

## CURRENT STATUS OF FISHERIES FOR TUNAS AND TUNA-LIKE FISHES IN INDIA

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### Introduction

The Indian tuna fishery comprises two distinct segments, the coastal fishery and the oceanic fishery. The main components of the coastal tuna fishery are the gillnet fishery around mainland India, in which different species of tunas and tuna-like species occur, and the pole-and-line and troll line fisheries exploiting skipjack and young yellowfin tuna around the Lakshadweep Islands. The oceanic fishery uses exclusively longlines, targeting large deep-swimming yellowfin and bigeye tunas. The status of the coastal fishery was last reviewed by Pillai *et al.* (1995), and that of the oceanic fishery by Somvanshi and John (1995). The present paper gives an update of the national tuna fishery, both the coastal and oceanic segments, and its recent trends. All three groups of resources (tunas, billfishes and seerfishes) are covered.

### The Coastal Fishery

In the mainland of India, tuna fishing is carried out by small-scale mechanised and traditional vessels operating in waters up to about 80m deep all along the coastline. The fishery does not target tunas, and boats use multispecies gear such as gillnets, purse seines, hooks and lines, and troll lines. Motorisation of vessels, which gained momentum in the early eighties, enables the traditional fishermen to venture into distant areas. In Lakshadweep, where a targeted tuna fishery exists, mechanised boats are used for pole-and-line fishing and for surface trolling.

The catch of tunas and tuna-like fishes during 1991-1997 ranged from 76,773 t in 1991 to 91,780 t in 1997 (Table 1). In 1997 the catch consisted of 46,460 t of tunas (50.6 %), 4,448 t of billfishes (4.8 %), and 40,872 t of seerfishes (44.6 %). Fishing Areas 51 and 57, essentially representing the West and East coasts, accounted for 70.8 % and 29.2 % of the catch, respectively. The trend in production of the three resource groups in Areas 51 and 57 during 1991-1997 is shown in Figure 1.

### Tunas

Tuna production during 1991-1997 ranged from about 38,000t in 1991 to 46,460t in 1997, the highest catch ever recorded. 78.3 % of the catch was landed in Fishing Area 51. The State of Kerala was the major contributor (34.5 %), followed by Gujarat (20.1 %) and Lakshadweep (14.4 %).

*Euthynnus affinis* constituted the major species, forming 41.9 % of the total tuna catch, followed by *Auxis* spp. (18.9 %), *Katsuwonus pelamis*, (17.1 %) *Thunnus tonggol* (9.5 %), *Thunnus albacares* (8.6 %) and *Sarda orientalis*

(3.0 %). At Minicoy, *K. pelamis* constituted 89.1 % and *T. albacares* 10.9 % of the catch in the pole-and-line fishery, whereas, *T. albacares* constituted 91.7 % of the catch in the handline fishery. At Agatti, *K. pelamis* constituted 97.6 % of the total tunas caught, followed by *A. thazard* (1.8 %), *T. albacares* (0.4 %) and *E. affinis* (0.2 %). The species composition in 1997 did not show any significant variation from that of 1996.

The size range of the fish in the catch was: *E. affinis*, 24-60 cm, with the mode supporting the fishery in the 38-64 cm size range; *A. thazard*, 22-54 cm, with modes in the 32-42 cm size groups; *K. pelamis*, 24-68 cm, with modes in the 42-64 cm size groups; *T. albacares*, 28-90 cm, with modes in the 42-86 cm size groups; *S. orientalis*, 36-54 cm, with modes in the 43-48 cm size group; and *A. rochei*, 22-34 cm, with modes in the 24-28 cm size group.

### Billfishes

During 1991-1997 the landings of billfishes rose from 1,151 t to 4,448 t. *Istiophorus platypterus*, *Makaira indica* and *Xiphias gladius* were the major species in the fishery.

### Seerfishes

Landings of seerfishes during 1991-1997 ranged from about 37,000 t to 46,000 t. In 1997, the catch was 40,872 t, of which 61.9 % was reported from Fishing Area 51 and the remaining 38.1 % from Fishing Area 57.

The State of Gujarat, situated along the north-west coast, recorded the highest share (29 %) of the catch, followed by Tamil Nadu (18 %) and Andhra Pradesh (11.5 %) on the south-east coast. Drift gillnets were the major gear, contributing 56.1 % to the total catch of seerfishes, followed by bottom trawls (31.9 %), hooks and lines (9.9 %), purse seines (1.5 %), and other gears (0.6 %).

Of the four species occurring in the fishery (king seer, *Scomberomorus commerson*; spotted seer, *S. guttatus*; streaked seer, *S. lineolatus*; and wahoo, *Acanthocybium solandri*), the first two were commercially important, contributing 59.9 % and 39.4 %, respectively, to the total catch of seerfishes.

The size range of *S. commerson* was 22-134 cm in the large-mesh drift gillnet fishery, 14-72 cm in the small-mesh gillnet *podivalai* at Tuticorin, 12-108 cm in the bottom trawl fishery, and 48-128 cm in the hook-and-line fishery, and these fisheries were mainly supported by the 34-112, 14-58, 12-100 and 48-128 cm size groups, respectively. The lengths of *S. guttatus* ranged from 20 to 68 cm in gillnet fisheries and 18-58 cm in trawl fisheries. Both these fisheries were supported chiefly by the 20-64 cm size groups.

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## **The Oceanic Fishery**

The oceanic tuna fishery is exclusively by longlining. The Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Act of 1981 permitted the charter of foreign vessels for fishing in the Indian Exclusive Economic Zone (EEZ). Under this scheme tuna longline vessels operated in Indian waters from 1985 to 1995.

Tuna vessels also operated under two other schemes introduced in 1991, (1) leasing of foreign fishing vessels by Indian entrepreneurs for operation in the Indian EEZ and (2) joint ventures between Indian and foreign companies in fishing, processing, and marketing.

As the charter scheme, originally envisaged as a prelude to joint-venture and Indian ownership enterprises, having fulfilled its objectives to a large extent, the charter scheme was gradually phased out between 1992 and 1995 in favour of joint ventures and Indian-owned vessels.

### **Charter fishing**

Fishing under the charter scheme was introduced in 1985 and witnessed phenomenal growth in the subsequent years. This activity was at its peak in 1990, when 58 foreign longline vessels were in operation in Indian waters. The results of fishing under this scheme have been published by the Fishery Survey of India from time to time.

#### ***Effort, catch and CPUE***

The chartered fishing fleet consisted mostly of vessels of Taiwanese origin flying the flags of Panama or Honduras, of 42 to 60m LOA and 364 to 825 GRT. The number of vessels operated, voyage days and fishing effort are given in Table 2. The highest effort of 19.8 million hooks occurred in 1990. Details of catches by species are given in Table 3. The average annual catch in 1991-1995 was about 3,914 t, consisting of yellowfin tuna (69.1%), bigeye tuna (3.8%), billfishes (19.0%), and other fishes, mainly sharks (8.1%). The average catch per fishing day during the period was 1.9t, of which 1.2t was yellowfin tuna.

#### ***Fishing areas and seasons***

The highest fishing effort (48.1%) was off the north-west coast, followed by Andaman and Nicobar waters and the east coast. The vessels followed a clear operational strategy in the selection of fishing grounds with respect to different regions and months. Along the north-west coast, fishing activity starts by April and increases progressively up to September. By October the vessels start moving southwards and, from November, the main fishing activity shifts to the Bay of Bengal. By April, vessels start moving back to the west coast and, from May, fishing occurs exclusively off that coast. The pattern of effort distribution by 5° squares is shown in Figure 2.

### **Fishing by Indian-ownership, joint-venture and leased vessels**

Making use of liberal policy initiatives and institutional financing, the Indian fishing industry took up tuna fishing in the early 1990s. One industrial longliner had been in operation since 1986, and five longliners of 42 to 55m LOA were added to the fleet in 1992-1993. Due to operational constraints and economic reasons, these five vessels

discontinued operations by 1994-1995. Fresh joint-venture arrangements and leasing of vessels came into force from 1996, and in 1998 five foreign tuna longliners are in operation under these schemes. The declared catch of these vessels in the current year indicates a CPUE of 2t per fishing day, consisting of yellowfin tuna (55.5%), bigeye tuna (1%), skipjack (1.9%), swordfish (18.1%), marlin (15%), sailfish (3.9%) and sharks (4.6%). Catch statistics of these categories of vessels are given in Table 4.

### **Catches by Government of India survey and training vessels**

Catches by survey and training vessels of the Government of India also formed an important component of the longline catch from Indian waters. The details for the 1983-1997 period are given in Table 5.

### **Overall production from the oceanic fishery**

The total longline catches from Indian waters during 1983-1997 by different categories of vessels are shown in Table 6. The highest annual catch was the 12,713t reported in 1990.

## **Data Collection and Biological Research**

The Central Marine Fisheries Research Institute (CMFRI) continues to collect landing statistics from the coastal fisheries of all areas of India. The statistics are collected by state, species, and year, following a well-defined sampling system. The Fishery Survey of India (FSI) is engaged in an exploratory survey of oceanic tuna resources in the Indian EEZ. Extensive surveys in different regions of the EEZ have generated data on the availability and distribution of the larger pelagic stocks. Besides, the FSI has been collecting, processing and disseminating information regarding the operations and catches of foreign fishing vessels operated under the charter scheme. These data provide comprehensive information on commercial longline fishing for tuna by these vessels.

Biological research on various species of tuna and seerfish in the coastal fishery is undertaken by the CMFRI from different centres all over the mainland and in Lakshadweep. The FSI is engaged in a study of the biological aspects of large oceanic tunas and billfishes occurring in the longline fishery from the north-west coast of India and Andaman and Nicobar waters. Several studies have been published, and further research is in progress to provide the necessary research and development support for the fishery for tunas, billfishes and seerfishes in Indian waters.

## **References**

- Pillai, N.G.K., P.P.Pillai and K.P. Said Koya. 1996. Status report on the tuna fishery in India, with particular reference to longtail tuna, *Thunnus tonggol*. In Anganuzzi, A.A., K.A. Stobberup, N.J. Webb (eds.) 1996. Proceedings of the Expert Consultation on Indian Ocean Tuna, 6th Session, Colombo, Sri Lanka, 25-29 September, 1995: 6-8.
- Somvanshi, V.S. and M.E. John. 1996. The oceanic tuna fishery in India - an update. *Ibid.*: 1-5.

**Table 1. Estimated landings (t) of tunas, billfishes and seer fishes in the coastal fishery in India, 1991-1997.**

Species	1991	1992	1993	1994	1995	1996	1997
<b>Tunas</b>							
<i>K. pelamis</i>	5,576	6,105	12,960	7,131	7,152	7,591	7,937
<i>T. tonggol</i>	3,869	2,597	3,769	4,065	5,787	4,263	4,429
<i>E. affinis</i>	17,565	23,400	16,334	12,888	15,447	14,778	19,488
<i>Auxis</i> spp.	5,407	7,896	3,365	10,228	4,867	11,119	8,791
Tunas NEI	5,351	3,797	8,230	3,007	4,536	3,169	5,815
<b>Subtotal</b>	<b>37,768</b>	<b>43,795</b>	<b>44,658</b>	<b>37,319</b>	<b>37,789</b>	<b>40,920</b>	<b>46,460</b>
<b>Billfishes</b>	<b>1,151</b>	<b>1,747</b>	<b>2,053</b>	<b>1,722</b>	<b>1,388</b>	<b>3,889</b>	<b>4,448</b>
<b>Seerfishes</b>							
<i>S. commerson</i>	17,269	24,413	20,639	24,062	28,057	23,813	23,360
<i>S. guttatus</i>	20,019	17,438	21,174	15,982	16,855	12,250	13,255
<i>S. lineolatus</i>	46	1,027	77	45	85	93	901
<i>A. solandri</i>	451	10	1		5	22	21
Seerfishes NEI	69	69	69	936	851	1,216	3,335
<b>Subtotal</b>	<b>37,854</b>	<b>42,957</b>	<b>41,960</b>	<b>41,025</b>	<b>45,853</b>	<b>37,394</b>	<b>40,872</b>
<b>Grand total</b>	<b>76,773</b>	<b>88,499</b>	<b>88,671</b>	<b>80,066</b>	<b>85,030</b>	<b>82,203</b>	<b>91,780</b>

**Table 2. Fishing effort of chartered tuna longline vessels operated in Indian waters, 1985-1995**

Year	Number of vessels	Number of voyages	Voyage days	Sets made	Hooks operated (millions)
1985	1	1	29	26	0.04
1986	10	15	1,062	768	1.54
1987	5	9	647	513	1.23
1988	8	13	840	655	1.57
1989	30	39	3,281	2,237	6.26
1990	58	81	9,187	6,608	19.82
1991	22	26	2,869	2,224	7.18
1992	23	29	3,282	2,474	7.92
1993	28	37	2,049	1,636	5.24
1994	17	17	1,394	1,213	3.88
1995	18	24	2,452	2,137	6.84

**Table 3. Catches (MT) by chartered tuna longline vessels operated in Indian waters, 1985-1995.**

Year	Yellowfin	Bigeye	Billfishes	Others	Total
1985	3		2	2	7
1986	839	86	169	809	1,903
1987	473	66	263	104	906
1988	627	11	216	93	947
1989	2,891	56	609	434	3,986
1990	10,352	256	1,478	485	12,571
1991	3,784	343	705	366	5,198
1992	4,349	139	655	528	5,671
1993	2,071	62	461	174	2,768
1994	1,344	164	866	205	2,579
1995	1,975	40	1,021	317	3,353

**Table 4. Catches (MT) of Indian-owned/joint-venture/leased tuna longline vessels operated in Indian waters, 1986-1997.**

Year	Yellowfin	Bigeye	Billfishes	Others	Total
1986	229		32	232	493
1987	142		23	125	290
1988	99		11	116	226
1989	19		9	31	59
1990	4		7	62	73
1991	35		13	107	155
1992	11		14	84	109
1993	219	866	43	150	1278
1994	169	1076	150	85	1480
1995(P)	169	1076	150	85	1480
1996(P)	162		100	53	315
1997(P)	136		141	42	319
1998(P)	1018	18	678	114	1828

**Table 5. Catches (MT) of Government of India survey training vessels operated in Indian waters, 1983-1997.**

Year	Yellowfin	Bigeye	Billfishes	Others	Total
1983	14.0	1.5	10.8	33.8	60.1
1984	41.6	1.7	23.9	34.3	101.5
1985	114.9	0.9	18.9	47.2	183.9
1986	415.8	1.2	35.4	52.9	505.3
1987	97.7	0.7	25.3	59.3	181.0
1988	33.8	0.1	23.2	42.9	100.0
1989	11.7	0.1	12.5	20.7	45.0
1990	13.0	0.2	13.1	42.8	69.1
1991	14.2		5.3	9.2	28.7
1992	29.0	0.4	9.9	68.5	107.8
1993	8.5	0.2	5.7	56.4	70.8
1994	15.6	0.1	4.7	30.0	50.4
1995	25.4		4.9	25.5	55.8
1996	9.7		3.2	15.2	28.1
1997	18.0		7.4	16.5	41.9

**Table 6. Overall tuna production (MT) from the oceanic fishery operated in Indian waters, 1983-1997**

Year	Yellowfin	Bigeye	Billfishes	Others	Total
1983	14	2	11	33	60
1984	42	2	24	34	102
1985	118	1	21	49	189
1986	1484	87	236	1094	2901
1987	713	67	311	288	1373
1988	760	11	250	252	1273
1989	2922	56	631	486	4095
1990	10369	256	1498	590	12713
1991	3833	343	723	482	5381
1992	4389	139	679	680	5887
1993	2299	928	510	380	4117
1994	1529	1240	1021	320	4110
1995	2169	1116	1176	428	4889
1996	172		103	68	343
1997	154		148	59	361

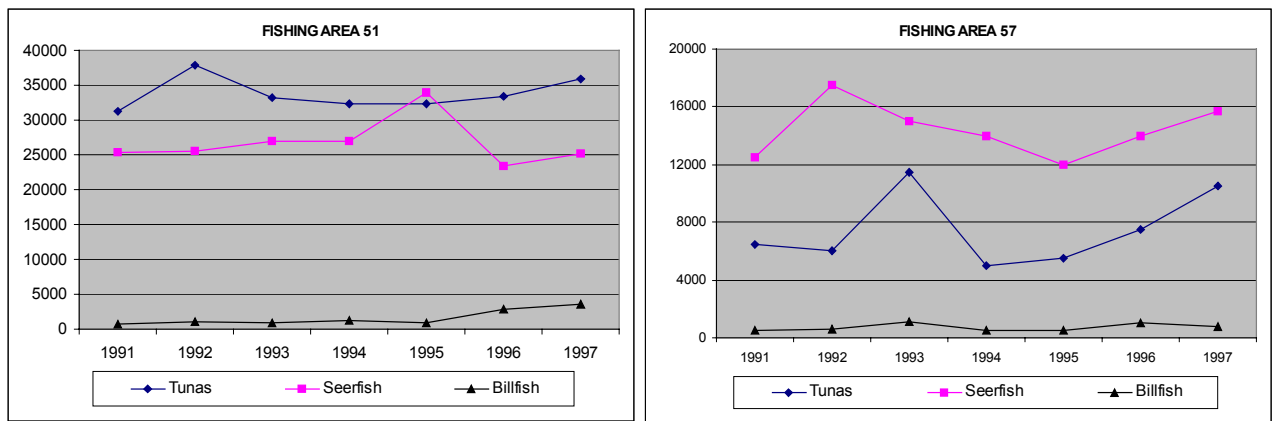


Figure 1: Production trend in Fishing Areas 51 and 57 of tuna and tuna-like species in the coastal fishery of India, 1991-97

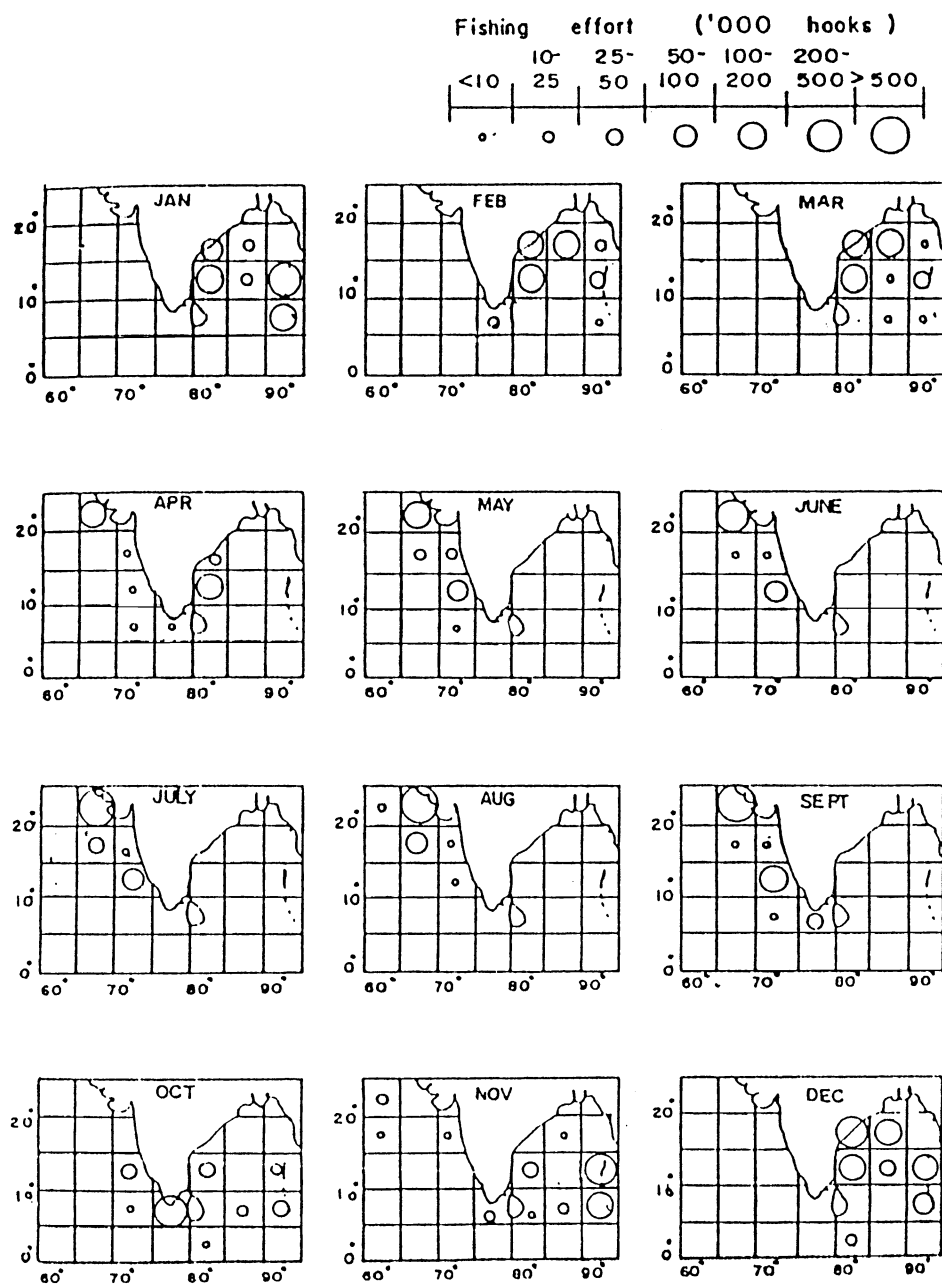


Figure 2: Monthly distribution of fishing effort by chartered vessels (Source: John, 1995).