



National Fisheries Development Board

Guidelines for Deep Sea Fishing and Tuna Processing

1.0 Introduction

The total world catch of the major commercial species of tunas (albacore, bigeye, bluefin, skipjack and yellowfin) has increased almost tenfold during the last 50 years (from 0.4 to over 4 million tonnes). Tuna species are a significant source of food in many countries. The main tuna catching nations are concentrated in Asia, with Japan and Taiwan as the main producers. In Europe, Spain is the major tuna fishing nation. The global trade of tuna and tuna-like species reached a level of US \$ 6.54 billion in 2003 and in terms of the global trade in fish commodities, tuna accounts for around 8 per cent of imports by value and quantity. Of the many areas identified for increase in fish production by the NFDB, harvesting of the underutilized deep sea resources such as tuna and tuna-like species is one of them. Presently, tuna is one of the least exploited seafood resources in the Indian EEZ and the Board proposes to organize massive training and educational programmes to equip large number of persons to work on resource-specific vessels such as tuna long liners, as the operators of these vessels have been depending on foreign crew for want of adequately trained indigenous manpower.

In the Indian context, against an estimated harvestable potential of about 278 000 metric tonnes of tuna and tuna-like species for the Indian EEZ, the average landings recorded during the period 1995 – 2004 have been to the tune of about 39 992 tonnes, leaving a vast scope to harvest from the EEZ. During the said period, the west coast accounted for 75 percent of the tuna catch and the rest came from the east coast. In the overall landings, little tuna (*Euthynnus affinis*) recorded maximum landings, accounting for 32 percent of the catch on the west coast and 16 percent on the east coast. The cumulative annual growth rates (CAGR) for the west and east coasts were 0.37 and –1.60 respectively. However, as per the industry sources, the scenario during the last 3-4 years has changed and it is likely that the CAGR might have also improved.

Except Lakshadweep, there is no organized tuna fishery in India. Synonymous with tuna fishing, the Lakshadweep group of Islands abound in skipjack followed by yellow fin. Fish aggregating device such as 'payao' were introduced in Lakshadweep for increasing the fish catch and have performed well. Similarly, the Lakshadweep Administration is introducing larger fishing vessels (38 foot and 55 footers) for increasing tuna catches from its waters. Baitfish fishing also forms an important component of the pole and line tuna fishing of Lakshadweep and could become a constraint in future if not managed sustainably. The Lakshadweep tuna largely goes for local consumption, canning at the canning plant located in Minicoy Island and for preparation of *masmin*, a delicacy in the Islands and some parts of southern India.

In the Bay of Bengal, the Andaman and Nicobar Islands offer some of the best tuna fishing grounds in the Indian EEZ. However, due to lack of capacity and weak forward and backward linkages prevailing in the Islands, the tuna resources from the Andaman and Nicobar waters have largely remained unexploited. Since the oceanic tunas are migratory in nature, the tunas that could have been caught by the Indian fleet in the Andaman and Nicobar waters get harvested in the EEZs of the neighbouring countries.

2.0 Prospects of developing Tuna fisheries

After declaration of the EEZ in 1977, the area available to India is estimated at 2.02 million sq. km, comprising 0.86 million sq. km on the west coast, 0.56 million sq. km on the east coast and 0.60 million sq. km. around the Andaman and Nicobar Islands. Both the Arabian Sea and the Bay of Bengal abound in tuna and tuna-like species.

Of the many seafood resources available in the Indian EEZ, the tuna and tuna-like species are the least exploited. Even on a very conservative basis, about 70 – 80 000 metric tonnes of tuna and tuna-like species can be harvested annually from the EEZ in the next 3-5 years. This translates into an increase of almost two-times¹ more than what is being presently exploited. While there may be a limited domestic market for these species, there is an insatiable demand for premium quality tuna in countries such as Japan. With the growing market for sashimi-grade tuna and tuna loins/ steaks, the Indian tunas have considerable prospects. The sashimi is no longer a Japanese preferred food item. With the growing economy in China, more and more Chinese are now switching to sashimi, which is considered a health food par excellence. In fact, the growing Chinese demand for sashimi-grade tuna has already started impacting the Japanese requirements of quality tuna.

Expansion of tuna fisheries in India will have positive impacts on the employment scenario in the fisheries sector, both in harvest and post –harvest categories. Deployment of a sustainable tuna fishing fleet will ensure constant job opportunities in the sector and in the process also create a cadre of skilled tuna fishermen. The boat building industry will receive a big boost if additional boats are to be constructed and so will other ancillary units manufacturing lines, hooks, etc. The increased tuna catches will also mean additional raw material for the processing sector, which is now starved of raw material and is operating much beyond its installed capacity.

3.0 Development of Tuna fisheries

3.1 Development of indigenous tuna fishing fleet

A pre-requisite to sustainable tuna fishing in the Indian EEZ is the development of a wholly Indian-owned tuna fishing fleet. An intermediate range of tuna monofilament long liner with an endurance ranging from 7-10 days and a crew complement of 8-10 seems to be an ideal size for deployment in the Indian EEZ. Further with the spiraling fuel costs crew shortages, it may be prudent to operate smaller boats, as they tend to be more economical than the larger ones.

¹ Assuming that the entire incremental catch harvested in the next 3-5 years is exported, the increase in exports of tuna will amount to four-times from the present levels of 20 000 metric tonnes.

Economic viability of small-scale tuna fishing boats can be further improved through deployment of carrier boats. The carrier boats with adequate preservation facilities can cater to the needs of 10-15 fishing crafts and commute between the fishing areas and the landing ports.

Based on interactions with the industry, it is estimated that an 18 meter OAL wooden hull with Fiber-reinforced Plastic (FRP) coating or a fully FRP tuna long liner with monofilament gear would be costing around Rs. 65–70 lakhs. Similarly, a 16.5 meter OAL FRP tuna long liner with gear would cost around Rs 55 lakh. On the contrary a steel hull vessel of similar size (18 meter OAL) with gear component and RSW facility² would cost around Rs. 120–130 lakhs.

The proposed indigenous tuna fishing fleet would comprise intermediate range of FRP tuna long liners of 15 –18 meter OAL and about 300 such vessels would be required to bring in the desired hikes in tuna exports in the next 3-5 years. Assuming that each FRP vessel of about 18 meter OAL would cost Rs 75 lakhs (including gear component and the first year recurring cost), a total of Rs 225 crores would be required to construct 300 vessels. It is suggested that the NFDB may contribute 25 - 33 percent of the total cost of construction as equity participation (varying from Rs 56.25 - Rs 74.25 crores) and the beneficiaries could raise the balance through loan, etc. After a moratorium of one year, the beneficiaries could start repaying the Board's equity in equal installments.

The NFBD may seek the assistance of the Central Institute of Fisheries Technology (CIFT), Kochi in development of suitable prototypes of intermediate range of tuna fishing vessels, keeping in view the requirements of the industry. If necessary, the designs adopted by the multi-day tuna fishing boats of Sri Lanka may also be considered for replication in India with suitable modifications, if necessary.

The Board's interventions in development of tuna fishing fleet could be conceived in many ways. The first approach could be to construct tuna long liners of intermediate size range (around 18 meter OAL) and lease it to willing entrepreneurs/ groups of fishers on deferred payment basis. The second approach could be through equity participation (25 –33 %) in construction of the vessels by the beneficiaries. The beneficiary could liquidate the Board's equity over a pre-agreed time period.

3.2 Human Resource Development

In view of the acute need for trained manpower in the area, it would be essential to engage master trainers from tuna fishing nations such as Japan, Taiwan, etc. The training curriculum would largely focus on handling of the gear (in particular monofilament long lines), use of baits, on-board handling of the fish and its preservation, on-shore handling of the catch, grading, packing and processing (especially for loins/ steaks and other value-added forms). It would be essential to have a critical mass of trainers in the country who could then be deployed to train other fishers/ shore-based operators in the long run. To achieve this critical mass, it may be essential to have at least two master trainers (one each for the east and west coasts) for a minimum period of two years.

² Industry sources have indicated that a complete commissioning of RSW facility in a 23 meter fishing vessel would cost around Rs 30 lakhs.

The Central Institute of Fisheries Nautical Engineering and Training (CIFNET), Kochi conducts an 18 month Mate Fishing Vessel Course (MFVC). The trainees after completing this course are required to undergo 24 months sea service, which can be completed in either a Government fishing vessel (*e.g.* those of FSI) or a private-owned fishing vessel. These trainees can also form an ideal pool of candidates who could be trained in tuna fishing and some of them may later also serve as trainers.

The Board may cooperate with the CIFNET and the Association of Fishing Industries (AFI), Visakhapatnam to prepare the training calendar and curriculum. The premises of CIFNET and the FSI on both the east (Visakhapatnam, Chennai) and west coasts (Cochin, Goa, Porbandar)) could be used for training and the CIFNET and the AFI may coordinate the training programme on behalf of the NFDB. The agencies assisting NFDB in this regard could be reimbursed the cost that would be incurred for coordination, etc. The other trainees could be sponsored by the industry on a regular basis.

3.3 Development of shore-based infrastructure

Maintenance of adequate levels of hygiene and sanitation at all stages of harvesting and post-harvest is of utmost importance if tuna is to be marketed in sashimi grade. In this regard the maintenance of fishing harbours/ fish landing centers (FLCs) becomes critical and cannot be overlooked. Presently, the fishing harbours at Visakhapatnam, Chennai, Cochin and Mumbai handle the bulk of tuna landings. It is, therefore, essential that these harbours and also those where tuna landings might increase substantially in the near future (*e.g.* Goa, Pondicherry, Vanakbara, etc) should be renovated to ensure that they have the optimum levels of hygiene and sanitation and all other facilities that is required for quick handling of the catch before it is either sent to the processing unit or packed for export. If possible, the provision of dedicated jetties for tuna landings could also be considered in these harbours to minimize the risks of contamination and facilitate quick handling.

The NFDB may collaborate with the Central Institute of Coastal Engineering for Fishery (CICEF), Bangaluru and the AFI, Visakhapatnam for preparing a master plan for up-gradation of fishing harbours and FLCs, which are important from the tuna fisheries point of view.

3.4 Upgradation of processing units

The most common forms in which tuna and tuna-like species are exported include the premium-grade sashimi tuna, followed by steaks and loins and finally canned tuna. Sashimi is prepared from fresh, high quality raw tuna meat, or from tuna frozen at temperatures below – 40°C immediately after capture. Traditional sashimi is prepared from the three species of bluefin, bigeye and yellow fin tunas. Tunas that are not acceptable for sashimi grade are sold in the steak market, generally in Europe and the United States. Steaks are generally prepared from bigeye, yellowfin and albacore tunas, mostly fresh but also frozen.

Japan is the world's largest producer and market for fresh and frozen tuna and tuna based products (excluding canned tuna). In recent years, tuna in the form of sashimi and steaks is becoming increasingly common within the European and North American markets (and now also in China). The major importers of canned tuna are the United States, the United Kingdom and France, in terms of both quantity and value. Skipjack, yellowfin and albacore are the

species principally used for canning. The fish, which are generally frozen, are cut up, cooked and then canned in brine or oil.

Sashimi-grade tuna is recognized by its quality and freshness and does not require any processing. While tuna steaks and loins requires nominal processing, the maximum processing takes place in the case of canning. For sashimi-grade tuna, the harvesting practices and on-board handling are of utmost importance, followed by immediate freezing in temperatures below—40°C. The other important requirement is the hygienic handling of such tunas at the fishing port before it leaves for the export market. Therefore, the Board's interventions for this activity could be with regard to improvement in selected fishing harbours where tunas can be landed and exported in sashimi-grade quality. The other interventions of the NFDB's would be towards upgradation of the processing units for preparation of steaks and loins for the export market and also in modernization and, if possible, capacity augmentation of the tuna canning plant at Minicoy, Lakshadweep Islands.

A sizeable infrastructure already exists in the coastal states for processing of fin and shellfishes for exports. Some of the existing processing units could be identified for adding facilities for processing of tunas for steaks and loins. There may not be a need for setting up of exclusive units for this purpose as tuna processing (for loins and steaks) does not require extensive paraphernalia. The other requirements for increasing the availability of quality tuna would be ice, as adequate quantity of ice is critical for maintaining the quality of tuna that is caught by the small fishing boats. There is also need for better packaging material, especially the PUF boxes, which can carry individual tunas to markets abroad.

The production from tuna canning factory at Minicoy has remained stagnant for years now. On the contrary, Maldives, which is located in a similar geographical setting and more closer to the Lakshadweep group of Islands than mainland India has done well with its tuna canning infrastructure. Modernization and upgradation of the tuna canning plant in Minicoy could have many spin-off effects on the Islands economy. The Board may cooperate with the Integrated Fisheries Project (IFP), Kochi and the private sector to prepare a blueprint for the up-gradation, keeping in view the products that have a market demand.

3.5 Other interventions

Some of the other interventions that are critical for development of tuna processing in India, include a more pro-active marketing support/ development of market linkages by MPEDA, especially through its overseas offices; creation of a brand image for the Indian tuna as productions increase; popularization of tuna in the domestic market; subsidies on freight charges; supply of dry ice on subsidized rates; R&D support to the industry for bait-fish supply if productions are to be increased and sustained and development of technologies for cage farming of tuna in offshore waters.

Application for Establishing Tuna Processing Centres

Sl. No	Particulars sought from the applicant	Information furnished by the applicant
(1)	(2)	(3)
1.0	Name and address of the applicant/ firm/ institutes/ departments/ cooperatives/Self Help Group/NGO (IN BLOCK LETTERS):	
2.0	Address for communication (telephone/ mobile number):	
3.0	Details of land where processing activity is proposed to be taken up:	
	a) State:	
	b) District:	
	c) Taluk/ Mandal:	
	d) Revenue Village:	
	e) Survey Number(s):	
	f) Ownership (whether freehold or on lease):	
	g) If on lease, duration of lease:	
	h) Total land area (in ha):	
	i) Total built up area (in ha):	
	j) Details of the proposed activity (Lay out plan/ Design details and engineering works(item wise/work wise details) to be certified by the CICEF/ / CIFT/ IFP/ or State/Central Government Departments/agencies.	
5.0	Whether the applicant is in default of payment to any Financial Institution/ State Government for loan/ assistance availed earlier. If yes, please provide the details and the reasons for default:	
6.0	Estimates regarding input costs:	
	a) Products to be developed and species to be processed:	
	b) Processing capacity:	
	c) Recurring Cost Raw material Sub material Packing material Utilities	
	d) Source of procurement:	

(1)	(2)	(3)
7.0	Experience of the applicant/Agency in the field and details of training undergone so far:	
8.0	Details regarding economics of operation:	
9.0	Whether any financial tie up has been made for availing Bank loan, if so please provide the details:	
10.0	Expected date of operation of the processing activity:	
11.0	Marketing tie up:	
12.0	Source and number of labour employed for renovation as well as day-today culture operations:	

Declaration by the Applicant

I/ We.....son/daughter/wife of
..... Working
at..... hereby declare
that the information furnished above is true to the best of my/ our knowledge and belief. I
am/ we are fully aware that if it is found that the information furnished by me/ we/ us is
false or there is any kind of deviation/ violation of the conditions under which assistance is
provided to me by the NFDB, any action as deemed fit for violation of this condition may
be taken against me/ us.

Date:

Place:

Signature of the applicant (s)

Countersigned by the implementing Agency

Date:

Place:

Signature and seal of the authorized
representative of the Implementing Agency

Application for Construction of Indigenous Tuna Fishing Fleet

Sl. No	Particulars sought from the applicant	Information furnished by the applicant
(1)	(2)	(3)
1.0	Name and address of the applicant/ association/Self Help Group/Dept. of Fisheries of State Governments/local self governing bodies, boat owners' association (IN BLOCK LETTERS):	
2.0	Address for communication (telephone/ mobile number):	
3.0	Details of the location of the construction yard:	
	a) State:	
	b) District:	
	c) Taluk/ Mandal:	
	d) Revenue Village:	
	e) Details of the proposed construction works (Design details/engineering works to be certified by CIFT/AIFI/MPEDA	
4.0	Details regarding assistance for the construction of fleet	
5.0	Whether the applicant is in default of payment to any Financial Institution/ State Government for loan/ assistance availed earlier. If yes, please provide the details and the reasons for default:	
6.0	Estimates regarding input costs:	
	a) Hull Material	
	b) RSW	
	c) Gear	
	d) Other items etc	
7.0	Whether any financial tie up has been made for availing Bank loan, if so please provide the details:	
8.0	Expected date of commencing of activities	

Declaration by the Applicant

I/We.....son/daughter/wife
of.....Working
at..... hereby declare that the information
furnished above is true to the best of my/ our knowledge and belief. I am/ we are fully aware that if it is
found that the information furnished by me/ we/ us is false or there is any kind of deviation/ violation of the
conditions under which assistance is provided to me by the NFDB, any action as deemed fit for violation of
this condition may be taken against me/ us.

Date:

Place:

Signature of the applicant (s)

Countersigned by the implementing Agency

Date:

Place:

Signature and seal of the authorized
representative of the Implementing Agency

National Fisheries Development Board

Form for Submission of Utilization Certificate

Sl. No	Letter No and date	Amount

Certified that out of Rs. _____ sanctioned during the year _____ in favour of _____ under the National Fisheries Development Board's Letter No given in the margin and Rs. _____ on account of unspent balance of the previous sanction, a sum of Rs. _____ has been utilized for the purpose of _____ for which it was sanctioned and that the balance of Rs. _____ remains unutilized. The same will be adjusted towards the next instalment payable during the period _____.

Physical progress:

Certified that I have satisfied myself that the conditions on which the funds were sanctioned by the National Fisheries Development Board have been duly fulfilled/ are being fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for which it was sanctioned.

Date:

Place:

Signature and seal of the
authorized representative of the
Implementing Agency

Matrix of proposed activities for development of tuna fisheries in India

Sl No	Proposed activities	Components	Inputs required	Cooperating institution/ agency
(1)	(2)	(3)	(4)	(5)
1.0	Development of indigenous tuna fishing fleet	<ul style="list-style-type: none"> (i) 18 meter OAL FRP boat. (ii) 16.5 meter OAL FRP boat. (iii) Use of Refrigerated Sea Water. (iv) Fishing gear 	Finalization of blueprints for different OALs and hull material and other requirements, such as RSW, gear, etc.	<ul style="list-style-type: none"> (i) Central Institute of Fisheries Technology, Kochi. (ii) Association of Indian Fishery Industries (AIFI), Visakhapatnam. (iii) Marine Products Export Development Authority (MPEDA), Kochi.
2.0	Human Resource Development	<ul style="list-style-type: none"> (i) Master Trainer for harvest and post-harvest activities (ii) Expert for processing sector (iii) Trainees of Central Institute of Fisheries Nautical Engineering and Training (CIFNET). 	<ul style="list-style-type: none"> (i) Finalization of the terms and conditions of the master trainer and expert from abroad and their engagement. (ii) Finalization of the training calendar and curriculum for the trainees. 	<ul style="list-style-type: none"> (i) Central Institute of Fisheries Nautical Engineering and Training (CIFNET), Kochi. (ii) AFI, Visakhapatnam. (iii) MPEDA, Kochi. (iv) Fishery Survey of India (FSI), Mumbai.
3.0	Development of shore-based infrastructure	<ul style="list-style-type: none"> (i) Repair and renovation of jetties in Fishing Harbours (ii) Repair and renovation of Fish Landing centers (FLCs) (iii) Setting up of back-up facilities for grading, packing, etc. 	(i) Finalization of a master plan for up-gradation of fishing harbours and FLCs, including components to be assisted for setting up of the back-up facilities.	<ul style="list-style-type: none"> (i) Central Institute of Coastal Engineering for Fishery (CICEF), Bangaluru (ii) AFI, Visakhapatnam.
4.0	Up-gradation of processing units	<ul style="list-style-type: none"> (i) Up-gradation of existing processing units to allow value addition of tuna and tuna-like species. (ii) Setting of new units exclusively for tuna and tuna-like species. 	Finalization of a blueprint for up-gradation of the existing processing units/ setting up of new units for processing of tuna and tuna-like species.	<ul style="list-style-type: none"> (i) Integrated Fisheries Project (IFP), Kochi. (ii) Processing sector (iii) Marine Products Export Development Authority (MPEDA), Kochi.
5.0	Other interventions	<ul style="list-style-type: none"> (i) Development of marketing support/ linkages. (ii) Creation of brand image for Indian tuna. (iii) Subsidies on freight charges (iv) R&D support for baitfish supply. (v) Increase in the frequency of Potential Fishing Zone information. (vi) Guidance on potential shoal movements. 	Finalization of specific activities/ programmes under each of the listed items in column (3).	The activities are of cross-cutting nature and cooperation would be required from several institutions/ agencies in the country and also linkages with institutions/ agencies abroad.