

RECENT RESULTS OF TUNA LONG LINING IN THE INDIAN SEAS

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ABSTRACT

This paper reviews the development and growth of tuna longlining in India from early 1960s, the assistance received from FAO through the Japanese expert, training provided by CIFNET to the personnels required for larger and sophisticated fishing vessels for oceanic fishing, etc. and discusses the recent trend of tuna and related fishery in our high seas.

INTRODUCTION

THE ATTENTION of the Government of India had been focussed on developing a fishery for the oceanic tuna resources of waters adjacent to India as early in 1960s. Realising that long lining for tuna is successfully employed in Indian Ocean by Japan and catches were removed in appreciable quantities from the area, the Government directed its efforts in introducing this new technology in India. The services of Mr. Kawaguchi, a Japanese expert was obtained at the instance of FAO in September 1963 and the expert stationing at Deep Sea Fishing Station, Cochin initiated the training in long lining operations from M. V. *Pratap* and M. T. *Kalyani*, both side trawlers modified for long lining. The assignment of the expert lasted upto February 1965 and thereafter the initial momentum slowly cooled down.

It was again revived during 1967 when a second FAO expert, Captain C. Y. Pao arrived for long lining training. The expert continued the work by re-rigging a 17.5 m indigenous stern trawler for long lining. The assignment of Capt. Pao was from October 1967 to October 1970 and as in the earlier attempt tuna long lining entered into a hibernation.

Both the experts after carefully taking stock of the capabilities of marine fishing arena of the

country in those days identified the pre-requisites which fell short of for the take off of the long line fishery. The chief elements thus identified included the paucity of suitable tuna long liners, the low morale of the crew for remaining far out for prolonged voyages and the poor technological competence of the navigating and engineering officers who manned the fishing vessels. A highly lucrative export market for shrimp and the least demand for tuna as a food fish in the domestic market were other possible reasons which inhibited development of tuna fisheries.

The short comings listed by the experts were overcome one by one. A new generation of competent deck and engine room officers were produced through the Central Institute of Fisheries, Nautical and Engineering Training (CIFNET), a new work culture was inoculated into the crew for fishing far away from the coast for extended days, larger and sophisticated vessels were acquired both by the industry and the Governmental organisations.

If the earlier attempts of harvesting tuna meant an effort for making available more protein rich food to the masses as a social obligation, the proclamation of EEZ in 1977 made it more of a Governmental responsibility of rationally exploiting the living resources of the area over which the nation commanded sovereign

rights. The vast stretches of the EEZ beyond the continental shelf was known to harbour oceanic tuna, billfishes and cephalopods as the main resources and once again the attention was directed towards harvesting the tuna resources by late seventies. The progress made since then in the development of tuna fishery by CIFNET is briefly reviewed in this paper.

MATERIALS AND METHODS

Creating trained manpower in harvest and post-harvest technology and conducting a quick resources assessment of oceanic tuna and bill fishes were taken up on top priority by the Government of India. Two tuna long liners "*Prashikshani*" and "*Matsya Sugandhi*" were acquired under Japanese Aid Programme by the end of 1980. These vessels were attached to CIFNET and FSI respectively for carrying out training and resources survey as mentioned earlier. The services of Capt. E. Haruta, a tuna long line fishing expert were made available through Japan International Co-operation Agency (JICA) for the period from August 1983 to February 1985.

The tuna fishing training vessel M. V. *Prashikshani* has 34.0 m LOA, 750 BHP and freezing tunnel and cold storage of 50 m³ capacity and a bait hold of 2 tonnes capacity at -20°C. The vessel is equipped with a line hauler and shooting table and hydrographic winch and electronic temperature recorder for probing temperature from surface to bottom. Trawl winch and stern ramp were provided as an additional facility without hampering the long lining arrangements.

Tuna long lining was organised in 1981 by bringing together all technical personnel on shore as well as on board who had been associated with this fishing method under the previous two experts in sixties and seventies. Capt. Haruta on his arrival, stationing at CIFNET,

participated in voyages alternatingly on *Prashikshani* and *Matsya Sugandhi*. The experts also organised training in gear fabrication and maintenance in the department of fishing gear technology of the Institute. Tuna long lines imported from Japan was made use of for the most part of operations. Indigenous gear also was used side by side to test suitability of local gear material.

The training on board focussed on the following points:

1. Making prolonged trips to distant grounds beyond the equator so as to remove the inhibition of the officers and crew regarding high sea navigation.
2. Systematising the practices of navigation and seamanship as required by an ocean going vessel.
3. Proper handling of vessel and long line gear for harvesting tuna.
4. Establishing a post harvest technology for handling tuna, billfishes and sharks.
5. Carrying out repair and maintenance of fishing gear
6. Ensuring a proper documentation.

A scientific/technical officer from shore was also sent on each voyage of the vessel, who besides ensuring proper implementation on the cruise programme, collected all relevant information on the resources. During the expert's tenure, officers and crew were judiciously replaced with the intention that maximum number of personnel could get trained directly under the expert.

In order to locate viable tuna grounds within our EEZ and to give a start to commercial exploitation of the resources, the Government

of India launched an 'intensive tuna drive programme' from October 1983 to March 1985. The programme envisaged a quick random sampling of the entire area in the shortest possible time to identify the locations which merit intensive surveys and feasibility studies. Under the guidance of Capt. Haruta the synoptic survey was done covering the EEZ on the west coast, equatorial waters, East coast and Andaman Sea. The area off Karnataka-Konkan Coast which was found to yield the highest potential during the synoptic survey was subjected to intensive survey and attempts were made on studying the commercial viability of the ground.

RESULTS AND DISCUSSION

The operation of the vessel during 1981-82 was of preliminary nature meant to getting used to the long lining technique. The synoptic survey of the distant oceanic waters was conducted during 1983-86. The vessel was available for 39 months during this period for operation. A total of 382 sets were made during this period. The average hooks operated per day worked out to 549 and average monthly effort had been in the order of 5969 hooks.

Of the 382 sets made, tuna were caught in 306 sets while 28 sets yielded nil catch. About 9,100 fishes were caught the composition of which were as following:

Yellowfin tuna	: 73.0%
Bigeye tuna	: 0.8%
Skipjack	: 2.1%
Marlin	: 2.5%
Sailfish	: 2.5%
Swordfish	: 0.4%
Shark	: 17.4%

A total of 81 number squares each bounded by 1 lat. by 1 long. were surveyed during the

period. The distribution of sampling effort in different Geographical regions of EEZ and the hooking rate observed from each are furnished in Table 1.

TABLE 1

Geographical division of EEZ	Total No. of hooks operated (%)	Hooking rate obtained (%)		
		Tuna	Billfishes	Sharks
Between lat. 15°N and 23°N and long. 74°E and 67°E	0.85	6.2	0.4	0.9
Between lat. 15°N and 8°N and lat. 78°E and 67°E	40.86	6.2	0.3	0.9
Between lat. 8°N and 6°S and long. 67°E and 97°E	33.30	0.6	0.2	0.3
Between lat. 8°N and 15°N and lat. 78°E and 97°E	24.18	1.1	0.1	0.9
Between lat. 15°N and 23°N and long. 81°E and 97°E	0.81	0.3	0.2	0.1

Encouraging results were obtained from new areas such as Karnataka-Konkan Coast, Equatorial waters, areas off Madras and Andaman Sea with a hooking rate of 3% and above. Highest hooking rate of 43.7% was recorded from the area 14-72, 100 nautical miles off Honavar. Intensive fishing was carried out in this area from October 1985 to May 1986 by making 78 sets and putting in 40,422 hooks in all. A total of 147 tonnes of fish was landed of which yellowfin tuna consisted of 128 tonnes. The hooking was found to be very much intensive and as a result baskets sank with floats due to the weight of fish. Many a times the floats cracked and lines were broken off. Loss of a portion of lines with catch occurred on two occasions. In order to over come this three hooks were rigged per basket thereafter. The average monthly hooking rate was found to range from 5.4% to

28.4% during the period. Yellowfin tuna composed 87.8% of the catch with an average hooking rate of 13.4% for the whole period. The yield per thousand hooks calculated for the area is furnished in Table 2. The total products landed by the vessel during the period of intensive survey is furnished in Table 3.

TABLE 2. Yield (Kg/1000 hooks) obtained by M.V. Prashikshani off Karnataka - Konkan Coast by long lining

Months	Yield (kg/1000 hooks) obtained		
	Yellowfin tuna	Bill-fishes	Pelagic sharks
October 85	1211	63	214
November	2657	85	305
December	3322	84	207
January 86	7209	83	34
February	5716	260	146
March	4543	331	117
April	5077	501	186
May	1017	256	687

Coming to the training front, the operation of the vessel during the period created a few teams of expert officers and crew for tuna long lining in high seas. The vigorous training they got under the expert in navigation, gear maintenance and operation and post-harvest treatment of catch is being continued with the same tempo even after the departure of the expert, as can be testified from the impressive results being produced. The summary of training imparted is given below:

TABLE 3. Details of products landed by M.V. Prashikshani by Tuna long lining off Karnataka - Konkan Coast from October 1985 to May 1986

Month	Weight of fish products (kg.)							
	Tuna (guttled) Frozen	Marlin (guttled) Frozen	Sailfish (guttled) Frozen	Sailfish (Round) Frozen	Marlin (Round) Frozen	Shark (guttled) Frozen	Shark (Round) Frozen	Swordfish (Round)
October 1985	9,842	80	428	—	—	1,739	—	—
November	14,878	402	74	—	—	1,690	16	—
December	18,771	699	304	—	—	1,172	—	—
January 1986	19,934	166	—	24	40	94	—	—
February	18,587	—	487	—	290	474	—	70
March	19,354	1,096	—	314	—	497	—	—
April	19,193	991	901	—	—	703	—	—
May	7,110	524	—	1,268	—	4,804	—	—
Total	1,27,669	3,958	2,194	1,606	330	11,173	16	70

Category	numbers
Skipper	13
Mate	15
Chief Engineer	3
Engine Driver	13
Deckhands	50
Engine Room Assistants	20

In addition 15 technical officers from shore also involved in high sea tuna fishing. Apart from getting acquainted with the various aspects of oceanic tuna fishery, a good deal of information on the biology and resources of the tunas and billfishes were collected by them.

A strong base for fabrication and maintenance of fishing gear was organised at shore. Efforts were also initiated towards bringing out an Indian standard for tuna long line gear and also to motivate indigenous production of long line gear components.

Future programme would include monitoring the resources in grounds already located off Karnataka-Konkan Coast, commencing detailed investigation in other pockets in Equatorial waters, Bay of Bengal and Andaman Seas where presence of tuna in appreciable quantities was indicated during the synoptic survey. Two training schemes, one for the certified officers working in private commercial trawling vessels,

and one for artisanal fishermen of Lakshadweep has been launched. Intensive studies on the distribution and biology of the fisheries and research on bait selectivity and gear technology will be taken up.

The details collected by the vessel *Prashikshani* on various aspects of the new fishery has been disseminated through publications of the Institute. Swaminath *et al.* (1985) has given a detailed account on the fishing gear technology and harvesting techniques by long lining. Haruta (1984) has vividly explained the tuna long lining fishery of Japan and its present status. Swaminath *et al.* (1986) has given a complete account on the results of training and resources survey done by *Prashikshani* upto June 1986.

CONCLUSION

A concerted effort on developing the method of long lining for exploiting the oceanic tuna and bill fish resources of our EEZ commenced in 1980. The training in harvest and post-harvest technology of tuna by M.V. *Prashikshani* of CIFNET during 1983-1986 has been reviewed. There is ample scope for developing this fishery and this has to be taken up as a national responsibility. Efforts have to be geared up to develop a domestic market for tuna products and also to capture export market. Proper infrastructure for processing and marketing oceanic tuna has to be established through long range programings. Positive indication in this direction is already shown by entering few commercial fishing firms into the field by chartering tuna long liners.

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