore fish fauna is being collected, identified, and catalogued in order to provide a check-list of Samoan fishes for management purposes. Field surveys of big-game fishing potential are continuing.

### Cook Islands

15. The Cook Islands, consisting of fifteen islands is scattered over an ocean area of over 800,000 square miles. It is divided into two groups: seven in the north and eight in the south.

16. The population of the group is presently around 24,000 with at least 50% living on Rarotonga, the capital island and seat of government.

17. Some of the main programmes undertaken during the last 20 years included:-

- (a) transplants of mother-of-pearl shells (Pinctada margaritifera) to suitable areas throughout the Cook group.
- (b) the introduction of Trochus niloticus from Fiji around 1957 and its transplant in later years to selected areas throughout the group.
- (c) the construction of a 55 foot fishing vessel - Chinese sampan design which took no less than 15 years to complete being launched in mid 1971.

18. In the last four to five years Government supported proposals to investigate other fisheries which could result in its main market - Rarotonga - being supplied with local fish, aim of reducing to a minimum, imported tinned and frozen fish. In 1971 five 28 foot fishing boats were purchased from the U.S. at a cost around US\$70,000 and a Fishermen's Co-operative was formed.

19. The venture did not live up to expectations and in the early part of 1973 the Co-operative was dissolved. An effort was made some months later to re-establish the Co-operative but a few months later it was again dissolved. The boats have since been let out on hire-purchase to individual fishermen but problems still occur, mainly with the repayments.

20. The more successful project was one which concerned the locally built 55 footer. Certain islands, mainly in the south, were provided with either one or two ice-boxes each and of two sizes:-

90 cub. ft. and  
200 cub. ft.

(For power, we provided the areas with 3KW diesel generators.)

21. Of the six islands provided with the above facilities, only one has proven to be a success.

22. The 55 foot vessel ensures that the catches stored in the ice-boxes on the nearer islands are picked up regularly and servicing of the power plants attended to when necessary.

23. However, the demand for fish on the Rarotonga market is yet to be satisfied and the retail price of all locally caught and sold fish is never less than N.Z.30c. per lb. At the moment, there is no price control on local fish but legislation is being considered.

24. The Cook Islands imports of fish from overseas, New Zealand mainly, is approximately N.Z.\$100,000/annum and this represents about 20% of its annual imports of animal protein.

25. In the Cook Islands the figures indicated above are colossal. It is therefore hoped that future fisheries development programmes be introduced in order to try to improve the situation.

### Fiji

26. Government have decided that skipjack fishery will be by Fijian boats and crews only. But an agreement will be made with an outside company to operate an industrial scale cannery. Fish production has increased substantially since the National Marketing Authority have increased prices to recommended levels. Some difficulties have been experienced with freezers and ice-making machines. Assistance to villages have gone forward with fish carriers to demonstration centres in a hurricane relief programme. Servicing with fish carriers will continue. Plans include a build-up of the skipjack fishery to 10 vessels in 5 years while monitoring supplies of bait. Catch and effort data from the commercial fishery to make regular analyses of fish stocks are being undertaken for management purposes. The professional capability of the Fisheries Department is being built up with recruitment of the University of the South Pacific graduates in Science. Also extension staff from the Diploma in Tropical Fisheries will be recruited at the end of 1975. Aquaculture programmes are described in working papers except one on the introduction of grass carp.

### French Polynesia

27. The Territory of French Polynesia now has two organisations that complement one another's fisheries development and aquaculture activities - the Fisheries Department and the Pacific Oceanographical Laboratory (OLP), set up in 1972 by the French National Ocean Exploitation Centre (CNEXO).

28. As regards fisheries, several activities have been undertaken:-

- (a) Development of a port with refrigerated store rooms and the installations required for longliners chartered by various companies. It is planned to set up a cannery as soon as catch levels are significant.
- (b) Special efforts to convert the present bonito fleet into a live bait fleet. A study is being made on the extent of natural bait resources and the possibility of producing bait in ponds. The determination of a boat suitable for this region is in hand and staff training has been undertaken.
- (c) Establishing of new cold stores and improvement in the means of transport for enabling the rational exploitation of the resources of lagoons and outer islands.
- (d) Preparation of a general data-collection programme so as to determine statistically the stocks involved, with a view to improved management.

As regards the other activities:

- (e) Oyster production (C. glomerata) went up to 10 metric tons and tests continue in connection with the introduction of C. gigas.
- (f) The collection of top shells (Trochus) is being intensified.
- (g) Pearl culture is in progress and the first collections of round pearls have been made by two companies. Two others are setting up operations. Half pearls are being produced by the islanders. Spat production experiments are being undertaken to offset the depletion of stocks.
- (h) Tests on the farming of Macrobrachium rosenbergii have revealed that it is possible, after five months in the ponds, to produce 300 kg of marketable-sized specimens. Composite feed products are being prepared from local by-products.
- (i) Tests on the possibility of farming sea-shrimps have been initiated. Controlled reproduction in captivity has been accomplished in the case of Penaeus merquiensis, Metapenaeus ensis and Penaeus aztecus. Growth rates are being tested both in Polynesia and New Caledonia.
- (j) Finally, other experiments are in hand concerning the possibilities of rearing Siganids, Jacks, Milkfish and Turtles.



## Gilbert and Ellice Islands Colony

29. The Fisheries policy of the Colony is directed to the early development of the tuna resources in order to replace, in part at least, the revenue at present earned from phosphates. Overseas fishing companies have recently been given data from tuna surveys so far completed, and have been invited to state their interest and possible investment in the Colony's fisheries.

30. At the same time subsistence level fisheries are being developed. In the Gilbert Islands group a survey is being conducted with four dories to determine the ability of small craft to catch fish in commercial quantities.

31. With the assistance of the UNDP, investigations into the possibilities of bait fish culture are being made in areas of Tarawa lagoon.

32. A project aimed at improving the existing canoe fishery in the Ellice Islands by providing outboard engines and modern gear is being carried out at Funafuti.

33. At Christmas Island in the Line Group, a pilot project for Brine Shrimp production has been started. It is operated jointly by staff of the University of Hawaii and the Development Authority. Surveys on the tuna and spiny lobster resources continue.

## New Caledonia

34. New Caledonia is situated in the centre of a region in which there are considerable tuna stocks. Further, the presence of an extensive lagoon and several mangrove swamps is a factor that greatly favours diversified mariculture development.

35. Two objectives may therefore be taken into consideration for the future: the development of a tuna industry and aquaculture on a semi-industrial scale.

36. The initial phase provides for a base to harbour 25 to 30 longliners whose production in 1975 is estimated at 5,000 metric tons. A maximum level of 30,000 metric tons could be attained in 1980 using 140 to 160 boats. Depending on the results of live bait fishing and purse-seining experiments, a production of 30 to 50,000 metric tons more could be expected.

37. The first growth tests on sea-shrimp were conclusive, so that with the co-operation of CDP in Tahiti a larger programme has just been initiated. A temporary hatchery should be in operation at the end of the year and research is underway to develop a feed based on local by-products. Oyster farming should continue to develop so as to cater to the needs of the local market, assessed at 250 metric tons.

38. There will probably be no great changes in the artisanal fishery, the products of which are marketed locally by an economic interest group and a co-operative, but it is desirable that a revival plan is prepared to upgrade the fleet, with the proviso that the boat best suited to the region be determined.

#### New Hebrides

39. Although the New Hebrides are not on the routes of international airlines or sea lanes and its population is mainly land-orientated, some progress has already been made there in the field of fisheries and aquaculture:

- (a) In Santo, the South Pacific Fishing Company, operating a fleet of tuna longliners, does not have a major impact on the local economy, since it never employed more than a relatively small number of islanders.
- (b) The Mounparap Oyster farm, a private undertaking, which has had more than satisfactory results. Spat of C. gigas one month old yield marketable oysters (40 g) in 8 - 12 months. The main obstacle is the supply of spat.
- (c) In Malekula, the Port Sandwich-Lamap Oyster Farm, an indigenous co-operative which has been in operation since April 1973, but which apart from some technical problems connected with adapting technology to the environment, found its activities hampered through a lack of spat. This Centre therefore is still in the experimental stage.

40. The development of a lobster fishery on the south coast, which has more reefs: lobsters are caught by hand, at night, on reefs left dry by the tide, and placed in galvanized iron cages (2m x 1m x 1m) kept in holes in the reef. A boat collects the lobsters each month. They are immediately sold live in the capital, and in consequence demand a high price.

41. Holothurians (beche-de-mer): a training course bringing together agricultural extension officers took place last year. These officers now look after extension work so that villagers may suitably prepare these animals for which very high prices are offered.

42. We hope that the visit of the SPC Outer Reef Artisanal Fishing Project team to the New Hebrides in the second half-year of 1974 will be followed by the establishment of the first local fishing enterprise to supply the local market.

43. It is of course to be desired that a Fisheries Department may be set up soon so as to co-ordinate and promote fishing activities in the New Hebrides.

#### Papua New Guinea

44. The pattern of rapid expansion in total fisheries production which commenced in 1970 continued through 1973. As in 1972 the skipjack (Katsuwonus pelamis) tuna fishery dominated the gross catch figures and was the focus of the greater part of fisheries research. The 1973 skipjack catch was approximately 28,300 tons and at the present time the negotiations for the establishment of a canning complex at Madang are being finalized. Expansion of the trawl fishery for prawns continued with the export of prawns valued at approximately \$A1,000,000. During 1973 the trawl fishery produced an unexpectedly great quantity (approximately 500 tons) of crayfish (Panulirus ornatus). The influence which this new development may have on the existing crayfish fishery is being closely watched. Catches from the barramundi (Lates calcarifar) fishery remained relatively constant and the results of the almost completed research programme indicate that catches of this species could only be expanded by approximately 20%.

45. Pilot projects on determining the possibility of canning tilapia (Tilapia mosambica) continued, as did feasibility studies on the establishment of a freezer ship and shore-based freezer system in the outlying areas. The possibility of establishing salt-fish processing in Papua New Guinea will be further investigated together with increasing the degree of local participation in the pearling industry.

### Kingdom of Tonga

46. The past year has been one of planning and organization for the future. Four Fisheries staff are now on overseas training courses. Two important submissions for aid have been formulated: one on a bilateral basis to Australia will provide for an infrastructure upon which the development of the industry will be based. An application to the UNDP Development Fund has also been formulated and this would investigate the skipjack and deep water bottom fish resources which is known to have considerable potential. The estimated budget for this project is \$U.S. 250,000.

47. The Fisheries Department has initiated experiments in the Fanga'uta Lagoon, an area of some 7,000 acres, suitable for bivalve culture. The oysters not only survived but showed excellent growth rates. Suitable legislation to protect the area has been drafted.

48. Legislation to protect the stocks of turtles within the Kingdom has been drafted and now awaits Cabinet approval. This would create sanctuaries on the main nesting sites in the Ha'apai group, and would legally define methods of capture.

49. The priorities for the Kingdom of Tonga, therefore, as far as Fisheries are concerned, are:-

- (a) Socio-economic: to provide food, employment and revenue.
- (b) Education - Conservation: to train fishermen in new technique to allow them to move away from traditional inside reef resources. To ensure that the marine resources are exploited rationally supported by realistic enforceable legislation.

### Trust Territory of the Pacific Islands

50. The Trust Territory's Marine Resources programme which is headquartered in Saipan has District Offices in Ponape, Truk, Yap and Palau. In addition, a marine laboratory which is concerned primarily with mariculture research is located in Palau.

51. The principle programme in Ponape is the development of the Oregon Dory as a suitable boat for tropical fisheries. Mechanical failures with gasoline engines have jeopardized the success of this programme and an alternate propulsion unit is recommended. Other programmes include construction of new facilities for the district programme and improvement of local fishery co-operatives.

52. The Truk district fisheries programme includes renovation of a large freezer barge and improvement of handling facilities at local co-operatives.

53. Yap's programme began six months ago with emphasis on turtle surveys and tagging to determine abundance of Chelonia mydas.

54. Palau's district programme is concerned with deep water surveys of commercial stocks, organization of fishing co-operatives under a central fishing authority and development of a local oyster industry.

55. The marine laboratory (Micronesian Mariculture Demonstration Center) is presently concentrating on the culture of Siganus canaliculatus, Chanos chanos, Macrobrachium rosenbergii, Penaeus monodon, Crassostrea sp. and Iridaea clams. A successful hatchery for S. canaliculatus and M. rosenbergii has been established and three ponds are presently being constructed.

#### Western Samoa

56. The Fisheries Division within the Department of Agriculture, Forestry and Fisheries presently has a permanent staff of seven and a yearly budget of about \$ 50,000. An FAO Fisheries Adviser is assisting in formulating development projects. The work programme of the Fisheries Division will in 1974/75 include:-

##### (a) FAO Tuna Fisheries Project

A survey is being carried out to determine whether sufficient bait is available for commercial pole-and-line fishing of skipjack. FAO has provided a masterfisherman and a 42 ft. boat.

##### (b) Deep handlining

Efficiency of present handlining methods should be improved and request has been made for short-term visit of a snapper expert under the UNDP regional programme.

##### (c) Construction of prototype boats

A nucleus of a boatbuilding unit will be established within 1974.

(d) Turtle hatchery

A hatchery on the east coast released about 6000 turtles of 2 - 3 month age in 1973.

(e) Outboard engine repair shop

A Japanese volunteer is assisting in repairing up to 30 outboard engines per month.

57. Western Samoa is presently importing fish and fishery products valued at WS\$400,000, and two major fishery projects aimed at increased production have been proposed for inclusion in the five year plan starting 1975:-

1. Village fishery development

Supply of 300 outboard engines of standard type, provision of spare parts and repair service, introduction of improved boats and organization of fish transport. Supply of fishing gear through a government store.

2. Commercial fishery development

Establishment of infrastructure, boatyard, shipway, engine repair shop, ice-making plant and freezer storage. Construction of boats for skipjack fishery and deep handlining.

EXPERT COMMITTEE ON TROPICAL SKIPJACKA. Summary of Report and Recommendations

58. The recommendations of the Expert Committee on Tropical Skipjack, which held its first meeting in February 1974, were received. The Daily Tuna Catch Record and General Biological Information Sheets as devised by the Expert Committee were discussed and copies submitted to all representatives. The Meeting endorsed the recommendation of the Expert Committee that all territories should arrange to have forms completed for all commercial skipjack vessels and operations. It was suggested that data collected should be channeled through the South Pacific Commission as the central collection agency and be processed by the National Marine Fisheries Service in Honolulu, Hawaii.

59. Though the Committee had recommended the development of a regional morphometric study to assist in the evaluation of skipjack populations in the Pacific, population dynamics experts felt that such a study is not worth pursuing at this time.

60. There are strong indications that the growth rate of skipjack in the Western Pacific is somewhat slower than in the Eastern Pacific. A preliminary comparison of daily growth marks on otoliths of skipjack from Hawaii and Papua New Guinea supports this theory suggesting that there may be separate stocks.

61. Reference was made to the FAO Working Party on skipjack tuna which concluded that high priority be given to tagging, particularly in areas where no tagging is presently being done. In Papua New Guinea, 9780 skipjack have been tagged with recoveries amounting to approximately 6%. Tags have been recovered from a wide area of the South Pacific after as much as 595 days with several returns from as far away as Palau.

62. A tagging programme as outlined by the Expert Committee would be based upon the activities of a suitable tagging vessel which would travel throughout the South Pacific Commission area over a two to three year period. Such a vessel would carry out a great deal of bait research and general skipjack survey work in all areas. The results would greatly assist in the management of all existing and future skipjack fisheries and would be of particular benefit to those countries and territories, at present without skipjack fisheries, but which are commencing skipjack and bait research, or are proposing to negotiate the establishment of a skipjack industry with foreign interests.

#### Recommendation No. 1

63. The Meeting recommends that the Tagging Programme as outlined by the Expert Committee on Tropical Skipjack be accepted as a project of the highest priority and urgency. The need for such a programme has been accepted and the Meeting recommends that the South Pacific Commission make every possible effort to obtain funding for the programme from any possible sources. It was appreciated that such funding should not interfere with the existing funding structure for South Pacific Commission projects.

B. Review of the Bait Fish Workshop held in Honolulu, June 4-6, 1974

64. A summary of the results of the Honolulu Workshop was presented and discussed (see Appendix II) and the following recommendation was made.

Recommendation No. 2

65. The Meeting recognizes that live bait is at present absolutely essential for development of skipjack fisheries in the tropical Pacific. It is considered that the culture of hardy live bait species has the potential to assist substantially in the development of small boat skipjack fisheries in the islands. The Meeting therefore strongly recommends that every support be given to bait fish research and development of the culture of suitable hardy live bait species.

PROGRESS REPORTS ON SPC SPECIAL PROJECTS

A. Inshore Fisheries Development

66. These fisheries are to be conducted at the village level:-

1. Lobster sub-project

- (a) To be carried out in two phases, firstly research on holding and handling spiny lobster (Panulirus sp.) alive and secondly to determine the extent of the stocks and the fishing pressure they might withstand.
- (b) Discussion covered resource, habitat, catching, handling and the doubtful success of small refrigeration plants in local areas for processed spiny lobster.

2. Beche-de-mer sub-project

This project to be handled in conjunction with the lobster sub-project.

3. Turtle farming sub-project

- (a) To be carried out at the village level.
- (b) A volunteer is joining the project in two weeks and will proceed to the Cook Islands.
- (c) Noted that the University of the South Pacific had started some research on turtles.



## B. Outer Reef Artisanal Fishing Project

67. The SPC Fisheries Adviser gave an account of progress in this project (see SPC Newsletter No. 11). The boats are expected to be in operation in the New Hebrides in August 1974.

68. Countries interested in having access to the facilities of this project were:-

British Solomon Islands Protectorate  
Cook Islands  
Fiji  
Gilbert and Ellice Islands Colony  
Kingdom of Tonga  
New Hebrides  
Papua New Guinea  
Trust Territory of the Pacific Islands  
Western Samoa.

69. It was agreed that the second phase of the dory programme would be carried out in Western Samoa.

70. Discussion accentuated the need to operate the Outer Reef Artisanal Fishing Project (ORAFP) with experienced personnel in order to test the economical feasibility of the operations with known units.

71. In discussions following this statement, several territories requested access to results and expertise for their dory project, with particular reference to deep water fishing. It was suggested that consultant assistance be sought from UNDP or the South Pacific Commission when this was available.

### Recommendation No. 3

72. The Meeting strongly supported the recommendation of the Third Conference of Directors of Agriculture, Livestock Production and Fisheries for the expansion of the Outer Reef Artisanal Fishing Project to permit the earlier completion of the approved programme of the project.

Recommendation No. 4

73. The Meeting agreed that the maintenance of power units was a major problem in developing fisheries in the South Pacific area. The possibility of standardizing on a standard power pack was discussed. This was thought to be desirable but difficult to implement. However, the Meeting strongly recommends that the South Pacific Commission seek funding in order to

- (a) establish a centralised spares holding agency;
- (b) provide specialist servicing of fuel pumps, injectors and gearboxes;
- (c) recruit a qualified Marine Engineer, centrally based, to make regular visits to check, maintain and overhaul machinery and train local staff.

REPORT BY UNDP REGIONAL FISHERIES CO-ORDINATOR

74. The report was presented to the Meeting (see Appendix III).

Recommendation No. 5

75. Following discussion of this report the Meeting recommends that UNDP Regional Representative seek a more generous allocation of funds for short-term consultant services to make greater assistance available to the region in the fields of

- (a) fishing boat design and construction;
- (b) deep water snapper fishing;
- (c) other projects as the needs arise.

PRESENT STATE OF AQUACULTURE, WITH PARTICULAR REFERENCE TO  
ECONOMIC ASSESSMENTS IN THE SPC AREA

A. Fish

76. In Fiji 18 acres of sea water ponds have just been completed for the culture of certain species of fish.

77. In Palau the Micronesian Mariculture Demonstration Center (MMDC) has succeeded in spawning Siganus canaliculatus under hatchery conditions. Selective breeding will be used to improve natural stocks and pond culture will be attempted with this species. Carangids are being grown in cages in Tahiti.

## B. Crustacea

78. Macrobrachium rosenbergii, the giant fresh water prawn has been cultured with good technical results in Tahiti and Palau. Studies of feasibility of culture of Penaeid shrimp have been commenced in Tahiti and spontaneous spawning has occurred in holding tanks. It was noted that the economic production of crustacea depends on the availability of high priced markets and cheap protein sources for supplemental feed.

## Recommendation No. 6

79. The Meeting recognized the value of current experimentation and research proceeding in various centres in the area on fish and crustacea culture, with notable success in some fields. It recommends that continuing support be given to these experiments in order to develop them to commercial levels.

## C. Molluscs

80. The status of existing and planned projects in aquaculture of molluscs was reviewed. The Micronesian Mariculture Demonstration Center has determined the suitability of Crassostrea sp. for culture in Palau with development directed toward high price export markets and low price local consumption. In Tahiti the Centre National pour l'Exploitation des Océans (CNEOX) has begun breeding experiments with Pinctada margaritifera and Crassostrea. Studies by the University of the South Pacific and the Department of Fisheries in Fiji on the genus Batissa have been carried out to determine the feasibility of using this species for aquaculture. Remarkable growth of C. gigas has been observed in Fiji.

81. The difficulties of obtaining molluscan spat was mentioned by many participants. It was suggested that Mytilus smaragdinus and Crassostrea iredelei be imported to New Caledonia and distributed to other countries in the Pacific when requested.

Recommendation No. 7

82. The Meeting considers that the development of mollusc culture in the Pacific area can add substantially to protein requirements and income. Therefore the Meeting recommends that the South Pacific Commission encourage experiments on the culture of commercially successful tropical marine molluscs, e.g. the Philippine oyster (Crassostrea iredelei) and the green mussel (Mytilus smaragdinus) and seek the co-operation of the New Caledonian administration in these experiments.

D. Marine Turtles

83. A recent survey reveals that in Tonga the number of female turtles coming to nesting beaches is diminishing. A short turtle survey was made in Fiji in 1970. At present, the size of the turtle population is not clearly known and a more thorough investigation is needed. Commercial and scientific research in other areas of the world such as the Caribbean illustrate the need for closely co-ordinated work in this Pacific resource. The proposed turtle farm in the Cook Islands, the hatchery in Western Samoa, research work at the Micronesian Mariculture Demonstration Center in Palau, and research already commenced at the University of the South Pacific are intended for such co-ordinated work.

Recommendation No. 8

84. The Meeting supported the recommendations made at previous SPC Technical Meetings, on the need to conserve marine turtle stocks in the South Pacific island territories, and recommends that

- (a) a central bank of information on resources of marine turtles be established by the South Pacific Commission at the University of the South Pacific and that the information be available for distribution;
- (b) experimental turtle ranching or farming should be restricted to small scale operations and under the strict supervision of the Fisheries Departments in the territories concerned.

### FISHERMAN TRAINING

85. The Meeting reviewed the training activities throughout the region where in-service training was recognized as the main training medium. It was noted that the University of the South Pacific was now running a three year diploma course for the training of fisheries extension officers.

#### Recommendation No. 9

86. The Meeting, recognizing the critical need for skilled fishermen and fisheries staff, and further recognizing the absence of trained fishermen and staff in most of the territories, strongly recommends the implementation of training programmes incorporating the following:-

- (a) in-field demonstration of commercial fishing methods;
- (b) formalized short-term commercial fishermen training courses;
- (c) formal training of fisheries officers and biological staff, and fisheries extension officers.

87. The Meeting stressed the need for funds to be made available for inter-territorial study visits in order to take full advantage of achievements in the area.

#### Recommendation No. 10

88. The Meeting strongly supported the recommendations of the Third Regional Conference of Directors of Agriculture that a Fisheries Training Officer be appointed to the staff of the South Pacific Commission to assist in achieving the above objectives.

### PROMOTION OF VILLAGE FISHERIES

89. The Meeting agreed that as fisheries at the village level constitute a very important part of the fisheries activity in the SPC area, any expansion or promotion of villages fisheries was of considerable importance to all countries represented.

90. It was appreciated that it is a common problem throughout the region that those areas where the village production of fish is highest are frequently the most remote. The problems associated with the handling and transportation of fish from these areas often result in the fisheries being uneconomical. These problems are further complicated by sociological changes associated with the conversion of the villages to a cash economy. It was also appreciated that there were further complications caused by the migration of able-bodied persons from the remote to the urban areas.

Recommendation No. 11

91. The Meeting recognized the importance of increased mechanization in areas where marketing is assured and recommends that fuel for fisheries purposes is provided free of taxes and duties.

FUTURE PROJECTS

92. The Meeting discussed in detail several possible future projects.

Recommendation No. 12

93. The Meeting recommends that the following proposals be considered by the South Pacific Commission if and when funds become available.

Proposal A. Recognizing the need for experimental, exploratory and demonstration fishing, the Meeting proposed that, as expertise and facilities will be available at the termination of the economic feasibility stage of the Outer Reef Artisanal Fishing Project, the South Pacific Commission retains the equipment, boats and teams established to carry out such experimental exploratory and demonstration fishing.

Proposal B. It being understood that aquaculture in the Pacific islands can only become economic if feeds are prepared locally, the Meeting proposed that a general study be made to prepare a list of possible protein fish feeds. The food values and the various possible ways of preserving and processing by-products involved in fisheries, agriculture or other industries should be examined in order to develop the technology of manufacturing low price artificial feeds that are easy to transport and to store.

Proposal C. The Meeting proposed a feasibility study to investigate increased utilization of fish traps to increase production at the village level particularly in view of the advantages inherent in storing fish alive in the traps in remote areas.

### OTHER BUSINESS

#### A. Circulation of Information

94. The need for increased dissemination of information was stressed and it was requested that information regarding fishing techniques and fisheries development be forwarded to the South Pacific Commission for inclusion in the Newsletter.

95. The incidence of red tides and associated fish kills and shellfish poisoning was discussed. It was agreed that a data bank of these phenomena should be established.

96. Reference was made to the availability of the PEACESAT system for satellite communication for use in discussing scientific and educational matters. Present PEACESAT stations include:-

Anchorage	(University of Alaska)
Honolulu	(University of Hawaii)
Lae	(Papua New Guinea University of Tech.)
Noumea	(South Pacific Commission)
Nuku'alofa	(University of the South Pacific)
Pago Pago	(Administration)
Rarotonga	(Administration)
Saipan	(Administration)
Suva	(University of the South Pacific)
Washington	(Nat. Inst. of Health)
Wellington	(Polytech. Institute).

#### Stations may soon be established at

Apia  
Honiara  
Tarawa  
Vila.

B. Future MeetingsRecommendation No. 13

97. The Meeting recommends that Technical Meetings on Fisheries continue to be held annually. The Cook Islands have offered to host the next Meeting in mid-July 1975.

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SUMMARY OF RECOMMENDATIONSEXPERT COMMITTEE ON TROPICAL SKIPJACKA. Summary of Report and RecommendationsRecommendation No. 1

The Meeting recommends that the Tagging Programme as outlined by the Expert Committee on Tropical Skipjack be accepted as a project of the highest priority and urgency. The need for such a programme has been accepted and the Meeting recommends that the South Pacific Commission make every possible effort to obtain funding for the programme from any possible sources. It was appreciated that such funding should not interfere with the existing funding structure for South Pacific Commission projects.

B. Review of the Bait Fish Workshop held in HonoluluRecommendation No. 2

The Meeting recognizes that live bait is at present absolutely essential for development of skipjack fisheries in the tropical Pacific. It is considered that the culture of hardy live bait species has the potential to assist substantially in the development of small boat skipjack fisheries in the islands. The Meeting therefore strongly recommends that every support be given to bait fish research and to the development of the culture of suitable hardy live bait species.

PROGRESS REPORTS ON SPC SPECIAL PROJECTSB. Outer Reef Artisanal Fishing ProjectRecommendation No. 3

The Meeting strongly supported the recommendation of the Third Conference of Directors of Agriculture, Livestock Production and Fisheries for the expansion of the Outer Reef Artisanal Fishing Project to permit the earlier completion of the approved programme of the project.

Recommendation No. 4

The Meeting agreed that the maintenance of power units was a major problem in developing fisheries in the South Pacific area. The possibility of standardizing on a standard power pack was discussed. This was thought to be desirable but difficult to implement. However, the Meeting strongly recommends that the South Pacific Commission seek funding in order to:-

- (a) establish a centralised spares holding agency;
- (b) provide specialist servicing of fuel pumps, injectors and gearboxes;
- (c) recruit a qualified Marine Engineer, centrally based, to make regular visits to check, maintain and overhaul machinery and train local staff.

REPORT BY UNDP REGIONAL FISHERIES CO-ORDINATORRecommendation No. 5

Following discussion of this report the Meeting recommends that UNDP Regional Representative seek a more generous allocation of funds for short-term consultant services to make greater assistance available to the region in the fields of

- (a) fishing boat design and construction;
- (b) deep water snapper fishing;
- (c) other projects as the needs arise.

PRESENT STATE OF AQUACULTURE, WITH PARTICULAR REFERENCE TO  
ECONOMIC ASSESSMENTS IN THE SPC AREA

B. CrustaceaRecommendation No. 6

The Meeting recognized the value of current experimentation and research proceeding in various centres in the area on fish and crustacea culture, with notable success in some fields. It recommends that continuing support be given to these experiments in order to develop them to commercial levels.

### C. Molluscs

#### Recommendation No. 7

The Meeting considers that the development of mollusc culture in the Pacific area can add substantially to protein and income. Therefore the Meeting recommends that the South Pacific Commission encourage experiments on the culture of commercially successful tropical marine molluscs, e.g. the Philippine oyster (Crassostrea iredelei) and the green mussel (Mytilus smaragdinus) and seek the co-operation of the New Caledonian administration in these experiments.

### D. Marine Turtles

#### Recommendation No. 8

The Meeting supports the recommendation made at previous South Pacific Commission Technical Meetings, on the need to conserve marine turtle stocks in the South Pacific island territories. It recommends that

- (a) a central bank of information on resources of marine turtles be established by the South Pacific Commission at the University of the South Pacific and that the information be available for distribution;
- (b) experimental turtle ranching or farming should be restricted to small scale operations and under the strict supervision of the Fisheries Departments in the territories concerned.

### FISHERMAN TRAINING

#### Recommendation No. 9

The Meeting, recognizing the critical need for skilled fishermen and fisheries staff, and further recognizing the absence of trained fishermen and staff in most of the territories, strongly recommends the implementation of training programmes incorporating the following:-

- (a) in-field demonstration of commercial fishing methods;
- (b) formalized short-term commercial fishermen training courses;
- (c) formal training of fisheries officers and biological staff, and fisheries extension officers.

Recommendation No. 10

The Meeting strongly supports the recommendations of the Third Regional Conference of Directors of Agriculture that a Fisheries Training Officer be appointed to the staff of the South Pacific Commission to assist in achieving the above objectives.

PROMOTION OF VILLAGE FISHERIESRecommendation No. 11

The Meeting recognises the importance on increased mechanization in areas where marketing is assured and recommends that fuel for fisheries purposes is provided free of taxes and duties.

FUTURE PROJECTSRecommendation No. 12

The Meeting recommends that the following proposals be considered by the South Pacific Commission if and when funds become available.

Proposal A. Recognizing the need for experimental, exploratory and demonstration fishing, the Meeting proposed that, as expertise and facilities will be available at the termination of the economic feasibility stage of the ORAFP, the South Pacific Commission retains the equipment, boats and teams established to carry out such experimental exploratory and demonstration fishing.

Proposal B. It being understood that aquaculture in the Pacific islands can only become economic if feeds are prepared locally, the Meeting proposed that a general study be made to prepare a list of possible protein fish feeds. The food values and the various possible ways of preserving and processing by-products involved in fisheries, agriculture or other industries should be examined in order to develop the technology of manufacturing low price artificial feeds that are easy to transport and store.

Proposal C. The Meeting proposed a feasibility study to investigate increased utilization of fish traps to increase production at the village level particularly in view of the advantages inherent in storing fish alive in the traps in remote areas.

OTHER BUSINESS

B. Future Meetings

Recommendation No. 13

The Meeting recommends that Technical Meetings on Fisheries continue to be held annually. The Cook Islands have offered to host the next meeting in mid-July 1975.

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PROVISIONAL COSTING OF THE PROPOSED TAGGING PROGRAMME

The funds needed to conduct an extensive tuna tagging programme will be dependent greatly upon the kind of arrangement the South Pacific Commission can make to obtain the services of a suitable vessel. It has been suggested that a donor be sought for a suitable vessel for a two or three year period. Fuel and deck supplies may have to be obtained from alternative sources; however, should such a vessel be made available by a donor country or organization, the overall costing of the project would be greatly reduced, probably halved.

The type of vessel being sought is one which is specifically designed for skipjack fishing. It is essential that the vessel be a viable fishing unit. Based on past experience in the Western Pacific Ocean a vessel of the Okinawan pole-boat design would be the most effective. Such vessels have the great advantage that poling and hence tuna tagging can be carried out from the bow and stern of the vessel, thus enabling two tagging teams to operate simultaneously.

In developing a budget for the tagging programme many possible funding levels exist. These range from complete funding from internal sources, to donation of a vessel with a crew. Three schedules are presented. These are:-

- (1) purchase of vessel (schedule A);
- (2) vessel and crew donated (schedule B);
- (3) charter of vessel (schedule C).

B U D G E TFIRST YEAR

	<u>Cost</u>	A	<u>Schedule</u> B	C
		(in thousands)		
		\$A		
<u>Vessel</u>				
Purchase	300.0	300.0	Donated	
Charter	200.0			200.0
<u>Vessel Operating Cost</u>				
Fuel and Lubrication	15.0	15.0	15.0	15.0
General Maintenance	15.0	15.0	15.0	15.0
<u>Vessel Complement</u>				
Captain	20.0	20.0		
1st Mate	15.0	15.0		
Master Fisherman	15.0	15.0	Donated	
Chief Engineer	15.0	15.0		
Engineer	12.0	12.0		
Fishermen (7)	50.0	50.0		50.0
<u>Scientific Personnel</u>				
Biologists (3)	50.0	50.0	50.0	50.0
Technicians (3)	40.0	40.0	40.0	40.0
<u>Equipment and Gear</u>				
100,000 Tags (\$ .18/tag)	18.0	18.0	18.0	18.0
Ancillary tagging gear	5.0	5.0	5.0	5.0
Fishing gear	10.0	10.0	10.0	10.0
<u>Miscellaneous</u>				
Tag reward at \$2.00	2.0	2.0	2.0	2.0
		582.0	155.0	405.0

APPENDIX IITUNA BAITFISH WORKSHOP

June 4-6, 1974, Honolulu, Hawaii

Report of Final General Session

Chairman : Richard S. Shomura (in place of Michio Takata)  
Rapporteur: Robert T.B. Iversen

A. Discussion

Each of the chairman of the working groups briefly summarized the major findings of each session, as given in the rapporteur's reports. It was pointed out that identification of the different agencies and organizations to carry out the various recommendations would serve a most useful purpose for the orderly progress of future work. It was again emphasized that there is no one single solution that will solve the baitfish problems of the various areas, and that the economics of the various methods proposed for alleviating baitfish shortages be kept firmly in the forefront on a continuing basis as the technical developments proceed. The need for a critical experimental design for field trials was again noted. It was suggested that a systems analysis review of all facets of the baitfish problem, drawing on the background information and recommendations made at this workshop, should be carried out as soon as possible by the National Marine Fisheries Service.

B. Priorities for action/alternatives

The participants then held a general discussion on the order in which further studies should be held, covering both short-term and long-term activities. These are given in the table below. In general, the first priority for Hawaii is the anchovy transport system test, for American Samoa the culturing and sea trials of mollies, the initiation of studies on Apogon by the Trust Territory of the Pacific Islands, and for the other areas, the development of cultured baitfish and development of natural stocks.

C. Acknowledgements

The participants voiced their thanks to Chairman Richard S. Shomura and the staff of the Honolulu Laboratory, Southwest Fisheries Center, National Marine Fisheries Service, for the outstanding support and hospitality accorded them during the Tuna Baitfish Workshop.



Action Priorities/Alternatives

Hawaii	Anchovy transport (Sea Grant, NMFS)	Improve bait handling and utilization (nehu)	Shiners and shad
American Samoa	Mollies (Govt. of Am. Samoa)	Economic evaluation of bait transport	--
Trust Territory	<u>Apogon</u>	--	--
Other areas	Develop use of natural stocks (availability and accessibility)	Culture suitable species	--

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APPENDIX IIIREPORT BY THE UNDP REGIONAL FISHERIES CO-ORDINATOR

The post of Regional Fisheries Co-ordinator was established by UNDP/FAO in late 1973 following completion of the South Pacific Islands Fisheries Development Agency (SPIFDA) project. It should be pointed out that the area covered by this new project is somewhat less extensive than that covered by SPIFDA. Under my terms of reference, I am directly concerned with the six island nations and territories which formally endorsed the project. These include Western Samoa, Fiji, Tonga, Gilbert and Ellice Islands Colony, British Solomon Islands Protectorate and the Cook Islands.

Since my appointment to this post last December, I have been primarily concerned with learning as much as possible about fisheries in the region. I have gone over available background information on work done in the area and have had the opportunity of visiting all the participating island territories. With the kind assistance of Fishery Officers, I compiled a series of fishery profiles for each of the island groups. These profiles contain such things as a review of past and present development efforts, an analysis of potentials and constraints, government priorities and objectives, an identification of possible UNDP assistance and a section on training requirements.

Looking at the region as a whole, I think that one of the most surprising facts that a newcomer learns is that virtually all of the islands rely heavily on imports to meet the demand for fishery products. In many cases, these imports place a relatively heavy drain on the islands foreign exchange reserves, but of even more significance is the recent inflationary trend which is rapidly increasing the price of these commodities. I think that if we were to analyse import data over the past couple of years we would find that these price increases do not directly relate to the increased income of the average islander. Therefore, these islands which depend so much on imported fish are facing a situation whereby the per capita consumption of animal protein could be on a downward trend, unless local production can be increased to offset this dependency on imports.

During my visits to the islands, I have been impressed by the enthusiasm of Fishery Officers in their efforts to improve fisheries. Unfortunately, this enthusiasm in many cases, is dampened by the lack of adequate support to carry out viable projects. It is my impression that although governments are becoming increasingly aware of the importance of fisheries to their economy, they are also taking a more critical look at the approach to be taken to meet the immediate and

long range objectives. There have been innumerable surveys, investigations and studies made on fisheries in the region, and volumes of reports have been written on what should be done to develop fisheries. Moreover, many of the islands have provided considerable funds to carry out various type projects, too many of which seem to have ended with little or no tangible result. To gain the confidence and support of these governments, I feel that we must also look towards realistic and practical type programmes that can lead to something tangible. There are a number of recent projects in the region which are taking this approach. The recently completed skipjack tuna project in Fiji demonstrated the feasibility of a pole-and-line fishery and has led almost immediately to negotiations for major investments; the SPC Outer Reef project is moving in a similar direction and can certainly make a substantial contribution in developing a major resource; the fishery officers training course supported by Canadian aid is another example of a direct and realistic approach towards fisheries development.

In reviewing the priorities and objectives of fisheries development in the region, I find that virtually all the islands share the same view that priority be given to harvesting known marine resources. In some cases, higher priority is given to increasing production for a growing domestic market to offset dependency on imports, create more employment or upgrade village fisheries. In other cases, development of an export oriented industry is given first priority as a means to provide employment and to increase foreign exchange earnings. This seems a logical approach considering that at so many of the islands, known marine resources are still virtually untouched, yet there is a strong local demand for fish and an almost unlimited world market for tuna.

It is my hope that UNDP/FAO can continue to make a contribution towards reaching some of these objectives. We are of course limited in scope as fisheries must compete with other sectors for development funds available within the UNDP Country Programme. Therefore, I feel that one of my first tasks has been not only to collaborate with Fishery Departments in identifying viable proposals, but also to try to influence, as much as possible, the inclusion of fisheries projects in the country programmes. In this respect, we have had some success during the past few months. At recent UNDP Country Programme reviews, additional allocations were obtained for fisheries in Western Samoa and Tonga. In Western Samoa, funds were allocated for needed support and extension of the ongoing skipjack project; and in Tonga, support is being given to implement a large scale project which will explore the possibilities of establishing

a local skipjack and deep water reef fishery. In the Cook Islands, a request for the services of a fisheries advisor is currently being processed. The advisor will assist the Government in preparing a long range development plan and, at the same time, try to improve the efficiency of the four commercial boats provided by a previous government project. UNDP has also approved a request by the Gilbert and Ellice Islands Colony for a master-fisherman to assist in the operations of four new dories and a small pole-and-line skipjack vessel. These three new projects will provide not only expert services, but will also include the provision of needed equipment and fellowships. On a regional basis, preliminary arrangements are now being made to recruit a short-term consultant experienced in deep water snapper fishing. He is expected to work together with the SPC Outer Reef project in New Hebrides and in Samoa with the current FAO project to demonstrate commercial methods of deep water reef fishing.

In conclusion, I should like to thank the South Pacific Commission for the opportunity of attending this meeting, and to express my appreciation to my colleagues in the region for their assistance in putting together the new development proposals.

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APPENDIX IVAGENDA

1. Country statements: Recent developments and future plans.
  2. Expert Committee on Tropical Skipjack.
    - A. Summary of report and recommendations.
    - B. Review of the bait fish workshop, held in Honolulu, June 4-6, 1974.
  3. Progress reports on SPC special projects.
    - A. Inshore Fisheries Development.
    - B. Outer Reef Artisanal Fishing Project.
  4. Report by UNDP Regional Fisheries Co-ordinator.
  5. Present state of aquaculture, with particular reference to economic assessments in the SPC area.
    - A. Fish
    - B. Crustacea
    - C. Molluscs
    - D. Marine Turtles
  6. Fisherman training.
  7. Promotion of village fisheries.
  8. Future projects.
  9. Other business.
    - A. Circulation of information.
    - B. Future Meetings.
  10. Conclusions and Recommendations.
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Mr G. Azariah  
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APPENDIX VILIST OF WORKING PAPERS

- No. 1 Juvenile-Adult Rearing of Siganus (Pisces: Siganidae) in Guam, by Roy T. Tsuda, Patrick G. Bryan, William J. Fitzgerald and William J. Tobias.
- No. 2 Fisheries Development in Tonga, by W.A. Wilkinson.
- No. 3 Induced Spawning and Larval Rearing of the Rabbitfish Siganus canaliculatus, by P.G. Bryan, R.C. May, B. Madraisau and J.P. McVey.
- No. 4 The Ponape CAA Dory Project, by M.A. Perez and B.M. Sablan.
- No. 5 Introductory Paper, by J.P. Hallier.
- No. 6 Final Report of the "MER" Commission, Seventh Plan, by J. Sauvée.
- No. 7 Future Fishery Research and Development Requirements in the SPC Area, by R.H. Baird.
- No. 8 Present Status of Research within the SPC Special Project on Fish Poisoning, by Dr A.L. Bourre.
- No. 9 Aquaculture in the St. Vincent's Bay Experimental Mariculture Centre, by M. Autrand.
- No. 10 Preliminary "Mollie" Live Bait Trials - American Samoa, by S.N. Swerdloff.
- No. 11 Marine Turtle Research. Progress Report, by U. Raj.
- No. 12 Diploma in Tropical Fisheries at the University of the South Pacific, by Dr H. Squires.
- No. 13 A comment on the Study of Skipjack Tuna Sub-populations by Morphometric Analysis, by J.A. Wetherall and R. Skillman.
- No. 14 The 1974 Status of Experimental Oyster Culture in Fiji, by T.P. Ritchie.

- No. 15     Tuna Baitfish Workshop Draft Report.
- No. 16     L'aquaculture au Centre Océanologique du Pacifique :  
              équipe d'aquaculture du COP.
- No. 17     Premiers essais d'élevage de Macrobrachium rosenbergii  
              en Polynésie : équipe d'aquaculture du COP.
- No. 18     Elevage des crevettes de mer Peneides en Polynésie :  
              équipe d'aquaculture du COP.
- No. 19     Raviravi Fishpond Experimental Project. Progress Report,  
              by D.M. Popper and T. Lichatowich.

Country Statements:     Gilbert & Ellice Islands Colony.

Western Samoa, by F.B. Moors.

French Polynesia, by A. Michel

Information Papers:     SPC Newsletter No. 11.

Shellfish Poisoning in the South Pacific,  
by J. Maclean.

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OPENING SPEECH

by

THE MINISTER OF AGRICULTURE  
H.R.H. PRINCE TU'IPELEHAKE

It gives me great pleasure to address such a distinguished gathering of Fisheries Experts representing their Governments from no less than twelve Pacific Island Territories, and the Observers and consultants from Australia, and from the region's own University of the South Pacific in Suva.

The Kingdom of Tonga is indeed grateful to the Secretary General of the South Pacific Commission for accepting our invitation to hold this Seventh Technical Meeting on Fisheries on our Island, and we extend our warmest and friendliest welcome to all the participants. May your short stay here be an enjoyable one as well as a fruitful one.

The South Pacific Territories are now becoming increasingly aware of the importance of their marine natural resources, and the need to develop these resources for the benefit of its people.

It is not for me to lecture to all experts on the Fishing Industry, you are all, I'm sure, fully aware of the value of a progressive fishing industry in our developing Islands. Here is a natural resource that provides fundamental basic requirements - Food, revenue, and employment. What is also so important is that the development of an industry, based on a natural resource, can be achieved without the erosion of our traditional cultures and traditions.

As you all are of course fully aware, there is increasing pressure on the world's fish resources to meet the demands of a world-wide increase in population. The larger economically developed and industrialised countries, are using their wealth and advance technologies to extend their fishing activities into all the oceans of the world. In the South West Pacific Ocean area alone, it is considered profitable enough for four foreign fishing nations to send their fishing fleets into this area, harvesting some 1.5 million metric tons of fish each year. It is perhaps ironic that the bulk of this large catch is returned for processing to the industrialised countries, and is ultimately reexported to the Pacific Territories. It is perhaps a little sad that Tonga's importation of tinned fish is increasing annually. No less than 146,000 pa'anga was spent on tinned fish alone in 1973. This is too great a drain on our foreign exchange, especially for a food product that is caught - so to speak - on our very doorstep.

The Kingdom of Tonga has a land mass of some 270 square miles, encompassed in a sea area of 116,000 square miles. The Kingdom has been long aware that we have within this large sea area a considerable potential for development, but has lacked the technical know-how and expertise to exploit this valuable natural asset on a large scale. Nevertheless, our small country has already taken the initiative of purchasing and operating an Oceanic Long line fishing vessel - the "EKIAKI" - for the past four years. And we are, I believe, the first Pacific Territory to own and man a commercial fishing vessel of this type. This vessel is entirely manned by Tongans, and produces between 60-90 tons of fish annually, mainly for local consumption. The day Ekiaki arrives from the fishing grounds is an important one for Tongans as indicated by the large queues of people which quickly form to buy the catch of perhaps eight tons or so, which is sold within hours of landing.

The Kingdom's local fisheries produce an estimated 750 tons of fish annually. Our Fisheries Officer estimates a further 1,000 tons of fish annually will have to be produced to meet our local demands for fresh fish. To meet this challenge the local fishery will have to be developed to move away from the inside and near resources which has been a source of sustenance for Pacific Islanders for centuries. The increase in population in recent years has put an added pressure on these traditional resources, resulting in their virtual depletion in some cases. This is happening in Tonga, as in other island Territories. New fishing methods and techniques must be introduced to local fishermen to extend their fishing activities into sea areas, hitherto outside their capability to fish. The training of what will virtually be a new generation of fishermen must be given the highest priority. Only by doing so can we ensure a locally produced essential food for our future people now and for future generations.

Another very important aspect which this meeting no doubt will be discussing is the conservation of existing marine resources. The sea, unfortunately, has in the past been treated with little respect, and has been used as a dumping ground for every conceivable type of rubbish from domestic and industrial sewage to radio active atomic wastes. We, in the Pacific are fortunate in having our sea relatively unpolluted, it is important that the legislation to maintain this favourable situation be established. It is sometimes much cheaper to prevent than to cure. The unspoilt reefs and seas areas of Tonga, and of all the Pacific Islands are a priceless asset and heritage, which must not be eroded by selfish interests. The development of our marine natural resources must be carried out with due consideration to conservation aspects to ensure the natural

resources are not exploited beyond their capacity to reproduce. It is you, the Fisheries experts from the Pacific Island Territories, who must decide on the long-term rational development of the industry in the interests of the people who inhabit these islands.

Gentlemen, this meeting is a very important one. It will bring a fresh emphasis on the vital need to developing fisheries in the Pacific Islands. Your deliberations I am sure will be of great value to achieving the objectives so vitally needed. I again must express our satisfaction in having this meeting in our Kingdom, and it is with great pleasure that, I now declare this meeting open.

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APPENDIX VII(b)MESSAGE FROM THE HONOURABLE G.F.D. BETHAM,  
SECRETARY-GENERAL, SOUTH PACIFIC COMMISSION

I have asked Mr Harris to convey this message to participants and observers at the Seventh Technical Meeting on Fisheries.

I would first like to express my thanks to the Government of the Kingdom of Tonga for agreeing to host the Meeting, for the assistance of the Department of Agriculture in making the arrangements for the Meeting, and to H.R.H. Prince Tu'ipelehake for the interest he has shown and for formally opening the proceedings.

Next I would like to express my gratitude for the wide representation from Pacific countries and territories at this year's Meeting, and to the Governments of Australia and Western Samoa, the United Nations Development Programme and FAO for sending observers to the Meeting.

I would also like to extend a welcome to our two consultants, Mr Richard Shomura, Director of the Honolulu Laboratory of the National Marine Fisheries Service, and Mr Uday Raj, School of Natural Resources, University of the South Pacific, Suva.

At the Thirteenth South Pacific Conference, a sum of over \$A 200,000 was provided in 1974 for the Commission's fisheries development programme, including \$A 178,000 from the voluntary contributions provided by participating governments. This was a substantial increase in amounts previously provided for the Commission's fisheries programme, and reflected the need felt by Pacific countries and territories for an effective fisheries development programme.

Of the total programme approximately half was allocated for the Outer Reef Artisanal Fishing Project (ORAFP). A full complement of staff has been recruited for this project and a start has been made with the first investigation to be undertaken at Lamap, Malekula, New Hebrides, notwithstanding some frustrating delays in the construction of dories, and the supply of necessary equipment.

For the Inshore Fisheries Project, which will be concentrating mainly on turtle culture and lobster storage and transport, there have also been delays in the recruitment of staff but these difficulties have now been largely overcome.

Two proposals have been put forward for new projects, one for extension of the ORAFP to enable the programme of the project to be completed more quickly, and one for the setting up of a Skipjack Tuna Tagging Programme.

You will be asked to consider progress on the two projects currently under way, and to express your views on the two new proposals, and to bring forward any further suggestions for projects which you feel would be worthwhile undertaking.

It is not yet clear how much money will be provided for the Commission's 1975 Work Programme, and it may even be necessary to consider pruning some project activities, even though the projects were in most cases designed to continue over a period of at least three years. Alternatives are however available, for example to seek funds from outside sources. For this reason you should not be deterred from recommending new activities solely on the ground that funds are unlikely to be available to permit their execution.

For example, the Rockefeller Foundation has within the past few months advised the Commission of its intention to establish an International Center for Living Aquatic Resources Management (ICLARM), to foster development of fisheries and aquaculture in the Pacific region. While the details of the operation of this Center have not yet been finalized, it does seem reasonable to suppose that the Commission's programme of fisheries development is such that substantial support could be expected from the Center in carrying it into effect.

With this and other similar possibilities in mind, you are requested to give careful consideration to the proposal, originated by the Expert Committee on Tropical Skipjack Tuna which met in February, for a Skipjack Tuna Tagging Programme.

While the work programme proposed by the Secretariat for 1975 has been examined by the Planning Committee, and is being submitted to the Fourteenth South Pacific Conference in identical form, your ideas and suggestions for future additions to, or changes in, the work programme will be welcome.

I wish you a successful and enjoyable Meeting.

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