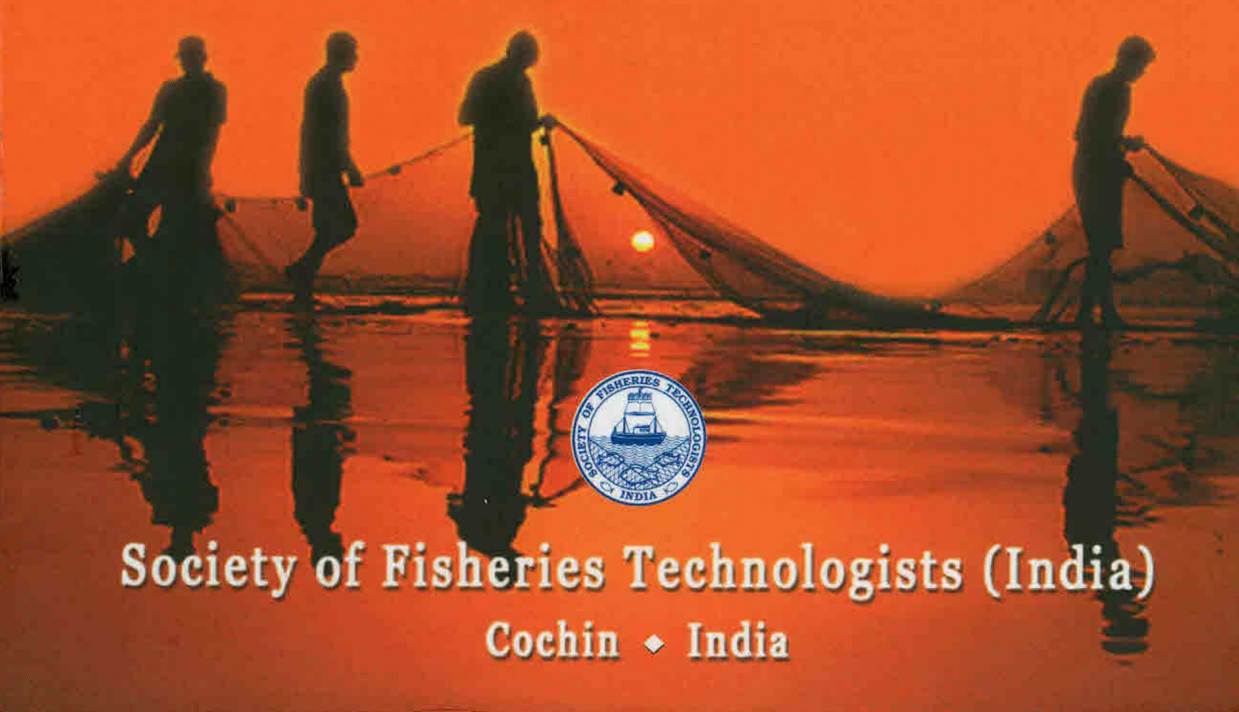
Coastal Fishery Resources of India

Conservation and Sustainable Utilisation



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Conversion of Mechanised Fishing Vessels to Tuna Longliners

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Introduction

Exploitation of tuna resources has been identified as one of the thrust areas for increasing export of Indian marine products (Joseph *et al.*, 2008). The Indian EEZ alone has a resource potential of 0.21 million tonnes of oceanic tuna consisting of yellowfin 54%, skipjack 40% and bigeye 6% (Anon, 2000). The resources extend far beyond the EEZ as tunas are highly migratory and straddling stocks. Tunas are exploited by a variety of gears and major share in India is landed by gill nets, followed by hooks and lines and purse seines (Pravin, 2009; John and Pillai, 2009). Tuna landings along he Indian coast was estimated at 61,972 t during 2009, and the fishery is supported mainly by *Euthynnus affinis*, *Thunnus albacares*, *Auxis* spp., *Katsuwonus pelamis*, *Thunnus tonggol* (CMFRI, 2010). Stock assessment has indicated that while nearly 86% of the coastal tuna potential is being exploited, only less than 15% of oceanic tuna potential is currently being exploited (CMFRI, 2010). Tuna resources in the shelf are more or less fully utilized and that further avenue for development lies in harvesting the oceanic tuna stocks. Fishing capacity from the shelf fishery is being diverted, with appropriate modifications, for harvesting the oceanic tuna resources.

There is a significant level of excess capacity in shelf fisheries of India (Devaraj and Kurup, 2000; Boopendranath, 2007). A high percentage of the mechanized and motorized fleet operates fishing gears which have poor selectivity and high ecological impact such as bottom trawls and small-meshed gillnets, which negatively impact on sustainability of resources (Boopendranath, 2007). Long lining has better selectivity characteristic and comparative less ecological impacts and conversion of trawlers to tuna longliners offers an important avenue for reducing the fishing pressure on the coastal demersal resources.

In this paper, efforts made towards conversion of mechanised fishing vessels, to tuna longliners facilitated by the Marine Products Export Development Authority (MPEDA) (Ministry of Commerce and Industry, Government of India), with the technical collaboration of Central Institute of Fisheries Technology (CIFT, Cochin) Central Institute of Fisheries Nautical Engineering and Training (CIFNET, Cochin) and Fishery Survey of India (FSI, Mumbai), are discussed.

Schemes for conversion of fishing vessels for tuna long lining

With the objective of increasing tuna based export earnings by improving production and increasing the quality of marketed fish, a number of new projects and schemes have been introduced (Thomas *et al*., 2008; John and Pillai, 2009; MPEDA, 2010). During the 10^{th} five year plan (2002–2007), under the centrally sponsored scheme on *Development of Marine Fisheries, Infrastructure and Post-harvest Operations*, the Ministry of Agriculture(MoA), Government of India has been providing subsidy of Rs.1.5 million per vessel for conversion of existing trawlers above 20 m L_{OA} for tuna longline fishing. Under this scheme, ten shrimp trawlers in the size range of 21.5–24.0 m OAL were converted for tuna long lining (John and Pillai, 2009). Financial assistance is offered by MPEDA for the conversion of existing fishing vessels to tuna longliners, in order to encourage the fishing vessel owners to harvest deep sea tunas and other underexploited fishes using monofilament tuna longline system (MPEDA, 2010). The amount of assistance under the scheme is limited to 50% of the cost of the monofilament longline system, related equipment and conversion charges (including installation charges), subject to a maximum of Rs. 0.75 million for fishing vessels of less than 20 m L_{OA} and Rs.1.5 million for deep sea fishing vessels of more than 20 m L_{OA}. Under the Letter of Permission (LOP) scheme of the Ministry of Agriculture, 60 tuna longline vessels in the range of 21.6 - 58.7 m L_{OA}, which were of foreign origin, but registered as Indian vessels, have been permitted for fishing in the Indian waters.

The structure of longline fleet in India, during 2008 is given in Fig. 1. The tuna longline fleet consisted of 295 vessels, of which 235 were converted vessels under schemes by the Marine Products Export Development Authority and Ministry of Agriculture and 60 vessels were operating under the Letter of Permission (LOP) scheme (John and Pillai, 2009). About 72% of the fleet was below 20 m L_{OA}, and the rest above 20 m L_{OA}.

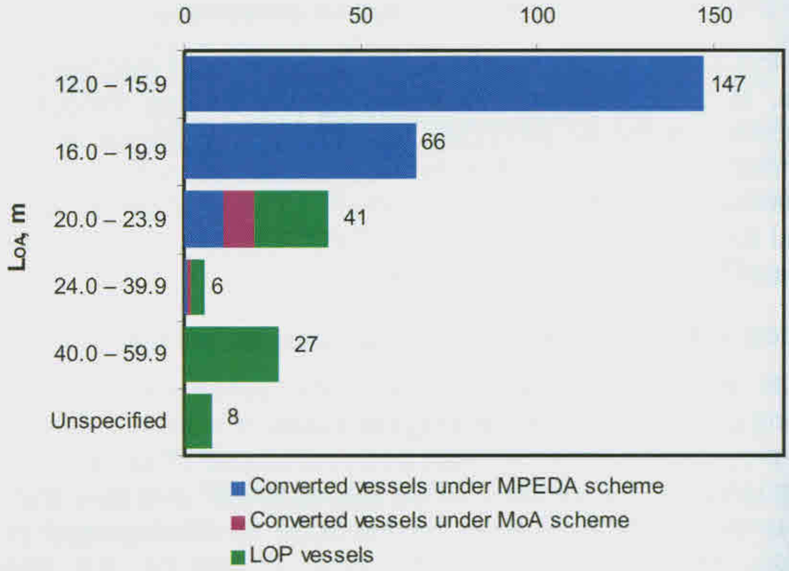

Fig. 1: Tuna longline fleet in India, during 2008 (Source of data: John and Pillai, 2009)

Technical aspects of conversion

Eligibility criteria for financial assistance under MPEDA scheme included that the age of the vessel proposed for conversion should be less than 12 years and have a minimum economic life 8 years. The L_{OA} of the fishing vessel proposed for conversion must be above 13 m. Category-wise approved cost details for conversion of trawler to tuna longliner are given Table 1 (source: MPEDA).

The main part of the conversion process is fitting the longline spool, line setter and hauler, providing complete longline gear and refrigeration of fish hold. The existing main engine of the boat is used as the prime mover for the hydraulic system of the mainline winch.

Fishing gear

Monofilament longlines with 300 to 1000 hooks are used in the converted vessels for harvesting tuna, depending on the size of the boat. Minimum thickness of polyamide monofilament mainline is 2.5 mm.

Table 1: Category-wise approved cost details for conversion of mechanised fishing vessels to tuna longliners

Item	Vessels of <20 m L_{OA} (Rs. x10^5)	Vessels of >20 m L_{OA} (Rs. x10^5)
Radio telephone, Radio direction finder and STD meter	1.25	0.95
Removal of frame, derrick, gallows, outrigger equipment and modification of deck	0.15	0.25
Compartmentalisation of fish hold	0.25	1.00
Line hauler, setter, spooler reel and fish and bait handling equipment	4.00	6.00*
Longline, hooks, floats, radio buoys (2000 hooks)	5.00	8.00
Refrigeration system -generator, cooling coils and compressors	4.50	10.00

* Rs. 7.00x10^5, if items are imported

Source: MPEDA, Cochin

Deck equipment

In the case of trawler, the trawl winch was replaced by a mechanically driven longline spool, driven by power take-off from the main engine, initially (Fig. 2). A clutch and brake are used for the control of the longline spool. The longline spool is installed on the forward deck, at the port side. The pulley to facilitate hauling mainline was fitted on the forward deck, at the starboard side. At a later stage, hydraulically operated mainline spools (Fig. 3 and 4) and was introduced in the converted vessels of more than 14 m L_{OA}. The longline spool stores the main line and hauls up the mainline with the branch lines and catch. This is basically a drum with a guide on spooler and the drum is driven from the hydraulic motor. Controls are provided on the side of the drum, for regulating the speed and direction of rotation of the drum. A guiding pulley is provided at a certain height on a frame, at the starboard side, for leading the main line to the spooler. Gear handling equipments onboard tuna long liners and the advantages of hydraulic system have been discussed by Baiju (2002; 2009).

The line setter is fitted on the aft deck of the vessel (Fig. 5). It is driven hydraulically from the pump and consists of 4 to 5 tension relieving rollers and a main roller with rubber lining. The mainline from the drum is lead to the setter through the small rollers and finally comes along the periphery of the larger roller and comes out over a channel to the sea. The branch line with bait is attached, at this point.

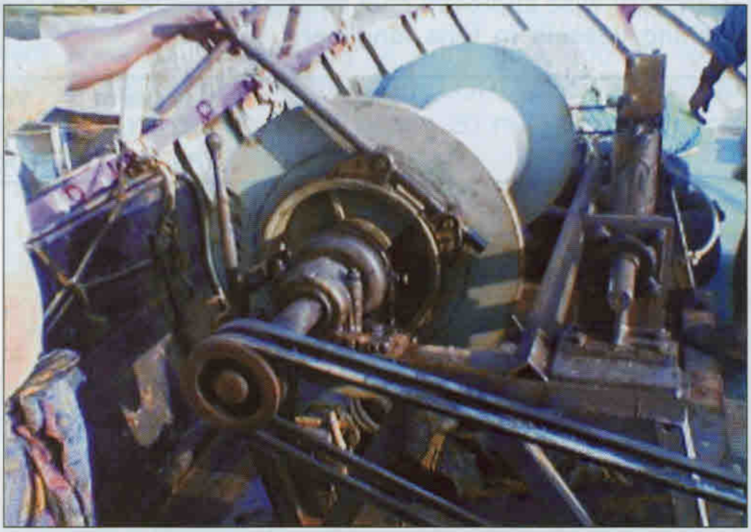

Fig. 2: Mechanically driven longline spool in converted longliners

Fig. 3: Hydraulically driven indigenous monofilament longline spool

Several boats are converted under the MPEDA scheme in Tamil Nadu, Gujarat, Kerala, and Karnataka. Total number of conversions as on February 2010 exceeded 300. Majority of the boats converted were originally trawlers. Trawling is a fuel intensive method of fishing which uses about 5 times more fuel than longlining, during harvesting (Gulbrandson,

Fig. 4: Hydraulically driven imported monofilament longline spool

Fig. 5: Line setter

1986; Boopendranath, 2009). Other comparative advantages are reduction in crew requirement from 8 to 5, better price realisation for the catch, lower cost of maintenance of the gear system, besides beneficial impacts on conservation of coastal resources.

Conclusion

Conversion of fishing vessels for longlining has been popular in India and more than 300 fishing boats have been converted under the scheme of MPEDA in Tamil Nadu, Gujarat, Kerala and Karnataka. Majority of the converted longliners were originally trawlers. Conversion to longlining has obvious advantages in terms of fuel savings, lower maintenance cost and lower crew requirements and high value catches, in addition to benefits in coastal resource conservation and better utilisation of oceanic tuna resources.

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