

Work Plan Implementation  
(General Report)

IPTP/91/GEN/19

REPORT OF THE FOURTH SOUTHEAST ASIAN TUNA CONFERENCE

Bangkok, Thailand  
27 - 30 November, 1990

Mailing Address : P.O. Box 2004, Colombo, Sri Lanka  
Street Address : 1st Floor, NARA Bldg., Crow Island, Colombo 15.  
Telephone : 522369/70  
Telex : 21989 IPTP CE / 22203 FAOR CE  
Fax : 941 522371

INDO-PACIFIC TUNA DEVELOPMENT AND MANAGEMENT PROGRAMME (IPTP)  
Colombo, Sri Lanka

## REPORT OF THE FOURTH SOUTHEAST ASIAN TUNA CONFERENCE

### 1. OPENING OF MEETING

#### 1.1 Welcoming Address

Mr. T. Sakurai, Programme Leader of IPTP, welcomed participants and observers to the Fourth Southeast Asian Tuna Conference. He extended appreciation and thanks to the Department of Fisheries, Ministry of Agriculture and Cooperatives, Government of Thailand for hosting this year's tuna conference.

Mr. Sakurai provided a brief background of the conference and noted that it was an informal meeting to provide a venue to exchange knowledge and experience in tuna activities. Tuna has become an important resource for the region, and in 1989 the four countries directly involved with the IPTP programme (Indonesia, Malaysia, Philippines and Thailand) landed approximately 863,000 metric tons of tuna; this total was larger than the entire catch from the Indian Ocean in 1989.

Mr. Sakurai stressed the need for cooperation among scientists from countries harvesting and processing tunas, since recent tagging studies have shown close linkages of fisheries in the region, e.g. skipjack and yellowfin movement from Papua New Guinea, Palau and Federated States of Micronesia to Indonesia and skipjack movement from Indonesia to the Philippines. In this connection, Mr. Sakurai noted that this year's conference will focus on tuna tagging.

Finally, Mr. Sakurai commented that the Japan Trust Fund project which supports the present activities of IPTP in sampling and tagging programmes, and biological studies is scheduled to be terminated at the end of this year. He noted that the conference may wish to comment on this matter.

#### 1.2 Opening Address

On behalf of the Department of Fisheries, Ms. Bung-Orn Saisithi, Deputy Director-General opened the conference by welcoming scientists, industry members and staff of IPTP. Ms. Bung-Orn briefly described the growth of the tuna industry in Thailand and noted that Thailand has led the world in canning tuna since 1984. As a major canning nation with limited domestic tuna catches, Thailand is dependent upon supplies from other tuna fishing nations.

The full text of Ms. Bung-Orn's opening address is given in Appendix 1.

#### 1.3 Election of Chairman

Mr. Sakurai proposed to the conference participants that Dr. Veravat Hongskul, Assistant Director-General, Department of Fisheries, be elected Chairman of the Fourth Southeast Asian Tuna Conference. The proposal was unanimously endorsed by conference participants and Dr. Hongskul accepted the chair. Mr. Richard Shomura was appointed rapporteur of the conference.

Participants were asked to introduce themselves and to note their affiliations. The list of participants is given in Appendix 2.

#### 1.4 Adoption of Agenda

The agenda was adopted after minor modifications were made in the order of items to be covered by the conference. The agenda is given in Appendix 3.

## 2. SUMMARY OF STATUS REPORTS

### 2.1 Indonesia

The total marine fish catch in Indonesia in 1989 was 2,166,000 tonnes, of which 309,700 tonnes or 14.3% were tuna and tuna like fishes. Export of fishery commodities amounted to 228,658 tonnes and was worth US\$ 883.0 millions of which 56,667 tonnes or US\$ 102.7 millions were tuna and tuna like species. Tuna catch has increased approximately 10.37% in volume, while its export has increased 53.17% in volume and 118.3% in value annually during the period of 1979-1989.

There are two different tuna fishing grounds in Indonesia: (1) The eastern part of the Indonesian waters bordering the West Pacific Ocean and (2) The western part bordering the east Indian Ocean. In the western part, the fisheries are mostly small scale in nature, while in the eastern part of Indonesia the tuna fishery is more industrialized and run by enterprises (State enterprises and private enterprises). About 86% of Indonesia's tuna and tuna like species come from this eastern area.

There are more than 18 species of tuna, skipjack and tuna like fishes caught in Indonesian waters. Skipjack (Katsuwonus pelamis) is the dominant species caught followed by yellowfin tuna (Thunnus albacares), bigeye tuna (T. obesus) and albacore (T. alalunga). Those species are exploited by two groups of fisheries, i.e. (1) small scale fisheries using pole-and-line, hand line, Danish seine, mini purse seine, troll line, and gillnet; and (2) industrial or large scale fishery using pole-and-line, long line and purse seine.

Pole and line is the main fishing gear used by two types of fisheries and is only developing in the eastern part of Indonesian waters with skipjack as the main target species (70-80% of the total tuna catch). The catch of tuna, skipjack and tuna-like species in the western part of Indonesia tended to increase from 1979 to 1983, decreased in 1984 and increased again from 1985 to 1987 and decreased a lot in 1988. In the eastern part, the tuna, skipjack and tuna-like species catch increased steadily from 1979 to 1985, remained stable in 1986 and 1987 then increased in 1988. The total catch also increased from 127,315 tonnes in 1979 to 309,700 tonnes in 1988. Landings of frozen and fresh tuna caught by long liners have increased from 1987 to 1989 in line with the increase in the number of long liners. The average hook rate was 1.34. The catch rate of pole and line vessels (30GT) based in

Sorong, Ambon and Bitung ranged from 730-950 kg/boat/day, while the catch rate of 15 GT pole and line vessels based in Maumere ranged from 550-1100 kg/boat/day for the period 1982 - 1989. The catch rate of large pole and liners (300 GT) based in Biak was 800 tonnes-/boat/year, compared to the catch rate of large purse seine of 4,000 tonnes/boat/year.

The trend in exports of tuna and skipjack shows that the volume increased from 9,800 tonnes in 1979 to 20,300 tonnes in 1983, decreased to 14,700 tonnes in 1984 and increased again from 17,900 tonnes in 1985 to 56,700 tonnes in 1989. Despite the steadily increasing volume of exports (except in 1984), the value only increased from US\$ 8 million in 1979 to US\$ 19.9 million in 1982, declined from US\$ 14.8 million in 1983 to US\$ 18.1 million in 1986 and increased from US\$ 23.5 million in 1987 to 102.7 million in 1989.

Current research activities on tuna, skipjack and tuna-like species carried out by the Research Institute for Marine Fisheries, Jakarta are as follows: 1) Collection of data and information through sampling activities; 2) Tagging programmes; 3) Fisheries oceanography research to support tuna fisheries and 4) Socio-economic research consists of socio-culture of fishermen and economic aspects of tuna fisheries including fish marketing.

## 2.2 Malaysia

With the expansion of Malaysian waters, there is a strong encouragement from government to promote deep-sea fishing of which tuna fishing has become one of the primary concern of the government. Even though there are significant amounts of tuna around the coast of Malaysia, they are still under-exploited by local fishermen. This is evidenced by the fact that tuna landings only contributed about 5% from total marine landings.

There was a tremendous increase in the catch of tuna from 1970 to 1989 which accounted to a maximum catch of 30,000 tonnes in 1987. From 1987 onwards, there was a sharp decrease in 1989, and only about 22,207 tonnes of tuna were landed. Most of the catch came from the East Coast of Peninsular Malaysia, followed by West Coast, Sabah and Sarawak. The type of gears used varies from one geographical area to another. A majority of tuna catch landed at the East Coast came from hook and line whereas that on the West Coast, came from fish purse seiners. As for Sarawak, most of tuna landings came from drift/gill-netters. As regard to species composition, three major small tuna species found off the east coast of Peninsular Malaysia are longtail tuna, kawakawa and frigate tuna. In the West Coast, the same neritic type of tuna species are being caught in the Indian Ocean. The Taiwanese longliners have unloaded a lot of yellowfin tuna at Penang Port. These tunas are caught in the Indian Ocean. The landings in Sabah are dominated by the oceanic species such as bigeye, yellowfin tuna, albacore and skipjack. These were found quite near the coast because of the deep water that runs close to the coast in North and West Sabah. Other neritic types of tuna such as kawakawa, longtail tuna and frigate tuna were landed in Sabah.



The species landed in Sarawak vary along the coast, becoming more oceanic in further east along the coast.

A majority of the neritic types of tuna such as kawakawa and longtail tuna are consumed locally. Although most of the oceanic species are sent to canning factories in Peninsular Malaysia, some are exported as fresh, chilled or frozen. The export quantity of fresh or frozen tuna has decreased since 1970 due to an increased demand of these tunas by the local canning industry. The import of these tunas has also decreased due to the increase in the domestic tuna landings which can meet the need of local consumptions. Since much of the domestic catch is consumed locally, there is however a large shortfall in the supply of tuna to canneries. In 1988, about 72% of the import of fresh tuna came from Taiwan, 21% from India and 2% from Thailand. With regard to the export of canned tuna, in 1988 a majority of these products were exported to Canada (46%), USA (27%) and Australia (10%).

Current research activities that are being conducted for the development of tuna fishery in Malaysia are biological research, a tagging programme - both were initiated by IPTP and preliminary study on the use of payaos as FAD. Many problems have been encountered in running these activities, especially with the collections of biological data together with catch and effort data. Other problems are difficulties in the identification of fishing ground and identification of tuna by species and gear groups; these difficulties limit the ability to properly assess the tuna resources.

Some suggestions for tuna research are the use of special device to measure tuna rapidly in order to increase coverage of samples, increase the extent of sampling areas, improve the statistical collection of tuna catch data, and monitor foreign vessels that land tuna at several commercial and fishing ports in Malaysia.

### 2.3 Philippines

The tuna fishery is one of the most important marine fishery resources of the Philippines which contributed 18 percent to the total fish production and 39% to total fishery exports in 1989.

This fishery is supported by six species, namely: yellowfin (Thunnus albacares), skipjack (Katsuwonus pelamis), bigeye (Thunnus obesus) frigate tuna (Auxis thazard), bullet tuna (A. rochei) and eastern little tuna (Euthynus affinis).

The tunas are exploited by both municipal fishing vessels (less than 3 gross tons) and by the commercial vessels (over 3 gross tons), licensed to operate by the Bureau of Fisheries and Aquatic Resources. The most important commercial fishing gears are purse seines and ringnets which are operated in conjunction with fish aggregating devices (FADs) locally known as "payao".

From 1978 to 1989 the total tuna landings from both the commercial and municipal sectors indicated annual fluctuations in the abundance of the four species groups.

Exports of frozen/chilled tuna increased from 5,735 metric tons in 1976 to 47,200 mt in 1989. However, it decreased by 24% in 1981 to 50% in 1982 and continuously declined until 1989. On the other hand, exports of canned tuna continuously increased from 71 mt in 1980 to 47,499 mt in 1989.

Frozen/chilled tuna are exported to the United States of America (including Hawaii), Italy, Japan, Singapore, and Thailand. The major markets for canned tuna are Germany, United States of America, United Kingdom, Canada, Netherland, Switzerland and Japan.

The trends in the catch per unit effort for purse-seine caught yellowfin indicated annual variations from 100 kg/day to 408 kg/day in Gen. Santos City and from 2,991 kg/day to 16,456 kg/day for Navotas. For the handliner at Labuan, about 300 kg/day in 1987; around 30 kg/day in 1983 for Sta Cruz; a little over 200 kg/day for Initao.

For skipjack, the cpue for purse seine in Recodo was 97,270 kg/day in 1985 and a low value of less than 10,000 kg/day in 1986. At Navotas, highest cpue was observed in 1984 while those at Gen. Santos City were highest in 1981 at about 1,400 kg/day. The cpue for ringnet at Labuan in 1986 was about 2,000 kg/day and lowest in 1982. In General Santos City cpue was about 600 kg/day in 1983, decreased abruptly in 1986 and remained steadily increasing until 1988. Handliners at Labuan, had the highest cpue in 1987 at about 200 kg/day.

The cpue for frigate tuna caught by purse seine at Gen. Santos City increased rapidly from 1981 to 1982 but dropped gradually until 1987. The cpue for the Navotas purse seine landings increased from 1983 to 1986 and subsequently decreased until 1988. For the ringnetters, the cpue indicated annual variability in all sampling sites. The annual changes in cpue for bullet tuna for ringnets in all sampling sites were very variable. For the purse seine at Recodo and Navotas, the cpue was highest in 1985 at values over 6,000 kg/year.

The cpue for the ringnet-caught eastern little tuna increased steadily from 1982 until 1986 and at Labuan dropped abruptly in 1987. For the purse seine there was abrupt increase from 100 kg/day in 1982 to over 1,000 kg/day in 1983.

The data obtained from the sampling program in 1989 generated the following information: At Navotas, the total landed catch amounted to 5,527 mt, 41% of which was tuna with skipjack as the dominant species throughout the year.

The ringnet landings at Gen. Santos City amounted to 836 mt of tuna composed of 211 mt yellowfin, 467 mt skipjack, 60 mt

frigate tuna, 15 mt eastern little tuna, 75 mt bullet and 8.5 mt bigeye. The handline landings were mostly yellowfin.

The purse seine landings at Recodo were 99% tuna composed mostly of skipjack. Ringnetters at Labuan landed 86,000 mt of skipjack, 4 mt bullet tuna and 1.5 mt eastern little tuna. Those at Opol landed 62 mt tons of tuna composed mostly of bullet tuna.

The sizes of yellowfin ranged from 18 cm to 68 cm for the ringnet catches and from 100 cm to 175 cm for the handline catches at General Santos City. The size range for skipjack were from 20 cm to 80 cm for the handline; 16 to 40 cm for the ringnet at Opol. The purse seine catch landed at Navotas was from 24 cm to 72 cm with a majority in the 40 to 50 cm groups.

For the research plans in the 1990's it is envisioned to continue and expand the current tuna stock assessment as well as the tagging projects. Oceanographic/environmental studies related to tuna distribution, egg and larval studies, electrophoresis, biological investigations and socio-economic studies are included in the National Tuna Fisheries Research and Development Plan.

## 2.4 Thailand

Total catches of tuna from both sides of the Thailand Peninsular increased from 102,619 MT in 1988 to 146,3375 MT in 1988, the catch was mostly by purse seine gear. About 90% came from the Gulf of Thailand which included the South China Sea and the rest came from the Andaman Sea. Longtail tuna (Thunnus tonnggol), kawakawa (Euthynnus affinis) and frigate tuna (Auxis thazard) contributed about 59%, 29% and 12%, respectively. The mean size of fish changed from 1988 unmarkedly, while CPUE trend (kg/day) expressed increasing tendency.

The total production was insufficient to support the tuna canneries in Thailand, thus about 75% of tuna must be imported from other countries in the Western Pacific and the Indian Ocean with increasing quantities from 1988. These are skipjack, yellowfin and bigeye tuna, totalling 274,910 mt in 1988.

## 2.5 Other Reports

### 2.5.1 Maldives

Mr. Ahamed Hafiz reported that the tuna industry continues to be a major element in the economy of the Maldives. Tunas make up about 95% of the fish landings of the country, employs considerable percentage of the labour force. In 1989 the tuna catch was 67,803 mt.

In 1990 a tuna tagging experiment was conducted to define the movements and migratory pathways of skipjack and yellowfin tuna in the Maldives archipelago.

### 2.5.2 U.S.A.

Highlights of recent tuna activities in the U.S.A. were provided by Dr. George Boehlert (U.S. National Marine Fisheries Service). These highlights included (a) the inclusion of tunas in the Magnuson Fishery Conservation and Management Act, (b) "initiation of 'dolphin-free' terminology in U.S. legislation and on certain canned tuna sold in the U.S., (c) commencing research activities relating to the drift gill net issue in the North Pacific, and (d) a report of a rapid expansion of the longline fishery in the Hawaiian Islands.

### 2.5.3 Association Thoniere (IOC)

The Indian Ocean Commission is made up of Madagascar, Seychelles, La Reunion (France), Mauritius and the Comoros. Dr. P. Cayre reported on the last 3 years activities undertaken by the Association Thoniere for the execution of the Regional Tuna Project of IOC. A new three year tuna project including tagging activities is scheduled to commence shortly.

The participants wished to point out the beneficial impact of all regional cooperation, specially in the field of research on tunas, recognized the relevance of projects such as the Regional Tuna Project of the Association Thoniere (Indian Ocean Commission) and supported its continuation.

### 2.5.4 SEAFDEC

Dr. Hiroyuki Yanagawa reported that SEAFDEC recognises the importance of tuna research but is currently not involved with any tuna activities except data analysis for small tuna fishery in the Gulf of Thailand.

### 2.5.5 Canada

Ms. Lynne Yamanaka reported that due to the movement of warm oceanic waters into the eastern North Pacific, Canada has enjoyed two years of good albacore fishing.

### 2.5.6 South Pacific Commission

The SPC has a membership of 26 island nations in the Pacific with a population of about 7 million people. Dr. A. Lewis reported that recent research activities included (a) a regional tuna tagging project focused on yellowfin tuna, and (b) several in-country tuna tagging projects. Included in the latter is a recently completed skipjack tagging experiment in the Solomon Islands; future activities will include tuna tagging in Kiribati and Fiji. Other recent activities reported included SPC acting as the Secretariat for the South Pacific Albacore Research (SPAR) group, initiating an albacore research programme, and continuing statistical data collection, analysis and dissemination on a regional basis.

### 2.5.7 FAO

Dr. Jacek Majkowski informed participants that the Consultation on Tuna Interaction which was originally scheduled to be held in early 1991 has been postponed to December 1991; postponement was due to a delay in securing funding. The meeting will be held in Noumea and will be hosted by the SPC.

## 3. EXPERIENCE AND RESEARCH PAPERS

The several experience and research papers submitted to the conference were categorized into (a) statistics, (b) fisheries, (c) biological studies, (d) assessment, and (e) socio-economic.

### 3.1 Statistics

Three papers covering statistics were presented to the conference (SEAC/90/8, SEAC/90/9, and SEAC/90/14). It was noted that although the tuna catch for the Indian Ocean showed a decrease in landings for the first time in history (a decrease from 756.2 thousand tonnes in 1988 to 702.1 thousand tonnes in 1989), the tuna catch of the region of IPTP interest continued to increase, the increase was due to the substantial tuna catches in the Southeast Asian region.

Although there has been a marked improvement in the collection of tuna statistics from the region, several shortcomings were still noted. These include the combining of tuna species in country statistics provided to IPTP, and the inability to differentiate between "absence" and "not reported" when zero is noted in the catch statistics. Finally, a point was made that improvements in statistics could be achieved by demonstrating the need for good and value of statistics.

In describing several tuna sampling programs in the region (SEAC/90/8 and SEAC/90/14), Mr. Nishida noted that the Japan Trust Fund project is scheduled for termination in 1990; thus, continuation of these sampling programs will have to be assumed by the countries. In discussing future collection of tuna statistics from the region, reference was made to a proposed Indian Ocean Tuna Commission. Establishment of such a Commission would assure collection of tuna statistics from the Indian Ocean. Currently there are no plans for post-IPTP collection of tuna statistics from the Southeast Asian region.

### 3.2 Fisheries

Five fisheries-related papers were presented; two were on fisheries of Indonesia (SEAC/90/10 and SEAC/90/13) one on tunas of Malaysia (SEAC/90/28), one on fisheries in the Gulf of Thailand (SEAC/90/27), and a paper describing the exploratory tuna fishing results of the FRTV "Chulabhorn" (SEAC/90/29).

## TABLE OF CONTENTS

	<u>Page</u>
1. OPENING OF MEETING	1
1.1 Welcoming Address	1
1.2 Opening Address	1
1.3 Election of Chairman	1
1.4 Adoption of Agenda	2
2. SUMMARY OF STATUS REPORTS	2
2.1 Indonesia	2
2.2 Malaysia	3
2.3 Philippines	4
2.4 Thailand	6
2.5 Other Reports	6
2.5.1 Maldives	6
2.5.2 U.S.A.	7
2.5.3 Association Thoniere (IOC)	7
2.5.4 SEAFDEC	7
2.5.5 Canada	7
2.5.6 South Pacific Commission	7
2.5.7 FAO	8
3. EXPERIENCE AND RESEARCH PAPERS	8
3.1 Statistics	8
3.2 Fisheries	8
3.3 Fish Processing	9
3.4 Biological Studies	9
3.5 Stock Assessment	9
3.6 Socio-economic	10
4. TAGGING PROGRAMMES	10
4.1 Overview	10
4.2 Western Pacific	11
4.2.1 South Pacific Commission (SPC)	11
4.2.2 Japan	12
4.2.3 Philippines	12
4.2.4 Philippines	13
4.2.5 Indonesia	13
4.2.6 Malaysia	13
4.3 Indian Ocean	14
4.3.1 Japan	14
4.3.2 IOC Association Thoniere	14
4.3.3 Maldives	15

4.4	Large Scale Tuna Tagging Proposal	15
4.5	General Discussion	16
5.	RECOMMENDATION	17
6.	ADOPTION OF THE REPORT	18
<u>Appendixes</u>		
I	Opening Address	19
II	List of Participants/Observers	21
III	Agenda	27
IV	List of Documents	28



### 3.3 Fish Processing

An experience paper was presented by Mr. Mongkol Saneyatham, Vice President of Unicord Co., on the topic of development of the Thai tuna cannery industry. The industry began in 1975-76 building on the cannery industry for other commodities. At that time there was little in the way of tuna expertise. In 1983-84, as the U.S. tuna canning industry was restructuring, "co-packing" agreements were made with U.S. tuna canning interests. A strategy was developed to establish a low cost tuna canning industry, and markets in the U.S.; markets in Europe were to be developed later. Mr. Saneyatham described tariff agreements. High efficiency operations were promoted, using all components of the fish possible for other products, including shrimp feed for aquaculture and fish oil. Particular interest is presently being paid by the Thai industry to environmental concerns, including ensuring that yellowfin tuna procured is dolphin safe, and going along with the U.N. resolution regarding driftnet-caught fish. The tuna industry in Thailand has a "defensive" program, using law firms and lobbyists as "watch-dogs", particularly in Washington, D.C., and an "offensive" program to work for lower tariffs in the U.S. and elsewhere. The possibility of trade actions under GATT was described. In the following discussion, the future of tuna loin exports was considered and thought to be an increasing component of the tuna industry. There was also discussion of future competition with other Southeast Asian producers of canned tuna, particularly in light of the need to import raw product.

### 3.4 Biological Studies

The two papers describing tuna biological studies included a tuna larval distribution study in the Hawaiian Islands (SEAC/90/16) and an age and growth study of the narrow-barred Spanish mackerel and kawakawa from Oman (Seac/90/15). The Hawaiian Islands tuna study indicated that larvae of yellowfin were more abundant in near-shore waters than offshore waters, and that yellowfin tuna were more abundant in leeward than windward waters.

A comment was made that the progression of modal size groups in the Spanish mackerel report was very clear. This was attributed in part to sampling only during the first 10 days of the month.

### 3.5 Stock Assessment

Although no tuna assessment papers were submitted to the conference, Dr. A. Lewis of SPC provided a brief review of tuna assessment research conducted by SPC and tuna stock assessment in general. Presently SPC has plans to assess the yellowfin resources in the western Pacific by utilizing the tag attrition or "throughput" model developed at SPC. This technique was used in the first tuna tagging experiment to assess the skipjack resource in the western tropical Pacific.

### 3.6 Socio-economic

The assistance provided for small scale artisanal tuna fishermen in Indonesia by the State Enterprise and Private Fishing Companies was described in a paper presented by Dr. N. Naamin (SEAC/90/11). The profitability of small scale fisheries has been increased by the assistance provided by industry, e.g. placement of FADs by the fishery industry in the region fished by the artisanal fishermen.

## 4. TAGGING PROGRAMMES

This session was designed to allow scientists from Southeast Asia and from outside the region to review their experiences with tagging programmes. Topics to be covered include approaches to tagging (vessel type, fishing gear and methods of capture), tagging equipment and methodology (tag types, applicators), results of tagging experiments (stock structure, migration pattern, growth, mortality), publicity and rewards, and data collection and processing. The session was convened on Thursday, 29 November, 1990, by Chairman Mr. Richard S. Shomura. The session included presentation of 9 papers on tagging in the Western Pacific and Indian Ocean; the presentations were kept relatively brief to provide more time for a panel discussion which followed the presentations. The panel consisted of Dr. A. Lewis, Mr. M. Asano, Dr. P. Cayre and Mr. R. Shomura. The Chairman mentioned that having read over all pertinent papers, they will present their views and comments. Also, since tagging has been going on for over 30 years, each should address the shortcomings of programs in general and the best means of developing next generation approaches to tagging.

### 4.1 Overview

The Chairman then presented some comments on tagging in general. He mentioned the purposes for which tagging is carried out, noting in particular issues cited in a paper by Bayliff and Holland (1986). On the use of tagging for growth information, he mentioned that most information gathered on tunas seems questionable and should be carefully examined. A recent paper by Hunter and others stated that more than 600,000 tuna have been tagged in the many tagging programs in the world, and given this level of effort, a periodic revaluation of goals and objectives is in order. He noted that very critical examination of data is important, because some studies have noted conflicting results or alternative explanations and others have noted inter-annual variability requiring longer time scales for tagging programs. He described several past and extant programs, noting that skipjack tuna and yellowfin tuna are the key species in tagging programs, and cited the SPC skipjack tagging program as a major success story among tuna tagging programs. After this overview, he introduced the first speaker.

## 4.2 Western Pacific

### 4.2.1 South Pacific Commission (SPC)

Dr. A. Lewis described the contents of (SEAC/90/26) SPC Tagging Programmes - a progress report to November 1990 on the current programs at the SPC, namely the Regional Tuna Tagging Project (RTTP) and the Solomon Islands In-Country Tagging Project (SIICTP). Because of the relevance of this paper to most others, it is summarized here in some details. His talk concentrated on four aspects, namely project planning, operations on board the vessel, procedures to facilitate tag returns, and the results to date. The importance of project planning is evident in the development of precise statements of the objectives. This allows specifying the area of operations, the techniques, and the target numbers of fish to be tagged (statistically based on simulations to meet the stated objectives). The RTTP is using a pole and line vessel, but there is some experimental work with group seiners and trolling for yellowfin tuna.

Operations on board have been modified to facilitate two objectives, namely to cover the broad areas in the program (some 4 million square miles) and to increase the percentage of yellowfin tunas tagged. The first has been met by increasing the bait keeping abilities so that an operational radius of 500 miles from the baiting grounds is possible, the second by fishing near current lines, logs, and seamounts. He described the sizes of fish tagged and the manner in which data are entered and processed at sea so that reports can be generated shortly after returning from each cruise. A video depicting the pole and line fishing and tagging activities aboard the RTTP's charter vessel Te Tautai was shown later in the day.

The critical importance of cooperation of fishermen and publicity of the program was stressed as a means of facilitating tag returns. Posters advertising the RTTP are in 10 languages. Publicity is also continued on radio and newspapers to reinforce the importance of the program. Stylish shirts and hats are provided as rewards and a lottery held annually has prizes to US \$1000. Contact points in each area are also important to serve as conduits for tag returns. Monthly summaries and annual reports are distributed to serve as feedback to those returning tags.

Description of the results to date followed much of the information in the working paper. In the SIICTP, 8304 fish have been tagged and 39,667 have been tagged in the RTTP. To date, 2540 tag recoveries in both programs have been made. The two leading sources of tag returns are from the Philippines and Japan, with about 1/3 of the canneries and the remainder from vessels. Most movements to date seem to be longitudinal, not north-south. A video was presented later showing a computer generated animation of the movement results. Double tagging and tag seeding experiments are being conducted to better assess tag attritions (slippage and non-reporting); tag slippage is apparently less than 10%. They are projecting an overall tag return rate of 10-15% for the project when completed. Analysis

completion schedules are the end of 1991 for the SIICTP, the end of 1992 for skipjack tuna, and the end of 1993 for yellowfin tuna and bigeye tuna, although the latter may be delayed due to a longer time before tags are returned.

In the discussion of this paper, a comment was made on growth, reflecting variance with the Chairman's earlier statement about the quality of growth results from tagging. Specifically, it was mentioned that growth from tagging should be one of many approaches to be used to verify other techniques and to seek the best approach to measure growth. Also, the assumption of full mixing of tagged fish was brought up; apparently this was tested for southern bluefin tuna and found to be less than fully supported. Also pertinent to this is a point made in a later discussion that programs should pay attention to the number of schools tagged, not just the numbers of fish. Because the mixing question can have profound influences on the results of a tagging program, it was recommended that the SPC program examine the effects that less than full mixing might have. In response to a question as to whether the approach of the RTTP has been successful on other tropicls, Dr. Lewis mentioned the success of the previous SPC skipjack tagging program and it was suggested that it has been reviewed and found to be a valid approach.

#### 4.2.2 Japan

Mr. T. Nishida described the contents of SEAC/90/12 (Skipjack resources in the western Pacific Ocean looking through the information of tagging experiments), by Mr. Asano. It was noted that the present paper should be considered provisional pending changes to be made due to translation difficulties. A newer version will be provided to IPTP soon. The Japanese skipjack tuna tagging program began in 1967 and continues to the present time. It has tagged overall 95,500 fish, with a return of some 4,500 tags. Most have been from pole and line vessels, as only 5 returns came from fish tagged during purse seine operations. Some changes in tag design have resulted in improvements in the return rates. There is no double tagging in the program. Some results of this long term program were described, showing a varied pattern of movements. It appears that the tropical area is used for spawning and nursery, while the northern areas in waters adjacent to Japan are for feeding during the growing period at 2-3 years.

In the discussion following this paper, it was noted that the program will continue with an annual target of 7500 tags. Funding is provided by the Japan Fishery Agency.

#### 4.2.3 Philippines

Dr. K. Ishida described SEAC/90/20 (Tuna and skipjack tagging in the Celebes Sea of Philippines). It describes certain portions of the tagging program, with the remainder discussed in SEAC/90/25 (see below). The techniques and approaches used were described. Most fish tagged are rather small by comparison with most other studies, and the gear used is ring net and purse

seine. There is very good cooperation from the vessel crews. During the discussion, a question was asked about the recovery rate; 124 fish have been recovered from 5324 tags put out. It was suggested that population parameters could not be described from these results, but it was noted that this is the first effort at tuna tagging in the Philippines and thus it is perhaps preliminary in nature. Concern was expressed about the mortality rates of tagged fish associated with the fishing method.

#### 4.2.4 Philippines

Mr. N. Barut presented the contents of SEAC/90/25 (Skipjack and tuna tagging in the Philippines - Progress Report). It follows upon SEAC/90/20 described above but concentrates on the most recent three cruises, the latest of which concluded on 1 November 1990. He described the spatial distribution of tagging and the fishing method. To date, only 16 tags have been recovered from these recent cruises. In the discussion, concern was expressed about the mortalities encountered in the purse seine and ring net operations. It was mentioned that pole and line vessels are not an option in the Philippines due to a lack of baitfish in nearshore areas. A video showing ringnet and purse seine fish tagging in the Philippine Islands was shown later in the day.

#### 4.2.5 Indonesia

Dr. N. Naamin discussed SEAC/90/21 (Indonesian experiences in tuna tagging programme). Most tagging has been done from three fishing bases in the eastern part of the country, beginning in 1983. Nearly 7888 pole and line-caught tuna have been tagged, mostly skipjack tuna but about 10% yellowfin tuna. Some 45 fish were tagged from a cruise using a payang (Danish seine), but the general poor condition of the catch and probable high mortalities of tagged fish led to a decision to discontinue use of this gear.

A total of 93 tags have been recovered, mostly within 30 days. Dispersion seems to be in nearly all directions. In the discussion, it was noted that there was an apparent discrepancy among the movement patterns for skipjack tuna from Indonesia, SPC, and Japan, but this was likely the result of not all data being presented for consideration. Questions about the low rate of recovery wondered if fish were moving to areas where fish were less available, but the program has not ruled out high tagging mortality as one cause.

#### 4.2.6 Malaysia

Mr. I. Kamaruddin presented SEAC/90/19 (Preliminary report of tuna tagging in Malaysia - 1990). The work was conducted in June-July 1990 and concentrated on longtail tuna and kawakawa. A total of 3803 fish was tagged, with 1595 longtail and 2208 kawakawa. Of a total of 48 recoveries, 47 have been kawakawa. The fishing method was trolling, typically around payaos. Fish were generally quite small. In noting the smallest fish near 14



cm, it was noted that the tag length, at 10 cm, was nearly as long as the fish. Tagging mortality for fish so small is likely quite high. In a discussion of the low return of longtail tuna, it was suggested that the small size was compounded by using barbed hooks, which should be avoided if possible as the survival rates of tagged fish decrease using barbed as opposed to barbless hooks. A video was shown later depicting tagging of small kawakawa and longtail tuna in Malaysia taken by trolling.

### 4.3 Indian Ocean

#### 4.3.1 Japan

Dr. K. Yano described SEAC/90/17 (An interim analysis of the data on tuna tagging collected by R/V Nippon Maru in the Indian Ocean 1980 - 1990). This purse seiner has been conducting tagging activities since 1980, concentrating on skipjack tuna, yellowfin tuna, and bigeye tuna. The skiff crew collects fish by dipnet to conduct tagging. Over 7000 fish have been tagged, with recoveries of only 193; of these, the Nippon Maru itself recovered 166. In discussion of this figure, it was suggested that recovery by other seiners should not be this low based upon experience of other programs in the Indian Ocean, and was recommended that the program be better publicized to increase awareness and possibly tag recovery.

#### 4.3.2 IOC Association Thoniere

Dr. P. Cayre presented SEAC/90/18 (Report and preliminary results of the tagging operation of natural drift logs in the tuna purse seine fishery area of the western Indian Ocean), but first briefly described an earlier tuna tagging program. On 3-5 week tagging cruises attempting to pole and line fish from a purse seiner, only 950 fish were tagged, the low numbers perhaps due to unfamiliarity with pole and line techniques. There were 15 long-range recoveries, however, and 3 were at liberty over 6 months. Several skipjack tuna that were at liberty for 3-5 months showed no growth increment, an odd result. A new tagging program will take place over the next 3 years, but the exact conditions of realization of such a program are still optional (opportunistic tagging from artisanal vessels, take the opportunity to charter a pole and line bait boat during its presence in the area). It was stressed that the Association Thoniere is quite open to any cooperative tagging programme which could be undertaken or triggered by ITP. SEAC/90/18 covers tagging of logs and tracking them over time along with the associated catch by purse seiners when sets are made. This work is the first of its kind and develops some approaches to determine the rate of aggregation of fish around logs as well as measuring ocean current flow. Results suggested that about 15 days is necessary for sufficient aggregation for productive sets on a natural log. In the discussion, it was suggested that the aggregation around logs may vary by season, species, and area. The optimal spacing of logs is unknown, but in a somewhat related study, it was pointed out that sonic tagging experiments undertaken in the south western part of the Indian Ocean by the Association

Thoniere suggest that 10 miles spacing in nearshore areas is about optimal for FADs. It was also pointed out that these experiments and any research dealing with fishing strategy using FADs on any floating log has to be continued and enforced due to the future relevance to stock assessment methodology with a growing use of this fishing strategy.

#### 4.3.3 Maldives

Mr. S. Rochepeau described SEAC/90/22 (Maldivian tuna tagging programme). The objectives were to tag fish near the area of the Maldives to study movements, to assess interaction of artisanal and industrial fisheries, to determine population parameters, and to train local scientists in tagging techniques.

A total of 88 daily trips was made. Nearly 10,000 tunas were tagged, with up to 386 from a single day on a vessel being tagged. Recovery rates were reasonably good, with some recoveries as far away as Sri Lanka and India. They are now awaiting returns of tags only recently put out. In the following discussion, questions were raised about tag shedding and the lack of any double tagging in the study. It was suggested that if the skipjack tuna follow the ocean current patterns that some of the more recent tags may end up in the industrial fisheries to the west. A video was later shown depicting pole and line and handline tagging activities in the Maldives.

#### 4.4 Large Scale Tuna Tagging Proposal

Mr. M. Yesaki discussed SEAC/90/23 (A proposal for a large-scale tuna tagging programme in the Indian Ocean). This proposal arose after the recent Expert Consultation in Bangkok, which recommended developing a larger scale tagging program proposal for submission to donor agencies. The proposal was described and the participants were requested to provide input and comments. Many suggestions and discussions ensued. Given the rather high cost of such a proposal, it was pointed out that a donor agency will want to know the chances of success and the costs. The former will require much greater detail than is in the present proposal. The objectives and methodology, outlined rather briefly in the present proposal, will also need to be spelled out in detail in order to determine cost. The same will be necessary for including the experimental design. Greater flexibility was also suggested to be retained in the proposal, for example not excluding other forms of sampling (artisanal fishing vessels, purse seines) and also keeping flexible on the area to be sampled. Restricting the sampling to pole and line methods could create problems with bait availability and the range that could be covered. Although the low recovery rate from purse seines was mentioned, others stated that the proposal should use purse seines and even consider developing new methods for tagging using purse seining. Further discussion seemed to conclude that the success would be poor for skipjack but past experience is promising for yellowfin, including the work of the IATTC and recent work of the SPC using group seiners and achieving returns of about 12%. The time available for tagging



on single seiners, however, makes them cost-ineffective. Finally, it was recommended that the SPC's RTTP could be used as a model for the Indian Ocean proposal, including conducting simulations of likely outcomes to determine the sample sizes needed, etc.

#### 4.5 General Discussion

Chairman Mr. R. Shomura brought the panel discussion into focus by requesting panelists to consider what new research is needed given the present tagging results in the Western Pacific and Indian Ocean. In response, Dr. A. Lewis described a hypothesis for the Western Pacific dealing with the "core" populations of fish between 10 N and 10 S which typically migrate in an east-west orientation. Biomass seems to decrease as one goes east. The yellowfin tuna and skipjack tuna surface schools north of 15 N and south of 15 S may in fact be "overflow" populations. It is conceivable that these overflow populations could sustain very high levels of fishing mortality without affecting the core populations markedly. More research will be needed to address this question, as well as big picture look at the stocks of skipjack tuna and yellowfin tuna. This was seconded in a comment from Mr. Asano, who recommended careful examination of all existing data and cooperation on future tagging programs to insure the greatest efficiency and cost effectiveness.

Dr. P. Cayre described the need for better understanding the relationship of tunas to their environment. It is unclear how environmental features affect migration patterns, for example, and what triggers migratory behavior. One must carefully define the scope of surveys and tagging projects. In this regard, the SPC's RTTP was discussed in light of the strategy of fielding a very large project as opposed to a mosaic of smaller ones. Dr. A. Lewis answered by stating that one must consider the cost-benefit ratio, and used the RTTP and in-country programs as illustrations.

The Western Pacific tuna fishery in the SPC area is worth an immense sum of money, and thus the added cost of the extensive tagging program in the RTTP is justified. For smaller fisheries, however, it is probable that smaller tagging programs may be more beneficial.

Chairman Mr. R. Shomura requested panelists to respond to a second question, namely "given that there has been several decades of tuna tagging in most oceans, what are your thoughts on the shortcomings of what has been done to date?". Dr. A. Lewis responded that many studies restrict objectives to stock structure and movement patterns. Such studies are open to the criticism that tag returns simply reflect the distribution of fishing effort.

That is, if fish move to an area but are not fished because they are not available to gears or for some other reason, tags will not be returned and the movement to that area will not be registered. Also, there is the shortcoming that having a

starting and ending point only does not give information on the path. While sonic tagging has provided important results, it is typically on a rather small spatial and temporal scale. The archival tag is promising but at present the cost is prohibitive. Dr. P. Cayre added that sonic tagging has mostly been conducted around the coasts or islands and that it needs to be extended to the open ocean.

Mr. R. Shomura noted that many studies have not exhaustively analyzed their data. Too often, only interesting items, such as long-distance movements, are extracted from the data record. He recommended that tagging data be re-examined carefully and all important information derived. He also suggested that means of tagging more large fish needs to be found, and that studies on how behavior changes after tagging should be done as well. A general discussion ensued with considerable participation from the audience.

The Chair closed the meeting by thanking all participants and in particular the panelists for their time and assistance in providing their perspectives on current and future tagging programs.

## 5. RECOMMENDATION

A variety of recommendations were made during the meeting. Some of them were summarized by the Chairmen (V. Hongskul and R. Shomura) at the end of their respective sessions; others were developed in the course of the conference. The following general recommendations were put forth:

1. There is a need to improve the collection of tuna statistics in the region; progress can be accelerated by demonstrating to governments that these statistics are needed;
2. National statistics should be improved through support by national and international agencies;
3. A workshop on statistics in the Southeast Asian region should be convened to address critical issues identified in this workshop;
4. Additional research on spawning, early life history and recruitment should be conducted in the region;
5. Convene a workshop to review tuna stock assessment techniques in light of the frequent inability to apply conventional methodologies to tuna stock assessment;
6. Tagging data from past studies should be comprehensively re-examined to derive all possible information on tuna resources;
7. Improved tagging methodology for increasing the numbers of releases of large tunas;

8. Conduct research to improve capabilities to successfully tag tunas taken by purse seiners;
9. That the functions provided for the past 10 years by the IPTP are crucial and means to assure their continuation should be actively sought.

A special recommendation was made in regards to the termination of the Japan Trust Fund project at the end of 1990, which supported sampling and tagging programmes and biological studies during the past 10 years. In addition to the need for future assistance to the countries of the region in the above mentioned activities, the participants recognized also a need for provision of technical assistance in analyses of the resulting data including stock assessment. The Conference recommended that FAO ensure funding for the assistance mentioned above and that this assistance will continue to be provided by IPTP in the future years.

#### **6. ADOPTION OF THE REPORT**

The report of the Fourth Southeast Asian Tuna Conference was adopted on 30 November 1990.

## Appendix : 1

Statement by Mrs. Bung-orn Saisithi, Deputy Director-General  
Department of Fisheries, Ministry of Agriculture and Cooperatives

Mr. Sakurai, Programme Leader of ITPP  
Participants and Observers,  
Ladies and Gentlemen,

It is a great pleasure for me to have you in Thailand again, after 4 years since the first meeting of tuna research groups in the Southeast Asian region was held at Phuket in 1986. I am very glad that we are able to hold at this time the Fourth Southeast Asian Tuna Conference here in Bangkok. I would like to take this opportunity to express my most cordial welcome to all of you, distinguished tuna scientists, representatives of tuna fishing companies as well as ITPP officials to participate in this conference.

The Development of tuna fishery in Thailand has been accelerating by the increasing demand of the tuna canning industry in the last decade. Total catches increased steadily from 49,307 tons in 1982 to 102,000 tons in 1988. The catches are mainly composed of longtail tuna, little tuna and frigate tuna. Small amount of skipjack tuna was also caught by tuna purse seine and light luring purse seine in the Andaman Sea.

The rapid development of the tuna canning industry has promoted Thailand as the largest canned tuna producer in the world, and the world's leading exporter of canned tuna since 1984. The expansion of the market for canned fish in recent years however has resulted in increased import of fresh frozen tuna to the present level of more than 400,000 tons from Philippine, Indonesia, Australia and Maldives valued at about 622 millions U.S. dollars in 1989.

Tuna fishery also plays an important role in the Southeast Asian region. Since the development and the rapid growth of the tuna industry started in last decade, supplies of raw frozen tuna for the canneries have become critical because of the stabilized domestic tuna catches. Therefore, particular attention has to be concentrated on biological investigations and other relevant informations upon which to base an assesment on the state of exploitation of tuna stocks in the region in order to ensure the wise-use of tuna resources in Southeast Asia.

Ladies and gentlemen, your deliberations here over the next few days will certainly guide the Fourth Southeast Asian Tuna Conference to its objectives. I also hope that the conference will bring to light many significant research findings.

I express my sincere wish that this conference will be fruitful and I hope that your stay in Bangkok be a pleasant one. At this auspicious moment, I declare this Fourth Southeast Asian Tuna Conference officially opened.

Thank you

LIST OF PARTICIPANTS/OBSERVERS**MALAYSIA**

- 1) Ms. Mahyam Mohammad Isa  
Fisheries Research Officer  
Fisheries Research Institute  
11700 Glugor, Penang
- 2) Mr. Kamaruddin Ibrahim  
Fisheries Research Officer  
No. 5 Tingkat 1  
Wisma Armon  
Jalal Kamarudin  
20400 K. Terengganu

**PHILIPPINES**

- 3) Mr. Noel C. Barut  
Scientist  
Bureau of Fisheries & Aquatic Resources  
Ministry of Agriculture & Food  
860 Quezon Avenue  
Quezon City  
Metro Manila
- 4) Ms. Flerida M. Arce  
Supervising Aquatic Resources Development Specialist  
Fisheries Resources Research Division  
Bureau of Fisheries & Aquatic Resources  
Ministry of Agriculture & Food  
860 Quezon Avenue, Quezon City, Metro Manila

**OBSERVER**

- 5) Dr. Stanley N. Swerdloff  
Tuna Consultant  
Philippines Fisheries Sector Project  
Arcadia Building  
860 Quezon Ave, Quezon City, Metro Manila

**INDONESIA**

- 6) Dr. Nurzali Naamin  
Director  
Research Institute for Marine Fisheries  
Jl Krapu 12  
Sunda Kelapa, Jakarta 14430
- 7) Mr. Sofri Bahar  
Tuna Biologist & Fishing Master  
Jl Krapu 12  
Sunda Kelapa, Jakarta 14430

## THAILAND

- 8) Dr. Veravat Hongskul  
Assistant Director-General  
Department of Fisheries  
Ministry of Agriculture & Cooperatives  
Rajadamnern Avenue  
Bangkok
- 9) Ms. Sunee Suvapepun  
Director  
Bangkok Marine Fisheries Development Center  
89/1 Charoen Krung 58 (Soi Sapan Pla)  
Yannawa District  
Bangkok 10120
- 10) Mr. Komoet Charoenpanich  
Director  
Oceanic Fisheries Division  
Srisamuth Road  
Samuth Prakarn 10270
- 11) Mr. Mongkol Saraneeyatham  
Vice President  
UNICORD Co., Ltd  
606-608 Luang Road  
Phomprab  
Bangkok 10100
- 12) Ms. Amara Cheunpan  
Marine Fishery Biologist  
Bangkok Marine Fisheries Development Center  
89/1 Charoen Krung 58 (Soi Sapan Pla)  
Yannawa District  
Bangkok 10120

OBSERVERS

- 13) Mr. Dhummasak Poreeyanonda  
Senior Marine Fishery Biologist  
Oceanic Fisheries Division  
Srisamuth Road  
Samuth Prakarn 10270  
Bangkok
- 14) Mr. Yongyuth Sintupinyo  
Senior Marine Fishery Biologist  
Oceanic Fisheries Division  
Srisamuth Road  
Samuth Prakarn 10270  
Bangkok



- 15) Mr. Niyom Lohakarn  
Senior Marine Fishery Biologist  
Oceanic Fisheries Division  
Srisamuth Road  
Samuth Prakarn 10270  
Bangkok
- 16) Mr. Pirochana Saikliang  
Marine Fishery Biologist  
Bangkok Marine Fisheries Development Center  
89/1 Charoen Krung 58 (Soi Sapan Pla)  
Yannawa District  
Bangkok 10120
- 17) Mr. Veera Boonragsa  
Marine Fishery Biologist  
Andaman Sea Fisheries Development Center  
Phuket  
Thailand
- 18) Mr. Montri Klitsaneephaiboon  
Senior Food Technologist  
Fishery Technological Development Division  
Ministry of Agriculture & Cooperatives  
Rajadamnern Avenue  
Bangkok
- 19) Ms. Sirilak Suwanrangsri  
Food Technologist  
Fishery Technological Development Division  
Ministry of Agriculture & Cooperatives  
Rajadamnern Avenue  
Bangkok
- 20) Ms. Sunan Chantavichaikit  
Fish Procurement  
Thai Union Co Ltd  
Tuna Group  
Bangkok
- 21) Mr. Saramit Uraiwan  
Marine Fisheries Biologist  
Southern Marine Fisheries Development Centre  
Songkla Province
- 22) Mr. Nimit Anamnart  
Procurement  
UNICORD Co, Ltd  
606-608 Luang Road  
Phomprab  
Bangkok

**MALDIVES**

- 23) Mr. Ali Waheed  
Project Officer  
Marine Research Section  
Ministry of Fisheries and Agriculture  
Male
- 24) Mr. Ahamed Hafiz  
Fisheries Research Officer  
Ministry of Fisheries and Agriculture  
Male

**JAPAN**

- 25) Mr. Masahiro Asano  
Senior Scientist  
Tohoku National Fisheries Research Institute (TNFRI)  
3-27-5, Shinhama  
Shiigama, Miyagi 985
- 26) Dr. Kazunari Yano  
Research Officer  
Japan Marine Fishery Resource Research Center  
3-27 Kioi-cho  
Chiyoda-ku, 102 Tokyo

**USA**

- 27) Mr. Richard S. Shomura  
Researcher, HIMB/SOEST  
University of Hawaii at Manoa  
Hawaii Institute of Marine Biology  
P O Box 1346  
Coconut Island  
Kaneohe  
Hawaii 96744-1346
- 28) Dr. George W. Boehlert  
Director,  
U S Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southwest Fisheries Service  
Honolulu Laboratory  
2570 Dole St  
Honolulu, Hawaii 96822-2396

## CANADA

OBSERVER

- 29) Ms. Kae Lynne Yamanaka  
Commercial Liaison & Support Technician  
Department of Fisheries and Oceans  
Offshore Division  
555 West Hastings Street  
Vancouver, B C  
Canada V4K 1W6

## SPC

- 30) Dr. Antony D. Lewis  
Chief Fisheries Scientist  
South Pacific Commission  
P O Box D5  
Noumea Cedex  
NEW CALEDONIA

## IOC

- 31) Dr. Patrice Cayre  
Representant of the Association Thoniere  
(Indian Ocean Commission)  
ORSTOM  
Albion Fisheries Research Centre  
Albion Petite Riviere  
Mauritius

## SEAFDEC

- 32) Dr. Hiroyuki Yanagawa  
Researcher  
Southeast Asian Fisheries Development Centre (SEAFDEC)  
956 Olympia Building  
4th Floor, Rama iv Road  
Bangkok 10500

## JICA

OBSERVERS

- 33) Mr. Shunji Fujiwara  
JICA Expert  
C/o Eastern Marine Fisheries Development Center (EMDEC)  
Ban Phe, Muang District  
Rayong 21160  
Thailand

- 34) Mr. Minour Sasaki  
JICA Expert  
C/o Eastern Marine Fisheries Development Center  
Ban Phe, Muang District  
Rayong 21160  
Thailand
- 35) Dr. Shoji Kikawa  
Team Leader of JICA Project  
C/o Eastern Marine Fisheries Development Center  
Ban Phe, Muang District  
Rayong 21160  
Thailand

#### FAO HQ

- 36) Dr. Jacek Majkowski  
FIRM  
FAO  
ROME

#### IPTP

- |     |                 |                     |
|-----|-----------------|---------------------|
| 37) | Mr. T Sakurai   | Programme Leader    |
| 38) | Mr. M Yesaki    | Biologist           |
| 39) | Mr. T Nishida   | Biologist           |
| 40) | Mr. S Rochepeau | Biologist           |
| 41) | Mr. K Ishida    | Biologist (Jakarta) |

A G E N D A27 November 1990

- 1 Opening of meeting
- 2 Adoption of the Agenda and arrangements for the meeting
- 3 Review of national fisheries and research programmes

28 November 1990

- 4 Presentation of research and experience papers

29 November 1990

- 5 Tagging programmes

30 November 1990

- 6 Adoption of report

LIST OF DOCUMENTS

SEAC/90/1	Provisional list of Participants.
SEAC/90/2	Provisional annotated Agenda and Time Table.
SEAC/90/3	Provisional list of Documents.
SEAC/90/4	Review of Tuna Fisheries in Malaysia. (Mahyam Mohamaad Isa and Kamaruddin Ibrahim)
SEAC/90/5	The Philippine Tuna Fisheries: Industry & Research. (Noel C. Barut & Flerida M. Arce)
SEAC/90/6	Present status of Tuna Fisheries in Indonesia. (N. Naamin and Sofri Bahar)
SEAC/90/7	Status of Tuna Fishery in Thailand. (Amara Cheunpan)
SEAC/90/8	Tuna Sampling Programme in Malaysia. (IPTP/90/MAL/SP)
SEAC/90/9	1989 Tuna catch statistics in the Indian Ocean and Southeast Asian regions (Provisional, IPTP). (T. Nishida)
SEAC/90/10	Report on the Recent Development of Tuna Longline Fisheries based in Jakarta - particular reference to Tuna longliner from Taiwan. (K. Ishida & Tadashi Yamamoto)
SEAC/90/11	The role of the State Enterprise and Private Fishing Companies in supervising the artisanal fishermen in developing tuna fishing in Indonesia. (N. Naamin & P. H. Niki Juluw)
SEAC/90/12	Skipjack Resources in the Western Pacific Ocean looking through the information of tagging experiments. (M. Asano)
SEAC/90/13	Potential area for fishing ground of bigeye tuna ( <u>Thunnus obesus</u> ) in the southern Java and Nusatenggara waters. (S. Bahar)

- SEAC/90/14 Tuna Sampling Programme in Thailand.  
(IPTP/90/THA/SP)
- SEAC/90/15 The age structure of narrow-barred Spanish Mack-  
erel (Scomberomorus commerson) and kawakawa  
(Euthynnus affinis) stocks from length data.  
(M. Yesaki)
- SEAC/90/16 Vertical and Onshore-Offshore Distribution of  
Tuna Larvae near Islands in the Tropical Pacific.  
(G. W. Boehlert & Bruce C. Mundy)
- SEAC/90/17 An Interim analysis of the data on tuna tagging  
collected by R/V Nippon Maru in the Indian Ocean,  
1980-1990.  
(Dr. Kazunari Yano)
- SEAC/90/18 Report and preliminary results of the tagging  
programme of natural drift logs in the tuna purse  
seine fishery area of the western Indian Ocean.  
(P. Cayre & F. Marsac)
- SEAC/90/19 Preliminary results of the tuna tagging progra-  
mme in Malaysia.  
(Raja Bidin B. Raja Hassan)
- SEAC/90/20 Tuna and skipjack tagging in the Celebes Sea of  
Philippines (IPTP/90/WP/23).
- SEAC/90/21 Indonesia experiences in tuna tagging programme.  
(N. Naamin)
- SEAC/90/22 Maldivian Tuna Tagging Programme.  
(S. Rochepeau)
- SEAC/90/23 A Proposal for a Large-Scale Tuna Tagging Progra-  
mme in the Indian Ocean (1st draft).
- SEAC/90/24 Preliminary report on the Tuna Tagging Programme  
in Maldives, January - October 1990.  
(Ali Waheed)
- SEAC/90/25 Skipjack and Tuna Tagging in the Philippines -  
Progress Report.  
(Noel C. Barut & Flerida M. Arce)
- SEAC/90/26 South Pacific Commission Tagging Programmes - a  
progress report to November 1990.  
(A. D. Lewis)
- SEAC/90/27 Notes on the Situation of the Small Tuna Fishery  
in the Gulf of Thailand during the Decade  
from 1978-1987.  
(Hiroyuki Yanagawa)



- SEAC/90/28      Notes on the species composition, size composition and frequencies and length-weight relationships of three species of small tunas found in the waters off Terengganu, Malaysia.  
(I. Kamarrudin & R. H. Raja Bidin)
- SEAC/90/29      The Status of Exploratory Tuna Fishing Survey by FRTV "CHULABHORN" in the Andaman Sea, 1990.  
(Dhammasak Poreeyanond)

PUBLICATIONS OF THE  
INDO-PACIFIC TUNA DEVELOPMENT AND MANAGEMENT PROGRAMME

WORKING PAPERS

- IPTP/82/WP/1 SKILLMAN. R.A. Tuna fishery statistics for the Indian Ocean  
SCS/80/WP/90 and the Indo-Pacific. June, 1982. 86p.
- IPTP/82/WP/2 DE JESUS. A.S. Tuna fishing gears of the Philippines.  
SCS/82/WP/111 June, 1982. 47p.
- IPTP/82/WP/3 WHITE. T.F. and YESAKI M. The status of tuna fisheries in  
SCS/82/WP/112 Indonesia and the Philippines. September, 1982. 62p.
- IPTP/82/WP/4 YESAKI. M. Illustrated key to small and/or immature  
SCS/82/WP/113 species of tuna and bonitos of the Southeast Asian region.  
October, 1982. 16p.
- IPTP/82/WP/5 WHITE. T. F. The Philippine tuna fishery and aspects of  
SCS/82/WP/114 the population dynamic of tunas in Philippines waters.  
December, 1982. 64p.
- IPTP/83/WP/6 YESAKI. M. The Pelagic Fisheries of the Philippines.  
SCS/83/WP/6 March, 1983. 15p.
- IPTP/82/WP/7 YESAKI. M. Observations on the biology of yellowfin  
SCS/82/WP/119 (Thunnus albacares) and skipjack (Katsuwonus pelamis) tunas in  
the Philippine waters. July, 1983. 66p.
- IPTP/83/WP/8 WHITE T.F. and MERTA G.S. The Balinese Tuna Fishery.  
October, 1983. 15p.
- IPTP/83/WP/9 WHITE T.F. and UKTOLSEJA J.C.B. The West Java Tuna  
Fishery. October 1983. 25p.
- IPTP/84/WP/10 JOSEPH B.D.L. Review of tuna fishery in Sri Lanka. July,  
1984. 29p.
- IPTP/84/WP/11 SAKURAI T. Major Findings from the Indo-Pacific historical  
tuna fisheries data summary. September, 1984. 11p.
- IPTP/85/WP/12 YONEMORI T., UKTOLSEJA J.C.B. and MERTA G.S. Tuna tagging  
in Eastern Indonesian waters. February, 1985. 33p.
- IPTP/85/WP/13 HONMA M. and YONEMORI T. Manual for storing tuna tagging  
data in computer readable form. February, 1985. 19p.
- IPTP/86/WP/14 ANDERSON, C. Republic of Maldives Tuna catch and effort  
data 1970-1983. April 1986. 66p.
- IPTP/86/WP/15 LAWSON, T., LABLACHE, G., SIMOES, F. and ALI, FARAH A. The  
Western Indian Ocean tuna fishery from 1980 to 1985: A summary  
of data collected by Coastal States. October, 1986. 30p.
- IPTP/87/WP/16 YESAKI, M. Synopsis of biological data on longtail tuna,  
Thunnus Tonggol. July, 1987. 56p.

- IPTP/88/WP/17 MALDENIYA, R. and JOSEPH, L. Recruitment and migratory behaviour of yellowfin tuna (*Thunnus albacares*) from the western and southern coasts of Sri Lanka. March 1988. 16p.
- IPTP/88/WP/18 BARUT, NOEL C. Food and feeding habits of yellowfin tuna *thunnus albacares* (Bonnaterre, 1788), caught by handline around payao in the moro gulf. December 1988. 39p.
- IPTP/89/WP/19 YESAKI, M. Synopsis of biological data on kawakawa, *Euthynnus Affinis*. September 1989. 55p.
- IPTP/90/WP/20 GEORGE, K.C. Studies on the distribution and abundance of fish eggs and larvae off the south-west coast of India with special reference to scombroids. January 1990. 40p.
- IPTP/90/WP/21 YAMANAKA, KAE LYNNE Age, growth and spawning of yellowfin tuna in the southern Philippines. February 1990. 87p.
- IPTP/90/WP/22 ROCHEPEAU, S. and HAFIZ, A. Analysis of Maldivian tuna fisheries data 1970-1988. August 1990. 56p.
- IPTP/90/WP/23 SHIOHAMA, T. and ISHIDA, K. Tuna and skipjack tagging in the Celebes sea of Philippines. September 1990. 31p.

#### GENERAL REPORTS

- IPTP/82/GEN/1  
SCS/GEN/79/24 Report of the consultation meeting on management of tuna resources of the Indian and Pacific Oceans, Manila, Philippines, 26-29 June 1979. September, 1982. 155p.
- IPTP/82/GEN/2  
SCS/GEN/82/32 A selected bibliography of tuna fisheries in the South China Sea region. September, 1982. 24p.
- IPTP/82/GEN/3  
SCS/GEN/82/42 Report of the consultation meeting of the joint Indonesian/Philippine tuna working group. Manila, Philippines. 21-23 October 1981. Manila, South China Sea Fisheries Development and Coordinating Programme. December, 1982. 64p.
- IPTP/83/GEN/4 Report of the workshop on Philippine and Indonesian research activities Manila, Philippines. 3 - 8 February, 1983. February, 1983. 16p.
- IPTP/84/GEN/5 Report on the expert consultation on establishing and maintaining a regional data base for tuna fisheries in the Pacific and Indian Oceans. March, 1984. 27p.
- IPTP/84/GEN/6 Report on the ad hoc workshop on the stock assessment of tuna in the Indo-Pacific region. September, 1984. 61p.
- IPTP/85/GEN/7 Report on the preparatory expert meeting on tuna longline data for stock assessment in the Indian Ocean. April, 1985. 12p.
- IPTP/85/GEN/8 Report on the joint tuna research group meeting of Philippines and Indonesia. 21 - 23 October 1985. November, 1985. 85p.

- IPTP/85/GEN/9 Report on the expert consultation on the stock assessment of tunas in the Indian Ocean. 28 November - 2 December 1985. December, 1985. 78p.
- IPTP/85/GEN/10 Report on the meeting of tuna research groups in the Southeast Asian Region. Phuket, Thailand. 27 - 29 August 1986. August, 1986. 75p.
- IPTP/86/GEN/11 Report on the Expert Consultation on the stock assessment of tunas in the Indian Ocean. 4 - 8 December 1986. December, 1986. 87p.
- IPTP/87/GEN/12 Report of the second meeting of the tuna research groups in the Southeast Asian Region. Manila, Philippines. 25 - 28 August 1987. December, 1987. 154p.
- IPTP/87/GEN/13 Report of workshop, on small tuna, seerfish and billfish in the Indian Ocean. 9 - 11 December 1987. February 1988. 123p.
- IPTP/88/GEN/14 Report of the expert consultation on stock assessment of tunas in the Indian Ocean. 22 - 27 June 1988. October 1988. 89p.
- IPTP/88/GEN/15 Report of the second Southeast Asian tuna conference and third meeting of tuna research groups in the Southeast Asian Region. Kuala Terengganu, Malaysia. 22 - 25 August 1988. November 1988. 220p.
- IPTP/89/GEN/16 Report of the IPTP workshop on tuna and seerfishes in the North Arabian sea region. Muscat, Sultanate of Oman. 7, - 9 February 1989. May 1989. 109p.
- IPTP/89/GEN/17 Report of the 3rd Southeast Asian Tuna Conference. Bali, Indonesia. 22 - 24 August 1989. November 1989. 238p.
- IPTP/90/GEN/18 Report of the expert consultation on stock assessment of tunas in the Indian Ocean. Bangkok, Thailand. 2 - 6 July 1990. September 1990. 96p.

#### DATA SUMMARIES

- IPTP Data Indo-Pacific Tuna Fisheries Data Summary (Draft).  
Summary No. 1 September 1983. 184p.
- IPTP Data Indo-Pacific Historical Tuna Fisheries Data Summary.  
Summary No. 2 September 1984. 142p.  
(Revised Edition)
- IPTP Data Indian Ocean Tuna Fisheries Data Summary.  
Summary No. 3 March 1985. 62p.
- IPTP Data Western Pacific Ocean Tuna Fisheries Data Summary.  
Summary No. 4 May 1985. 73p.
- IPTP Data Indian Ocean Tuna Fisheries Data Summary for 1984.  
Summary No. 5 April 1986. 67p.

IPTP Data Summary No. 6	Western Pacific Ocean Tuna Fisheries Data Summary for 1984. April 1986. 88p.
IPTP Data Summary No. 7	Indian Ocean Tuna Fisheries Data Summary for 1985. April 1987. 79p.
IPTP Data Summary No. 8	Indian Ocean and Southeast Asian Tuna Fisheries Data Summary for 1986. April 1988. 103p.
IPTP Data Summary No. 9	Indian Ocean and Southeast Asian Tuna Fisheries Data Summary for 1987. April 1989. 108p.
IPTP Data Summary No. 10	Indian Ocean and Southeast Asian Tuna Fisheries Data Summary for 1988. April 1990. 95p.
IPTP Data Summary No. 11	Indian Ocean and Southeast Asian Tuna Fisheries Data Summary for 1989. March 1991. 96p.

#### MANUALS

IPTP Manual No. 1	Manual for the collection of historical statistical data on
SCS Manual No. 2	tuna and tuna-like species in the Indo-Pacific region. January, 1983.
IPTP Manual No. 2	Manual for collecting statistics and sampling on tuna and tuna-like species in the Indian Ocean and Southeast Asian Region. May, 1987. 157p.
IPTP Manual No. 3	Manual for computer operation of tuna database management. December 1989. 99p.

#### DATA CATALOGUES

IPTP/85/CAT/1	IPTP Data Catalogue, November 1985. 29p.
IPTP/86/CAT/2	IPTP Data Catalogue, November 1986. 49p.
IPTP/87/CAT/3	IPTP Data Catalogue, May 1987. (attached to IPTP Data Record - Vol. 1).
IPTP/87/CAT/4	IPTP Data Catalogue, December 1987. 54p.
IPTP/88/CAT/5	IPTP Data Catalogue, May 1988. 57p.
IPTP/89/CAT/6	IPTP Data Catalogue, February 1989. (attached to IPTP Data Record - Vol. 2).
IPTP/90/CAT/7	IPTP Data Catalogue, September 1990. 71p.

#### DATA RECORDS

- Volume 1            ITPP Data Record, May 1987. 346p.
- Volume 2            ITPP Data Record, February 1989. 456p.
- Volume 3            ITPP Data Record, September 1990. 133p.

#### COLLECTIVE VOLUMES

- Volume 1            Collective Volume of Working Documents presented at the Expert Consultation of Stock Assessment of Tunas in the Indian Ocean held in Colombo, Sri Lanka, 28 November - 2 December 1985. 364p.
- Volume 2            Collective Volume of Working Documents presented at the Expert Consultation on Stock Assessment of Tunas in the Indian Ocean held in Colombo, Sri Lanka, 4-8 December 1986. May 1987. 374p.
- Volume 3            Collective Volume of Working Documents presented at the Expert Consultation on Stock Assessment of Tunas in the Indian Ocean held in Mauritius, 22-27 June 1988. October 1988. 418p.
- Volume 4            Collective Volume of Working Documents presented at the Expert Consultation on Stock Assessment of Tunas in the Indian Ocean held in Bangkok, Thailand, 2-6 July 1990. March 1991. 503p.

#### ATLASES

Atlas of Industrial Tuna Longline and Purse-seine Fisheries in the Indian Ocean. April 1988. 59p.

Atlas of the Tuna Fisheries in the Indian Ocean and Southeast Asian Regions. May 1988. 62p.

#### SAMPLING PROGRAMME

- IPTP/89/SRL/SP    Tuna Sampling Programme in Sri Lanka. September 1989. 109p.
- IPTP/90/THA/SP    Tuna Sampling Programme in Thailand. November 1990. 67p.
- IPTP/90/MAL/SP    Tuna Sampling Programme in Malaysia. November 1990. 55p.