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Historical reconstruction of Indian marine fisheries catches, 1950-2000, as a basis for testing the ‘Marine Trophic Index’

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**Fisheries Centre, University of British Columbia, Canada**

Historical reconstruction of Indian marine fisheries catches, 1950-2000, as  
a basis for testing the 'Marine Trophic Index'<sup>1</sup>

by  
Brajgeet Bhathal

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2000, AS A BASIS FOR TESTING THE 'MARINE TROPHIC INDEX'

by  
Brajgeet Bhathal

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## DIRECTOR'S FOREWORD

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This document demonstrates the occurrence of the 'fishing down' phenomenon in India's marine fisheries, i.e., the tendency, through time, for these fisheries to rely increasingly on small fishes and invertebrates low in the food webs, due to increased scarcity of large, high trophic-level predatory fish. This demonstration is remarkable for several reasons.

The first is that data were available to document this phenomenon. 'Fishing down' has been demonstrated mainly in developed countries, notably in Europe and North America, while demonstrations from developing countries has been rare. The reasons for this were, perhaps, lack of interest by developing country scientists (but see below) and the absence of suitable data, notably long catch time series of sufficient taxonomic resolution.

In India, however, reasonably detailed catch statistics, covering both the small-scale ('non-mechanized') fisheries and the industrial ('mechanized') fisheries are available for every year since 1950, which make possible an analysis that would not have been feasible for other countries in South Asia.

The second reason why this analysis is remarkable is that, contrary to analyses done elsewhere, where data sets are available which pertain to the whole country, this analysis was performed for each of India's States and Union Territories separately, with each exhibiting the 'fishing down' phenomenon.

This is certainly due to the detailed nature of Indian catch statistics, alluded to above, but also to the pre-processing of these catch statistics performed by Ms. Bhathal. This pre-processing resolved inconsistencies, filled gaps, and reduced the large amount of 'miscellaneous fish' in the statistics, while maintaining overall total catch. The painstaking procedure she employed led to internally consistent data sets, one for each of the States and Union Territories, and these are presented here as Appendix II.

The third reason why this study is remarkable is that it resembles, but still is not inspired from, the account of Vivekanandan *et al.* (Fishing the marine food web along the Indian coast. 2005, *Fisheries Research* 72: 241-252). The reason, quite simply, is that Ms. Bhathal, who visited India in July 2003 to gather the data needed for her analysis, innocently told those 'colleagues' of her research question, of which models and literature she was going to use, which temporal resolution she was hoping to achieve, etc.

It was thus easy to 'scoop' her work, especially as she was incapacitated by sickness for several months after her trip, and especially if corners could be cut, e.g., by not subjecting one's data to the same time-consuming data pre-processing that Ms. Bhathal performed.

Nevertheless, I still will encourage my graduate students to be open about their research: a few bad apples should not cause us to become secretive, and cut us off from fair and respectful exchanges.

This episode was a bump in the road for Ms Bhathal, it is true. However, her study, and its follow-up will change the way we view the future of Indian fisheries, and by extension, the fisheries of the developing world.

Daniel Pauly  
Director, Fisheries Center

## ABSTRACT

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Presently, fisheries are in deep crisis worldwide due to overfishing. Increasing intensity of fishing throughout the world has had impacts on the target species and their supporting marine ecosystems. Globally, the total catches are declining by about 1/2 million t per year since 1988. As well mean trophic level of landings are declining at a rate of 0.1 per decade. This threatens the world's food security specifically its animal protein supply, especially in developing countries.

In order to evaluate the status of marine fisheries in India, the catches were reconstructed over the period of 1950 to 2000. This reconstruction shows marine fish catches increased gradually from 0.6 in 1950 to 3.3 million t in 2000.

To determine if the Indian marine fisheries trends are ecologically sustainable or not, the mean trophic level of landings was analysed over the five decades. It was found that the fishing down marine food web phenomenon is happening all over India, i.e., in each state and union territory, similarly to the rest of the world. This trend, however, was generally not visible when the catches of small pelagics fishes were included, i.e., their variability masked the fishing down phenomenon when this was based on the mean trophic level of all shelf species. On the other hand, application of the cut off trophic level of 3.25 (i.e., excluding small pelagics and most invertebrates) made the fishing down effect visible for all states and union territories.

This analysis thus confirms the potential usefulness of the MTI (Marine Trophic Index), recently adopted by the Convention on Biological Diversity as one of the 8 indicators of biodiversity. It also confirms that the use of MTI, jointly with a TL cutoff point (i.e., <sup>3-25</sup>MTI) better reveals underlying trend than overall mean TL.

The time series of Fishing in Balance (FiB) index show an overall increase for all Indian states and union territories, suggesting a geographic expansion of the fisheries. However, in recent years, a stagnation or decline of FiB index is visible in almost all areas. This indicates a serious problem, presumably the end of the expansion phase in Indian fisheries. Overall, this historical review clearly indicates that India has suffered from sequential depletions of coastal stocks.

## DEVELOPMENT OF INDIA'S FISHERIES

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### INTRODUCTION

Fishing has been for humans an important occupation at least since the Palaeolithic period, some 90,000 years (Yellen, *et al.*, 1995) and fishing methods have gradually improved and diversified over the millennia. The impacts of fishing did not receive attention until John Cleghorn's 1854 term, 'overfishing' became an issue in the scientific community (Smith, 2002). Two leading zoologists of the time, Thomas Huxley and Ray Lankester had contradictory perspectives on this. Thomas Huxley, in 1884, stated that "probably all the great fisheries are inexhaustible", i.e., the fishes have too high fecundity for their biomass to be influenced by fishing (Hart, *et al.*, 2002; Smith, 2002). Contrarywise, Ray Lankester emphasised that the high fecundity of fishes does not imply that fishing will have no effect on them. He suggested instead, that "there is a definite place of living beings with complex interactions within their area" (Smith, 2002). This argument was partially resolved by McIntosh (1900) through a paper titled, 'The Impoverishment of the Sea', in which he presented the results of his analysis of Scottish data, which supported Lankester's argument about complex interactions, and agreed that fishing does reduce the abundance of fishes (Smith, 2002). Soon there was a growing scientific consensus that research was needed to identify the effects of fishing and through time fisheries science<sup>2</sup> had its major breakthroughs, not detailed here. For many years, fisheries scientists have tried to provide advice that could be used to prevent the overexploitation or collapse of fished stocks. However, the increasing intensity of fishing throughout the world has had impacts on the target species and their supporting marine ecosystems (Jennings, *et al.*, 2001; Pauly, *et al.*, 2002; Reynolds, *et al.*, 2002). The erroneous belief in the inexhaustibility of the sea has largely ended, except perhaps in some industry circles.

Several factors have brought global fisheries to the present plight; they range from uncertainties in stock assessments, overcapitalization, open access and common pool fisheries, shifting baselines, deterioration of coastal habitats, rapid expansion of unsustainable aquaculture enterprises to increasing consumption rates (Burger, *et al.*, 2001; Pauly, 1995; Pauly, *et al.*, 2002; Watson, *et al.*, 2001).

According to the United Nations Food and Agriculture Organization (FAO), which has been compiling catch data worldwide since 1950, there was a steady increase of fish catches until the mid-1990s, i.e., a 6% increase per year from 1950-1970, and 2% from 1970-1990 (FAO, 2000), when the catch began to level off. However, Watson and Pauly (2001) has shown that, when more realistic series of Chinese catches are substituted into the FAO fisheries statistics, they clearly indicate decline by about ½ million tonnes per year since 1988. The apparent continued increase until the mid-1990s was due to inflated catch statistics reported by China<sup>3</sup>. These new results, which confirm previous claims of global overfishing, clearly indicate that the fisheries sector is in deep crisis and that such a situation threatens the world's food security and its protein needs (Watson and Pauly, 2001), especially, in developing countries. The problems created by open access system for fisheries are further exacerbated by increases in human population growth (Hardin, 1968). For example, in India, where the population has reached over 1 billion, making the required protein available to the existing population is a challenge on its own. With an increasing population and an increasing number of fishers (10 million in 1998), the effort exerted to catch more fish is also increasing. Furthermore, the bulk of fish catches (62%) comes from coastal capture fisheries (Vivekanandan, *et al.*, 2003). Given these constraints, it becomes essential to look at the impacts of fishing on the marine environment of India. Moreover, more than 50% of global marine fisheries catches are made in developing countries, with a very large and increasing fraction of these catches entering the world market increasingly at the loss of exporting countries (Pauly, *et al.*, 2003a). Therefore, fisheries related issues in the developing world ought to be addressed and always included when discussing global fisheries issues.

As stated earlier, FAO compiles, based on member country reports, worldwide fisheries statistics. However, the datasets in question are assembled by large, arbitrary statistical areas (rather than by ecosystems), and not verified against local data sets (Pauly and Zeller, 2003a). On the other hand, there is

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<sup>2</sup> Fisheries science has been recognized as a scientific discipline since the late 1850s, when the Norwegian government hired scientists to find out why the catches of Atlantic cod fluctuated from year to year (Jennings *et al.*, 2001, Smith, 1994).

<sup>3</sup> The reason for over reporting by Chinese officials is analysed in some detail by Pang and Pauly (2001), and attributed to the incentives (promotions) associated with optimistic reports.

a growing need for catch data sets with fine spatial resolution for use in ecosystem models (Watson, *et al.*, 2004). Such an approach has already been initiated by the Sea Around Us Project ([www.searoundus.org](http://www.searoundus.org)), which has started assembling databases of the global distribution of all commercial marine species and assigning these to ½ degree latitude and longitude cells, which can then be grouped into larger areas (Watson, *et al.*, 2004).

Local data sets and better local knowledge are preconditions to better policy in the field of marine resource management (Watson *et al.*, 2004). This chapter sets the general background for this study, notably by presenting key definitions and a brief history of Indian fisheries.

## STUDY OBJECTIVE

In India, fish and fisheries have always played an important role in nutrition and livelihood. However, concerted efforts at development of Indian fisheries began only after the Independence of India (Bensam, 1999a). Then, over the span of 50 years, marine fish catches increased considerably from 0.6 to 3.3 million t<sup>4</sup>. Presently, there are too many fishing vessels, generating an excess fishing effort in various areas, especially where valuable species occur (Somvanshi, 2001a). This situation reflects the lack of appropriate fisheries management policies. It is believed that there is not much scope for further catch increase from inshore waters. Hence, the impetus in the last 20 years has been to diversify the fishing activities and exploit deeper water areas (Pillai, *et al.*, 2000).

It is thus appropriate, at this point, to collate the available data, in order to assess Indian marine landing trends and to evaluate the feasibility of Indian Government's push for growth in this sector.

Specifically, the objectives of this study are to: (1) reconstruct India's marine catches from 1950 to 2000; (2) identify changes in catch composition in space (i.e., by state and union territory) and time; (3) study the ecosystem impact of fisheries via a test of the occurrence of the "fishing down effect" by examining trends of mean trophic level of catches (Pauly, *et al.*, 1998) and; (4) use the FiB (Fishing in Balance) index to test if Indian marine fisheries are sustainable (Pauly, *et al.*, 2000).

The ultimate goal of this study is to assemble scattered data into a coherent whole and make it readily available to interested parties. Transparency of this sort should eventually increase public understanding and participation in making policy. The database on Indian fisheries developed in the process will allow a first order assessment of the fisheries over time, and an evaluation of the status of the species and populations (stocks) upon which the fisheries depend (Caddy, *et al.*, 1983; Grainger, *et al.*, 1996; Pauly, Zeller, 2003a)

For clarity, we must also define here the key term of this report. Catch refers to "the fish (or other aquatic organisms) of a given stock killed during a certain period by the operation of fishing gear(s)" (Pauly, *et al.*, 2001a). This definition implies that fish not landed, that is, discarded at sea, or killed by lost gear (ghost fishing), should be counted as a part of the catch of a fishery. It is widely recognized that catch statistics are crucial to fisheries management, as they provide the most important information about a fishery over time (Pauly and Zeller, 2003a).

## STUDY AREA

### *India*

India is located between latitudes 8° 4' and 37° 6' N and longitudes 68° 7' and 97° 25' E (Figure 1) with 28 states (9 maritime) and 7 union territories<sup>5</sup> (4 maritime) covering a total land area of about 3.3 million km<sup>2</sup> (Arora, *et al.*, 1996e). India's Exclusive Economic Zone (EEZ) covers a total area of 2.02 million km<sup>2</sup>, i.e., 0.86 million km<sup>2</sup> on the west coast; including the Lakshadweep Islands and 1.16 million km<sup>2</sup> on the east coast, including the Andaman and Nicobar Islands (Nair, 1998). The continental shelf cover half a million km<sup>2</sup> (Vivekanandan, *et al.*, 2003).

<sup>4</sup> 't' is used here for tonne, or metric ton, corresponding to 1000 kg.

<sup>5</sup> The union territories are under direct control of the India's federal government.



The country tapers off near the Tropic of Cancer into the Indian Ocean, between the Arabian Sea on the west and the Bay of Bengal on the east. These two seas are very different from each other.



**FIGURE 1.** Map of India, showing all maritime states and union territories with the Arabian Sea on the west and the Bay of Bengal in the east.

### West coast of India

The following states and union territories border the west coast of the country:

1. Maritime States
  - Gujarat;
  - Maharashtra;
  - Goa;
  - Karnataka;
  - Kerala.
2. Union Territories
  - Daman and Diu;
  - Lakshadweep.

The west coast, also known as 'Malabar coast', has a broader continental shelf (Table 3) (DAHD, 1993; 1994), with pronounced upwelling that results in high primary productivity and thus, high fish catches.

The northwest monsoon has a strong influence on the dynamics of the Arabian Sea; the seasonal cycles of the waters of the Arabian Sea are well mixed and nutrients such as nitrates and phosphates are more abundant, leading to higher plankton production (Jhingran, 1975b; Pannikar, *et al.*, 1966). The joint effect of these factors is a richer fish fauna, both in terms of diversity and in abundance. Over 75% of India's total fish landings originate from the west coast (Chandy, 1970a).

## East coast of India

The following states and union territories border the east coast of the country:

1. Maritime States
  - Tamil Nadu;
  - Andhra Pradesh;
  - Orissa;
  - West Bengal.
2. Union Territories
  - Pondicherry;
  - Andaman and Nicobar Islands.

The eastern coast, also known as 'Coromandel coast', has a narrow continental shelf (Table 3) (Chandy, 1970a; DAHD, 1993; 1994). The northeast monsoon winds, which sweep over the Bay of Bengal are moderate and have short duration. Primary production in the Bay of Bengal is relatively low and the open oceanic waters are oligotrophic (Chauhan, *et al.*, 2001; Dwivedi, 1993). Overall, this region accounts for only 25% of total Indian marine landings.

## BACKGROUND INFORMATION

### *History*

Fish and fisheries occupy an important place in Indian mythology, history and tradition. It is believed that formal knowledge on fish in India dates back to 3000 B.C. (Jhingran, 1975c). This is supported by relics such as fish remains with cut marks (indicative of their use as food), fish drawings on potteries and fish figurines from ancient sites of human civilization, such as Mohenjodaro and Harappa which thrived in the Indus valley from 2500 to 1500 B.C.<sup>6</sup> (Chandy, 1970b; Prashad, 1936; Pushkarna, 1998). Kautilya's Arthashastra (circa 300 B.C.) also has a reference to the utility of fish as food. Historically, many references to fish, their trade and fisher communities are found in the great epics, stone carvings, paintings, and even in the songs of the Sangam Age, from 1st to 4th century A.D. (Silas, 1977).

Traditionally, fishing has been the principal source of livelihood for many people living in the coastal region, and on the banks of rivers, lakes and canals. According to Hindu mythology, one of the incarnations of God was in the form of a fish, "Matsyavathara" (Silas, 1977).

Several other findings also support the significance of fish and fisheries in ancient times. For example, the second pillar edict of Ashoka forbade use of fish during the certain phases of the moon (Panikkar, 1957) which has been interpreted by Hora (1950) as reflecting existing principles of fisheries conservation; a coin from the Uttama Chola Dynasty (973 - 985 A.D.) has a seated tiger facing right, roaring at two fishes with a bow and torch behind (Mitchiner, 1979); and records in the form of traveler's diaries (for example, Pliny) to India and the guide for merchant traders known as 'Periplus of the Erythraean Sea', dating back to 2000 years, made several references to fish and their trade (Johnson, 2002; McPherson, 1993; Silas, 1977).

Sport fishing was also popular in India among the elite. King Somesvara, the son of King Vikramaditya VI, composed a book titled "Mansoltara" in 1127 A.D., to record the common sport fish of India, grouping them into marine and freshwater forms (Jhingran, 1975a).

### *Historical studies on fish fauna*

Efforts to collect the fishes of India and to describe them in the scientific literature were initiated in the 18th century, at the time of foreign domination in India. Several significant contributions were made on the systematics, distribution and bionomics of the freshwater and marine fishes.

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<sup>6</sup> The Indus Valley, or Harrapan, civilization was discovered in 1920-1921 when engraved seals were unearthed near present-day Sahiwal in Pakistani Punjab, at a place called Harappa. Excavations at Mohenjodaro, in Sind, led to the buried remains of another civilization, which used a pictographic script. This civilization extended to the Yamuna along the bed of the river Ghaggar in Rajasthan, Gujarat and up to the mouths of the rivers Narbada and Tapi. The major sites of this civilization are in present-day Pakistan.

Research work done on fisheries in the 18th and 19th century, in general, was confined to observations recorded by some officers of the erstwhile East India Company.

Some of the important achievements for Indian ichthyology based on Day (1873); Jhingran (1975b); Bensam (1999c) and Pauly (2004) are the following:

- 1785: Marcus Eliezer Bloch publishes “Ausländische Fische” and “Icthyologia”;
- 1801: Joseph Gottlob Schneider extends Bloch’s work on the “Icthyologia”;
- 1798–1803: Bernard Germain Etienne de Lacepède publishes his “Histoire des Naturelle Poissons”;
- 1803: D. Russel describes 200 fish species from ‘Vizagapatnam’ (now Vishakapatnam);
- 1822: Francis Hamilton presents his pioneer work, “An account of the fishes in the river Ganges and its Branches”;
- 1828-1849: Georges Cuvier and Achille Valenciennes published their masterpiece, “Histoire Naturelle des Poissons”;
- 1839-1860: John McClelland, Pieter Bleeker, Edward Blyth, Albert Günther and others add to the knowledge of Indian fishes;
- 1876-1878: Francis Day, then Inspector-General<sup>7</sup> of fisheries in India completes his monumental work on the “Fishes of India”, still a major reference in the Indian region.

During the closing of the 19th century and starting of 20th century, officials of the Marine Survey of India and the Zoological Survey of India undertook numerous studies on fishes and other aquatic fauna (BOBP, 1982). A report by the Industrial Commission of 1916-1918 stipulated that the central government should promote studies on fisheries.

In the 1930s, Dr. Stanley Kemp, Director of the Marine Biological Laboratory, Plymouth, U.K. and the former Director of the Zoological Survey of India, also emphasized the need to improve knowledge on Indian fishes (Bensam, 1999b). In the twentieth century, a biologist, S. L. Hora (1920-1956) also made considerable contributions to fish systematics (Bensam, 1999a). *FishBase* ([www.fishbase.org](http://www.fishbase.org)) may be consulted for a comprehensive bibliography on Indian ichthyology.

## *Development of marine fisheries*

### Before Independence (1947)

The first formal step toward the development and management of marine fisheries was an enactment of the Indian Fisheries Act of 1897, delegating various erstwhile provinces with the responsibility of fisheries administration and management (Bensam, 1999a; d; BOBP, 1982; Chidambaram, 1982). However, in pre-Independence times, regulations regarding the fisheries were essentially revenue-oriented, and expressed little interest in the development of the fisheries. The first fisheries department explicitly aimed at developing the fisheries was the Madras Presidency, organized in 1907 by Sir F. Nicholson, also called the “Father of Indian Fisheries Development” (Bensam, 1999c; Devanesen, *et al.*, 1953).

Overall, however, Indian marine fisheries were neglected until the 1940s. The Second World War (1939-1945) changed this. During the war, India provided bases for American and other allied army personnel and this brought the problem of supplying adequate amounts of good quality fish. This scarcity of food led to interest in expansion of marine fisheries. As a result, Dr. Beni Prasad, then the director of the Zoological Survey of India, was asked to inquire and write a report on Indian fisheries (Bensam, 1999a).

Before 1947, Tamil Nadu, West Bengal and Travancore (now in Kerala) were the only states which had a separate department of fisheries (Samuel, 1968a).

### After Independence (1947)

After Independence (1947), concerted efforts were undertaken to develop Indian fisheries, as expressed through a succession of National Five Year Plans. The First Plan was initiated under Prime Minister Nehru

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<sup>7</sup> Francis Day joined as a veterinary surgeon in the British Army and was initially stationed in southern India. He developed an intense interest in Indian fishes and fisheries and soon become Inspector General of fisheries in India and Myanmar (Bensam, 1999b).

in 1951 as a part of an effort to strengthen the country's economic and social structure, and to stimulate overall growth of the country (industrial, economic, scientific and technical).

It was felt in the 1950s that the development of fisheries would be one of the most promising means of improving the Indian diet. Fisheries planning in India was then officially guided by the same goals as agriculture, i.e., increasing production and equitable distribution. However, with time, the priorities of the central government gradually shifted from providing fish as a protein supply to the poor (First Five Year Plan) towards increasing foreign exchange reserves (Ninth Five Year Plan) (Table 1).

**Table 1.** Major developments and objectives of successive Five Year Plans. Sources: GOI, 1951, 1956, 1961, 1969, 1974; Silas, 1977; GOI, 1980, 1985, 1992, 1997; Bensam, 1999c; Johnson, 2002 and Vivekanandan, *et al.*, 2003.

Plan period	Duration	Main objectives and developments
I	1951-1956	<ul style="list-style-type: none"> <li>• Increase fish catch by introduction of mechanized boats;</li> <li>• Improve ground facilities and supplies to fishers;</li> <li>• Improve fisheries statistics and training facilities;</li> <li>• Initiate the charting for deep sea fishing grounds and develop newly located ones.</li> </ul>
II	1956-1961	<ul style="list-style-type: none"> <li>• Further expansion of existing activities related to mechanization and introduction of new vessels and gear materials;</li> <li>• Further improvement of infrastructure for training, preservation, processing, storage and transportation;</li> <li>• Improve statistical information regarding production, supply and marketing of fish;</li> <li>• Organizing multipurpose co-operative societies to encourage development of fishers.</li> </ul>
III	1961-1966	<ul style="list-style-type: none"> <li>• Designing of improved mechanized fishing vessels and gear materials;</li> <li>• Adequate equipments and facilities for preserving fish and their marketing;</li> <li>• Impetus towards development of fisheries education, research institutes, improves condition of fishers and export trade.</li> </ul>
Annual Plans	1966-1968	<ul style="list-style-type: none"> <li>• Encourage export trade.</li> </ul>
IV	1969-1974	<ul style="list-style-type: none"> <li>• Expansion of export trade;</li> <li>• Initiation of deep sea fishing by import of trawlers and indigenous construction of deep sea trawlers;</li> <li>• Construction of fishing harbours at major and minor ports;</li> <li>• Intensification of exploratory fishery surveys.</li> </ul>
V	1974-1979	<ul style="list-style-type: none"> <li>• Motorization of artisanal craft and introduction of purse seines in 1977;</li> <li>• Development of fishing harbours;</li> <li>• Declaration of EEZ (1977).</li> </ul>
Annual Plans	1979-80	<ul style="list-style-type: none"> <li>• Development of diversified fishery products.</li> </ul>
VI	1980-1985	<ul style="list-style-type: none"> <li>• Motorisation of artisanal crafts;</li> <li>• Exploratory surveys in offshore grounds;</li> <li>• Promulgation of Maritime Zone of India Act, 1981;</li> <li>• Encouragement to deep sea fishing through licensing, chartering and joint venture vessels.</li> </ul>
VII	1985-89	<ul style="list-style-type: none"> <li>• New chartering policy (1989);</li> <li>• Development of post-harvest technologies.</li> </ul>
Annual Plan	1990	<ul style="list-style-type: none"> <li>• Development of deep sea fishing.</li> </ul>
Annual Plan	1991	<ul style="list-style-type: none"> <li>• Substantial growth in motorized artisanal fleet of ring seiners.</li> </ul>
VIII	1992-1996	<ul style="list-style-type: none"> <li>• Deep sea fishing by joint venture;</li> <li>• Development of coastal aquaculture;</li> <li>• Substantial growth in motorized artisanal fleet of ring seiners;</li> <li>• Export trade changes from a resource-based to food engineering industry.</li> </ul>
IX	1997-2002	<ul style="list-style-type: none"> <li>• Increase fisheries production (aquaculture and offshore fisheries);</li> <li>• Further diversify and modernize fisheries and fishery products;</li> <li>• Intensify research activities.</li> </ul>

The major thrust in marine fisheries throughout that time was to increase mechanization and foster to transition from inshore towards offshore, i.e., to encourage deep sea fisheries. During the first five of the Five Year Plans and intervening three annual plan years (1951-1979), special emphasis was given to the introduction of mechanized fishing boats and remove the 'middlemen' involved in fish marketing through establishment of co-operative societies.

However by 1961, it was realized that co-operatives set up mainly to avoid the perceived exploitation of fishers by 'middlemen' were not very successful (BOBP, 1982; GOI, 1951; 1956; 1961; 1969; 1974; Johnson, 2002). In the 1980s, the top priority of planning in India was fast economic growth and self-sufficiency in food through the agriculture sector. The Sixth and Seventh Five Year Plan (GOI, 1980; 1985) explicitly addressed the severity of the balance of payments deficit that India faced from the mid 1970s on. In 1991, India nearly defaulted on a loan of the International Monetary Fund (IMF) and its only escape was to agree to a liberalization strategy drawn up by the IMF. This included the phased reduction of import duties, the promise to shrink government and to reduce reliance on subsidies (Byers, 1998; Johnson, 2002). At this point, India tried various means to increase its foreign exchange earnings; one of these was to promote the marine fisheries sector.

However, by the end of 1991, it was realized that the marine fisheries were reaching near maximum levels of production in the inshore areas (and overexploited at various locations) and that no substantial increase in production could be expected. Therefore, the emphasis of fisheries development shifted towards expansion of the inland sector and aquaculture, and towards the offshore and deep sea fisheries (ICAR, 1998; Johnson, 2002). This led to the announcement of a Deep Sea Fishing Policy in 1991.

One of the crucial elements of all these Five Year Plans was the intention to strengthen the network of research and educational institutions meant to support fisheries. The history of some of these research institutions is given in the section below.

### *Development of fisheries research institutions*

#### Before Independence

Many reports were published after the First World War by committees and specialists, aiming to encourage the expansion of fisheries. During this post-war development phase, Dr. Beni Prasad was asked to review the fisheries of the country and to recommend necessary measures for their development.

In his historical memorandum "Post-war development of Indian fisheries" submitted in 1941, a definite programme to develop a research department for fisheries was proposed for the first time (Bensam, 1999a; Prasad, 1944).

Then, in the 'Kharegat Memorandum' (1944), the advisory board of the Indian Council of Agriculture Research (ICAR) laid down the essential elements of fisheries development to be achieved in the country. Among these were: (1) establishment of a Central Fish committee and of a fisheries research station; (2) starting a pilot project for mechanization of catching, and for storing catches; (3) development of pond culture practices; and (4) improvement of fish transport (Panikkar, 1957).

Another important document was a report of the Fish Subcommittee of the Policy Committee No. 5 on Agriculture, Forestry and Fisheries, which embodied the results of country wide surveys carried out by the Fish Subcommittee, with Dr. Prasad, fishery development adviser to the Government of India (BOBP, 1982; GOI, 1945a; Samuel, 1968a). Reports of the 'Bengal Famine Commission' (GOI, 1945b) and on the 'Scientific Research in India' (Hill, 1945), also emphasized fisheries as an essential aid to increase the country's food supply (Panikkar, 1957).

As result, a Deep Sea Fishing Station was set up at Mumbai in 1946, whose main functions were mapping of fishing grounds and the training of deep sea fishing personnel (Bensam, 1999b; CMFRI, 1987a). In 1946, Lt. Col. Dr. Seymour Sewell also submitted a memorandum on the proposed fisheries research institute. He recommended the creation of a marine fisheries research station in Karachi (present-day Pakistan) for the west coast, and another in Mandapam (Tamil Nadu) for the east coast (Bensam, 1999a). Sewell's recommendations covered pre-Independence India as a whole, but the Partition, resulted in numerous changes.

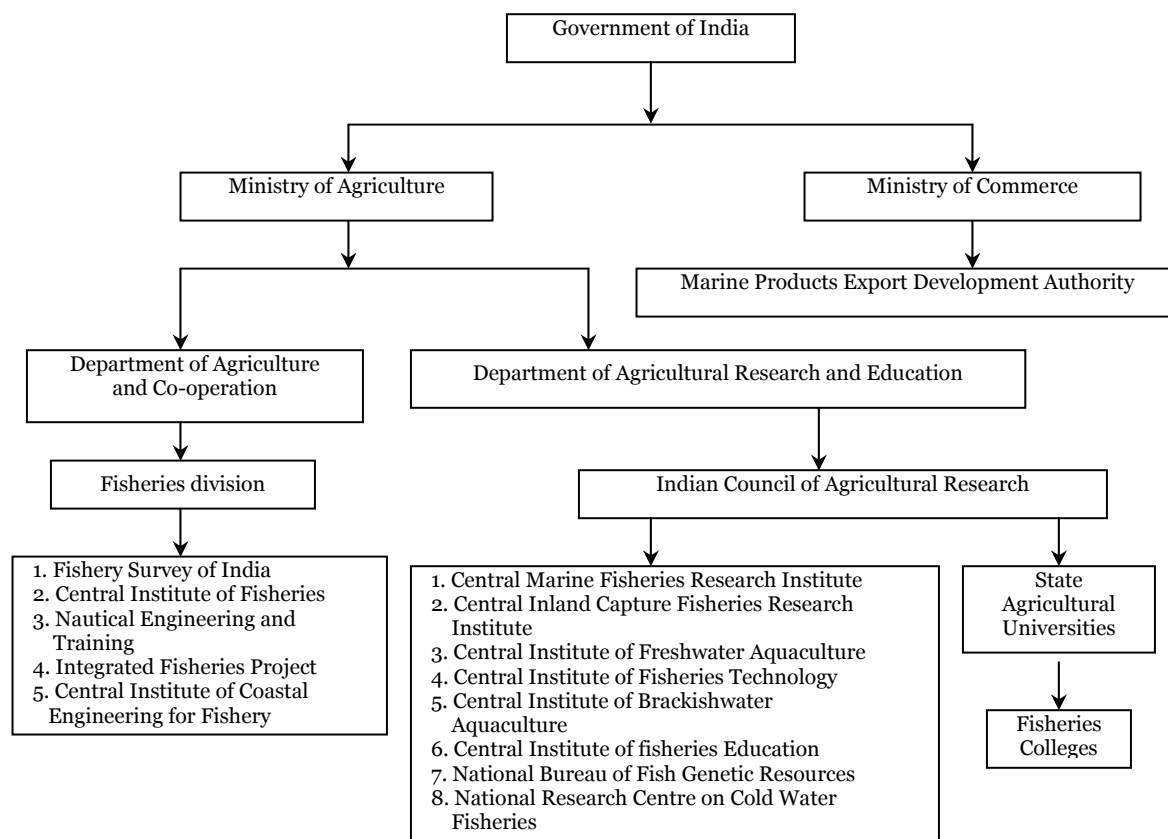
#### After Independence (1947)

On 3rd February 1947, just after Independence, the Government of India, through its ministry of Food and Agriculture, established the Central Marine Fisheries Research Station (renamed Central Marine Fisheries Research Institute [(CMFRI) in 1962] in Mandapam, with a mandate of conducting biological research on

fisheries (Figure 2). In October 1967, the management and administrative control of the Institute was transferred from the Ministry of Food and Agriculture to the Indian Council of Agriculture Research, and its headquarters were also shifted from Mandapam, Tamil Nadu to Kochi, Kerala (ICAR, 1998; James, 1987).

After Independence, two more stations were established: the Offshore Fishing Station (OFS) at Tuticorin (Tamil Nadu) and Vishakapatnam (Andhra Pradesh) and the Exploratory Fisheries Project (EFP) at Kochi (Kerala). In 1983, these various entities, along with the Deep Sea Fishing Station, were merged into the Fisheries Survey of India (FSI), with headquarters in Mumbai (Bensam, 1999b; Sudarsan, 1987). The FSI's main objective was to conduct surveys of the fishery resources and charting of fishing grounds in the Indian EEZ.

In 1952, the Indian Government drew international assistance through the Indo-Norwegian Project, the product of a tripartite agreement between the governments of India, Norway and the United Nations. The main objectives of this project were to study the operational efficiency and commercial feasibility of different crafts and gears, propagate various fishing methods, train personnel and provide technical consultancy services (Johnson, 2002; Sandven, 1959; Sathiarajan, 1987). In 1972, the agreement with the Government of Norway was terminated and the project's administration was taken over by the Government of India, as 'Integrated Fisheries Project' (IFP), with three substations managed by the respective state fisheries division (Bensam, 1999c; Sathiarajan, 1987).



**Figure 2.** Organization chart given above clearly shows that fisheries research institutes in India are under control of the Ministry of Agriculture except MPEDA, with two main departments: Department of Agriculture and Co-operation and Department of Agricultural Research and Education.

In 1954, the Government of India appointed a committee to consider steps toward the development of the fishing industry. Following the recommendations of this committee, a Central Fisheries Technological Research Station (re-designated Central Institute of Fisheries Technology (CIFT) in 1962) was established in Kochi in 1957. The activities of the institute are oriented towards designing craft and gear appropriate for Indian waters (Bensam, 1999b; Nair, 1987).

The Central Institute of Fisheries Education (CIFE) was founded in 1961 in Mumbai to improve fisheries education. It has its ancillary institutions in Barrackpore (West Bengal), Agra (Uttar Pradesh), and Hyderabad (Andhra Pradesh) (Sreekrishna, 1987). In the same year, the Marine Products Export Promotion Council was set up (Johnson, 2002). This statutory body was renamed Marine Products Export Development Authority (MPEDA) in 1972, and put under the Ministry of Commerce. It is vested with the responsibility for developing the Indian seafood industry with special reference to exports (MPEDA, 1987).

In 1963, the Central Institute of Fisheries Nautical and Engineering Training (CIFNET) was founded at Kochi in 1963 to provide technical training for crew of ocean going fishing vessels. CIFNET also provides technical consultancy services and conduct studies on fishing craft, gear and equipments to accelerate development in fishery technology (Swaminath, 1987).

All fisheries research institutes listed above fall under the Ministry of Agriculture, except MPEDA, which falls under the Ministry of Commerce. The majority of these institutes operate under the ICAR, and have regional offices spread all along the Indian coast (Figure 2).

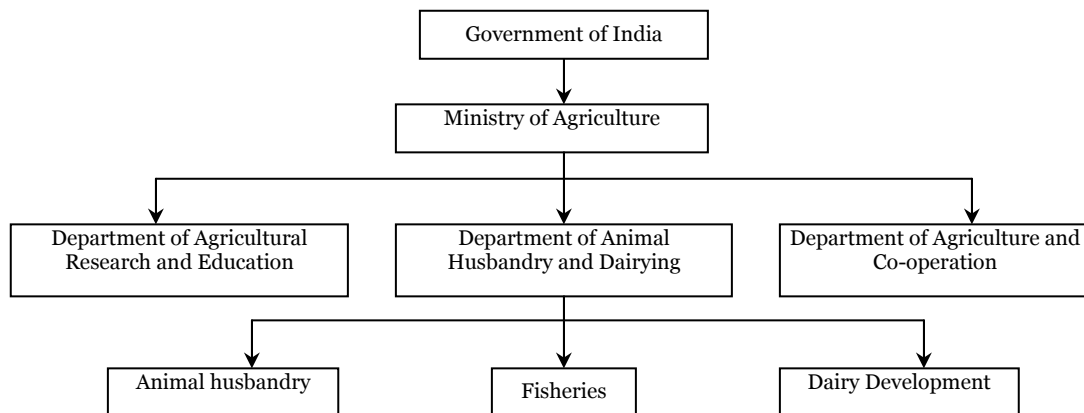
### *Regulatory bodies*

Fisheries in India are regulated by both the Central and the State Governments, responsible for the EEZ outside of territorial waters and for the territorial waters respectively (GOI, 2004a). Role of federal government is explicitly stated in the Constitution of India, Part XII, Chapter 3, article 297<sup>8</sup>:

Things of value within territorial waters or continental shelf and resources of the exclusive economic zone to vest in the Union:

- All lands, minerals and other things of value underlying the ocean within the territorial waters, or the continental shelf, or the exclusive economic zone, of India shall vest in the Union and be held for the purposes of the Union.
- All other resources of the exclusive economic zone of India shall also vest in the Union and be held for the purposes of the Union.
- The limits of the territorial waters, the continental shelf, the exclusive economic zone, and other maritime zones, of India shall be such as may be specified, from time to time, by or under any law made by the Government of India.

Schedule VII, Article 246, Entry 21 of List II specifies fisheries as the responsibility of the states (Somvanshi, 2001a; Yadav, 2001). Hence, both the governments play a vital role in management, conservation, development and monitoring of India's fisheries. Since, there is no separate Fisheries Department at the national level, therefore, the administration of fisheries lies within the Ministry of Agriculture (Figure 3).



**FIGURE 3.** Position of fisheries within the Government of India.

<sup>8</sup> The Article 297 was amended in 1963, according to which the limits of territorial waters were extended from 3 to 12 nautical miles. The Act of the Maritime Zones defines the extension of the territorial waters to 12 nautical miles (Nawaz, 1981).

## *Legal instruments*

### International

Some of the important global, legal, voluntary and advisory instruments regarding marine habitat in which, India is participating are the following (Chaudhary, 2000; Froese, *et al.*, 2002; Mathews, 2001; Somvanshi, 2001a; Yadav, 2001) :

- International Whaling Commission (ICW), 1946;
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973;
- Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), 1980;
- UN Convention on the Law of the Sea (UNCLOS), 1982 (entered into force in 1994);
- Agenda 21 of Rio Earth Summit, 1992;
- Convention on Highly Migratory Fish Stocks and Straddling Fish Stocks, 1995;
- Code of Conduct for Responsible Fisheries, 1995;
- Agreed Measures for the Conservation of Antarctic Fauna and Flora, 1964 (entered into force in 1982);
- Asia Pacific Fishery Commission (APFIC), 1948;
- Convention on Biological Diversity (CBD), 1992 (entered into force in 1993);
- Convention on the International Maritime Organization (IMO Convention), 1948 (entered into force in 1958);
- Indian Ocean Fishery Commission (IOFC), 1967;
- Indian Ocean Tuna Commission (IOTC), 1993 (entered into force in 1996);
- Indo-Pacific Fishery Commission (IPFC), 1960.

For more information on international treaties and conventions signed by India, see *FishBase* ([www.fishbase.org](http://www.fishbase.org)) and *Sea Around Us* ([seararoundus.org](http://seararoundus.org)).

### National

The British Government enacted the Indian Fisheries Act of 1897, which restrained certain injurious fishing activities in seas and inland waters. This Act banned and penalized the usage of explosives and poisons to catch fish and also empowered the provincial governments to frame rules under it (Bensam, 1999c; BOBP, 1982; Srivastava, *et al.*, 1991). It is still in force and various states and union territories have introduced fishery legislations under its enabling provision.

Following Independence, various Acts, regulations and guidelines were promulgated. Details of main ones are listed chronologically below (Choudhury, 1987; Nawaz, 1981):

- The Marine Products Export Development Authority Act, 1972;
- The Territorial Waters (12 nautical miles), the Contiguous Zone (24 nautical miles), the Continental Shelf (200 nautical miles), the EEZ and other Maritime Zones Act, 1976;
- The Indian Coast Guard Act, 1977;
- The Declaration of Exclusive Economic Zone (EEZ) in May 1976 (but which, came into force in 1977);
- The Maritime Zones of India (Regulation of Fishing by foreign vessels) Act came in place in 1981 to regulate fishing by foreign fishing vessels in India's EEZ. Although chartering of foreign fishing vessels was permitted as early as 1976, the detailed rules in Act were framed in 1982, to forbid fishing by foreign vessels in coastal areas. Subsequently, the rules were modified for chartered vessels requiring that they shall fish:
  - i. Beyond 24 nautical miles from the shore on the west coast as a general rule (with some exceptions<sup>9</sup>);
  - ii. Beyond 12 nautical miles from the shore on the east coast (with some exceptions<sup>10</sup>);

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<sup>9</sup> Off the Maharashtra-Gujarat coastline, fishing is not allowed by foreign vessels between the coastline and the line joining the following points: 22° 54' N-67° 33'E, 21° 33'N- 68° 56'E, 19° 02'N-72°E, 18° 33' N- 72°E, 18°N-72° 31'E. Similarly off the Kerala-Tamilnadu coastline fishing is not permitted to foreign vessels in the areas defined by the following points: 7° 45'N-77°E, 7° 45'N-78°E, 7° 30'N-78°E, 7° 30'N- 77°E (Somvanshi, 2001).



- In 1991, the Deep Sea Fishing Policy (DSFP) was announced which allowed leasing of foreign fishing vessels for operation in Indian waters beyond 12 nautical miles and joint ventures between Indian and foreign company in deep sea fishing, processing and marketing (Atookaren, 1991; Das, 1993). However, because of protests from local fishers, this policy was rescinded in 1997 (Vijayakumaran, *et al.*, 1998). Thereafter, no new licenses were granted to joint venture companies to operate in the EEZ (MOEF, 2002). There is an interest in strengthening the deep sea fishing policy in order to encourage the exploitation of deep water resources. However, opinions on this are very diverse, many supporting and others opposing the involvement of foreign companies on supporting traditional fishers (Bhandarkar, 1999; Dehadrai, 1999; Dixitulu, 1999; Kocherry, 1999; Sathiadhas, 1999; Vijyakumaran, 1999).
- In 2002, new set of guidelines came with an order issued by union Department of Animal Husbandry and Dairying (DAHD) for fishing operations in EEZ. These guidelines are similar to the 1991 provision of DSFP, but its main focus is registration status of the foreign fishing vessels and the promotion of deep sea fishing in the Indian EEZ (Anonymous, 2002). These guidelines have been criticized as favouring foreign deep sea fishing vessel operators registered as Indian companies (Mathew, 2003) given its two major provisions: (1) deep sea fishing vessel above 20 m can take a mid transfer of fish and can leave the Indian EEZ for foreign port, (2) there is no obligation for the vessels to return to the base port in India within a stipulated period. The provision of transfer of catch at high sea was even included in DSFP of 1991 because of requests by purse seine owners (mainly targeting tuna) to grant a waiver from the requirement to report back to base ports before export. They argued that it would involve avoidable fuel expenditures and makes the project unviable. As a result, to encourage tuna purses seining operation in India, the transfer/export of catch in high seas was permitted, but only after issuance of certificate by reputed surveyors (Das, 1993).

There are no regulations regarding the operations of Indian vessels beyond her territorial waters (Anonymous, 2002), but various Marine Fisheries Regulation Acts (MFRAs) were enacted by the maritime States, under a model bill circulated by the Government of India in 1979 (Yadav, 2001).

#### State

A review of Indian fishery laws and regulations reveals that their primary intent is to prevent and minimize the disputes and conflicts among different sectors of the industry (James, 1992b). However, most of these rules and regulations do not seem to have included adequate provisions regarding the undertaking of responsible fishing activities, such as imposing mandatory input and/or output controls.

The list of major regulations concerning marine fisheries for all coastal states and union territories is as follows (Arora, *et al.*, 1996a; b; c; d; Atookaren, 1991; Davidar, 1968; James, 1992b; JICA, 1999; MOEF, 2002; Nawaz, 1981; Rajguru, 1994; Somvanshi, 2001a; Vivekanandan, 2003; Yadav, 2001):

#### Gujarat

- The Indian Fisheries Act as adopted and applied by the State of Saurashtra<sup>11</sup>. 1897.

#### Maharashtra

- The Maharashtra Fisheries Act, 1961;
- The Maharashtra Marine Fishing Regulation Act, 1981.

#### Goa

- Indian Fisheries (Goa, Daman, Diu Amendment Act), 1968;
- The Goa Marine Fishing Regulation Act, 1980.

#### Karnataka

- The Mysore Game and Fish Preservation Act 2, 1901;
- The Karnataka Marine Fishing Regulation Act, 1986.

#### Daman and Diu

- Indian Fisheries (Goa, Daman, Diu Amendment Act), 1968.

<sup>10</sup> Fishing is allowed only beyond 24 nautical miles between the Nizampatanam (Andhra Pradesh) and Paradeep Port (Orissa) and is not allowed between the areas covered by coastline and the line joining the following points in the north of Chilka (Orissa) and up to Bangladesh boundary: 19° 22'N-85° 30'E, 20°N-86° 56'E, 20° 42'N-88°E, 21° 08'N-89° 07'E, 21° 16'N-89° 14'E (Somvanshi, 2001).

<sup>11</sup> The peninsular landmass of Gujarat state has been known as 'Saurashtra' since ancient times (Rajguru, 1994).

## Lakshadweep

- The Lakshadweep Marine Fishing Regulation Act, 2000.

## Kerala

- The Game and Fish Protection Regulation Act 12 of 1914, Government of Travancore (modified in 1921);
- Cochin Fisheries Act 3 of 1917 (modified in 1921), Government of Cochin;
- The United Provinces Fisheries Act 45 of 1948;
- Government of Travancore-Cochin Fisheries Act 34, 1950<sup>12</sup>;
- The Kerala Marine Fishing Regulation Act and Rules, 1980 (Act 10 of 1981).

## Tamil Nadu

- Nilgiris Game and Fish Preservation Act II of 1879, Government of Madras ('Madras' was renamed as Tamil Nadu in 1969);
- Government of Bengal and Madras Amendment Act 1929 (Act 11 of 1929);
- The Tamil Nadu Marine Fishing Regulation Rules, 1983.

## Andhra Pradesh

- Executive Order 1983 of the Government of Andhra Pradesh;
- Indian fisheries (Andhra Pradesh Extension and Amendment Act), 1961.

## Orissa

- The Orissa Marine Fishing Regulation Act, 1981 (Orissa Act 10 of 1982);
- The Orissa Marine Fishing Regulation Rules, 1983;
- Judgement by the Orissa High court making mandatory the use of Turtle Exclusion Devices (TED) by fishing trawlers (1998).

## West Bengal

- Bengal Private Fisheries Protection Act 2 of 1889;
- Government of Bengal and Madras Amendment Act 11 of 1929;
- Fisheries (Requisition and Acquisition) Act, 1965.

## Pondicherry

- The Indian Fisheries (Pondicherry Amendment), Act 18, 1965.

## Andaman and Nicobar

- Andaman and Nicobar Islands Fisheries Regulation 1 of 1938.

The states with no Marine Fishing Regulation Acts (MFRAs) are following ad hoc decisions to prevent or tackle conflicts between the artisanal and mechanized sector (James, 1992b). The demarcation of zones between non-mechanized and mechanized fishing vessels<sup>13</sup> under MFRAs for selected states are given in Table 2. It is noteworthy that 'traditional' vessels can fish anywhere in the sea, while limits exist for other categories of vessels. All these laws (MFRAs) are enacted in response to local issues, and lack uniformity. Based on complaints in demarcating the areas based on distance from shore and not on depth, several provisions related to depth were also added to existing regulations. For example, in MFRA of Kerala the coastline is divided into two parts, south and north. In the south Kerala, 16 m depth have been reserved exclusively for the artisanal craft, 16 m - 20 m depth zone only for the motorized crafts and, 40 m - 70 m depth zone for the small mechanized vessels (< 25 GRT) (Vivekanandan, *et al.*, 2003; Vivekanandan, 2003).

The states on the west coast, i.e., Gujarat, Kerala and Karnataka have been implementing closures of fishing operations by mechanized vessels during the monsoon season for the past decade or two. The decision on seasonal closure is taken on a year-to-year basis, normally prior or during the onset of southwest monsoon.

In 1996-1997, meetings were held among state fisheries authorities and union ministry of agriculture, where it was decided that there will be uniform closed seasons for fishing from the 10th of June to the 15th of August (65 days) along the west coast and from the 15th of April to the 31st of May on the east coast. However, the respective state governments have not implemented this decision strictly. In 1999, Andhra Pradesh observed 40 days closure, from April to May. The states of Kerala and Goa have also specified

<sup>12</sup> In July 1949, the states of Travancore and Cochin were united and are named the united State of Travancore and Cochin.

<sup>13</sup> Mechanized vessels are classified according to size and their area/depth of operation is delineated accordingly (Srinath, 2003).

legal mesh sizes for the trawl cod ends i.e., 35 mm and 20 mm, respectively (James, 1992b; Somvanshi, 2001a).

**TABLE 2.** Marine Fishing Regulation Act of selected states, which have demarcated fishing areas for mechanized and non-mechanized vessels (Somavanshi, 2001; Devaraj, 1999). OAL: overall length, GRT: gross tonnage.

States	Marine Fishing Regulation Act	Reserved for traditional vessels	Available to mechanized vessels
Goa	MFRA 1980	Up to 5 km	Beyond 5 km
Maharashtra	MFRA 1981	Up to 5-10 fathoms depth	Beyond 10 fathoms depth
Karnataka	MFRA 1980	Up to 6 km	< 15m OAL: 6-20 km; >15m OAL: beyond 20 km
Kerala	MFRA 1980	Up to 10 km	< 25 GRT: 10-22 km; >25 GRT: beyond 23 km
Tamil Nadu	MFRA 1983	Up to 3.4 nautical miles	Beyond 3.4 nautical miles
Orissa	MFRA 1984	Up to 5 km	< 15m OAL: 5-10 km; >15m OAL: beyond 20 km
Andhra Pradesh	MFRA 1985	Up to 10 km	< 20m OAL: 10-23 km; >20m OAL: beyond 23 km

### *Different sectors of fisheries*

Marine fisheries in India are characterized by a great diversity of marine resources (fishes, crustaceans, molluscs etc.), exploited by various types of fishing vessels and gears. The marine fishing sector of India can be subdivided into four distinct groups (CMFRI, 1980; Sathiadas, *et al.*, 1995):

- Non-mechanized (artisanal) sector using country craft with traditional gears;
- Mechanized sector using traditional craft with outboard motors (OBM) of less than 50 hp, most with 7-9 hp (commonly referred as motorized sector);
- Mechanized sector using inboard motors (IBM) of 50-120 hp (32' to 51' OAL);
- Deep sea fishing sector (boats 25 m and above or over 70' OAL) using engines of 120 hp and above.

Gears of traditional design and non-mechanized vessels are concentrated in the shallow inshore coastal waters in depth range up to 50 m. Mechanized and deep sea vessels also exploit the resources of deeper off shore waters (Chandy, 1970a; Jhingran, 1991).

### Non-mechanized artisanal sector

Owing to different sea conditions, different types of boats evolved on the two coasts of India, with plethora of different names applying to them. In this section, the most widely used traditional crafts on the east and the west coast are mentioned, with their categorization based on type of construction only (BOBP, 1982; 1983; 1983b; 1984; 1990; Mohapatra, 1986; Sathiadas, *et al.*, 1995):

- Catamarans;
- Canoes;
- Plank built boats.

The major gears deployed by artisanal vessels without any sort of mechanical device are the following:

- Hooks and lines;
- Gillnets;
- Seines (from boat and shore);
- Bag nets;
- Traps.

### Mechanized units with outboard engine

Most traditional crafts mentioned above, operating from different maritime states were modified to accept outboard engines of 5 to 9 hp, in order to increase their catching efficiency. The first set of outboards motors introduced were of 3 hp only and subsequently larger OBM's were introduced (Pillai, *et al.*, 2000; Srivastava, *et al.*, 1991).

### Mechanized units (small) with inboard engines

The majority of the units enumerated below exploit inshore waters, down to 50 m (Sathiadas, *et al.*, 1995; Somvanshi, 2001a):

- Small trawlers (all maritime states);
- Pair trawlers (Gulf of Mannar and Palk Bay regions of Tamil Nadu);
- Purses seiners (south west i.e., Kerala, Karnataka, Goa and southern Maharashtra);
- Gillnetters (all maritime states).

Each of these categories (mechanized, motorized and non mechanized) has several subdivisions and numerous local names, specific to the respective states (BOBP, 1982; 1983b; 1984; 1990; Chandy, 1970c; Chennubhotla, *et al.*, 1999; CMFRI, 1988; Pillai, *et al.*, 2000; Thirumilu, *et al.*, 1994).

### Deep sea fishing sector

The major types of fishing vessels used for deep sea fishing are (Sathiadas, *et al.*, 1995):

- Deep sea trawler (25 m OAL and used for catching prawns);
- Deep sea tuna long liner (34 m OAL and used for catching tuna);
- Deep sea multi purpose vessels (26 m OAL and used for catching both prawns and fishes with more emphasis given to prawns because of high value return).

### *Progress of different sectors through time*

Initially, the non-mechanized sector was the only sector in existence. Indian fishers used the age old craft and gear evolved centuries ago. However, with the advent of new technologies, a gradual shift occurred towards the mechanized sector.

No doubt, intensive efforts to develop the fisheries started after 1947. However, the Government of Bombay (now called Mumbai) made a first attempt to introduce trawling in 1900 by using a steam trawler. Subsequently, several similar experimental and exploratory surveys were conducted until Independence (Mukundan, *et al.*, 1998; Somvanshi, 2001a; Somvanshi, 2001b). Then, in the mid and late 1950s, a few state governments, notably Tamil Nadu and Andhra Pradesh commenced mechanization with the collaboration and assistance of FAO and the Indo-Norwegian project. Similar efforts were thereafter deployed by other states (BOBP, 1983; 1984; Kochary, *et al.*, 1996; Pillai, *et al.*, 2000; Thomas, 2000; Vivekanandan, 2003).

Soon, experimental trawling mutated into a commercial venture at Kochi (Kerala) in early 1960s and then spread to other parts of the country (Mukundan and Radhalakshmy, 1998). Since then, trawling has become widespread all along the Indian coast and the number and size of trawlers has increased substantially. Trawling has emerged as the most important method for exploiting demersal fisheries resources (especially prawns and shrimps) (Vivekanandan, 2003). Trawlers have become the main stay of the fishing sector and 50% of the total Indian catch comes from trawlers (Devaraj, *et al.*, 1997; Devaraj, *et al.*, 1999).

The consequent increase in the fisheries sector lead in the late 1950s to the introduction of gillnetters and use of synthetic twine, which by the 1980s, almost totally replaced cotton twine for making fish nets (BOBP, 1983; Thomas, 2000). Fibreglass reinforced plastic (FRP) boats were introduced in India in early 1970s, but did not become very popular due to high cost, lack of maintenance facilities and other problems (Sheshappa, 1998). However, during the late 1970s and 1980s, FRP canoes become very popular and largely replaced the traditional wooden canoes.

Several other major technological transformations were witnessed in the Indian fisheries before the 1980s, all resulting from successive Five Year Plans (see page 8). One of these transformations was the introduction of purse seines in the late 1970s on the west coast (This introduction occurred earlier in Goa, in 1957, but commercial operations commenced only in 1964, with just 2 purse seiners<sup>14</sup>).

These sophisticated gears were deployed by mechanized vessels and soon caught the bulk of the total catch, reducing the share of traditional fishers (Subramani, 1998). For example, in Kerala about two third of marine fish landings were accounted for the artisanal sector until the late 1970s, even though mechanization started as early as mid 1960s (Balan, *et al.*, 1989). However, the artisanal share started falling with further increase in mechanization. This led to open and severe clashes between members of the two sectors, and the mechanized sector was blamed for the pauperization of traditional fishers (Thomas, 2000).

Efforts to motorize traditional crafts began as early as 1953 in Jaleshwar village, Gujarat (Srivastava, *et al.*, 1991) but it did not make much headway in other parts of India (Kuriyan, 1982). However, it was not feasible for a developing country to replace large number of indigenous fishing boats with new mechanized boats, featuring inboard engines. Hence, it was decided to motorize the existing small scale craft with outboard engines (Chandy, 1970c). Motorization began in 1980s, as a program of the Seventh Five Year Plan, and the support of a financing schemes operated through the co-operative sector (Balan, *et al.*, 1989; BOBP, 1990; GOI, 1985; Subramani, 1998).

Simultaneously, India initiated deep sea fishing in 1972 with the import of two Gulf of Mexico trawlers from the USA. By the early 1980s, over 100 chartered vessels and joint venture deep sea fishing vessels were operating, mostly in the inshore grounds up to 50 m and rarely up to 100 m (Devaraj, 1995). This represented a serious challenge to the traditional sector. In 1983, because of widespread unrest, the minimum depth limitation (80 m) was enforced for offshore fishing operations and various regulations were also enacted by the states (see page no. 13). As a result, almost all chartered vessels left the country (Devaraj, 1995). The issue of large trawlers came to the limelight once again when a DSFP was announced in March 1991, stating that India would enter into joint venture agreements with foreign vessels to catch fish in "deep areas" (beyond 12 nautical miles from the coast). The Indian fisher's organizations protested this vociferously, claiming that Indian boats could reach those areas themselves and there were no guarantees that the joint ventures boats would not poach fish further inshore (Johnson, 2002; Kocherry, 1999). These protests were so strong that the Central Government shelved the issue of licenses to foreign fishing vessels (most of which were cancelled in 1997) and launched a commission of inquiry in 1994 to review this joint venture.

In a nutshell, the historical overview presented above indicates that, in the past, the expansion of fisheries to new areas (i.e., deep sea and offshore) was realised through accelerated mechanization, mainly in the 1980s. Introduction of outboard motors brought about a revolution in traditional fishing. Motorization effectively reduced search time, increased time at sea and made accessible previously untapped areas of high fish concentration (Devaraj and Vivekanandan, 1999; Sathiadas, *et al.*, 1995). However, there have been unsuccessful efforts since 1959 to increase fish catches from deep waters under the aegis of the Union Government, with marginal success to date (Mathew, 2003). One of the reasons is the protest by other sectors (see page no. 13 and 19). However, the major cause is the lack of economic viability. Deep sea vessels require huge investments and the rate of return are less compared to those of fishing units (both mechanized and artisanal) operating in inshore waters. Even tuna long liners fetch better rates of return than other deep sea vessels, which mainly concentrate on prawns. Presently, many of the exiting deep sea vessels (Gulf of Mexico trawlers) based in Vishakapatnam harbour are believed to operate rarely, because they find very difficult the break even<sup>15</sup>. Now the priority is shifting to sustain deep sea fishing by diversification of fishing effort to other resources and reduction of fishing pressure on the penaeid shrimp (Sathiadas, *et al.*, 1995).

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<sup>14</sup> The purse seine fishery is restricted to the coast between Ratnagiri in the southern Maharashtra and Kochi in central Kerala, where shoaling pelagic fishes (clupeoids, carangids and Indian mackerel) are abundant.

<sup>15</sup> During the 1980s a fishing voyage of 13 days was sufficient to catch about 2 t of shrimps and 18 t of good quality fish. Now a voyage of 30-90 days is required to break even, with a catch of 1-2 t of shrimp and 15-18 t of good quality fishes and 30-40 t of other fishes usually dried on deck to cover up the operating cost of Rs. 7-800, 000, (Sathiadas *et al.*, 1995) corresponding to 15,297-17,483 US\$, based on the conversion rate of Rs.45.76 = 1 US\$ in November, 2004.

### *Present situation : problems and challenges*

Today's Indian marine fisheries face challenges and problems in achieving the kind of sustainability that will assure its long term survival. Devaraj and Vivekanandan (1999) have categorized Indian fisheries into three phases (based on the classification by Csirke (1984), namely; pre-development phase (1947-1962), growth phase (1963-1988), and full exploitation phase (1989-1997), all applying only to coastal areas. The marine fisheries of India were not controlled in their initial phase, and insufficiently managed in the subsequent phases. Given this, the transition from the current, fully exploited to the overexploited phase will occur rapidly, where it has not already occurred, and lead to collapses (Devaraj and Vivekanandan, 1999). This is something that a country like India, with an acute shortage of animal protein, (Raghavan, 1998), cannot afford. The existing situation calls for an in-depth evaluation of the current state of affairs and take immediate measures, in order to avoid further depletion of the resources. There are additional problems besetting fisheries ranging from habitat degradation, water pollution and bioaccumulation of persistent organic pollutants, illegal fishing, including poaching, lack of infrastructure, poor socio economic conditions of fishers and many more. Some of these are addressed briefly in the following section.

#### Sectoral conflicts

Primarily conflicts arise in India and elsewhere because of the incompatibility of the technology used by different sectors, and violations of the national jurisdictions in pursuit of higher catches. The sharing of common resource has intensified the existing problems. Sometimes the resulting conflicts culminates into violence, killings and burning of boats (Balakrishnan, *et al.*, 1984; Menon, 1996; Nair, *et al.*, 1983). Thus, these conflicts have become a serious social, law and order problem in many coastal fishing areas. However, the magnitude and nature of the problem and losses varies from region to region.

Existing conflicts among different sectors can be categorized into two types: (1) those involved in different fisheries in the same locality, for example, fishers engaged in artisanal and mechanized fishing in a common fishing ground (Balakrishnan and Algaraja, 1984; Devaraj and Vivekanandan, 1999) and; (2) those involved in same fishery at the same localities (Balakrishnan and Algaraja, 1984). For example, frequent conflicts occur between the trawlers of south Andhra Pradesh and Chennai over sharing the productive fishing grounds off the southern coast of Andhra Pradesh (Balakrishnan and Algaraja, 1984; Devaraj and Vivekanandan, 1999).

In order to avoid such clashes MFRA's (see page no. 13) were put in place to safeguard the interests of different sectors. Along with this, some other approaches were suggested and followed on regional basis. For example, in some districts of Tamil Nadu, a Peace Council was formed with the local Regional District Officer (commonly referred as 'RDO') as chairman and representatives from state fisheries department, mechanized and traditional craft owners that allocated fishing nights (4 for non-mechanized and 3 for mechanized). Tokens were issued after collecting nominal fee from mechanized boats and this money was added up to the associations (of mechanized boat owners) general fund. This was then used to pay compensation towards damage of any traditional gears during the nights kept exclusively for traditional crafts or for social purposes. However, nothing was purposed to regulate conflicts for daytime fishing (Balakrishnan and Algaraja, 1984). Interestingly, fishers from all sectors honoured this system of regulated fishing.

#### Over capitalization

The increase in the demand for seafood and the commensurate rise in prices have contributed to the recruitment of many new fishers into the industry, and the introduction of many more vessels. As a result the current catching capacity of the fishing fleets in Indian waters far exceeds that required for biologically sustainable catches from most commercial stocks at depth down to 100 m (Devaraj and Vivekanandan, 1999).

Moreover, the Indian government encouraged mechanization via its various subsidies programmes (e.g., for diesel engines, use of innovative gears and vessels etc.) and loans to fishers and their co-operative organizations (Bapat, *et al.*, 1981; Srivastava, *et al.*, 1991). As a result the number of boats kept increasing, while the area per fisher decreased (Vivekanandan, *et al.*, 2003) (Table 3).

It is therefore of grave concern that there is an ongoing policy to still expand the fisheries sector. Although the expansion plans are for deep sea sector (i.e., waters beyond 50 m) and sustainability is emphasized (GOI, 1997; 2002), but no firm steps were purposed by the government to reduce the existing overcapacity. It is important to mention here that only the state of Orissa has determined the optimum number of mechanized vessels of various categories for the different fishing ports (James, 1992b).

**Table 3.** Continental shelf area of India's maritime states and union territories and, available area (in hectares) per fisher (top value) and per boat (mechanized and non-mechanized; bottom value) in inshore and offshore regions. Shaded boxes represent absence of data (Sources: DAHD, 1993; 1994; Sathiadas *et al.*, 1995).

States	Shelf (10 <sup>3</sup> km <sup>2</sup> )	Available area in ha; Inshore (0-50m)				Available area in ha; Offshore (50-200m)			
		1961	1973-77	1980	1990	1961	1973-77	1980	1990
Gujarat	164	554 1453	288 1095	177 862	136 499	843 2214	439 1669	271 314	207 760
Maharashtra	112	125 257	62 251	54 205	37 108	415 852	207 833	181 680	124 359
Goa	10	120 3030	72 229	33 87	23 94	280 7070	172 534	78 204	55 220
Karnataka	25	89 114	36 109	31 89	37 51	189 244	78 433	67 190	79 109
Kerala	40	17 59	16 57	9 44	6 40	36 123	33 118	20 92	13 84
Tamil Nadu	41	42 78	33 74	24 52	31 53	30 55	23 53	17 36	22 38
Pondicherry	1		36 82	27 77	6 25		24 55	18 51	4 17
Andhra Pradesh	31	35 84	26 64	20 46	11 31	29 69	21 53	16 38	9 25
Orissa	32	169 528	165 317	48 147	13 96	192 599	187 359	55 166	15 109
West Bengal	17	359 1503	199 599	60 234	14 192	149 626	82 249	25 97	6 80

### Overexploitation

Existing intra and inter fleet competition have driven the resources to over exploitation. The following manifestations of overfishing are discussed with examples in this section: (1) growth overfishing, (2) recruitment overfishing and, (3) economic overfishing.

Different sectors of fisheries in order to maximize their catches use smaller meshes. Thus, small fishes dominate catches and lots of juveniles and eggs are destroyed. Such growth overfishing, i.e., fish are caught before they had a chance to grow (Pauly, 1994b; Sparre, *et al.*, 1989) is done by both sectors. For example, in Maharashtra, Kerala, Tamil Nadu and Andhra Pradesh large quantities of juvenile fishes and prawn postlarvae are landed by vessels deploying seines (boat, ring, shore), trawls and dol nets (Bensam, *et al.*, 1994; Luther, *et al.*, 1993; Menon, 1996; Menon, *et al.*, 1996; Rohit, *et al.*, 1993; Zacharia, *et al.*, 1995). In Vizhinjam, in Andhra Pradesh state, a seasonal ( November to May) 'Nonnavu fishery', is performed using an artisanal gear with mesh size of 3-4 mm. (Menon and Pillai, 1996). It is estimated that 180 tonnes of juvenile fishes are caught in one day (Menon and Pillai, 1996).

One of the reasons for juvenile exploitation is that commercially exploitable quantities of prawns/shrimps occur in habitats that are also utilized by large number of fish juveniles. For example, the area swept by trawl nets for prawns in coastal waters of western India usually yield only  $\approx$  16% of prawns, while the rest

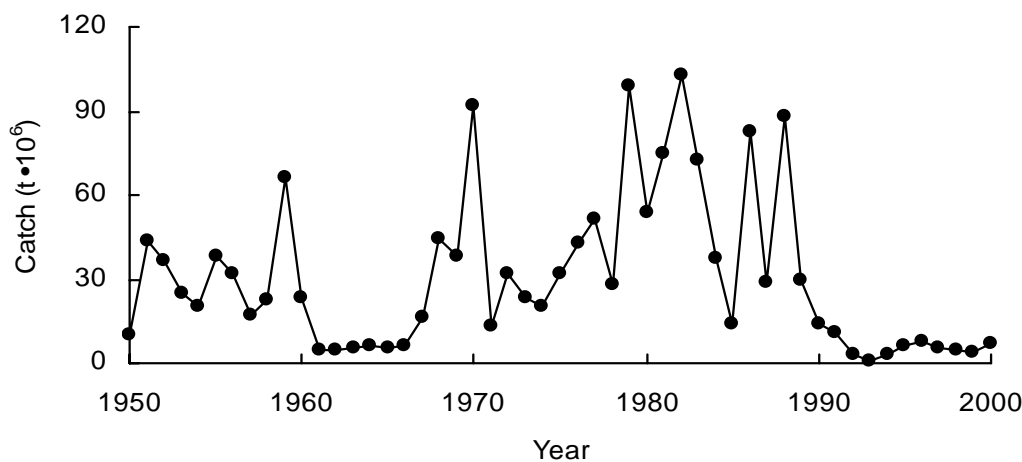
of catch consist of finfishes or benthic organisms, with considerable amounts of juveniles and eggs (Menon, 1996).

Furthermore, there is a significant price difference between finfishes and shrimps, also called 'pink gold', which fetch far more profit than other resources. This maintains a strong fishing pressure on the overall stocks. So, in order to retain as much as possible, mesh sizes are further reduced. This form of fishing destabilizes multi-species resources and causes massive changes in species composition (Beddington, *et al.*, 1982; Pauly, 1994c). Moreover, smaller mesh sizes catch larger numbers of small sized fishes.

During long voyages, these fishes are often discarded because of shortage of space or ice, which are preferably devoted to shrimps (see Chapter 3).

Similarly, recruitment overfishing (recruitment to a fishery is impaired because very few adults are left) (Pauly, 1994b; Sparre, *et al.*, 1989) has been also observed in many fisheries of India (Sathiadas, *et al.*, 1995). Such overfishing occurs when the aggregate fecundity of exploited stocks is low. For example, catfishes and sharks (Pillai, *et al.*, 2000) have suffered heavy losses due to indiscriminate fishing. Purse seine catches from Karnataka are reported to have more than 50% of male catfishes with eggs in their mouth (Menon and Pillai, 1996). Figure 4 shows decline in catfish catches in the State of Karnataka attributed to excess fishing pressure. Likewise, bulk removal of ripe running Oil sardine and Indian mackerel is also reported from states along the west coast since the late 1970s, i.e., since the introduction of purse and ring seines (Silas, *et al.*, 1980).

Economic overfishing, occurs when fishing effort exceeds than needed to maximize the economic rent from the fishery (Clark, 1990; Pauly, 1994b; d) has also been reported from the coastal fisheries of India (GOI, 2002; James, 1992a).



**FIGURE 4.** Catfish catches (thousand tonnes) for the Karnataka state, 1950-2000, showing decline in catch after 1988. This decline is attributed to the overfishing of incubating male catfish resulting in poor recruitment (Source: Menon and Pillai, 1996).

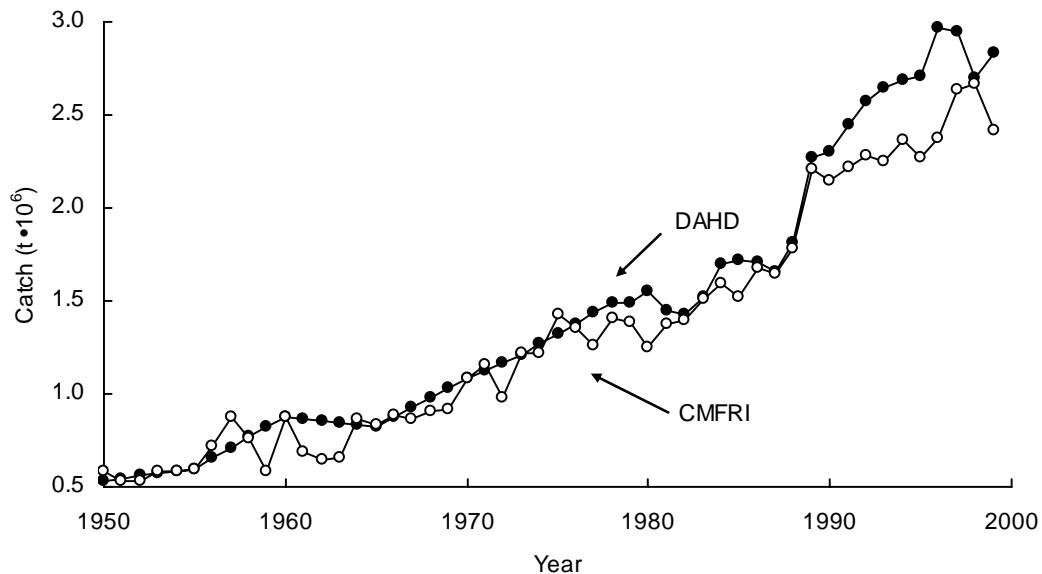
### Mismatching statistics

A multiplicity of organizations and agencies with overlapping jurisdiction, controlled by the central and state governments, compound the existing problems of Indian fisheries. For data collection systems created by different institutes to gather fishery statistics documents shows wide discrepancies. The catch data for the same species, year and state do not match in the documents published by DAHD, CMFRI and MPEDA (Figure 5; only shows comparison of CMFRI and DAHD).

This uncertainty is an impediment to understanding the real status of the fisheries. Moreover, duplication of work by different institutes results in wastage of valuable resources (money, personnel, time). Attempts



to overcome such problems are becoming increasingly apparent. For example, an independent Ministry for Fisheries has been proposed to ensure sustainable development in the fisheries sector (Chaudhary, 2000; Kumar, 2003) and to evolve a unified system of conducting sample survey by the maritime states, to improve and revise the existing collection and estimation methodologies (GOI, 1980; 2002).



**FIGURE 5.** Marine fisheries catch (million tonnes) trends for the whole of India, 1950-1999, showing differences between the datasets assembled by the Central Marine Fisheries Research Institute (CMFRI) and the Department of Animal Husbandry and Dairying (DAHD).

### Condition of fishers

In India, the development in fisheries is paralleled by the spatial changes of fleets using a large technological input compared to those using almost none. In this transition, the gap between wealthy boat owners and poor fishers has increased substantially. Furthermore, the 'middlemen' are also blamed for appropriating the bulk of the benefits from small scale fishing (Sathiadas, *et al.*, 1994; Sehara, *et al.*, 1986). It is very unfortunate that most of the fishers in India live in poverty with poor housing conditions, and illiteracy rates of up to 70% (Kochary, *et al.*, 1996). With a strength of 1 million (in 1998) full time fishers (Srinath, 2003), it is important to consider the social implications when making management decisions impacting on Indian fishers.

The subsequent Chapters, i.e., 2, 3 and 4 documents the general methodology used in this study. Chapter 2 describes the groups of taxa caught that are used in further analyses, as detailed in Chapter 3 and 4. Chapter 3 discusses the data collection and estimation methods, while Chapter 4 presents the ecological indicators that are used to evaluate the status of Indian fisheries.

## DESCRIPTION OF TAXA CAUGHT

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### INTRODUCTION

The waters along the Indian coast, and offshore to the limits of the Indian EEZ are home to a rich ichthyofauna. Overall, *FishBase* reports 1702 species of marine finfishes from Indian waters (FishBase, 2004b) but all of these species are not equally important to fisheries. About 500 commercially important fish species, 250 pelagic and 250 demersal support the multi-species multi-sector fisheries (Pillai, Pillai, 2000). Along with this, there are species-specific fisheries notably on Oil sardine (*Sardinella longiceps*), Indian mackerel (*Rastrelliger kanagurta*) and Bombay duck (*Harpadon nehereus*).

Some pelagic species enjoy wide geographical distribution, while others, such as shads and Bombay duck, have restricted distributions. The diversity of the pelagic resources is much higher off the west coast than off the east coast and vice versa for the demersal resources.

Demersal fishes inhabit all kinds of bottom habitat ranging from sandy, muddy to rocky and coral grounds, and range from shallow coastal waters to the deep continental slope (Bensam, 2000).

Crustaceans and molluscs also support important commercial fisheries. Overall, the prawns (penaeid and non-penaeid) fisheries are most important, surpassing all other marine resources in terms of its economic gains they generate.

All these marine resources have numerous local names. The following section lists only widely used English common names. More local names in various regional languages are available at *FishBase* ([www.fishbase.org](http://www.fishbase.org); Bhathal, 2003) for fishes.

### FUNCTIONAL GROUPS

The catch data in Chapter 3 are presented by groups of species, here called 'functional groups'. The species composition of each group is defined based on the lists of commercial species given in *FishBase*, CephBase and miscellaneous Indian and other sources, which are cited in the text where appropriate. The trophic level (TL) of each functional group (median of the estimates where several exist for a given species) as adopted here is provided in parentheses after the name of each group. The estimates were obtained from *FishBase* for fishes. For invertebrates; the estimates were based largely on *Sea Around Us* ([www.seaaroundus.org](http://www.seaaroundus.org)) database, and the 'ISCCAAP Table' of FishBase 2000 (Froese, *et al.*, 2000).

#### *Elasmobranchs (TL = 3.7 - 4.2)*

This group consists mainly of shark, skates and rays belonging to the Families Carcharhinidae, Hemiscylliidae, Rhincodontidae, Sphyrnidae, Stegostomatidae, Hemigaleidae, Ginglymostomatidae, Triakidae, Rhinobatidae, Pristidae, Myliobatidae, Dasyatidae and Gymnuridae (FishBase, 2004a). The maximum size in sharks ranges from 70 cm (*Rhizoprionodon oligolinx*) to 2000 cm (*Rhincodon typus*), in skates from 270 cm (*Rhina ancylostoma*) to 656 cm (*Pristis microdon*) and in rays from 70 cm (*Dasyatis kuhlii*) to 204 cm (*D. zugei*) (FishBase, 2004a).

Elasmobranchs are carnivores and predaceous in nature, with the exception of *Rhincodon typus* (Whale Shark), which is mainly a zooplankton (filter) feeder. Sharks mainly feed on pelagic teleosts, such as sardine, mackerel, Bombay-duck etc. and cephalopods (squid, octopus, cuttlefish) (Devadoss, *et al.*, 2000; Raje, *et al.*, 2003). Skates and rays mostly feed on benthic organisms viz. crustaceans, molluscs, polychaetes, amphipods and teleosts (*Apogon* spp., *Nemipterus* spp., sciaenids) (Raje and Joshi, 2003).

Elasmobranchs have gained commercial importance in India only recently because of increasing demand for shark's fins in the Southeast Asian countries (Anon., 1992). Sharks are caught in all the maritime states of India, mainly by shrimp trawlers (42%), followed by gill net (26%), hooks and lines (16%) and other gears (14%) (Raje and Joshi, 2003). These are high valued species as the products obtained from them are valued in international markets. The dominant and commercially important species of elasmobranchs, which support fisheries, are listed below.

### Sharks (TL = 4.2)

The important commercial species of sharks in Indian waters are *Scoliodon laticaudus* (Spadenose shark), *Rhizoprionodon acutus* (Milk shark), *Carcharhinus sorrah* (Spottail shark), *C. sealei* (Bull shark), *C. leucas* (Bignose shark), *C. macroti* (Hardnose shark), *C. melanopterus* (Blackfin reef shark), *C. hemiodon* (Pondicherry shark), *Rhincodon typus* (Whale Shark), *Galeocerdo cuvieri* (Tiger shark), *Eusphyra blochii* (Winghead shark), *Sphyrna lewini*, *Chiloscyllium plagiosum* (Whitespotted bambooshark), *C. punctatum* (Brownbanded bambooshark), *Rhizoprionodon oligoinx* (Grey sharpnose shark), *Chaenogaleus macrostoma* (Hooktooth shark), *Hemipristis elongata* (Snaggletooth shark), *Loxodon macrorhinus* (Sliteye shark), *Nebrius ferrugineus* (Tawny nurse shark), *Negaprion acutidens* (Sicklefin lemon shark), *Mustelus mosis* (Arabian smooth-hound) and *Triaenodon obesus* (Whitetip reef shark) (Devadoss, *et al.*, 2000; FishBase, 2004b; Rajee and Joshi, 2003).

### Skates (TL = 3.9)

This group includes *Rhynchobatus djiddensis* (White spotted shovelnose ray), *Anoxypristis cuspidate* (Pointed sawfish), *Pristis pectinata* (Smalltooth sawfish), *P. microdon* (Smalltooth sawfish), *Rhina ancylostoma* (Bowmouth angelfish), and *Rhinobatus granulatus* (Granulated shovelnose ray) (Devadoss, *et al.*, 2000; FishBase, 2004b; Rajee and Joshi, 2003).

### Rays (TL = 3.7)

This group represents several species, including *Aetobatus narinari* (Spotted eagle ray), *A. flagellum* (Longheaded eagle ray), *Aetomylaeus nichoffii* (Nieuhof's eagle ray), *Rhinoptera javanica* (Javanese cow-ray), *Himantura uarnak* (Marbled stingray), *H. bleekeri* (Whiptail stingray), *H. fluviatilis* (Ganges stingray), *H. jenkinsii* (Pointednose stingray), *H. marginatus* (Blackedge whipray), *H. bleekeri* (Bleeker's whipray), *Dasyatis zugei* (Pale edged stingray), *D. imbricatus* (Schneider's scaly sting ray), *D. kuhlii* (Blue spotted stingray), *Pastinachus sephen* (Drab stingray), *Gymnura poecilura* (Longtail butterfly ray), *G. micrura* (Shorttail butterfly ray), *Mobula mobular* (Devil ray), and *Aetomylaeus maculatus* (Bat ray) (Devadoss, *et al.*, 2000; FishBase, 2004b; Rajee and Joshi, 2003).

### Eels (TL = 4.1)

Eels in this group belong to the Families Muraenesocidae, Muraenidae, Anguillidae and Congridae. Their maximum size ranges from 80 cm (*Gymnothorax pseudothyrsoides*) to 250 cm (*Congresox talabonoides*) (FishBase, 2004a). Eels mainly feed on nektons, zoobenthos, small fishes and crustaceans (FishBase, 2004a; Menon, *et al.*, 1998).

This group mainly consists of *Congresox talabonoides* (Wam), *Gymnothorax pseudothyrsoides* (Black eel), *Muraenosox bagio* (Golden eel), *M. cinereus* (Daggertooth pike conger), *Conger cinereus* (Indian conger eel) and *Anguilla bengalensis* (Indian mottled eel) (FishBase, 2004b; GOG, 2004; Menon, *et al.*, 1998).

Initially, eels were considered as a poor people's food in India, but nowadays, demand of live eels for export and other fish products is increasing rapidly, and so is their price. These high value species are mainly caught on the conventional fishing grounds of the northwest and the northeast coasts largely as a bycatch of trawl nets (70%), and non-mechanized gears (13%) (GOG, 2004; Menon, *et al.*, 1998).

### Catfishes (TL = 3.9)

The catfishes (Families Ariidae and Plotosidae) with size range of 25 cm (*Batrachocephalus mino*) to 185 cm (*Arius thalassinus*), mainly feeds on invertebrates and small fishes (FishBase, 2004a).

This group includes, *Batrachocephalus mino* (Frogheaded catfish), *Arius sona* (Dusky catfish), *A. jella* (Smalleye catfish), *A. dussumieri* (Marine catfish), *A. tenuispinis* (Thinspine sea catfish), *A. caelatus* (Engraved catfish), *A. thalassinus* (Giant seacatfish), *A. sagor* (Sagor catfish), *A. subrostratus* (Sona sea catfish), *A. sumatranus* (Shovelnose sea catfish), *A. crossocheilos* (Roughback sea catfish), *Osteogeneiosus militaris* (Soldier catfish), *Plotosus canius* (Gray eel catfish) and *P. lineatus* (Striped eel catfish) (FishBase, 2004b; Menon, 2003; Menon, *et al.*, 2000).

Compared to many other demersal fishes, catfishes are within the affordable range of poor and middle class fish eaters. For example, in 1996, the retail price for catfishes was Rs. 36 or US\$<sup>16</sup> 0.78 per kg as compared to Pomfrets at Rs. 96 or US\$ 2.09 per kg (Sathiadas, *et al.*, 2000). Catfishes are utilised fresh, frozen and in processed form, in the domestic and export markets. Presently, this resource is chiefly exploited by trawlers (37%), followed by motorized gillnetters (24%), mechanized gillnetters (26%), and other gears (6%) (Menon, 2003).

### *Clupeoids (TL = 2.0 – 4.5)*

This group consists mainly of herrings, sardines, shads and anchovies, and forms one of the major pelagic fishery resources of the country. All these shoaling species show remarkably wide annual and seasonal fluctuations, one time bringing prosperity and at other times major economic setbacks to the fishers.

#### Wolf herring (TL = 4.5)

*Chirocentrus dorab*, commonly known as Wolf herring (Family Chirocentridae) with a maximum size of 122 cm, feeds on small schooling fishes, e.g., herrings and anchovies, and perhaps sometimes on crustaceans (FishBase, 2004a). *C. dorab* are more abundant on the east coast, especially in Tamil Nadu (Luther, 1973; Srivastava, 1999).

#### Indian oil sardine (TL = 2.5)

*Sardinella longiceps* or Indian oil sardine (Family Clupeidae) is a small fish with a maximum size of 28 cm (FishBase, 2004a). *S. longiceps* is a planktivore, with diatoms, dinoflagellates and copepods as favourite food items. An abundance of diatom *Fragilaria oceanica* is said to indicate abundance of oil sardine in coastal waters (Pillai, *et al.*, 2003b).

Oil sardine contribute about 15% of total marine fish catches in India. This is highly nutritive and affordable table fish, and available throughout most of the year. However, their abundance shows wide fluctuations on seasonal, annual and decadal scales. As well, small Oil sardine serves as a source for by-products, such as sardine oil used in several industries, and 'guano', used as fertilizer and fishmeal for cattle and poultry feed production (Jayaprakash, 2000; Pillai, *et al.*, 2003b).

#### Other sardines (TL = 2.7)

All sardines (Family Clupeidae) other than the Oil sardine were placed in this group. Their maximum size ranges from 15 cm (*Sardinella jussieui*) to 29 cm (*Amblygaster sirm*) (FishBase, 2004a). Like the Indian oil sardine, other sardines feed mainly on variety of plankton (Pillai, *et al.*, 2003a).

This group includes *Sardinella gibbosa* (Goldstripe sardinella), *S. jussieui* (Mauritian sardinella), *S. fimbriata* (Fringescale sardinella), *S. albella* (White sardinella), *S. sindensis* (Sind sardinella), *S. melanura* (Blacktip sardinella), *S. brachysoma* (Deepbody sardinella), *Amblygaster sirm* (Spotted sardinella), and *A. clupeoides* (Bleeker smoothbelly sardinella) (Pillai and Rohit, 2003a; Rohit, *et al.*, 2000).

Other sardines form a yearround fishery in different regions of the country, but the fishing seasons and catch rates vary among the regions. All these species form a cheap source of animal protein and are relished in fresh, frozen and dried forms.

#### Shads (TL = 2.0 – 3.0)

Shads (Families Clupeidae and Pristigasteridae) have a maximum size of 21 cm (*Anodontostoma chacunda*) to 73 cm (*Tenualosa ilisha*). They feed chiefly on plankton, mainly diatoms and dinoflagellates, but also on copepods, molluscan and crustacean larvae, prawns, amphipods and polychaetes. *Ilisha elongate* along with planktons also feeds on *Chelon macrolepis* (Largescale mullet) (FishBase, 2004a).

<sup>16</sup> Indian Rupees are converted into US dollars based on the conversion rate of Rs. 45.76 equivalent to 1 US\$ in November, 2004.

*Tenualosa ilisha* (Indian or Hilsa shad) support a lucrative fishery, especially along the Digha coast in the West Bengal. Other shads are also contributing to the fishery, such as *Tenualosa toli* (Toli shad), *Anodontostoma chacunda* (Chacunda gizzard shad), *Nematalosa nasus* (Bloch's gizzard shad), *Ilisha elongate* (Elongate ilisha), *I. megaloptera* (Bigeye ilisha) and *Hilsa kelee* (Kelee shad) (FishBase, 2004b; Jhingran, 1991). The trophic level used for Hilsa shad and other shads are 2.0 and 3.0, respectively.

#### Anchovies (TL = 3.3 - 3.6)

Anchovies (Family Engraulidae) range from 8 cm (*Stolephorus baganensis*) to 32 cm (*Setipinna brevifilis*) (FishBase, 2004a). Their food is mainly comprised of copepods, crustaceans (*Acetes* spp.), ostracods, amphipods, and young fishes and larvae (Jayaprakash, 2003; Khan, 2000b).

This group includes *Coilia dussumieri* (Golden anchovy), *C. ramcarati* (Ramcarat grenadier anchovy), *C. reynaldi* (Reynald's grenadier anchovy), *Setipinna brevifilis* (Shorthead hairfin anchovy), *S. tenuifilis* (Common hairfin anchovy), *Stolephorus waitei* (Spotted anchovy), *S. commersonii* (Commerson's anchovy), *S. indicus* (Indian anchovy), *S. baganensis* (Estuarine anchovy), *Encrasicholina devisi* (Devil's anchovy), *E. punctifer* (Buccaneer anchovy), *Thryssa mystax* (Mustached thyrssa), *T. malabarica* (Malabar thyrssa), *T. gautamiensis* (Gautama thyrssa) and *T. purava* (Oblique-jaw thyrssa) (FishBase, 2004b; Gopakumar, *et al.*, 2000; Jayaprakash, 2003; Khan, 2000b; Khan, 2003). The trophic level used for Anchoviella (*Coilia*, *Setipinna*, *Encrasicholina* and *Stolephorus* spp.) and Thrissoles (*Thryssa* spp.) are 3.3 and 3.6, respectively.

Consumer preferences for various species differ from place to place. For example, *Encrasicholina devisi* and *E. punctifer* are not preferred at Kochi, but are in great demand in the southern and interior parts of Kerala state (Jayaprakash, 2003).

#### Other clupeoids (TL = 3.1)

All clupeoids (Families Clupeidae and Pristigasteridae) not identified previously were placed into this group. Their size ranges from 6 cm (*Ehirava fluviatilis*) to 25 cm (*Opisthopecterus tardoore*) and feeds mainly on zooplanktons (copepods, larvae of bivalves, fish eggs, etc.), phytoplanktons and small crustaceans and fishes (FishBase, 2004a).

This group includes *Escualosa thoracata* (White sardine), *Ehirava fluviatilis* (Malabar sprat), *Opisthopecterus tardoore* (Long finned herring) and *Pellona ditchela* (Indian pellona) (Karbhari, 1982).

#### *Bombay duck (TL = 4.3)*

*Harpadon nehereus* (Family Synodontidae), popularly known as Bombay duck, which attains a maximum size of 40 cm, is a piscivorous fish that feeds on various fish species, notably *Coilia dussumieri*, and crustaceans (*Nematopalaemon tenuipes* and *Acetes* spp.) (Kurian, 2000).

*Harpadon nehereus* is an important and abundant species along the northwest coast of India, especially in the states of Gujarat and Maharashtra with about 90% of the Indian landings originating from this region (Kurian, 2000; 2003). Bombay duck support one of the few single-species fisheries in India.

#### *Lizardfishes (TL = 4.4)*

Lizardfishes belong to the Family Synodontidae, with size ranges from 25 cm (*Saurida longimanus*) to 67 cm (*S. tumbil*). They chiefly feed on teleost fishes, cephalopods and crustaceans (FishBase, 2004a).

This group consists of *Saurida tumbil* (Greater lizardfish), *S. undosquamis* (Brush toothed lizardfish), *S. longimanus* (Longfin lizardfish), *S. micropectoralis* (Shortfin lizardfish), *Trachinocephalus myops* (Blunt nose lizardfish) and *Synodus englemani* (Engleman's lizardfish), which forms an important component of demersal fish resources of India (FishBase, 2004a; Sivakami, *et al.*, 2003).

Lizardfishes are reported as an important bycatch of shrimp trawlers. This group has gained significance as it is used for food both in fresh and dried form (Nair, *et al.*, 1992; Sivakami, *et al.*, 2003).

### *Halfbeaks and Fullbeaks (TL = 3.4)*

Halfbeaks and fullbeaks (Families Hemiramphidae and Belontiidae) attain a maximum size of 35 cm (*Rhynchorhamphus malabaricus*) and 49 cm (*Strongylura strongylura*), respectively. Their food is comprised mainly of sea grass (*Cymodocea* spp.) and green algae, but may also include diatoms and polychaetes. However, *Strongylura strongylura*, with a trophic level of 4.5 is carnivorous and feed on small fishes, especially clupeoids (FishBase, 2004a).

Commercially important marine halfbeaks and fullbeaks are *Rhynchorhamphus georgii* (Halfbeak garfish), *R. malabaricus* (Malabar halfbeak), *Zenarchopterus dispar* (Feathered river garfish), and *Strongylura strongylura* (Fullbeak garfish). They are usually caught along with other fishes (FishBase, 2004b; Samuel, 1968c).

### *Flyingfishes (TL = 3.8)*

Flyingfishes (Family Exocoetidae) feed mostly on small crustaceans and other planktonic animals. Their maximum size ranges from 22 cm (*Hirundichthys oxycephalus*) to 30 cm (*Exocoetus volitans*) (FishBase, 2004a).

The main flyingfish species included in this group are *Cypselurus comatus* (Clearwing flyingfish), *Exocoetus volitans* (Two-winged flyingfish), *Hirundichthys coromandelensis* (Coromandel flyingfish) and *H. oxycephalus* (Bony flyingfish) (FishBase, 2004b; Jhingran, 1991). Flyingfishes are popular for their delicate flavour and nutritious value. Almost the entire Indian catch of flyingfishes is salted and sun dried (Samuel, 1968c).

### *Perches (TL = 3.4 - 4.1)*

This group is mainly comprised of groupers, snappers, pigface breams, threadfin breams and other perches, which mostly inhabit coral reef areas and rocky grounds. The maximum size of fishes within this group ranges from 18 cm (*Nemipterus mesoprion*) to 221 cm (*Epinephelus lanceolatus*).

Perches are predatory fishes, feeding on other fishes (*Therapon* spp., *Ambassis* spp., etc.) and invertebrates (crabs, prawns, stomatopods etc.). Cephalopods are also found in the diet of some perches, for example *Pristipomoides typus* (FishBase, 2004a; Mathew, 2003).

All species mentioned below are excellent food fishes and in great demand in the export market, both in live and frozen form. They are also gaining importance for commercial mariculture in India. Many are caught as a bycatch in shrimp trawls (Mathew, 2003; Mathew, *et al.*, 2000).

### Groupers (TL = 4.0)

The main species in this group (Family Serranidae) are *Epinephelus tauvina* (Greasy grouper), *E. malabaricus* (Speckled grouper), *E. bleekeri* (Dusky tail grouper), *E. areolatus* (Areolate grouper), *E. diacanthus* (Six banded reef cod), *E. epistictus* (Broken line grouper), *E. fasciatus* (Red banded grouper), *E. flavocaeruleus* (Blue and yellow reef cod), *E. morrhuia* (Banded cheek reef cod), *E. undulosus* (Brown lined reef cod), *E. merra* (Wire netting reef cod), *E. fuscoguttatus* (Brown marbled grouper), *E. chlorostigma* (Brown spotted grouper), *E. longispinis* (Spotted grouper), *E. lanceolatus* (Giant grouper), *Cephalopholis sonnerati* (Red coral cod) and *Cephalopholis boenack* (Blue lined seabass) (James, *et al.*, 1996; Mathew, 2003; Mathew, *et al.*, 2000).

### Snappers (TL = 4.1)

This group (Family Lutjanidae) includes *Lutjanus johni* (John's snapper), *L. argentimaculatus* (Red snapper), *L. gibbus* (Hunched snapper), *L. bohar* (Two spot snapper), *L. rivulatus* (Blue-lined snapper), *L. bengalensis* (Bengal snapper), *L. lutjanus* (Bigeye snapper), *L. fulviflammus* (Black snapper), *L. kasmira* (Blue and yellow snapper), *L. sebae* (Emperor snapper), *L. sanguineus* (Red snapper), *L. russelli* (Russel's snapper), *L. malabaricus* (Malabar snapper) and *Pristipomoides typus* (Sharp tooth snapper) (James, *et al.*, 1996; Mathew, 2003; Samuel, 1968b).

### Pigface breams (TL = 3.4)

This group (Family Lethrinidae) includes *Lethrinus nebulosus* (Starry emperor bream), *L. obsoletus* (Yellow banded emperor bream), *L. microdon* (Long face pigface bream), *L. miniatus* (Long nosed emperor bream), *L. nebulosus* (Bridle pig-face-bream), *L. mahsena* (Sky emperor), *Lethrinus ornatus* (Ornate emperor), *L. semicinctus* (Black blotch emperor) and *L. variegatus* (Slender emperor) (FishBase, 2004b; Mathew, 2003).

### Threadfin breams (TL = 3.8)

The only commercially important species of threadfin breams (Family Nemipteridae) are *Nemipterus japonicus* (Japanese threadfin bream) and *N. mesoprion* (Red filament threadfin bream) (Murty, *et al.*, 2003a; Murty, *et al.*, 1992; Samuel, 1968b).

### Other perches (TL = 3.7)

This group (Families Sparidae, Drepaneidae, Ephippidae, Centropomidae, Lobotidae, Haemulidae and Scatophagidae) represents all perches not previously mentioned. This includes: *Argyrops spinifer* (Long spined redbream), *Acanthopagrus latus* (Yellowfin seabream), *A. berda* (Black seabream), *Crenidens crenidens* (Karenteen seabream), *Drepane punctata* (Moon fish), *Ephippus orbis* (Spade fish), *Lates calcarifer* (Giant Sea perch), *Lobotes surinamensis* (Triple tail), *Pomadasys maculatus* (Spotted grunter), *P. hasta* (Lined silver grunter), and *Scatophagus argus* (Spotted butter fish), (FishBase, 2004b; Mathew, 2003; Mathew, *et al.*, 2000).

### *Goatfishes (TL = 3.5)*

The Goatfishes, also called red mullets (Family Mullidae) are small sized fishes, with a maximum size of 33 cm (*Upeneus taeniopterus*). They feed mostly on crustaceans, especially, penaeid shrimps and crabs, and small fishes (FishBase, 2004a; Vivekanandan, *et al.*, 2003b).

The main species of fisheries interest are *Upeneus sulphureus* (Yellow goat fish), *U. sundaicus* (Ochre-banded goatfish), *U. vittatus* (Yellowstriped goatfish), *U. tragula* (Freckled goatfish), *U. moluccensis* (Goldband goatfish), *U. taeniopterus* (Finstripe goatfish) and *U. bensasi* (Bensasi goatfish) (Bensam, *et al.*, 2000; Vivekanandan, *et al.*, 2003b).

Due to their small size, goatfishes fetch low price (e.g. Rs. 20 or US\$ 0.43 per kg in 1996) and contribute mainly to the diet of poor people. They are also used as live baits for tuna fishing. Goatfishes are usually caught by bottom trawlers and form one of the dominant components in their bycatch (Vivekanandan, *et al.*, 2003b).

### *Threadfins (TL = 4.1)*

Threadfins (Family Polynemidae) attain a maximum size of 142 cm (*Eleutheronema tetradactylum*) to 200 cm (*Leptomelanosoma indicum*). They feed on benthic crustaceans, especially prawns and crabs, and fishes, e.g. members of Families Mugilidae, Engraulidae, and Sciaenidae in the food of *E. tetradactylum* with the occasional polychaetes (FishBase, 2004a).

Besides, Indian salmon (*E. tetradactylum*), this group includes *Leptomelanosoma indicum* (Giant threadfin) as commercially important species.

Threadfins occur along the east and the west coast of India, both in inshore and offshore waters, but form a very important fishery in the offshore fishing grounds off Gujarat and Maharashtra. Stake bag nets, locally known as 'dol' nets, bottom set gillnets and bottom drift gillnets are the major gears used for their exploitation in these states (Jhingran, 1975b; Jhingran, 1991).

### *Sciaenids (TL = 4.0)*

Sciaenids (Family Sciaenidae), commonly called croakers and grunters have a wide range of sizes. For example, *Johnius coitor* attains a maximum size of 20 cm and *Otolithoides biauritus* up to 195 cm. Their

major food items are teleost fishes (*Stolephorus* spp., *Saurida* spp., etc.) and crustaceans (mainly *Acetes* spp.) (FishBase, 2004a; Mohanraj, *et al.*, 2003).

The important commercial species of croakers occurring in Indian waters are *Johnieops dussumieri* (Sharptooth hammer croaker), *Johnius macrorhynchus* (Big-snout croaker), *J. amblycephalus* (Bearded croaker), *J. glaucus* (Pale spotfin croaker), *J. coitor* (Coitor croaker), *J. belangrii* (Belanger's croaker), *J. carutta* (Karut croaker), *J. borneensis* (Sharpnose hammer croaker), *Pseudotolithus elongatus* (Bobo croaker), *Otolithes cuvieri* (Lesser tiger toothed croaker), *Otolithoides biauritus* (Bronze croaker), *O. pama* (Pama croaker), *Protonibea diacanthus* (Spotted croaker), *Nibea maculata* (Blotched croaker), *Kathala axillaris* (Kathala croaker), *Pennahia anea* (Greyfin croaker), *Daysciaena albida* (Bengal corvine) and *Dendrophysa russelii* (Goatee croaker) (Apparao, *et al.*, 1992; FishBase, 2004b; Mohanraj, *et al.*, 2003).

Two of these species, *Otolithoides biauritus* (Bronze croaker) and *Protonibea diacanthus* (Spotted croaker) contribute substantially to the sciaenid fishery in the northwest region. These fisheries are very popular by the name of 'Koth' and 'Ghol' in Marathi (Maharashtra state) and 'Goyani' and 'Ghol' in Gujarati (Gujarat state). These larger sciaenids are filleted and processed for local and export market, whereas, smaller sciaenids are sold in fresh conditions at local markets only. Very small juveniles are used for making fish meal (Mohanraj, *et al.*, 2003).

### **Ribbonfishes (TL = 4.3)**

Ribbonfishes (Family Trichiuridae), also known as hairtail and cutlass, are voracious feeders, feeding both during day and night. The most favoured food items include a variety of small and medium size fishes, prawns and shrimps. Their maximum size ranges from 50 cm (*Trichiurus gangeticus*) to 234 cm (*T. lepturus*) (FishBase, 2004a; Nair, *et al.*, 2003).

This group is comprised of *Trichiurus lepturus* (Grey ribbonfish), *T. russelli* (Short-tailed hairtail), *T. gangeticus* (Ganges hairtail), *Euplurogrammus muticus* (Smallhead hairtail), *E. glossodon* (Longtooth hairtail), *Lepturacanthus savala* (Silver ribbonfish) and *L. pantului* (Coromandel hairtail) (CMFRI, 1986; FishBase, 2004b; Lazarus, *et al.*, 1992; Nair and Prakasan, 2003).

Out of these, *Trichiurus lepturus* is the dominant species, forming approximately 95% of the total ribbonfish landings of India (Lazarus, *et al.*, 1992). Three decades ago, ribbonfishes were low priced fishes, preferred by poor people but at present they are significantly important in the export market. For example, in 2001, ribbonfishes contributed up to 30% to the total marine product export of India (Nair and Prakasan, 2003). The under-sized fish are utilized in fishmeal production.

### **Jacks and their relatives (TL = 3.6 - 4.5)**

This group (Families Carangidae, Rachycentridae and Coryphaenidae) is comprised of Horse mackerel (TL = 4.4), roundscads (TL = 3.6), queenfishes (TL = 4.5), trevallies, pompanos and other carangids (TL = 4.0).

Their sizes range from 18 cm (*Alepes para*) to 210 cm (*Coryphaena hippurus*). They are piscivorous fishes preying on anchovies, sardines, silverbellies, *Thrissocles* spp., *Apogon* spp., etc., but also on cephalopods (squids and cuttlefishes) and crustaceans (prawns and crabs) (FishBase, 2004a; Kasim, 2003).

For the compilation of fisheries statistics in India, this group is broadly grouped under four categories: Horse mackerel; scads; leather-jackets; and other carangids. The commercial fishery is supported mainly by 36 species: *Caranx sexfasciatus* (Six banded trevally), *C. hippos* (Black tailed trevally), *C. ignobilis* (Yellowfin trevally), *C. melampygus* (Bluefin trevally), *Megalaspis cordyla* (Horse mackerel), *Alepes kleinii* (Golden scad), *A. djedaba* (Shrimp scad), *Decapterus russelli* (Roundscad), *D. kurroides* (Redtail scad), *Scomberoides lysan* (Port hole fish), *S. commersonianus* (Talang queenfish), *S. tala* (Deep queenfish), *S. tol* (Slender queenfish), *Trachinotus blochii* (Subnose pompano), *T. baillonii* (Bailon's pompano), *T. botla* (Russel's pompano), *Atropus atropus* (Kuweh trevally), *Selar crumenophthalmus* (Bigeye scad), *S. boops* (Banded scad), *Carangoides armatus* (Longfin trevally), *C. malabaricus* (Malabar trevally), *C. oblongus* (Coach-whip trevally), *C. chrysocephalus* (Longnose trevally), *C. ferdau* (Ferdau's cavalla), *Atule mate* (One finlet scad), *Seriolina nigrofasciata* (Black banded kingfish), *Elagatis*



*bipinnulata* (Rainbow runner), *Alectis indicus* (Indian threadfin trevally), *A. ciliaris* (Redfin trevally), *Rachycentron canadum* (Cobia) and *Coryphaena hippurus* (Dolphin fish) (Kasim, 2003; Nair, 2000).

This group has emerged as one of the important resources especially in the mechanized sector, but are also exploited by motorized and non-mechanized sectors. Many carangid species form only a bycatch in almost all the gears except in small meshed drift gill nets, boat and shore seines, but the landings by these gears are negligible (Kasim, 2003).

### *Silverbellies (TL = 2.9 - 3.7)*

Silverbellies, also known as slipmouths or pony fishes (Family Leiognathidae), and called 'Mullan' in Malayalam (Kerala state), 'Karal' in Tamil (Tamil Nadu state) and 'Karlu' in Telegu (Andhra Pradesh state) are generally small, shallow water fishes usually seen in shoals. *Leiognathus* and *Gazza* species attain a maximum size of 28 cm (*Leiognathus equulus*) and 23 cm (*Gazza minuta*), respectively (FishBase, 2004a; Murty, *et al.*, 2003b; Pauly, *et al.*, 1981).

The group includes *Leiognathus splendens* (Splendid ponyfish), *L. dussumieri* (Dussumier's ponyfish), *L. brevirostris* (Shortnose ponyfish), *L. equulus* (Common ponyfish), *L. bindus* (Orangefin ponyfish), *Gazza minuta* (Toothpony) and *Secutor insidiator* (Pugnose ponyfish) (Murty, *et al.*, 2003b; Samuel, 1968b).

Silverbellies are of little demand when fresh, but there is a considerable market for them in form of sun dried fish (silverbellies contain very little fat, so, they are easily sun dried), fishmeal and poultry feed. Silverbellies are exploited by trawl and a variety of artisanal gears. However, about 80% of landings are contributed by trawls (Murty, *et al.*, 2003b; Samuel, 1968b).

### *Big jawed jumper (TL = 4.0)*

*Lactarius lactarius*, popularly known as Big jawed jumper, Whitefish or False trevally, is the only species in the Family Lactariidae which occurs all along the Indian coast. Big jawed jumper is a carnivore and mainly feed on teleost fishes (particularly anchovies) and crustaceans (*Acetes* spp.) (FishBase, 2004a; Vivekanandan, *et al.*, 2003a).

Though medium in size, up to a maximum of 40 cm (FishBase, 2004b), this fish fetches optimum price (Rs. 40 or US\$ 0.87 per kg in 1999) due to their good taste and consumer preference. No fishery targets the Big jawed jumper; they are bycatch of the trawls and are mostly consumed in fresh condition, but also salted and dried (Bensam, *et al.*, 2000).

### *Pomfrets (TL = 3.0 - 3.6)*

Pomfrets (Families Stromateidae and Carangidae) are one of the most delicious food fish available along Indian coast. Their maximum size ranges from 40 cm (*Pampus chinensis*) to 75 cm (*Apolectus niger*). Pomfrets mainly feed on crustaceans, zooplanktons, polychaetes and larval decapods (FishBase, 2004a; Sivakami, *et al.*, 2003).

The fishery is primarily comprised of three species, *Apolectus niger* (Black pomfret), *Pampus argenteus* (Silver pomfret) and *Pampus chinensis* (Chinese pomfret) (Kumari, *et al.*, 1981; Sivakami, *et al.*, 2003) with a trophic level of 3.0, 3.1 and 3.6 (FishBase, 2004b).

They are highly appreciated table fishes for internal and export markets, fetching a very high price (Rs. 94 or US\$ 2.05 per kg in 1999). Despite their high economic value, the research on their biology, fishery and population dynamics is scanty and scattered (Khan, 2000a). However, fisheries statistics are available for each of these species.

### *Mackerels (TL = 2.7 - 3.1)*

Mackerels belong to the Family Scombridae with their maximum size range from 22 cm (*Rastrelliger faughni*) to 39 cm (*R. kanagurta*). This group includes *Rastrelliger kanagurta* (Indian mackerel), *R. faughni* (Island mackerel) and *R. brachysoma* (Short mackerel).

*Rastrelliger kanagurta*, also called 'Indian mackerel', constitutes in India, the second most important species after the Indian oil sardine (Yohannan, *et al.*, 2003). The trophic level of Indian mackerel used here is not taken from the *FishBase* or *Sea Around Us* websites (as for the other species), because the values of 3.4 and 4.4 given therein are erroneous (D. Pauly, Fisheries Centre, UBC, pers. comm. Oct. 2004)<sup>17</sup>. Therefore, the (mean weighted) trophic level (TL) was recalculated based on Equation 1:

$$TL_i = 1 + \sum_{j=1}^n (DC_{ij} \cdot TL_j) \quad \dots\dots(1)$$

where  $TL_i$  is the trophic level of species  $i$ ,  $DC_{ij}$  is the proportion of prey species  $j$  in the diet of species  $i$  and  $TL_j$  is the trophic level of prey species  $j$  (Christensen, *et al.*, 1992).

The diet composition was taken from Rao (1967), which includes 24% *Coscinodiscus* (TL = 1.0), 4% foraminifera (TL = 1.0), 2% polychaetes (TL = 2.1), 36% copepods (TL = 2.1), 20% stomatopods (TL = 3.1), 12.3% other crustaceans (TL = 2.7), 1% bivalve larvae (TL = 2) and 6% fish scales (TL = 1.0 and 3.0). It was not clear if fish scales were consumed as detritus (TL = 1) or taken from live fish (mean TL  $\approx$  3.5). Therefore, the TL was calculated two times using the appropriate TLs. The resulting average value of TL = 3.1 was used as TL of Indian mackerel.

Indian mackerel is nutritious and affordable even to the poor. Though, small quantities were exported to the Middle East, the bulk of the catch is still consumed within India (Yohannan, *et al.*, 2002). All mackerel species are usually exploited by the large seines, mainly the purse seines (Noble, *et al.*, 1992; Yohannan, *et al.*, 2000).

### *Seerfishes (TL = 4.2 – 4.5)*

Seerfishes or Spanish mackerels (Family Scombridae) are one of the commercially important marine pelagic finfish resources of India. Their size ranges from 85 cm (*Scomberomorus guttatus*) to 267 cm (*S. commerson*). Seerfishes are mainly piscivorous, but occasionally feed on prawns, squids and cuttlefishes. Their main food items are sardines, carangids, silverbellies, croakers, etc. (FishBase, 2004a; Muthiah, *et al.*, 2003).

The fishery is sustained mainly by four species, *Scomberomorus commerson* (King seer), *S. guttatus* (Spotted seer), *S. lineolatus* (Streaked seer) and *Acanthocybium solandri* (Wahoo) with TL of 4.2, 4.3, 4.5 and 4.4, respectively. There is a low seasonal catch trend along the east coast as compared to the west coast (Muthiah, *et al.*, 2003).

Seerfishes are in great demand all over the country and fetch very high price, ranging from Rs. 80–150 per kg (Rs.96 or US\$ 2.09 per kg in 1999), on par with Pomfrets (Rs. 94 or US\$ 2.05 per kg in 1999). They are consumed mostly in fresh form (Jhingran, 1991; Muthiah, *et al.*, 2003; Sathiadas, *et al.*, 2002).

### *Tunas (TL = 4.1 – 4.5)*

Tunas are fishes of the Family Scombridae, with size ranging from 56 cm (*Auxis rochei*) to 267 cm (*Thunnus albacares*). Their major food items include crustaceans, especially shrimp and crabs, cephalopods and small pelagic fishes (FishBase, 2004a; Pillai, *et al.*, 2003).

The commonly occurring tuna species in the fisheries are *Euthynnus affinis* (Little tuna/ Kawakawa), *Katsuwonus pelamis* (Skipjack tuna), *Thunnus tonggol* (Longtail tuna), *Auxis* species such as, *A. thazard* (Frigate tuna) and *A. rochei* (Bullet tuna) and other tunnies, including, *Thunnus albacares* (Yellowfin tuna) and *Sarda orientalis* (Striped bonito) (Ganga, *et al.*, 2002). Trophic levels of *E. affinis*, *Auxis* spp., *K. pelamis*, *T. tonggol* and other tunnies are 4.5, 4.3, 4.4, 4.1 and 4.3, respectively (FishBase, 2004b).

<sup>17</sup> Because the original trophic level (TL) estimate was not based on diet composition data (as shown in section 'Mackerels'), but from the mean TL of individual prey items +1, with more animal prey being distinguished taxonomically than plants, thus biasing the estimated TL upward.

Tunas constitute one of the economically important marine fisheries resources of India, but are caught mainly by small-scale sector. The catches of the industrial sector are very low. About 75% of the landings are marketed fresh for human consumption.

The remainder is salt dried (3%), utilized for Masmin<sup>18</sup> production (10%), export (9%) and canning (4%) (Antony, *et al.*, 2002; Pillai and Gopakumar, 2003).

### *Billfishes (TL = 4.5)*

Billfishes (Families Istiophoridae and Xiphiidae) are large sized fishes, which attain maximum size of 506 cm (*Xiphias gladius*). They feed mainly on fishes, crustaceans and cephalopods (FishBase, 2004a).

Billfish catches in India are comprised mainly of two species, *Istiophorus gladius* (Indian sail fish) and *Xiphias gladius* (Swordfish). Being highly valued table fishes, they are of great importance in the scombroid fishery of India (James, *et al.*, 1992; Jhingran, 1991).

### *Barracudas (TL = 4.5)*

Barracudas (Family Sphyraenidae) are important food and sport fishes in tropical waters. Their maximum size ranges from 55 cm (*Sphyraena obtusata*) to 200 cm (*S. barracuda*). Barracudas feed mainly on fishes but also take squid (FishBase, 2004a).

Four species, *Sphyraena jello* (Banded Barracuda), *S. obtusata* (Great barracuda), *S. barracuda* (Great barracuda) and *S. forsteri* (Bigeye barracuda) are contributing to commercial barracuda fishery in Indian waters. The entire catch is sold fresh in the local markets of India. The smaller species are auctioned at Rs.10-25 or US\$ 0.21-0.54 per kg and the larger species fetch Rs. 25-45 or US\$ 0.54-0.98 per kg in the landing centres (Jhingran, 1991; Kasim, 2000).

### *Mullets (TL = 2.1)*

Mullets (Family Mugilidae) are coastal species that usually enters into estuaries, lagoon and backwaters and feeds mainly on sedimented detritus. Their size ranges from 16 cm (*Liza parsia*) to 147 cm (*Mugil cephalus*) (FishBase, 2004a).

Grey mullets are represented by such important species as *Mugil cephalus* (Flathead mullet), *Chelon macrolepis* (Largescale mullet), *Valamugil seheli* (Bluespot mullet), *V. cunnesius* (Longarm mullet), *Liza parsia* (Goldspot mullet), *L. tade* (Tade mullet) and *L. vaigiensis* (Squaretail mullet) (FishBase, 2004b; Jhingran, 1991).

### *Unicorn cod (TL = 3.3)*

*Bregmaceros mcclendii*, also known as Unicorn cod (Family Bregmacerotidae) is a small fish growing to about a maximum of 12 cm total length. They mainly feed on planktonic crustaceans (FishBase, 2004b). Unicorn cod supports a seasonal fishery mainly around Mumbai (Maharashtra), and in Gujarat (Jhingran, 1991).

### *Flatfishes (TL = 3.5 - 3.9)*

This group is comprised mainly of halibut, flounders and soles. Their size ranges from 12 cm (*Pseudorhombus natalensis*) to 65 cm (*Psettodes erumei*). Their main food items are benthic invertebrates, fishes and cephalopods (Bensam, *et al.*, 2000; FishBase, 2004a; Vivekanandan, *et al.*, 2003c). The dominant and commercially important species of flatfishes, which support fisheries, are listed below.

Large sized flat fishes, such as *Psettodes erumei* fetches a good price in the market compared to small sized soles, which sell for around Rs. 15 or US\$ 0.32 per kg. About 90% of the flatfishes are salted and

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<sup>18</sup> 'Masmin' is the traditional cured, dried and smoked tuna product from Lakshadweep Islands, which commands a good market in throughout India and overseas, e.g., in Sri Lanka, Singapore and Malaysia (Antony *et al.*, 2002).

sundried and sold outside the peak fishing season at price of about Rs. 30 or US\$ 0.65 per kg (Vivekanandan, *et al.*, 2003c).

#### Halibut (TL = 3.9)

This group (Families Psettodidae and Soleidae) includes *Psettodes erumei* (Indian halibut) and *Synaptura commersonnii* (Commerson's sole) (Bensam, *et al.*, 2000; Mathew, *et al.*, 1992; Vivekanandan, *et al.*, 2003c).

#### Flounders (TL = 3.5)

The important commercial species of flounders (Families Paralichthyidae and Bothidae) in Indian waters are *Pseudorhombus arsius* (Large tooth flounder), *P. elevatus* (Deep flounder), *P. javanicus* (Javan flounder), *P. malayanus* (Malayan flounder), *P. natalensis* (Natal flounders), *P. triocellatus* (Three spotted flounder), *Bothus pantherinus* (Leopard flounder), *B. myriaster* (Indo-Pacific oval flounder) and *Chascanopsetta lugubris* (Pelican flounder) (Bensam, *et al.*, 2000; Mathew, *et al.*, 1992; Vivekanandan, *et al.*, 2003c).

#### Soles (TL = 3.5)

This group (Families Cynoglossidae and Soleidae) is composed of *Cynoglossus dubius* (Tongue sole), *C. bilineatus* (Malabar tongue sole), *C. arel* (Largescale tonguesole), *C. pucticeps* (Speckled tonguesole), *C. carpenteri* (Hooked tonguesole), *C. dispar* (Roundhead tonguesole), *C. macrolepidotus*, *C. macrostomus* (Malabar tonguesole), *Paraplagusia bilineata* (Doublelined tonguesole), *Brachirus orientalis* (Oriental sole), *Solea elongata* (Elongate sole), *Zebrias quagga* (Zebra sole) and *Z. synapturoides* (Indian zebra sole) (Bensam, *et al.*, 2000; Mathew, *et al.*, 1992; Vivekanandan, *et al.*, 2003c).

#### *Crustaceans (TL = 2.7 - 3.1)*

The crustaceans group is comprised mainly of penaeid prawns, non-penaeid prawns, lobsters, crabs and stomatopods (mantis shrimp). India is one of the major contributors of marine crustaceans in the world market (Anon., 1982). Crustaceans also fetch a very high price of Rs. 200 or US\$ 4.3 per kg in the domestic market (Sathiadas and Hassan, 2002).

#### Penaeid prawns (TL = 2.7)

Penaeid prawns (Family Penaeidae) feeds mainly on small crustaceans, gastropods, bivalves and detritus (Kurian, *et al.*, 1976c).

Some of the important penaeid prawns that support commercial fisheries along the Indian coasts are *Penaeus indicus* (Indian white prawn), *P. semisulcatus* (Green tiger prawn), *P. monodon* (Giant tiger prawn), *P. merguensis* (Banana prawn), *P. japonicus* (Kuruma prawn), *P. penicillatus* (Redtail prawn), *Penaeopsis jerryi*, *Metapenaeus dobsoni* (Flowertail prawn), *M. monoceros* (Speckled prawn), *M. affinis* (Jinga prawn), *M. kutchensis* (Ginger shrimp), *M. brevicornis* (Yellow prawn), *Metapenaeopsis stridulans* (Fiddler shrimp), *M. andamanensis* (Rice velvet shrimp), *Parapenaeopsis stylifera* (Kiddi prawn), *P. hardwickii* (Spear prawn), *P. sculptilis* (Rainbow prawn), *P. maxillipedo* (Torpedo prawn), *P. uncta* (Uncta prawn), *Parapenaeus longiceps* (Flaming prawn), *Trachypenaeus curvirostris* (Rough prawn), *Solenocera crassicornis* (Coastal mud prawn), *S. choprai* (Coastal mud prawn), *S. hextii* (deep sea mud shrimp), and *Aristeus alcocki* (Arabian red shrimp) (Kurian, *et al.*, 1976b; Nandakumar, *et al.*, 2003; Suseelan, *et al.*, 1992).

The penaeid prawn fishery constitutes the backbone of the seafood export industry, being the major foreign exchange earner as well as source of livelihood for millions of fish workers. Frozen shrimp contributes about 70% (Rs. 44,800,000 corresponding to US\$ 978,807) of India's total seafood export value and the share of capture fisheries is 59% by volume (Nandakumar and Maheswarudu, 2003).

Non-penaeid prawns (TL = 2.7)

The non-penaeid prawn resources of the country are primarily composed of *Nematopalaemon tenuipes* (Spider prawn) and *Exhippolysmata ensirostris* (Hunter shrimp), which constitute one of the important fisheries resources of the northwest coast.

*Acetes indicus* and *A. johni*, commonly known as Paste shrimps (Family Sergestidae) feeds mainly on detritus, diatoms, foraminifers, polychaetes and other planktonic crustaceans (Deshmukh, 2003; Kurian and Sebastian, 1976b; c).

Lobsters (TL = 2.7)

Lobsters (Family Palinuridae) are widely distributed all along the Indian coast. They feed on smaller crustaceans, molluscs and polychaetes (Radhakrishnan, *et al.*, 2003).

This group includes *Panulirus polyphagus* (Mud spiny lobster), *P. homarus* (Scalloped spiny lobster), *P. ornatus* (Ornate spiny lobster) *P. versicolor* (Tropical rock lobster), *Thenus orientalis* (Shovel-nosed lobster), *Puerulus sewelli* (Indian ocean lobster), and *Linupurus somniosus* (Kurian, *et al.*, 1976a; Radhakrishnan and Manisseri, 2003).

Lobsters are one of the most valuable and highly priced seafood. Among them, the spiny lobsters (rock lobsters), especially the live ones, fetch the highest price. Heavy demand and attractive price in international market have resulted in increased exploitation of lobsters in recent years (Radhakrishnan and Manisseri, 2003). Trawlers targeting shrimps land 75% of the lobster catch. Trap fishing also catches significant amounts (40%) of lobsters in south west coast of India (Rajan and Meenakumari, 1995).

Crabs (TL = 2.9)

Marine crabs (Family Portunidae) generally feed on detritus, smaller crustaceans, fishes and molluscs (Manisseri and Radhakrishnan 2003).

The important crabs found in the Indian waters are *Portunus sanguinolentus* (Spotted crab), *P. pelagicus* (Reticulate crab), *Charybdis feriatus* (Cross crab), *C. annulata* and *C. natator*. Out of these, *Portunus sanguinolentus*, *P. pelagicus* and *Charybdis feriatus* are the dominant species of edible marine crabs; they are landed mainly as a bycatch of the trawlers.

Marine crabs are also one of the valuable seafood items of great demand both in the domestic and export market of India (Manisseri, *et al.*, 2003; Radhakrishnan, 2000).

Stomatopods (TL = 3.1)

Stomatopods (Family Squillidae) grow to about 14 cm in length and are predatory. *Oratosquilla nepa* (mantis shrimp) is the species that contributes to most of the catch (Okey, 2001; Shanbhogue, 1973).

There is no fishery targeting stomatopods in India and the catches are incidental and landed along with prawns and fishes by the shrimp trawlers. Mantis shrimp catches are either thrown back to sea to accommodate the commercially important fish or sold cheaply in certain localities to be used in poultry feed and as fertilizers. Unlike Philippines and Japan, the stomatopods are not consumed as food in India (Rajeswary, *et al.*, 1998; Shanbhogue, 1973).

Molluscs excluding cephalopods (TL = 2.0)

This group consists mainly of gastropods and marine bivalves (clams, mussels, edible oysters and pearl oysters) that mainly feed on dead and decayed matter, algae, polychaetes and phytoplankton (Kripa, *et al.*, 2003; Ramadoss, 2003). However, the helmet shells, the hairy tritons, the murex shells and the frog shells are also reported to be feeding on animals such as sea urchins and small clams (Ramadoss, 2003).

The most important shells and marine bivalves of commercial value are *Xancus pyrum* (Sacred chank), *Turbo marmoratus* (Turban shell), *T. intercostals* (Ribbed turban), *Trochus niloticus*, *T. radiatus* (Top

shells), *Umbonium vestiarius* (Button shell), *Lambis chiragra* (Spider shell), *L. lambis* (Scorpion shells), *Cypræna monita* (Cowries), *Cellana radiata*, *Strombus canarium* (Winged shells), *Thais rudolphi*, *T. bufo*, *Oliva gibbosa*, *Babylonia spirata*, *B. zeylanica*, *Cassis cornuta* (Helmet shells), *Chicoreus ramosus*, *Pleuropilæa trapezium* (Murex shells), *Villorita cyprinoides* (Black clam), *Paphia malabarica* (Short neck clam), *Meretrix casta*, *M. meretrix* (Yellow clams), *Marcia opima* (Baby clam), *Mesodesma glabaratum*, *Sunetta scripta* (Marine clam), *Donax* spp. (Wedge clam), *Geloina bengalensis* (Big black clam), *Anandra granosa* (Cockle), *Placenta placenta* (Windowpane oyster), *Hippopus hippopus* (Giant clam), *Perna viridis* (Green mussel), *P. indica* (Brown mussel), *Pinctada fucata* (Indian pearl oyster), *P. margaritifera* (Black lip pearl oyster), *Crassostrea madrasensis* (Indian backwater oyster) and *Saccostrea cucullata* (Rock oyster) (Appukuttan, *et al.*, 2000; Chellam, *et al.*, 2000; Kripa and Appukuttan, 2003; Ramadoss, 2003).

In the earlier days, after sorting bycatch on deck, the shell bycatch was thrown out into the sea as discard. Once the shell-craft industries got established and flourished, however, these molluscs were brought ashore and sold. Presently, these molluscs occupy an important place in the commercial shell-craft industry (Ramadoss, 2003). *Umbonium vestiarius* is the only gastropod species that is sold in the local market as food. The clam landings are used as a major ingredient of prepared shrimp feed or are fed directly to shrimp, while their shells are used by ornamental shell-craft industry and for manufacture of cement, calcium carbide, sand-lime bricks and lime (Kripa and Appukuttan, 2003).

### *Cephalopods (TL = 3.6)*

This group includes squids, cuttlefishes and octopuses (Families Loliginidae, Sepiidae and Octopodidae). They are carnivorous and their food consists of teleost fishes, crustaceans and cephalopods. Cannibalism is also common among them (CephBase, 2004; Meiyappan, *et al.*, 2003).

Commercially important species are *Loligo uyii* (Little squid), *L. duvauceli* (Indian squid), *Doryteuthis sibogae* (Siboga squid), *D. singhalensis* (Needle squid), *Loliolus investigatoris*, *Sepioteuthis lessoniana* (Palk-bay squid), *Sepia pharaonis* (Pharaoh cuttlefish), *S. aculeata* (Needle cuttlefish), *S. elliptica* (Golden cuttlefish), *S. prashadi* (Hooded cuttlefish), *S. brevimana* (Shotclub cuttlefish), *Sepiella inermis* (Spineless cuttlefish), *Octopus dollfusi* (Marbled octopus), *O. membranaceus* (Webfoot octopus), *O. lobensis* (Lobed octopus), *O. vulgaris* (Common octopus) and *Cistopus indicus* (Old woman octopus).

These were once thrown overboard as discards but the demand from export trade in the mid-1970s induced the fishers to save these catches. The bulk of the catches are now exported and very little is used for local consumption. Cephalopods are exported as frozen and dried products. The main markets for export of Indian cephalopods are Europe, Japan and China (CephBase, 2004; Meiyappan and Mohamed, 2003; Meiyappan, *et al.*, 2002).

### *Miscellaneous*

The catch data reported under this group does not identify the species composition. It is assumed that this group mainly contains so called 'low value fish', which are of smaller size and low consumer preference. Sujatha (1996) has shown that the trawl fishery off Vishakapatnam (Andhra Pradesh) contains 67% to 94% juveniles of larger fishes. Based on this and similar information from other sources, this group was reduced to zero by distributing its catch among all other groups. For a detailed account, see Chapter 3; see page no. 39.

## HISTORICAL RECONSTRUCTION OF INDIAN CATCHES: 1950 - 2000

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### INTRODUCTION

Institutes and departments falling under both federal and state governments estimate and collect the official fisheries statistics in India. The Fishery Survey of India (FSI) conducts exploratory surveys to estimate maximum sustainable yield and the Central Marine Fisheries Research Institute (CMFRI) as well as the state fisheries departments monitor and estimate the annual fish catch (Somvanshi, 2001a; for information on other fisheries related institutes, see Chapter 1, page 9 and 10).

As per the latest estimates of FSI, the potential yield of the Indian EEZ is 3.9 million t. Out of this, 2.2 million t would be available from coastal waters<sup>19</sup> and 1.7 million t from the offshore and deep sea waters<sup>20</sup> (Nair, 1998; Pillai and Pillai, 2000).

The CMFRI started collecting catch data for whole India since its inception in year 1947, but soon the need for estimates by region was felt for state planning and development. As a result, the state governments also started collecting data on marine fish landings. However, the sampling design and methods used for collection of marine fish catch statistics differs from the state to state (CMFRI, 1985).

The federal government made an effort, in 1985, to standardise the sampling method and streamline the process of collection of marine fish landings in India, by arranging for training workshops to be held by CMFRI for the officials of state departments and union territories, with focus on the collection method of statistics. These workshops, however, did not appear to have had much success.

State reports provide taxonomically highly aggregated landings statistics (e.g., only 26 groups in Gujarat state), with the bulk of the landings grouped under the 'miscellaneous category' with little or no information on species caught. For example, in reports from Gujarat state, the percentage of the 'miscellaneous' group in total landings is as high as 39% (GOG, 2000). Moreover, no details are given on the methodology used for arriving at the catch figures.

On the other hand, landing data published by the CMFRI divide the catch into 68 groups and the statistical reports describe the methods used to derive estimates. CMFRI statistics also have a miscellaneous group, as in state reports, but their percentage is quite low ranging from 2% in 1957 to 11% in 1950 (Here, the miscellaneous group was further reduced; see page 39 ).

CMFRI adopted a multistage stratified random sampling design to collect the information required for estimation of marine fish landings with a stratification that is both temporal (days) and spatial (zones) (Srinath, 2003). Under this approach, all maritime states are divided into contiguous and compact 'fishery zones'<sup>21</sup>, consisting of several landing centres. For example, the states of Maharashtra and Gujarat were divided into 8 and 6 zones, respectively, taking into consideration the topography and fishing intensity along the coasts (Kumari and Dharmaraja, 1981).

In order to ensure homogeneity among landing centres, a further stratification is preferred, if required, within a zone, to reduce sampling variance (Algaraja, 1998). Also, important landing centres, such as major fisheries harbour are treated as a single zone. In total, samples are collected from 2251 fish landing centres and the frequency of observations are up to 18 days per month (Vivekanandan, 2003).

Catch samples are obtained from fishing unit's landings (within a time interval) in a randomly selected landing centre. The total catch estimates for the month are obtained from these samples, using appropriate raising factors. The precision of the estimate is based on the sample size of sampling units (Kumari and Dharmaraja, 1981). All field data are processed at the headquarters of the CMFRI at Kochi,

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<sup>19</sup> The portion of the sea adjoining coastline and falling within the 50 m depth line

<sup>20</sup> Beyond coastal waters, the water within the 100 m is called offshore waters and an area beyond this stretching up to the EEZ limit is called the deep sea or oceanic waters.

<sup>21</sup> Each zone is comprised of 20 to 30 landing centers with similar landings levels (Algaraja, 1998; Silas, 1977).

Kerala. The estimation error is thought to lie between 4% to 5% of annual total landings of India (Jhingran, 1991).

I present in the following, the precedences developed by me to ensure consistency of the CMFRI data.

## MATERIALS AND METHODS

For each maritime state and union territory the catch data (which always pertain to weight in tonnes) were compiled. This included both landings reported in CMFRI and discards to estimate total catch (landings + discards) over the period of 1950 to 2000. The various techniques used in these calculations are presented below.

### *Compilation and encoding*

#### Compilation

Landings data are compiled from published sources of the CMFRI, state reports and other sources (Table 4). The bulk of the data used in this catch reconstruction originate from CMFRI publications, as reports published by other institutes or departments were largely inaccessible, even during on site visits (pers. obsv. (July), 2003).

Illegal fishing is reported in Indian waters by Dan (1982) and Rajan (2003), mainly by trawlers from Thailand, Myanmar and Indonesia. In 1980s, 30-100 Thai trawlers were found operating in the northern part of the Bay of Bengal, i.e., near Sandheads area, to mainly catch shrimps (Dan, 1982). From 1990-2000, 136 boats belonging to Thailand, Myanmar and Indonesia were apprehended from Andaman waters (Rajan, 2003). These poachers are reported to be discarding large quantities of fish (Dan, 1982), and even conducting blast fishing (Rajan, 2003), but there is no quantifiable information on amount of catches or discards.

Similarly, information is missing on bycatch of mammals and turtles, which are often reported as strangled by fishing gears (CMFRI, 1983; 1987b; c). Thus, in the absence of any quantifiable information illegal fishing is not further considered in this study.

Overall, data from union territories were more problematic than those from states. For example, CMFRI data do not include species wise landings for Lakshadweep, Goa and Andaman and Nicobar Islands, especially from 1950 to 1960s (CMFRI, 1969a; Nair, *et al.*, 1965). In order to resolve these issues, various methods were employed that are discussed in detail in the following sections.

#### Encoding

As all data listed above were available in only paper format, it was encoded using Microsoft Excel. The landings data thus assembled were aggregated into 29 broad taxonomic categories (see Chapter 2) with further subdivisions into subgroups at Family, Genus and Species level. In total, 65 statistical categories were used in all analyses through common template applied to all Indian states and union territories and which roughly corresponds to CMFRI's published format for landing statistics.

### *Recorded landings*

#### Ratio divisions of trawler catches

Nair and Banerji (1965) have reported aggregated annual trawler catch by species from 1950 to 1962 but this pertains to all of India, i.e., it is not distributed by states or species; CMFRI (1969) on the other hand, divided trawler catches from 1960 onwards among states. Therefore, Nair and Banerji's trawler catches from 1950 to 1959 were divided among states of West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka and Maharashtra, based on CMFRI for 1960. Then, the calculated values of all states were assigned to the demersal groups in proportion to their presence, the main assumption were being that trawlers near exclusively catch demersal taxa.



**TABLE 4.** List of sources used to compile marine landings and price data from 1950 to 2000. These sources do not include data on discards and Industrial fleet catches (except prawns). A & N Islands: Andaman and Nicobar Islands; D & D: Daman and Diu.

Source	Data type	Years covered	Remarks
Nair and Banerji (1965)	Landings	1950-1962	Data unavailable for Pondicherry (1950-1962), A & N Islands (1950-1955), Lakshadweep (1950-1960), Goa (1950-1956, 1962) and Daman and Diu (1950-1962)
CMFRI (1969a)	Landings	1956-1968	Only totals given for Goa (except 1956-1957, 1962-1964), Lakshadweep (except 1956-1959), and A & N Islands.
CMFRI (1969b)	Landings	1963-1968	Species wise landings; unavailable for Goa and union territories (except Pondicherry)
LDOF (1990)	Landings	1963-1968	Available only for Lakshadweep
CMFRI (1979)	Landings	1969-1978	Unavailable for Daman and Diu
Algaraja (1987)	Landings	1975-1984	Data only for Lakshadweep and A & N Islands
Alagaraja <i>et al.</i> (1987)	Landings	1975-1984	Available only for Andhra Pradesh
Balan <i>et al.</i> (1987)	Landings	1975-1984	Available only for Gujarat
Dharmaraja <i>et al.</i> (1987)	Landings	1975-1984	Available only for Tamil Nadu and Pondicherry
Jacob <i>et al.</i> (1987)	Landings	1975-1984	Available only for Kerala
Kurup <i>et al.</i> (1987)	Landings	1975-1984	Available only for Karnataka and Goa
Philipose <i>et al.</i> (1987)	Landings	1975-1984	Available only for West Bengal
Scariah <i>et al.</i> (1987)	Landings	1975-1984	Available only for Orissa
Srinath <i>et al.</i> (1987)	Landings	1975-1984	Available only for Maharashtra
Devaraj (1995)	Prawn landings	1978	Industrial vessels only
CMFRI (1980)	Landings	1979	Unavailable for Daman and Diu
CMFRI (1982)	Landings	1980-1981	Unavailable for Daman and Diu
Sudarsan (1992a)	Prawn landings	1981-1991	Industrial vessels only
Vergheze (1998)	Prawn landings	1982-1992	Industrial vessels only
GOK (1991)	Price	1982-1989	Landing price in Kerala
Rao (1988)	Prawn landings	1983-1987	Industrial vessels only
CMFRI (1995)	Landings	1985-1993	Data unavailable for Lakshadweep, A & N Islands, D & D
CMFRI (1989)	Landings	1985	Data used for Andaman & Nicobar Islands
Scariah <i>et al.</i> (2000b)	Landings	1985-1995	Only totals available for Orissa
Varghese (1991)	Landings	1986	Available only for Lakshadweep
Raghavan and Shanmughnam (1993)	Landings	1987-1990	Available only for Lakshadweep
DAHD (1994)	Landings	1991-1992	Data used for Andaman & Nicobar Islands
Scariah <i>et al.</i> (2000a)	Landings	1994-1995	Available only for Gujarat
DAHD (2001)	Landings	1994-1997	All maritime states and union territories
GOG (2000)	Landings	1996-1997	Available only for Gujarat
Sathiadhas (1999)	Price	1996-1997	Landing price for India as a whole
MPEDA (2001)	Landings	1998-2000	All maritime states and union territories
Sathiadas and Hassan (2002)	Price	1999-2000	Landing price for India as a whole

### Ratio divisions at species level

Assuming that total catches were correct, an effort was made to deal with incomplete or incoherent subsets of the data. For example, from 1950 to 1979 combined totals were available for elasmobranchs but were not divided into sharks, skates and rays. Therefore, while keeping the totals unaltered, elasmobranchs were divided into sharks, skates and rays based on their first available ratio. In this case the ratio of year 1980 was applied to elasmobranchs from 1950 to 1979. Here, the basic assumption is that the ratio of the subcategories has remained unchanged for years before 1980. This method was applied to groups that included pomfrets, tunas, seer fishes, perches and elasmobranchs in almost all states, but for different periods. Though, such inferences tend to deny the chances of serial depletion, gear transition or taxonomic changes etc., but, in absence of any other information, this was the only option to estimate the missing values.

### Ratio divisions at state level

Combined landings statistics were available for the states of West Bengal and Orissa, Tamil Nadu and Pondicherry and Gujarat and Daman and Diu from 1950 to 1974, 1954<sup>22</sup> to 1974 and 1950 to 1993, respectively. In order to disaggregate specieswise landings among individual states, ratios for each group in a year were estimated using data from the first year for which separate data were available for the combined states. These calculated ratios were then applied to all previous years.

Daman and Diu was the part of Goa until 1987 and became a separate union territory after statehood was conferred to Goa in May 1987 (GOI, 2004c). In CMFRI publications, the landings of Daman and Diu were always added to Gujarat instead of Goa because fishing vessels based in Daman and Diu generally operate in Gujarat waters (CMFRI, 1983; Srinath, CMFRI, pers. comm. April, 2004).

### Estimation of missing values

Pauly (1998) pointed out that reconstruction of series of catches and their composition may require interpolations and other bold assumptions, justified by the unacceptability of the alternative, i.e., “accepting catches as zero, or otherwise known to be incompatible with empirical data and historic records” (Pauly, 1998). Therefore, estimates for missing years were interpolated<sup>23</sup> and occasionally extrapolated<sup>24</sup>. Various other adjustments were also made based on information in the literature, as detailed in the appropriate sections.

### **First inter and extrapolations: total landings**

The missing annual landings of the following states were estimated by interpolations and extrapolations:

- Andaman and Nicobar Islands: Species wise data from 1950 to 1955, 1963 to 1968 and, 1986 to 1990 were unavailable. It was assumed that the fisheries remained unchanged over the period of 1950 to 1955, and that the composition of the landings of the year 1956 (Nair and Banerji, 1965) could be extrapolated backwards. The CMFRI (1969) provided only total landings from 1963 to 1968, with no information on species caught. In order to distribute landings among the groups, the values were interpolated between given group landings for 1962 (Nair and Banerji, 1965) and 1969 (CMFRI, 1979). Then, all the interpolated values were adjusted to match the published totals. Annual landings for 1986 to 1990 were interpolated between 1985 (CMFRI, 1989) and 1991 (DAHD, 1992), as totals were unavailable for these years.
- Goa: No landings data were available from 1950 to 1957. Thus, it was assumed that the fisheries remained unchanged during this period, i.e., the landings of 1958 (Nair and Banerji, 1965) were extrapolated backward. Again data were unavailable from 1962-1968, so, the values were interpolated between 1961 and 1969. However, the totals (i.e., without species breakdown) were available from 1965 to 1968 (CMFRI, 1969b), and the interpolated values were adjusted accordingly.
- Lakshadweep: The Lakshadweep fisheries department came in existence in 1960, so no data were available from 1950 to 1959. Ragahavan and Shanmughnam (1993) pointed out that before 1960, fishing in Lakshadweep relied only on small scale methods. Thus, annual reported landings before the year 1960 (Nair and Banerji, 1965) could only have been low; therefore, the low 1960 figure was extrapolated backward to fill in the years 1950 to 1959.
- Pondicherry: The union territory of Pondicherry was incorporated into India in 1954 (GOI, 2004b), and thus data were not available from 1950 to 1953. It was assumed that landings remained unchanged over the period of 1950 to 1953, i.e., the landings of 1954 were extrapolated backward.

<sup>22</sup> Pondicherry was incorporated into India in 1954. For the year 1950-1953, the catch values for Pondicherry were extrapolated based on estimated values of year 1954.

<sup>23</sup> Estimating a value between two given values.

<sup>24</sup> Estimating a value by extending known values backward or forward.

## **Second inter and extrapolations: group landings**

In a few cases, landings of the species (e.g., *Chirocentrus dorab*) or groups (e.g., the scads) were missing for few years. In such cases the values were interpolated between the landings for years for which the information was available. If the total was given for a group, then interpolated or extrapolated values for subcategories were adjusted, so that the total of all groups matched the given total or subtotal. For example, in Andhra Pradesh, a subtotal is given for elasmobranchs from 1994 to 1997. Here, the values were interpolated between 1993 and 1998 for each subgroup (sharks, skates and rays) and then adjusted to available subtotal.

Similarly, landings that were missing for earlier years or later years were replaced by extrapolation of the first or last available value. However, when the number of extrapolated years exceeded 10, a value of 1 t was assigned to the values still missing based on the observation that CMFRI assigns zeroes when catches are low (CMFRI, 1969). Furthermore, if zero or near zero landings for a single year are bracketed by high catches then the zero estimates were replaced by an interpolated value. The logic here is that near zero catches are unlikely when the previous and following year shows substantial amount of species landed.

All interpolated and extrapolated values were extracted from the miscellaneous group and similarly few erroneous values were replaced by interpolated values and the difference was added back in to miscellaneous.

### Miscellaneous

Along other taxonomically disaggregated groups, India reports 2% (1957) to 24% (1995) of its annual landings under the 'miscellaneous group'. In total, India has reported approximately 5 million t of marine landings this way since 1950, with total marine landings of approximately 71 million t.

Because the miscellaneous group represents considerable amount of landings, they were not excluded from the total landings, rather an attempt was made to disaggregate this group into the better defined groups. George *et al.* (1981) mentioned that the miscellaneous group contains several species of 'trash fish', which are of smaller size and low consumer preference. Sujatha (1996) has shown that the low value fish catch of the trawl fishery off Vishakapatnam (Andhra Pradesh) contains 67% to 94% juveniles. Similarly, Puthra *et al.* (1998) found that trawlers operating from 1988 to 1993 off the Veraval coast in Gujarat caught up to 52% of juveniles.

Based on this and similar information from other sources (Gordon, 1991; Puthra, *et al.*, 1996; Rohit, *et al.*, 1993; Salgrama, 1999; Sivasubramaniam, 1990), the miscellaneous group was reduced to zero by following a two-step approach. In the first step, this group was treated as a 'reservoir' with all interpolated and extrapolated catches taken out, and few erroneous catches added to this group (see page 38). Once this first step was completed, the remaining miscellaneous landings at state level were assigned to specific fish, crustacean and mollusc taxa in proportion to their value in the total.

## ***Unreported catches***

### Industrial catches

The industrial or commercial vessels that operate mostly from Vishakapatnam, Andhra Pradesh do not report their landings regularly to the designated institutes. Even, CMFRI has failed to obtain data from them (Srinath, CMFRI, pers. comm. April, 2004). However, the DAHD reports landings of the deep sea sector (assumed to consist of industrial vessels) of 30,000 t per year from 1994 to 1997, but without information on species composition (DAHD, 2001). These data are suspicious; the landings remain at 30,000 t from 1994 to 1997 despite a decrease in number of vessels from 117 to 67. Therefore, these data were not included in the recorded landings from 1950 to 2000. Instead, industrial catches were calculated using different methods (see sections below).

## **Industrial landings**

The first commercial trawlers to operate in India were imported from the Gulf of Mexico in 1972 to initiate deep sea fishing (Devaraj, 1995; also see chapter 1). The data on total number of vessels were available only for years 1972, 1978 (Devaraj, 1995) and, 1981 to 1991, when 168 units were recorded (Rao, 1988; Sudarsan, 1992a; Verghese, 1996). The majority of these vessels operate on the east coast of India, though most are based at Vishakapatnam, Andhra Pradesh (Devaraj, 1995; Srinath, CMFRI, pers. comm. April, 2004).

Therefore, for year 1998, it was assumed that 50 Vishakapatnam commercial trawlers (Salgrama, 1998) correspond to the total number of industrial vessels presently operating in Indian waters. Other values for the total number of vessels also exist. For example, according to Verghese (1996), 155 large industrial vessels trawled for prawn and fish in 1991-1992, while Sudarsan (1992) reported 180 fishing vessels. In such cases, the mean of the values were considered, i.e., 168 in the above example. The total number of vessels from 1973 to 1977, 1979 to 1980 and 1992 to 1997 were estimated by interpolating between 1972 and 1978, 1978 and 1981 and 1991 to 1998, respectively. For 1999 and 2000, the values for 1998 were extrapolated forward. Data on prawn catches by industrial vessels were available for 1978 (Devaraj, 1995) and 1981 to 1991 (Rao, 1988; Sudarsan, 1992a; Verghese, 1996). For 1972, total catches were estimated based on the average shrimp catch per vessel for year 1981, i.e., 28 t per vessel (Devaraj, 1995). The mean fish catch per vessel was calculated by dividing the estimated total fish catch (based on a 1:9 shrimp to fish ratio; see below) by the total number of vessels. Similarly, the average shrimp catch per vessel and average fish catch per vessel were calculated for 1996 and 1997. Their average was then used to derive the total shrimp and fish catch for 1998. For the other years, estimates were obtained by interpolation and extrapolation as explained above in conjunction with the total number of vessels. Catches also suffered from the same uncertainty, and thus means were taken where possible. Gordon (1991) used (head off) shrimp to fish ratio of 1:15, corresponding to 1:9 (with shrimp heads on). The latter ratio was used to estimate fish catches from prawn landings.

## **Industrial discards**

Fishes are major non-target species (bycatch) of shrimp trawlers. By catch and discards have been described differently by different authors in various parts of the world (Clucas, 1997). In India, 'bycatch' is generally taken to refer only to the bycatch that is landed. Here, however, bycatch refers to landed bycatch plus discards (i.e., the bycatch which is thrown back to the sea). Various reasons have been presented by different authors to explain discarding (Clucas, 1997); saving space in order to retain large amount of highly priced prawns seems to be the major one.

It is assumed that, from 1972 to 2000 only 30% of the fishes caught by trawlers are retained and 70% are discarded, though, some reports indicate that discards have decreased since the 1990s due to declining abundances of shrimps and prawns (Kungsuwan, 1999; Salgrama, 1999).

However, my estimates of discards are conservative. For example, Gordon (1991) estimated 40,000 to 60,000 t annual discards in 1988 by industrial trawlers (over 20 m) as compared to my estimate of 6,665 t. Similarly, in 1998; Salgrama (1999) reported 15,000 t of discards by commercial vessels as compared to my estimate of 3,311 t.

## Division of catch among states

The reported and estimated catches of prawn and fishes for India as a whole were divided among states of Tamil Nadu, Pondicherry, Andhra Pradesh, Orissa and West Bengal from 1972 to 2000, because these industrial vessels generally operate on the east coast (Devaraj, 1995; Srinath, CMFRI, pers. comm. April, 2004). This division was based in proportion to the states value in India's total landings for respective years. Some of these commercial vessels were reported fishing for lobster as far as Kerala (Sudarsan, 1992b). However, deep sea lobster fishing started in 1988 due to declining shrimp catches in the upper Bay of Bengal (Sivaprakasam, 1992). Thus, from 1987 to 2000, the states of Kerala and Karnataka were also included and likewise, catches were divided in proportion to their value in India's total.

### Species composition of catches

An analysis of the literature shows that trawlers catch large number of species as bycatch (George, *et al.*, 1981; Gordon, 1991; Kurup, *et al.*, 2003; Sivasubramaniam, 1990) with huge amount of juveniles. Most of these species, however, are represented in the groups of reconstructed landings data (also see section miscellaneous).

Based on the assumption that the taxa that are commercially valuable are landed ashore while remainder are thrown overboard (Sivasubramaniam, 1990), the price data were used to rank the demersal groups from high to low priced. Pomfrets for example are one of the highly valued group (see Chapter 2). Others are cephalopods, eels, big-jawed jumper, elasmobranchs and mullets.

The retained bycatch (30%) was assumed to consist of the highest priced species. The retained catch values were distributed among species on basis of their proportion in total landings of each state. Once the retained bycatch was distributed, the discards (70%) were distributed among the remaining demersal groups based on their proportion in the total catch. This procedure was performed independently for each year.

### Other discards

Along with the industrial fleet, other mechanised vessels also discard unwanted species (Gordon, 1991). To quantify their discards, it was assumed that 2% of India's total marine landings are discarded from 1970 onwards. The year of 1970 was chosen because several technological advances were introduced then and thereafter (also see page 16). The discard figure is based on the study by George *et al.* (1981) on bycatch of shrimp fisheries, in which he reported that, in 1979, discards by mechanised vessels (except industrial trawlers) were very low (i.e., 2%) and most of the bycatch were utilised.

These estimated discards were then assigned to all states and union territories based on their proportion in India's total. The discards in each state were then assigned proportionally among all other groups.

## MEASURING THE IMPACTS OF FISHING

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### INTRODUCTION

The evolution of fishing gears from hand held devices to industrial vessels had a huge effect on the abundance and biodiversity of the world's fish stocks. Fisheries are impacting ecosystems because the fish that are killed and removed function as parts of the food webs, both as consumers and prey (Parsons, 1996). For clarity, before moving on with this chapter, it is important to define the key terms of this analysis: ecosystems and the trophic level. An Ecosystem is "an area where a set of species interact in characteristic fashion, and generate among them biomass flows that are stronger than those linking that area to adjacent one" (Pauly and Froese, 2001a) and trophic level is "a number indicating the position of a species within an ecosystem through the number of steps linking it to the plants" (Pauly and Froese, 2001; Lindeman, 1942 and see page 43).

Fisheries target specific fish species, valuable in terms of their market value, but they do it at the expense of other species because the target species are embedded within an ecosystem (Alverson, *et al.*, 1994; Pauly, *et al.*, 2001b).

Though concerns about sustainability has been raised globally, and ecosystem-based approaches have been proposed to manage fisheries (Jennings, *et al.*, 1998; Kirkwood, *et al.*, 1994), concepts such as 'ecosystem health' are difficult to translate into operational objectives that can be directly used when policy making (Larkin, 1996). Therefore, there is a need for predictive indicators (Murawski, 2000), which can be easily parameterised using easily accessible statistics (Christensen, 2000) while communicating with a single number a variety of complex processes occurring within an ecosystem (Pauly and Watson, 2004).

Pauly *et al.* (1998a; 2001b) and Pauly and Watson (2004) have proposed two such indicators of fisheries sustainability: 'the Marine Trophic Index' (MTI) and the 'Fishing in Balance' (FiB) index.

Mean Trophic Index is name given by the Convention on Biological Diversity (CBD) for the mean trophic level (TL) of fisheries catches (Pauly and Watson, 2004). This was used by Pauly *et al.* (1998a) to demonstrate the global declining trend of mean TL of catches from 1950 to 1994 based on the FAO dataset. The proposed explanation for this phenomenon, now widely known as 'fishing down marine food webs' is that the fisheries catches are shifting from large, high-TL species to the small, low-TL species in response to their relative abundance in the ecosystem. Fishing down marine food web effect has also been shown in Thailand (Christensen, 1998), Canada (Pauly, *et al.*, 2001), Greece (Stergiou, *et al.*, 2000), Iceland (Valtýsson and Pauly, 2003), North Sea (Furness, 2002) and many others (Pauly and Watson, 2004). This phenomenon is widespread because the high-TL species (e.g., large piscivorous fishes such as sharks etc.), which are long-lived species with low reproductive rate are less resilient to overfishing, and tend to be depleted quickly as compared to low-TL species, which are short lived and fast growing (Kirkwood, *et al.*, 1994).

Caddy *et al.* (1998) and Caddy and Garibaldi (2000) have suggested alternative explanations for observed trends in mean TL. They agreed that a general decline in mean TL of marine landings has occurred in many regions of the world. While they conceded that the decline in landings of larger fishes are due to overfishing, they suggest that the decline in global TLs is due to cascading and bottom-up effect, i.e., is not necessarily only because of top-down effect. For example, in the Baltic Sea, 'bottom-up' effects are caused by increased nutrification, which is primarily responsible for observations of increased landings of species of lower TL and hence declines of mean TL (Caddy, *et al.*, 2000).

Moreover, they suggest, the apparent changes in trophic composition of catches could be due to changes in market demand, capture technology, or to changes in environmental conditions, rather than just a release of predator pressure. Other criticisms were related to the over aggregation of the FAO data used by Pauly *et al.* (1998a), ontogenic changes of TL, and the composition of landings not necessarily reflecting relative abundances in the underlying ecosystem. Pauly *et al.* (1998b), gave a response addressing these various points. Pauly and Palomares (2000; 2001), Pauly *et al.* (2001) showed that disaggregation of statistics,

and explicit consideration of ontogenic TL changes further strengthens the fishing down effect. Thus, these effects were not generating the effect, but rather masking it.

With the fishing down effect now being well established, Pauly and Watson (2004) went on to refining the approach used to document it, that the mean TL used to document fisheries impacts on marine ecosystems should be computed after excluding low-TL species from the analysis whose 'bottom-up' driven fluctuations tend to mask the (top-down) effect of fishing (for more details see section 'Marine Trophic index').

Further, to evaluate the success of 'fishing down' as a deliberate choice, Fishing in Balance (FiB) index was proposed by Pauly *et al.* (2000). This index is based on the notion that biological production increases by about one order of magnitude as one moves down one trophic level in a typical marine ecosystem (Pauly and Christensen, 1995). Thus, the FiB index is conceived such that it remains constant when a change in TL is matched by a corresponding change in catch.

## MATERIALS AND METHODS:

### *Catch statistics*

The landings data used for the east and the west coast of India cover the period 1950 to 2000. The catch data for India's EEZ were reconstructed and estimated based on the reports and other miscellaneous sources by Indian authorities and research institutes. This data set comprises 65 statistical categories that range from species (15) to genera (7) and higher groups (43). Key features of this dataset and methods used in its compilation are provided in Chapters 2 and 3.

### *Trophic levels*

The trophic levels (TL) estimates used are based on their diet composition data and on the equation 2.

$$TL_i = 1 + \sum_{j=1}^n (DC_{ij} \cdot TL_j) \quad \dots(2)$$

where  $TL_i$  is the trophic level of species  $i$ ,  $DC_{ij}$  is the proportion of prey species  $j$  in the diet of species  $i$  and  $TL_j$  is the trophic level of prey species  $j$  (Christensen and Pauly, 1992). The primary producers (i.e., plants) and detritus, both are assigned definitional TL of 1. Thus, a consumer eating 40% plants ( $TL = 1$ ) and 60% herbivores ( $TL = 2$ ) will have a trophic level of  $1 + [(0.4 \cdot 1) + (0.6 \cdot 2)] = 2.6$  (Christensen and Pauly, 1992).

The TLs used are fractional trophic levels (Christensen and Pauly, 1992; Odum, 1975) obtained mainly from *FishBase* ([www.fishbase.org](http://www.fishbase.org)) for fishes. For invertebrates; the estimates were based largely on *Sea Around Us* ([www.seaaroundus.org](http://www.seaaroundus.org)) database, and the 'ISCCAAP Table' of FishBase 2000 (Froese and Pauly, 2000). If more than one TL estimate was available for any species (or of species group), then the median of all available was used. In total, 415 different species of fishes, molluscs and crustaceans aggregated into groups were considered in this analysis and group TLs are given in Chapter 2. Details of TL estimates (diet composition and prey items) for fish species are documented in *FishBase*.

In absence of any other available source, the trophic level of 3.1 for the stomatopods were obtained from an Ecopath model of Middle Atlantic Bight (Okey, 2001). Similarly, the trophic level of *Rastrelliger kanagurta* (Indian mackerel) was re-estimated based on their diet composition given in local sources, because the given trophic levels at both the *FishBase* and *Sea Around Us* websites were erroneous (D. Pauly, Fisheries Centre, UBC, pers. comm. Oct. 2004; also see page 30).

### *Mean Trophic Index (MTI)*

Mean Trophic Index is the name given by the Convention on Biological Diversity (CBD, 2004) for the mean trophic level of fisheries catches, which are calculated for each year by weighting trophic levels of each species weighted by their catches, as described in equation 3:

$$MTI = \overline{TL}_k = \frac{\sum_{i=1}^m Y_{ik} TL_i}{\sum_{i=1}^m Y_{ik}} \quad \dots(3)$$

where  $Y_{ik}$  is the catches (consisting of landings and discards) of species (groups)  $i$  in year  $k$  and  $TL_i$  is its trophic level (Pauly, *et al.*, 1998).

Here, mean TLs of catches were computed in two different subsets of the data (see Chapter 5). At first, mean TL were computed using all neritic (= shelf) i.e., excluding only tuna and billfishes. These oceanic fishes were excluded in the analysis because they originate from an ecosystem (the high seas) other than rest of the catches considered here (shelf waters). Secondly, mean TLs were computed excluding not only the tuna and billfishes, but also species with TL below 3.25, the cutoff TL value proposed by Pauly and Watson (2004). The resulting mean TL values thus correspond to the  $^{3.25}MTI$  of Pauly and Watson (2004), which emphasizes changes in the relative abundance of medium and high-TL species. The cutoff of 3.25 which they proposes has the effect of removing most of the small planktivorous fish species whose fluctuations can potentially mask the fishing down effect.

Regression lines were then fitted to TL and/or MTI time series starting from different starting points for different states. These points are selected to represent the start of the fishing down trend (SOFT). Different SOFT points are used for the different states because: (1) the fishing down effect will be detectable only after fishing pressure has reached some critical level, varying between states and (2) in earlier decades (dataset starts from 1950) the fisheries statistics were not very good (or insufficiently detailed). Moreover, although shown (as open dots) in the graphs of Chapter 5, the data from 1994 to 2000 were also not included in regression analysis, for three reasons; (1) they were based on sampling methods different from those used by CMFRI; (2) the data collecting system in India have deteriorated in the last decade of the 20th century (Herrere, *et al.*, 2002), and (3) the data clearly deviate, on most plots from the trends suggested by the earlier years.

Provisions were not made to include ontogenic TL changes in this study. As discussed in Chapter 1 (page 19), overfishing is reported in Indian waters, and fishing tends to reduce the mean size of the species. Thus, the explicit consideration of TL change with size would have only accentuated the fishing down effects (see Chapter 5) in India. Thus, a length based model applied to the Northeastern Atlantic (Pauly and Palomares, 2001) and Eastern Canada (Pauly *et al.*, 2001) increased the fishing down effect, though not to a large amount.

### *Fishing in Balance (FiB) index*

FiB index enables us to assess whether a fishery is balanced in ecological terms or not and for each year  $i$  in a series it is defined as:

$$FiB_k = \log [Y_k \cdot (1/TE)^{TL_k}] - \log [Y_o \cdot (1/TE)^{TL_o}] \quad \dots(4)$$

where  $Y$  is the catch in year  $k$ ,  $TL$  the mean trophic level in the catch,  $TE$  the mean transfer efficiency between trophic levels, and  $o$  refers to any year used as a baseline to normalize the index (Pauly, *et al.*, 2000). Here  $TE$  is set at 10% or 0.1, as was estimated by Pauly and Christensen, (1995) on the basis of 48 published ecosystem models.

The FiB index is designed such that its value does not change when a change in  $TL$  is matched by a corresponding (in signed value) change in catch. Thus, when  $TL$  decreases, catch is expected to increase, and conversely when increases. Moreover, given a  $TE$  of 0.1 and equation (4), a decline of one  $TL$  should correspond to a ten fold increase of catch, and conversely for a  $TL$  increase.

In this analysis the baseline year differs for different states and is based on the same SOFT points used for the  $TL/MTI$  series, and which are shown in graphs of Chapter 5. Unlike, the  $TL/MTI$  graphs, the FiB index is shown for all shelf species only, because (1) the trends are roughly similar and, (2) the proposal of  $^{3.25}MTI$  is relatively recent. Thus, such differences will be analysed and discussed in future.



## RESULTS AND DISCUSSION

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### RESULTS

The main objective of this study is to determine if the marine fisheries as presently conducted are ecologically sustainable or not. Such analysis could be conducted either by analyzing data for India as a whole, or by looking at each of its component states and union territories. Available data on India as whole may not reflect the true extent of fisheries impacts on marine ecosystems, because a decreasing trend in one area may be masked by an increasing trend in another. Hence, to better understand the underlying trends, finer spatial analyses are required in which all maritime states and union territories are examined individually. This is the reason why total marine catches were reconstructed for all maritime states and union territories within the Indian EEZ over the period of 1950 to 2000, then evaluated on the basis of two ecological indicators, the MTI and the FiB index (see Chapter 3 and 4).

The following sections show the results, along with interpretative comments, starting with India and progressing geographically from the northwest to the northeast states and union territories. Note that all mean TL and MTI trends<sup>25</sup> presented below omit tuna and billfishes and are thus limited to shelf (= neritic) species.

#### *India*

Reconstructed Indian marine catches (Figure 6) indicate a gradual increase between 1950 and 2000 from 0.6 to 3.3 million t. Indian mackerel, Oil sardine, Bombay duck, sciaenids and penaeid and non-penaeid prawns jointly contribute about half of the overall catch. Out of these, Indian mackerel and Oil sardine show huge fluctuations over the five decades considered here.

There are biological limits beyond which fisheries cease to be sustainable. When a multi-species stock is overexploited, the top predators will be the first to decline (Pauly, 2000). This is evident in Figure 7, which illustrates a decline in the mean marine trophic level of species with TL >3.25 (<sup>3-25</sup>MTI) from 1964 onwards (i.e., from the start of the fishing down trend, or SOFT point in Figure 7). However, the mean trophic levels of catches show no clear trend when shelf species with TL <3.25 are included. This indicates that the fishing down effect is masked by the fluctuating catches of low-TL species i.e., Oil sardine and Indian mackerel, as mentioned above. Hence, the use of the <sup>3-25</sup>MTI (see Chapter 4).

Figure 8 illustrates a time series of the FiB index in the Indian EEZ. From 1964 onwards, the index shows an upward trend suggestive of geographic expansion, from shallow to deep waters, also corresponding to the trend of introduction of new technologies in the Indian fisheries from the early 1960s on (also see Chapter 1; page 16), which allowed expanding fishing activities beyond coastal waters.

As might be seen in the example below, FiB plots and plots of TL vs. log catch essentially convey the same information; this is the reason why both plots are presented only for Gujarat.

#### *Gujarat*

The marine catches from Gujarat state constitute 16% of India's total catch. The reconstructed catches (Figure 9) fluctuate sharply, though generally increasing over the 5 decades considered here.

From 1961 onwards (i.e., from the start of the fishing down trend, or SOFT point in Figure 10), there was marked decline in <sup>3-25</sup>MTI from mean TL = 4.2 to TL = 4.0, i.e., about 0.008 year<sup>-1</sup>. Unlike for India as a whole, the downward trend is visible even when all shelf species are included because the bulk of the landings are from group >3.25 TL (see Figure 9). Moreover, this trend indicates a steep rate of decline, i.e., 0.01 TL year<sup>-1</sup>, due to wider range of TLs considered.

Furthermore, the time series of the FiB index (Figure 11) shows a more or less flat sequence of points from 1961 (SOFT) to the late 1980, corresponding to an inverse relationship between TL and log catches for the

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<sup>25</sup> In the figures showing trend of MTI, coefficient of correlation (r) with single \* shows 5% level of significance and \*\* shows 1% level of significance.

same period (Figure 12). However, from the 1990 onwards there is an increase in the FiB index, demonstrating a strong expansion of the fisheries range.

### *Daman and Diu*

Daman and Diu contributes only 0.5% in total marine catch of India. Overall, the catches (Figure 13) increased gradually until 1990, followed by a sharp increase towards 2000.

The  $^{3-25}$ MTI shows a decline from 1960 (i.e., SOFT point in Figure 14) at the rate of  $0.004 \text{ year}^{-1}$ , mainly due to the decline of *Harpadon nehereus* (Bombay duck). Furthermore, inclusion of small pelagic species mask this declining trend (Figure 14) due to their highly fluctuating catches.

The time series of the FiB index (Figure 15) shows a decrease from 1960 (SOFT point) to 1972, followed by a gradual increase in the following decades. The initial decrease was due to limitation of fishing operations up to coastal areas (Balan, *et al.*, 1987). However, in mid 1970s, the Government of Goa, Daman and Diu focussed on expansion of fisheries to the deep sea (IDBI, 1974a, b). A fisheries federation was established at Panaji, Goa to encourage mechanisation to increase the catches (Gupta, *et al.*, 1984a). This expansion since mid 1970s is clearly visible in the FiB index (Figure 15), though it was not sufficient to offset the declining TL trend.

### *Goa*

Goa contributes 3% in total marine catches of India. Reconstructed catches (Figure 16) show a steady increase until 1980s, with a sharp increase thereafter. The species with TL <3.25 contributes more than 50% in total catch with major landings of Indian mackerel, Oil sardine and other sardines.

Trends in the mean TL of landings in Goa for five decades are illustrated in Figure 17. There was a marked decline in  $^{3-25}$ MTI for last three decades from TL = 4.0 to TL = 3.8 i.e., at the rate of  $0.01 \text{ year}^{-1}$ .

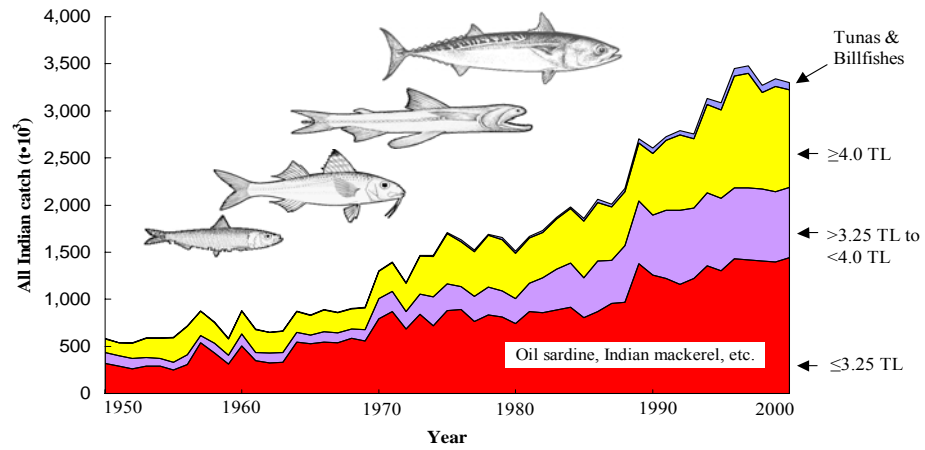
Goa was thought to be good location for deep sea fishing industry (IDBI, 1974) and, its fisheries experienced technological improvements in the mid-1970s (Gupta, *et al.*, 1984a). As a result, the fisheries expanded to offshore areas; this expansion is visible in the trend of FiB index (Figure 18), which has increased gradually from 1973 onwards.

### *Maharashtra*

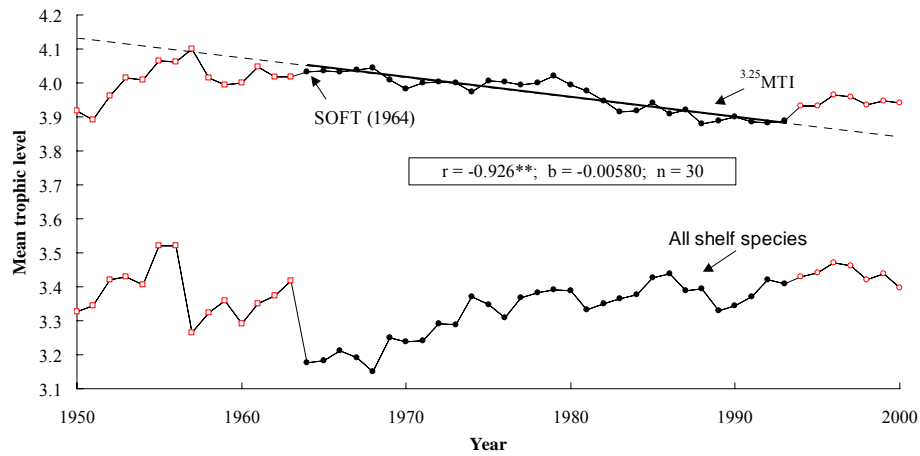
The state of Maharashtra ranks second among India's maritime states and contribute 18% on average in total marine fishery of the country. The reconstructed catches (Figure 19) indicate a steady increase between 1950 and 2000 from 99 thousand t to 478 thousand t. As in other northwest states, species with TL <3.25 predominate the Maharashtra catches.

The fishing down effect is visible from 1955 onwards for  $^{3-25}$ MTI, with a rate of  $0.004 \text{ year}^{-1}$  (Figure 20). No clear trend is visible when all shelf species are included.

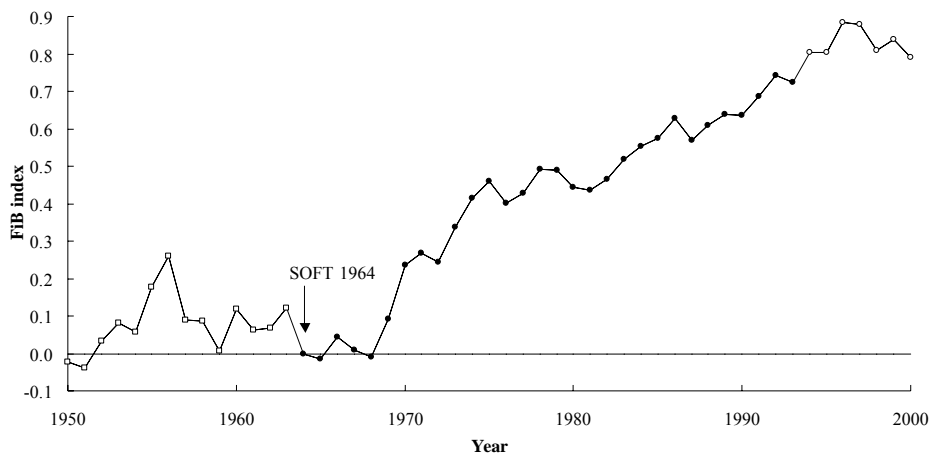
After Independence in 1947, the fisheries of Maharashtra were encouraged, but the increasing fishing effort were mainly concentrated in coastal areas, leading to catch declines as early as the mid-1950s (Figure 19). However, from the early 1960s, owing to increase in the mechanization in Maharashtra (Srinath, *et al.*, 1987), marine catches increased steadily as fisheries expanded to offshore and deep sea waters, as confirmed by the FiB index series (Figure 21).



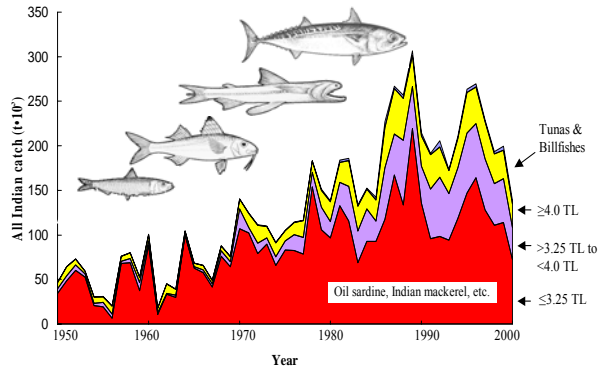
**FIGURE 6.** Trends of catch (million tonnes) in India from 1950 to 2000.



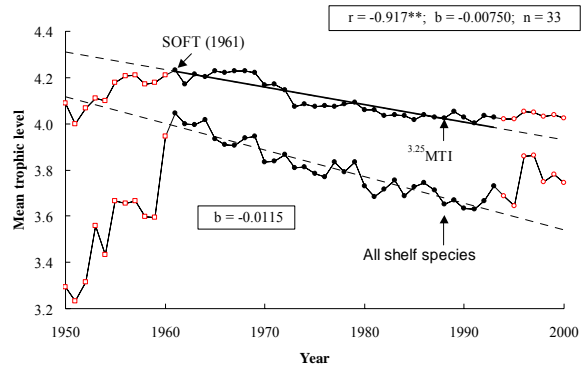
**FIGURE 7.** Trends in mean trophic level of landings in India from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



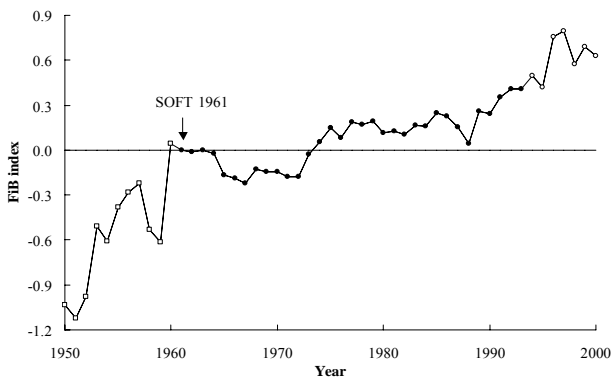
**FIGURE 8.** Trend of FiB index in India from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



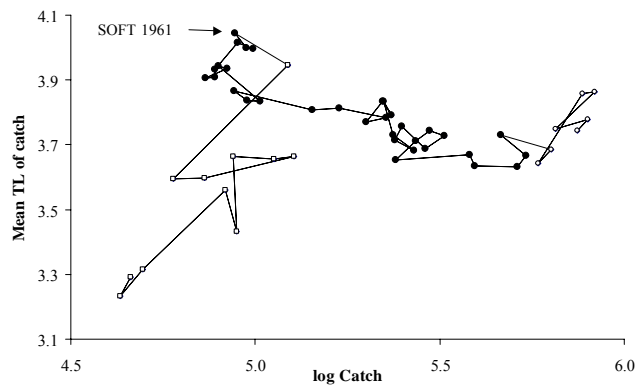
**FIGURE 9.** Trends of catch (thousand tonnes) in Gujarat state from 1950 to 2000.



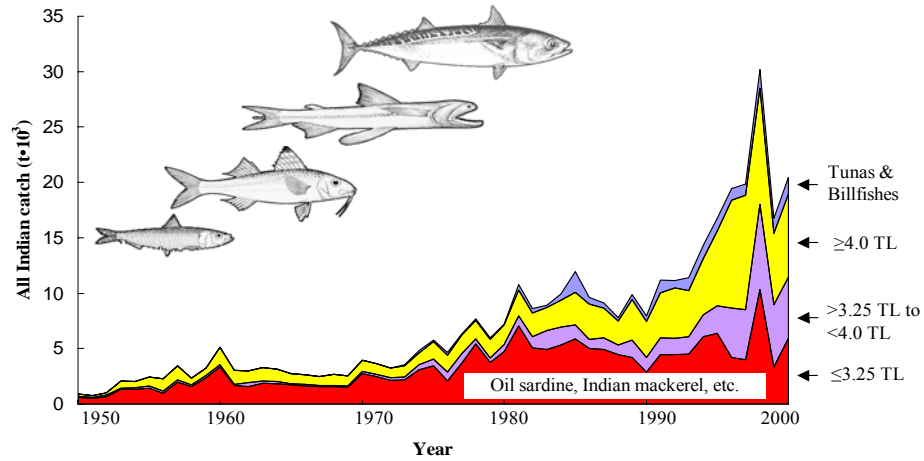
**FIGURE 10.** Trends in mean trophic level of landings in Gujarat from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



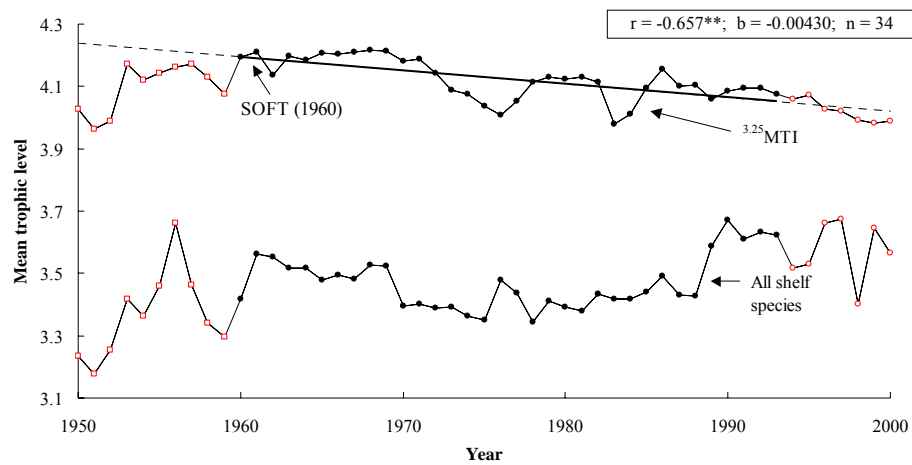
**FIGURE 11.** Trend of FiB index in Gujarat from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



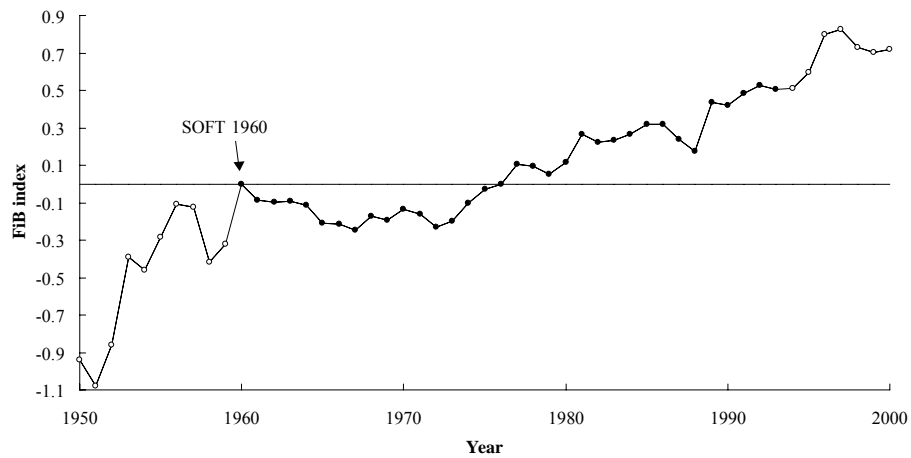
**FIGURE 12.** The plot of marine trophic levels of landings versus catch (thousand tonnes) for Gujarat.



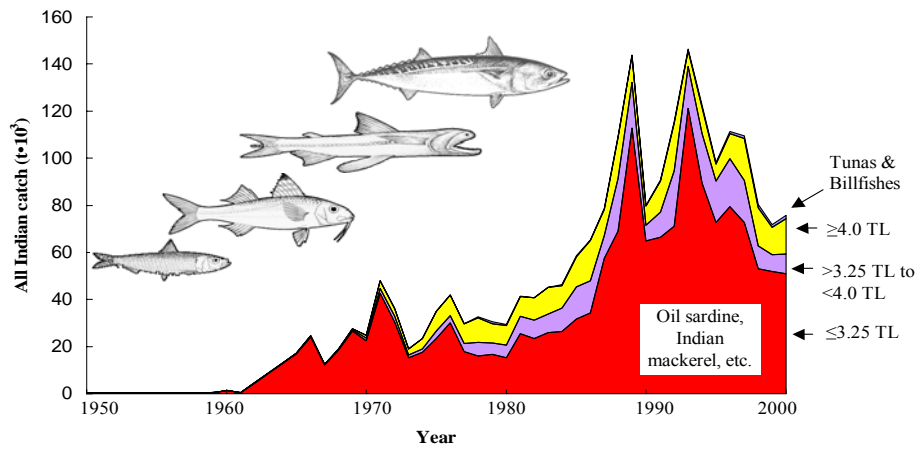
**FIGURE 13.** Trends of catch (thousand tonnes) in Daman & Diu from 1950 to 2000.



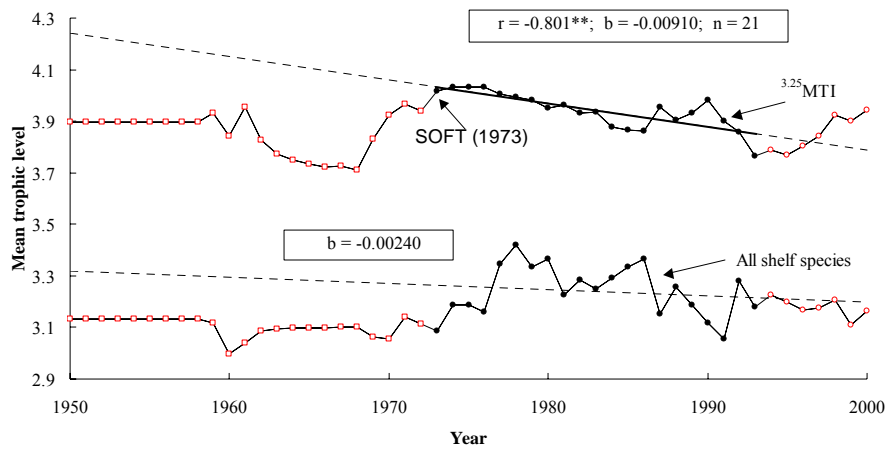
**FIGURE 14.** Trends in mean trophic level of landings in Daman & Diu from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



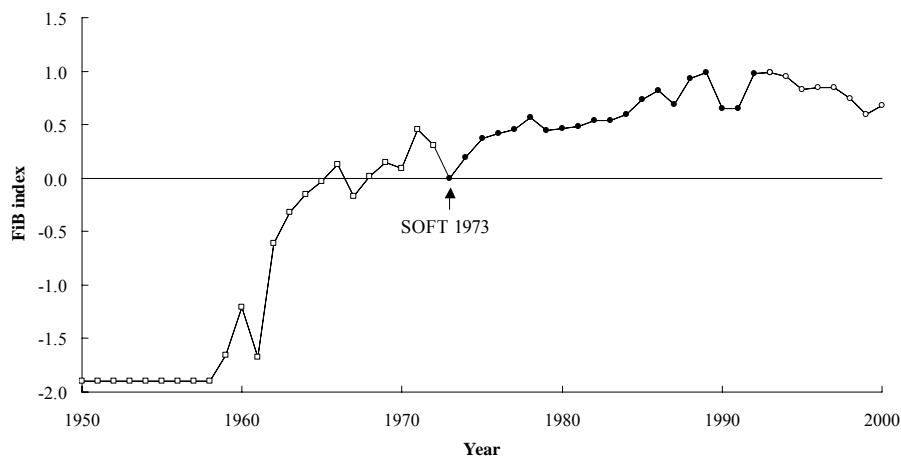
**FIGURE 15.** Trend of FiB index in Daman & Diu from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



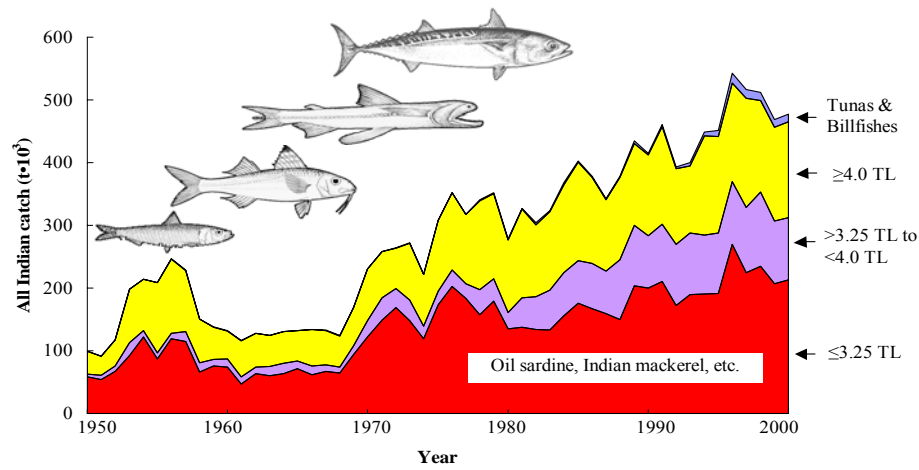
**FIGURE 16.** Trends of catch (thousand tonnes) in Goa from 1950 to 2000.



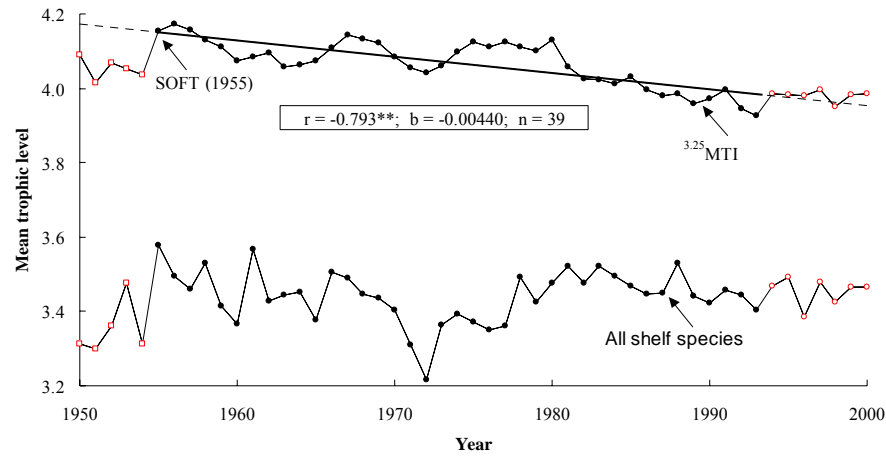
**FIGURE 17.** Trends in mean trophic level of landings in Goa from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



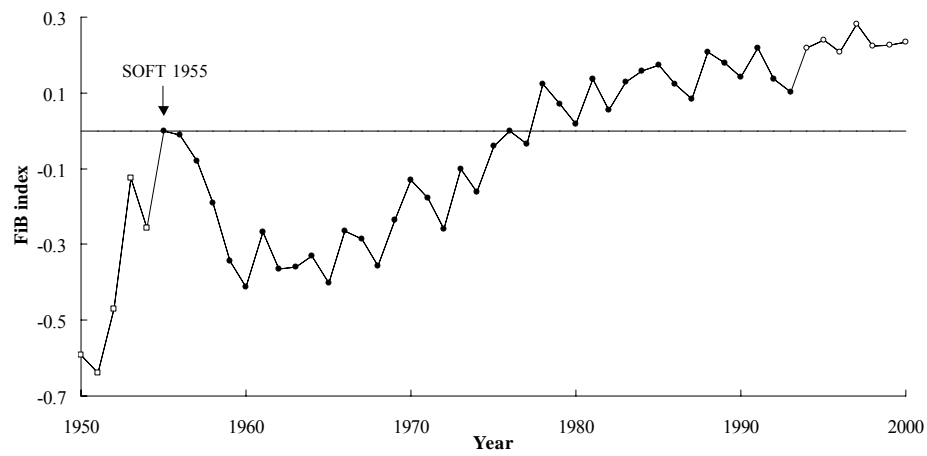
**FIGURE 18.** Trend of FiB index in Goa from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



**FIGURE 19.** Trends of catch (thousand tonnes) in Maharashtra from 1950 to 2000.



**FIGURE 20.** Trends in mean trophic level of landings in Maharashtra from 1950 to 2000 (open squares and circles represent data points not included in the



**FIGURE 21.** Trend of FiB index in Maharashtra from 1950 to 2000 (open squares and circles represent data points not included in the analysis).

## *Karnataka*

Karnataka contributes 8% of India's total catch. The reconstructed catches show huge fluctuations, mainly due to Oil sardine and Indian mackerel, which forms bulk of the catches. Overall, catches increased between 1950 and 2000 from 47 thousand t to 139 thousand t (Figure 22).

Figure 23 illustrates a decline in  $^{3-25}$ MTI, which proceeds at a rate of  $0.009 \text{ year}^{-1}$ , while no clear trend is visible when all shelf species are considered. This is due to the masking effect of highly fluctuating catches of Oil sardine and Indian mackerel. Their removal from the analysis shows a decline in mean marine TL of landings at the rate of  $0.002 \text{ year}^{-1}$  (not shown here).

The time series of the FiB index (Figure 24) shows a decrease from 1962 to 1966; it then increases steadily until 1988, suggestive of expansion in fisheries.

This trend corresponds with the growth of fishery sectors in Karnataka. The first demonstration of mechanised fishing was held in 1957 at Mangalore (Gupta, *et al.*, 1984b), but until early 1960s no concerted efforts were made to develop the fisheries, and fishing remained confined to inshore areas, irrespective of increasing effort. Then, it was realised that the inshore waters were heavily exploited (Kurup, *et al.*, 1987). Thus, the fisheries shifted towards unexploited offshore and deep sea areas, thereby relying on large number of newly introduced mechanised vessels<sup>26</sup>: the number of mechanised boats increased between 1958 and 1978 from 9 to 1,685 (Gupta, *et al.*, 1984b).

## *Kerala*

Kerala occupies the foremost position in India's total marine catches by contributing  $\approx 26\%$  over the five decades. However, the catches show huge fluctuations corresponding to catches of Indian mackerel and Oil sardine (Figure 25), as in the state of Karnataka.

The fishing down effect is visible in Kerala (Figure 26) from 1964 onwards for  $^{3-25}$ MTI, with a decline of  $0.008 \text{ year}^{-1}$ . However, no clear trend is apparent when all shelf species are included. This is again because of fluctuations by the small pelagics, i.e., mainly Oil sardine, other sardines and Indian mackerel (see Chapter 4).

The FiB index (Figure 27) increases gradually from 1964 onwards, indicating a geographical expansion of fisheries to previously unexploited areas. Kerala was the first state of India where mechanization began, in the late-1950s. Individual entrepreneurs invested in fishing in the mid-1960s, mainly trawling for prawn in coastal areas (Jacob, *et al.*, 1987). This was soon followed by various technological developments, enabling offshore expansion of the trawlers' areas of operation. The number of mechanized vessels increased from 23 in 1954 (Gupta, *et al.*, 1984c) to 4,206 by 1999 (DAHD, 2001). At present, the focus is to expand the fisheries into even deeper waters.

## *Lakshadweep*

The Lakshadweep (= Laccadive) Islands contribute only 0.3% of India's total marine catch. The reconstructed catches indicate a gradual increase from 1950s to 1980s, followed by a sharp increase to 12 thousand t (Figure 28) by 2000. Tunas and billfishes are the major fisheries, contributing about 70% of catches over the five decades.

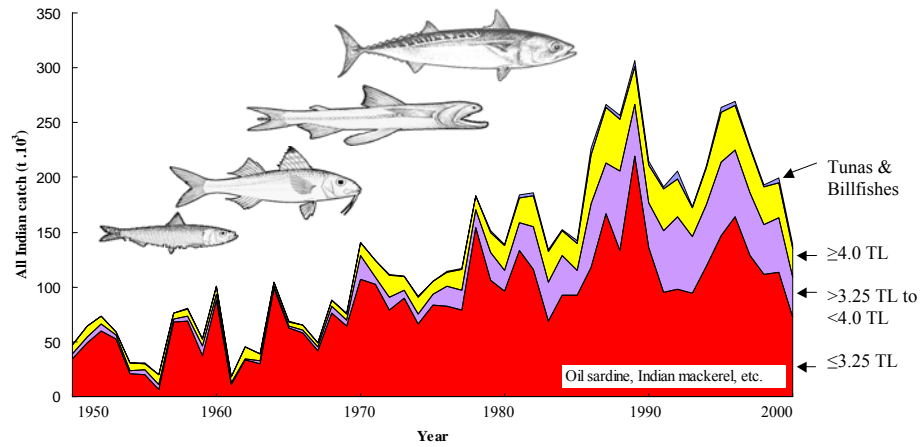
From 1965 onwards, a decline is evident (Figure 29) in both  $^{3-25}$ MTI and for the mean TL of all shelf species, at the rate of  $0.006 \text{ year}^{-1}$ .

However, the time series of the FiB index (Figure 30) shows continuous and steady increase from 1965 on. This is suggestive of geographical expansion of fisheries from coastal to deep sea waters. However, this expansion is relatively slow: even in the 1980s, most fishing was still confined to nearshore waters with pole and line as major gear (Algaraja, 1987). It is believed that the fisheries have not expanded to their fullest, due to shortage of skilled fishers in the Lakshadweep Islands (Raghavan, *et al.*, 1993).

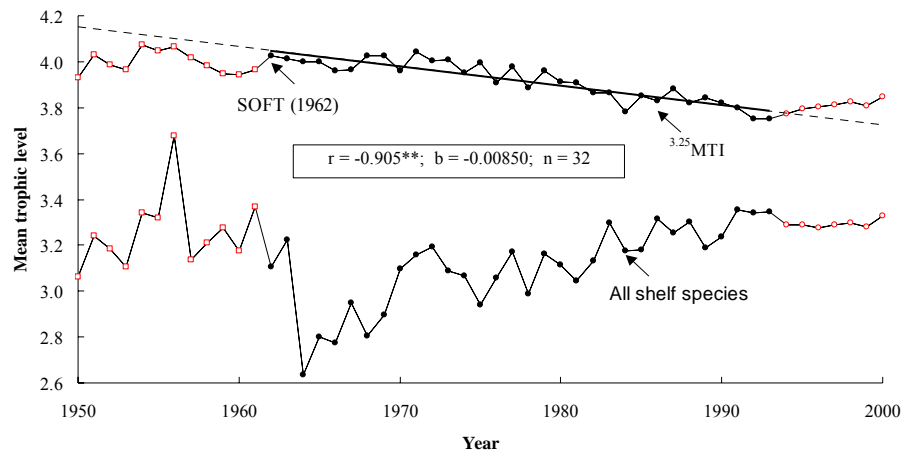
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<sup>26</sup> Motorisation of existing traditional crafts was not successful in state of Karnataka due to some technical problems (Gupta *et al.*, 1984).

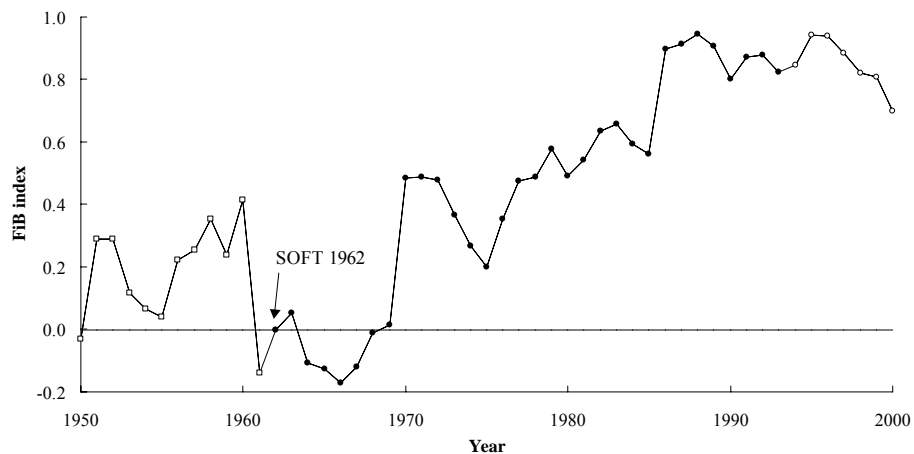




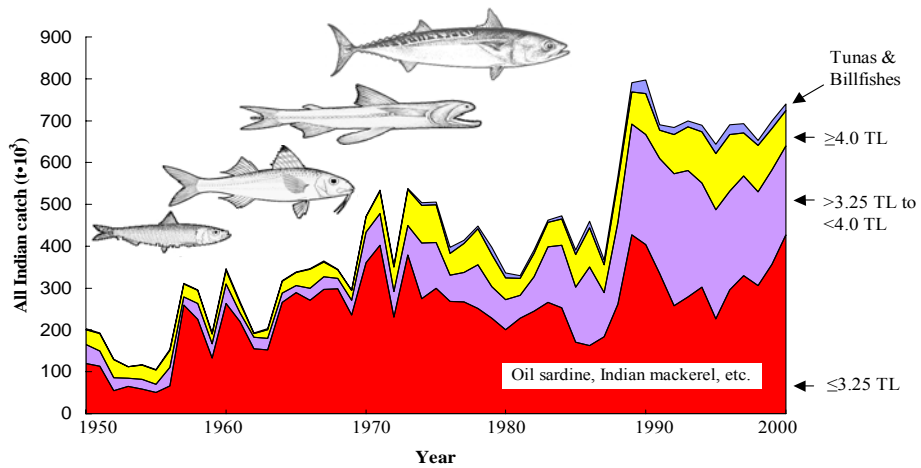
**FIGURE 22.** Trends of catch (thousand tonnes) in Karnataka from 1950 to 2000.



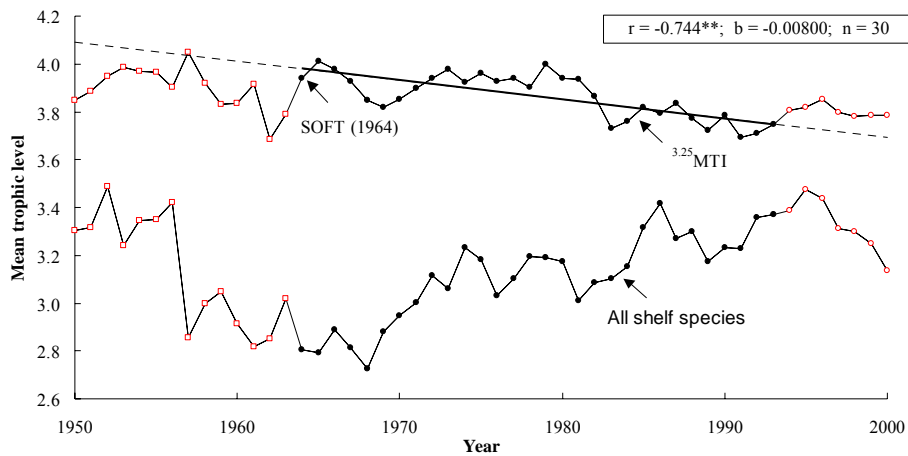
**FIGURE 23.** Trends in mean trophic level of landings in Karnataka from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



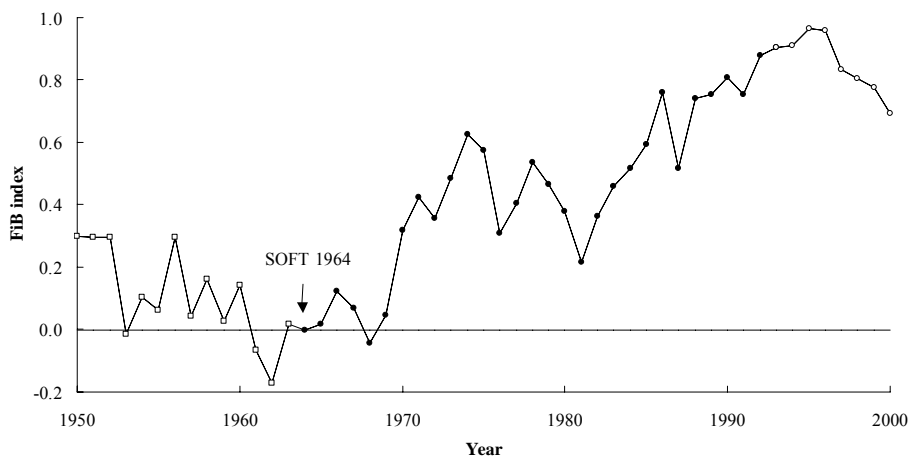
**FIGURE 24.** Trend of FiB index in Karnataka from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



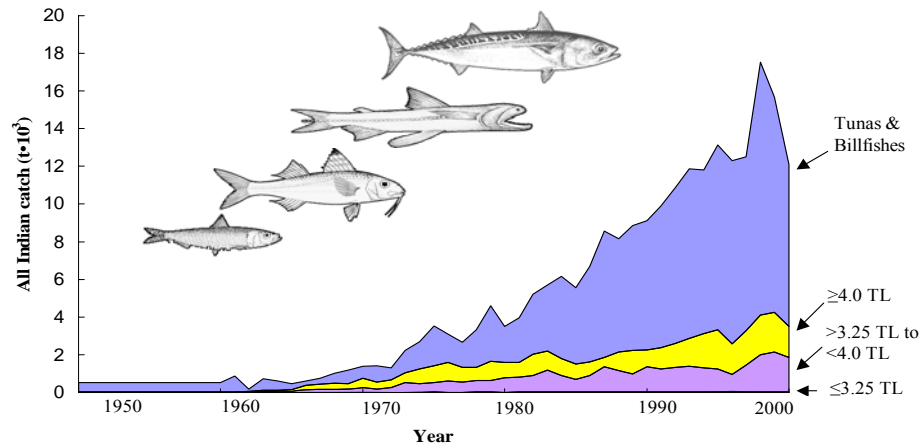
**FIGURE 25.** Trends of catch (thousand tonnes) in Kerala from 1950 to 2000.



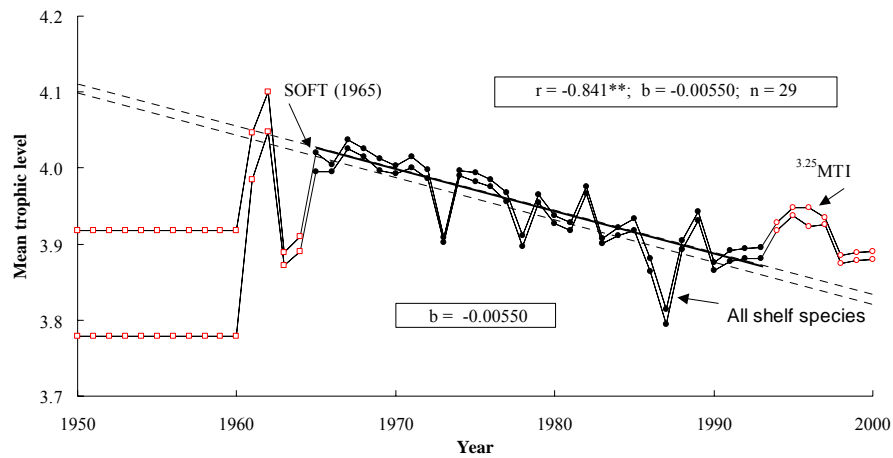
**FIGURE 26.** Trends in mean trophic level of landings in Kerala from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



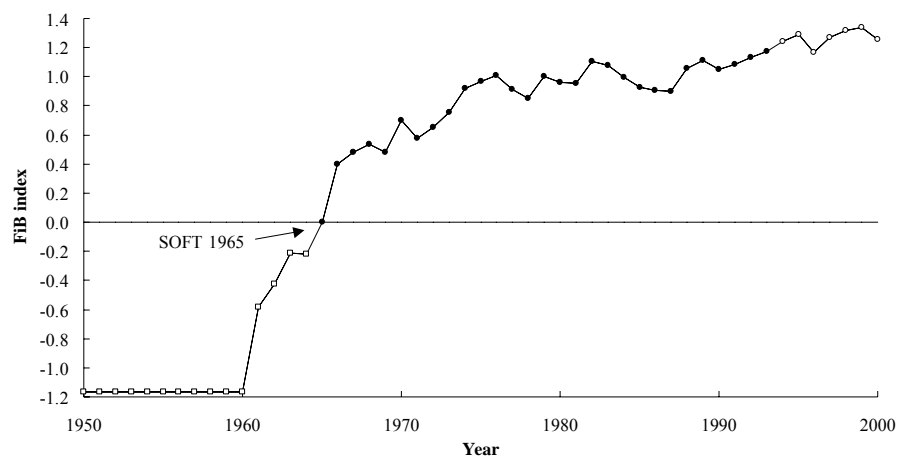
**FIGURE 27.** Trend of FiB index in Kerala from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



**FIGURE 28.** Trends of catch (thousand tonnes) in Lakshadweep from 1950 to 2000.



**FIGURE 29.** Trends in mean trophic level of landings in Lakshadweep from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



**FIGURE 30.** Trend of FiB index in Lakshadweep from 1950 to 2000 (open squares and circles represent data points not included in the analysis).

## *Tamil Nadu*

Among the various maritime states of India, Tamil Nadu, with 15% ranks third in the contribution to marine catches. The reconstructed catches show a gradual increase over the five decades considered here (Figure 31). Species with TL < 3.25 contribute about half of the overall catch. Out of these, various sardines and *Leiognathus* species dominate the catches.

From 1956 onwards, there is marked decline in  $^{3-25}MTI$ , of about  $0.006 \text{ year}^{-1}$  (Figure 32). The downward trend is also visible in all shelf species with a steeper rate of decline, i.e.,  $0.013 \text{ year}^{-1}$ .

Overall, the FiB index (Figure 33) shows a steady increase from 1956 onwards, suggestive of geographic expansion of fisheries from shallow to deep waters. This expansion has happened with improvement in technologies through time. The state's mechanisation program started in 1954, enabling mechanised vessels to be used for the operation of gill nets. After 1964, the emphasis shifted towards trawling (Gupta, *et al.*, 1984d). The total number of mechanised vessels in the state have increased from 50 in 1960 (Gupta, *et al.*, 1984d) to 9,896 in 1999 (DAHD, 2001).

## *Pondicherry*

Pondicherry contributes about 1% in India's total marine catch. The reconstructed catches increased slowly between 1950 and 1993, followed by a dramatic increase (Figure 34). This clearly illustrates that there is some problem with the different dataset used from 1994 on. That is why the data points from 1994 to 2000 were excluded from the analysis even in the states where they seems to fit (also see Chapter 4; page 43). The species with TL < 3.25 contributes about half of the overall catch, with major landings of various sardines and anchovies.

Figure 35 illustrates the fishing down effect from 1955 onwards, for all shelf species and using  $^{3-25}MTI$ . The slope of decline is steeper when all shelf species are included because a wider range of TLs is available, compared to  $^{3-25}MTI$ .

The time series of the FiB index (Figure 36) is rather steady until 1994, when a sharp increase is observed. The steady values of the index suggest that the motorization and mechanization of the fishery (Dharmaraja, *et al.*, 1987; Gupta, *et al.*, 1984e) led to TL declines that were largely matched by the catch increases. However, the sharp increase after 1993 seems to be the artefact of data, as the source of catches data has changed from CMFRI (1950-1993) to DAHD and MPEDA reports (1994-2000).

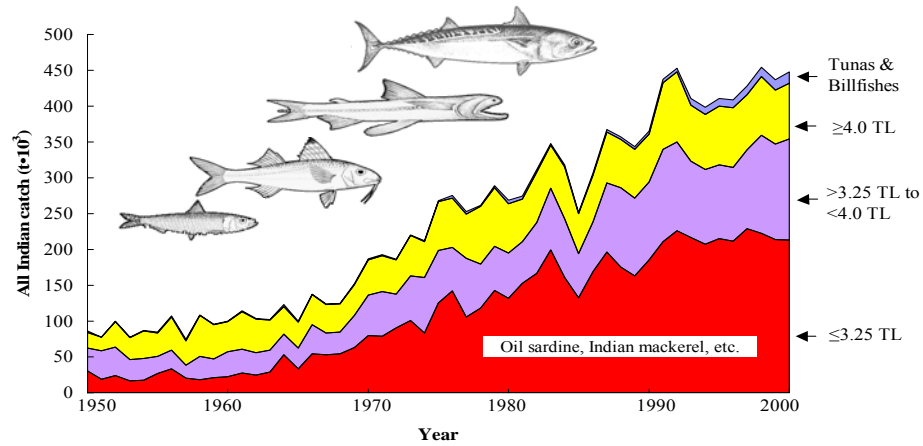
## *Andhra Pradesh*

Andhra Pradesh contributes 7% of India's total marine catch. The reconstructed catches (Figure 37) fluctuate sharply, though generally increasing over the 5 decades considered here. Species with TL < 3.25 TL contribute about half of the overall catch.

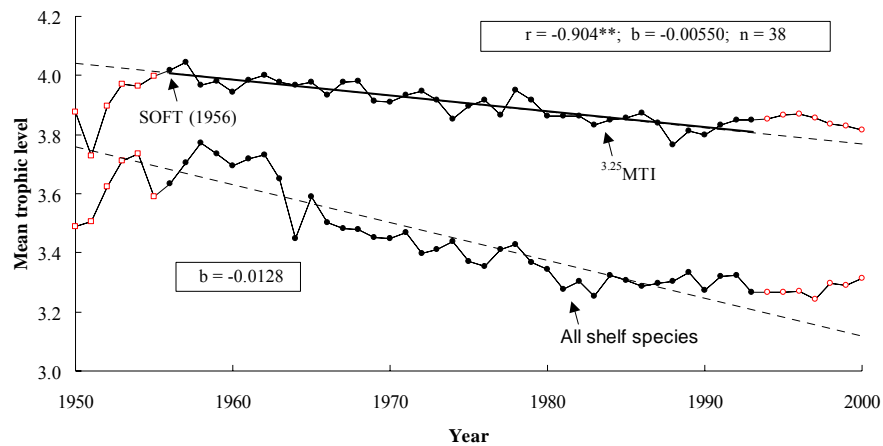
The fishing down effect is visible in Andhra Pradesh from 1968 onwards (Figure 38). There was a marked decline in both  $^{3-25}MTI$  and all shelf species, at rates of  $0.003 \text{ year}^{-1}$  and  $0.004 \text{ year}^{-1}$ , respectively.

Again, the FiB index (Figure 39) shows a steady increase from 1968 onwards indicative of geographical expansion of fisheries from shallow to deep waters.

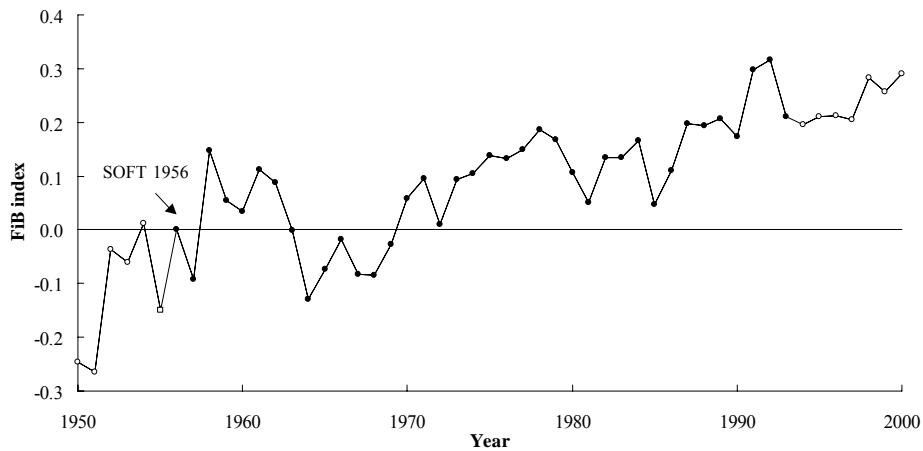
Historical account of fisheries development in Andhra Pradesh supports this trend. Initially, the fishing effort of non-mechanized vessels, few small trawlers and gillnetters was mainly concentrated in inshore waters where prawns were known to be abundant (Alagaraja, *et al.*, 1987; Gupta, *et al.*, 1984f). However, due to dwindling catches from inshore areas and drastic changes brought in by mechanization, the fisheries moved towards deep sea waters via its industrial vessels. At present, most of these industrial vessels operate from Vishakapatnam harbour (Sujatha, 1996).



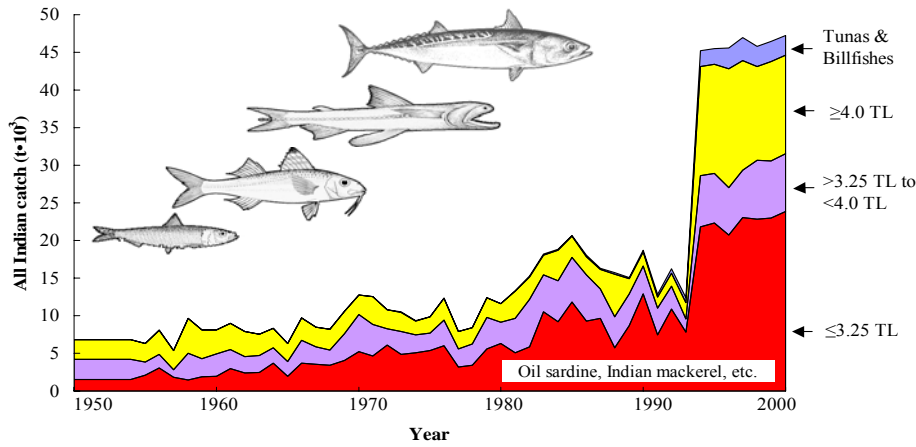
**FIGURE 31.** Trends of catch (thousand tonnes) in Tamil Nadu from 1950 to 2000.



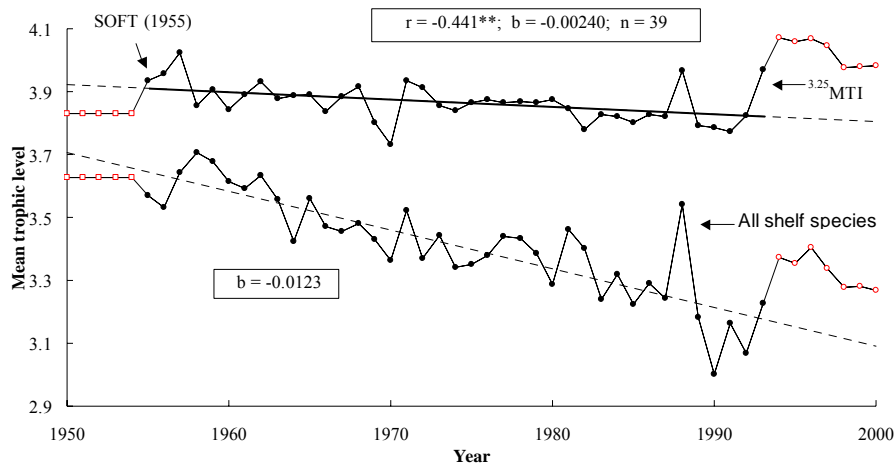
**FIGURE 32.** Trends in mean trophic level of landings in Tamil Nadu from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



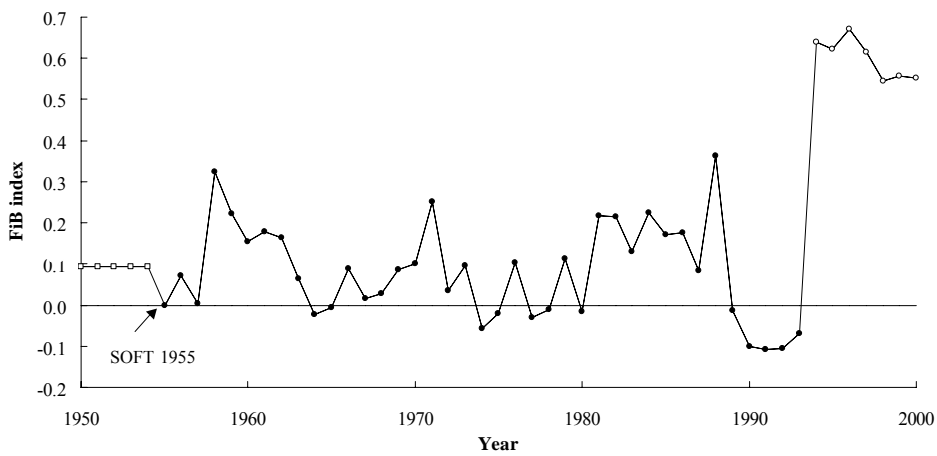
**FIGURE 33.** Trend of FiB index in Tamil Nadu from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



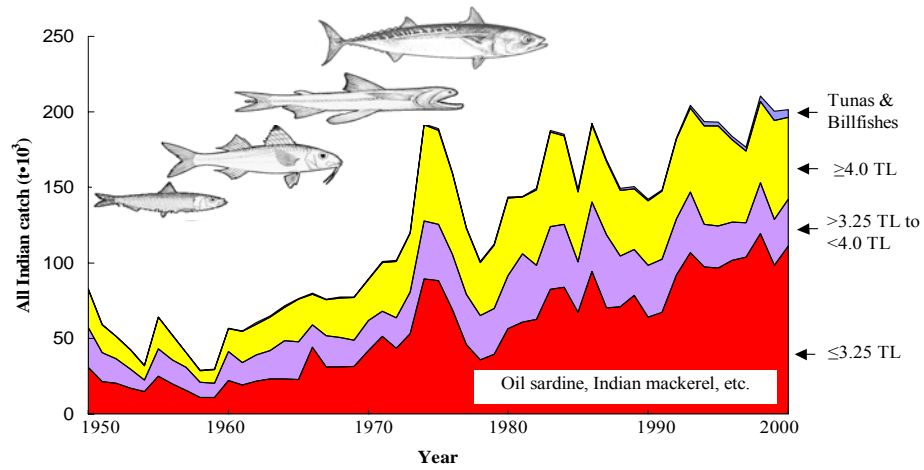
**FIGURE 34.** Trends of catch (thousand tonnes) in Pondicherry from 1950 to 2000.



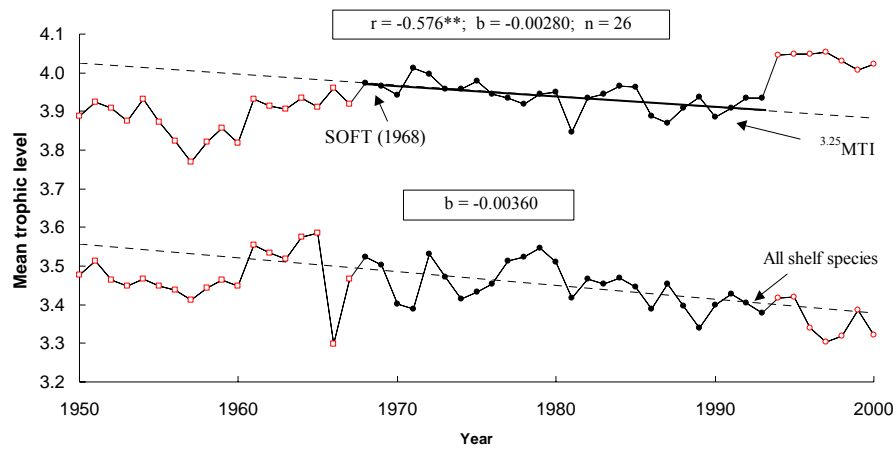
**FIGURE 35.** Trends in mean trophic level of landings in Pondicherry from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



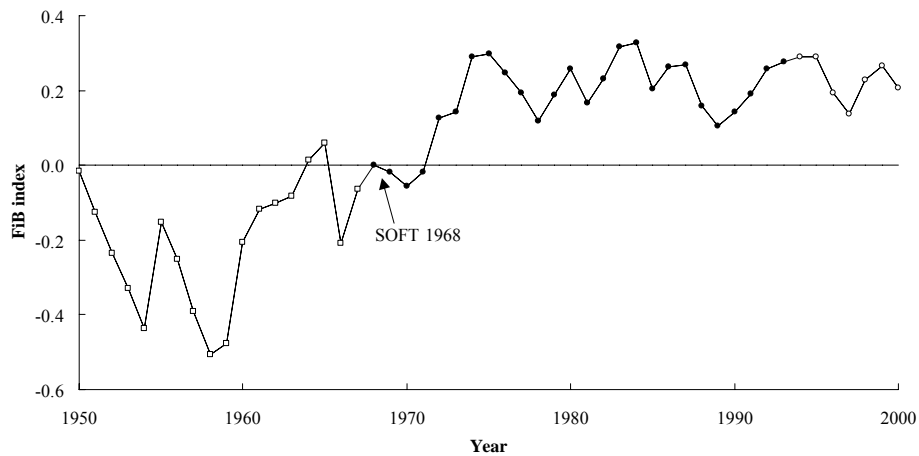
**FIGURE 36.** Trend of FiB index in Pondicherry from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



**FIGURE 37.** Trends of catch (thousand tonnes) in Andhra Pradesh from 1950 to 2000.



**FIGURE 38.** Trends in mean trophic level of landings in Andhra Pradesh from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



**FIGURE 39.** Trend of FiB index in Andhra Pradesh from 1950 to 2000 (open squares and circles represent data points not included in the analysis).

## *Orissa*

Orissa contributes 3% of India's total marine catch. Overall, the reconstructed catches (Figure 40) indicate a gradual increase until 1992, followed by a sharp increase. The species with TL <3.25, notably various sardines contribute significantly to overall catch.

Figure 41 illustrates a small decline of  $0.003 \text{ year}^{-1}$  in  $^{3.25}\text{MTI}$  but no clear trend is visible when all shelf species are included.

The time series of FiB index (Figure 42) shows an increase from 1967 onwards, which again suggests that fisheries are expanding in Orissa state. However, the development of marine fisheries sector was very slow and steady in this state (BOBP, 1984). Even until the late 1970s, 97% of total fishing fleet (including inland) consisted of non-mechanized vessels (Gupta, *et al.*, 1984g), with little or no commercial exploitation beyond 50 m depth (Scariah, *et al.*, 1987).

## *West Bengal*

West Bengal contributes 3% of the total marine catch of India. The reconstructed catches (Figure 43) show a gradual increase over the first four decades covered here, but thereafter, the catches increased sharply. The species with TL < 3.25 contribute about 40% of the total catch with major landings of prawns, sciaenids and other clupeoids.

From 1967 onwards (Figure 44), there is a decline in  $^{3.25}\text{MTI}$  at the rate of  $0.004 \text{ year}^{-1}$ . A less steep downward trend (slope =  $-0.003$ ) occurs with inclusion of all shelf species.

In West Bengal, inland fisheries are more developed than the marine fisheries, due to consumer preference for fresh water fish, which fetch higher prices than marine fishes. In mid-1980s it was realized that a good potential exists for the expansion of the small scale marine fish industry (Philipose, *et al.*, 1987). This geographic expansion of marine fisheries is also illustrated in the time series of the FiB index (Figure 45).

## *Andaman and Nicobar Islands*

The Andaman and Nicobar Islands contributes only 1% to the total marine catch of India. Overall, the catches indicate gradual increase over decades and thereafter, followed by a sharp increase (Figure 46).

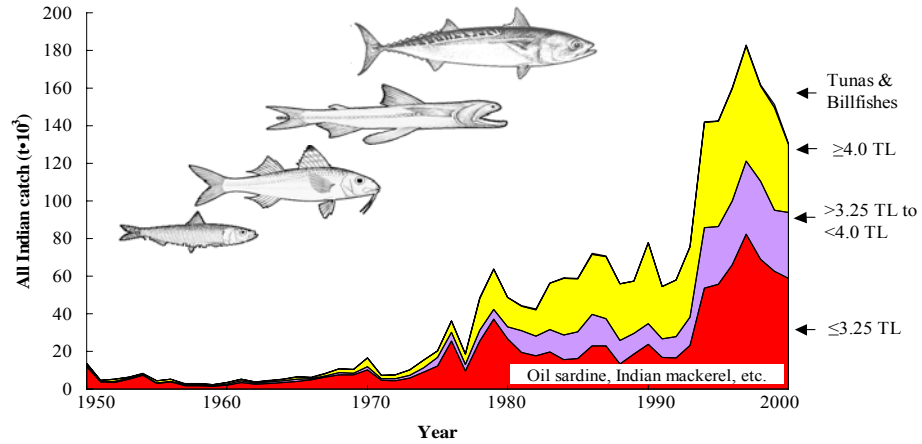
From 1950 (Figure 47) onwards, a decline is visible in both  $^{3.25}\text{MTI}$  and the mean TL of all shelf species, at the rates of  $0.001 \text{ year}^{-1}$  and  $0.008 \text{ year}^{-1}$ , respectively (The slope of decline is steeper when all shelf species are included because a wider range of TLs is available).

The time series of the FiB index (Figure 48) shows steady increase from 1950 onwards. However, fishing was until recently confined to near shore waters with little or no exploitation of offshore and deep sea areas (Rajan, 2003), owing to small number of skilled fishers<sup>27</sup> and limited investments, due to limited information on resource availability (Algaraja, 1987; Kumaran, 1973).

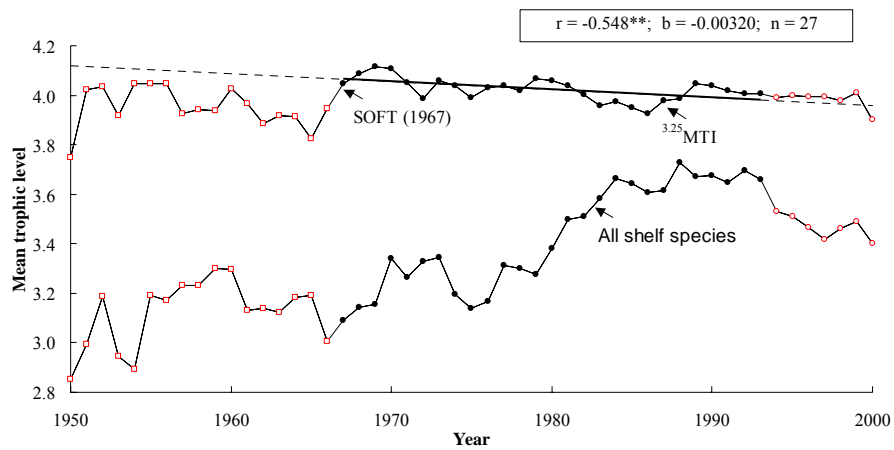
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<sup>27</sup> There are no traditional fishers in these islands. Fishing is mainly done by the fishers who settled here, and originated mainly from Tamil Nadu and Pondicherry (Alagaraja, 1987).

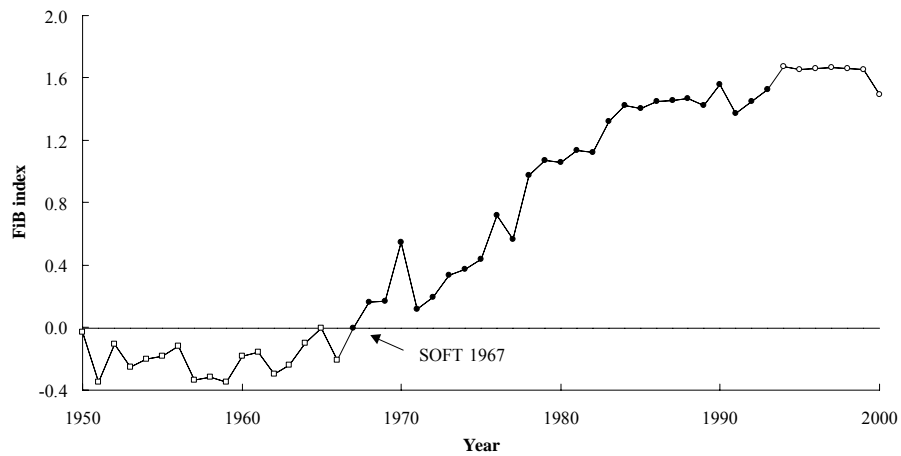




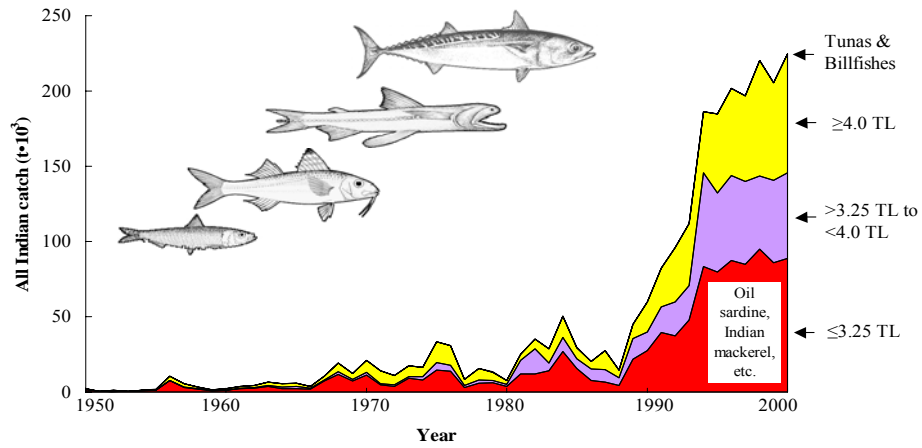
**FIGURE 40.** Trends of catch (thousand tonnes) in Orissa from 1950 to 2000.



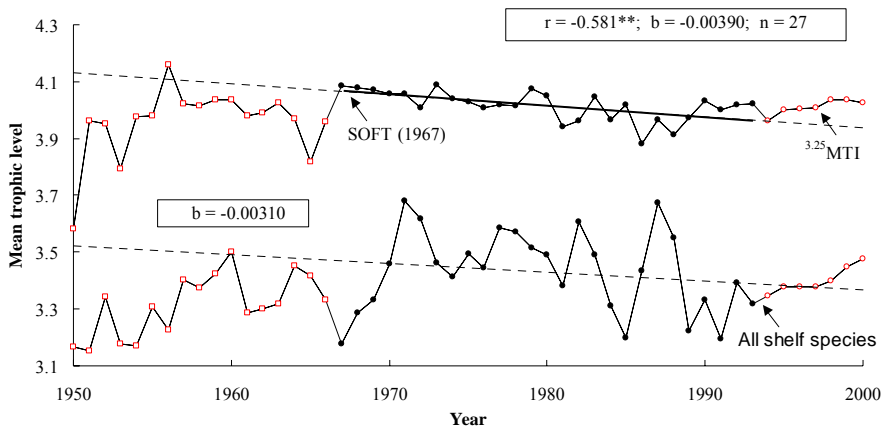
**FIGURE 41.** Trends in mean trophic level of landings in Orissa from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



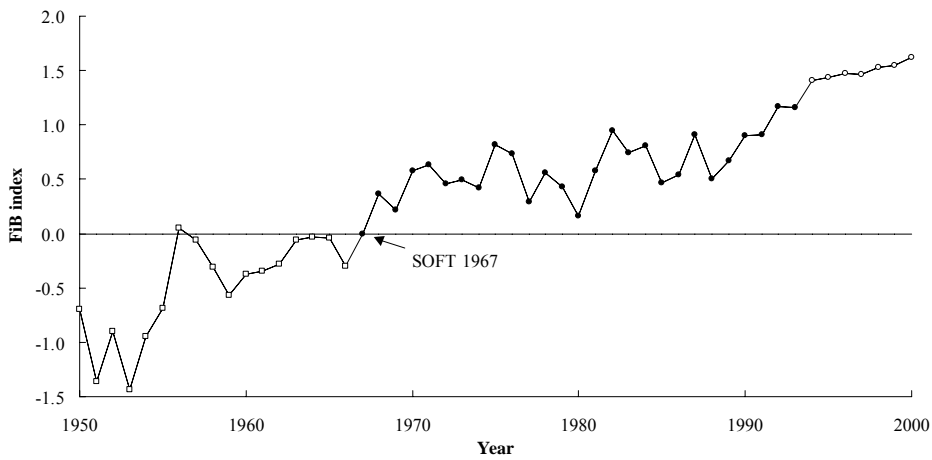
**FIGURE 42.** Trend of FiB index in Orissa from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



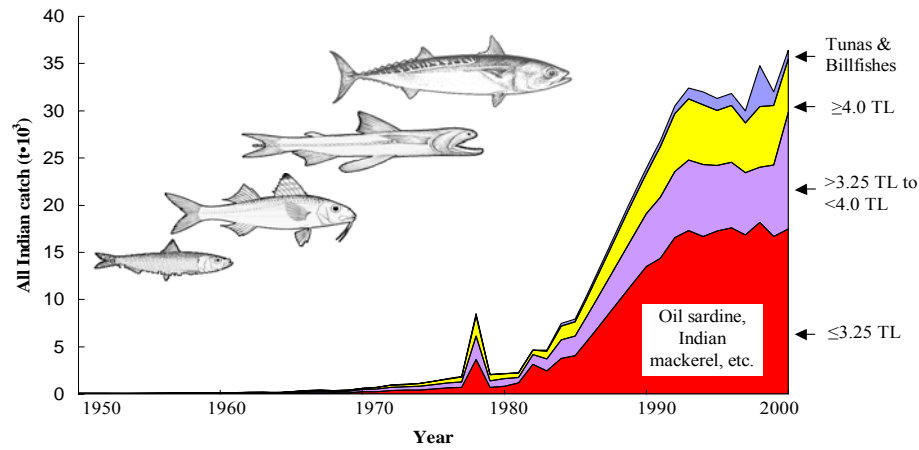
**FIGURE 43.** Trends of catch (thousand tonnes) in West Bengal from 1950 to 2000.



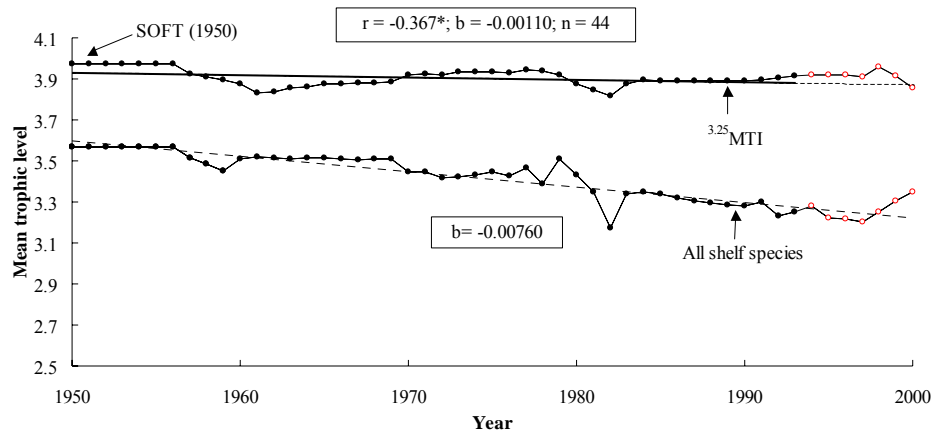
**FIGURE 44.** Trends in mean trophic level of landings in West Bengal from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



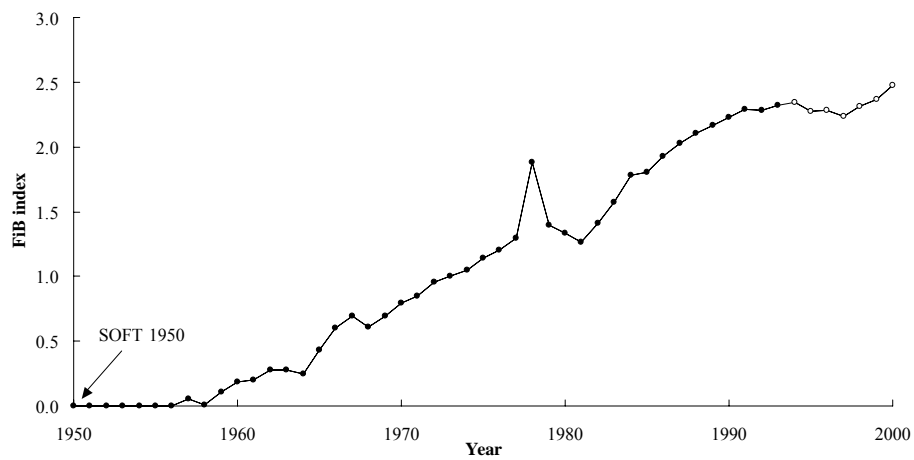
**FIGURE 45.** Trend of FiB index in West Bengal from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



**FIGURE 46.** Trends of catch (thousand tonnes) in Andaman & Nicobar Islands from 1950 to 2000.



**FIGURE 47.** Trends in mean trophic level of landings in Andaman & Nicobar Islands from 1950 to 2000 (open squares and circles represent data points not included in the analysis).



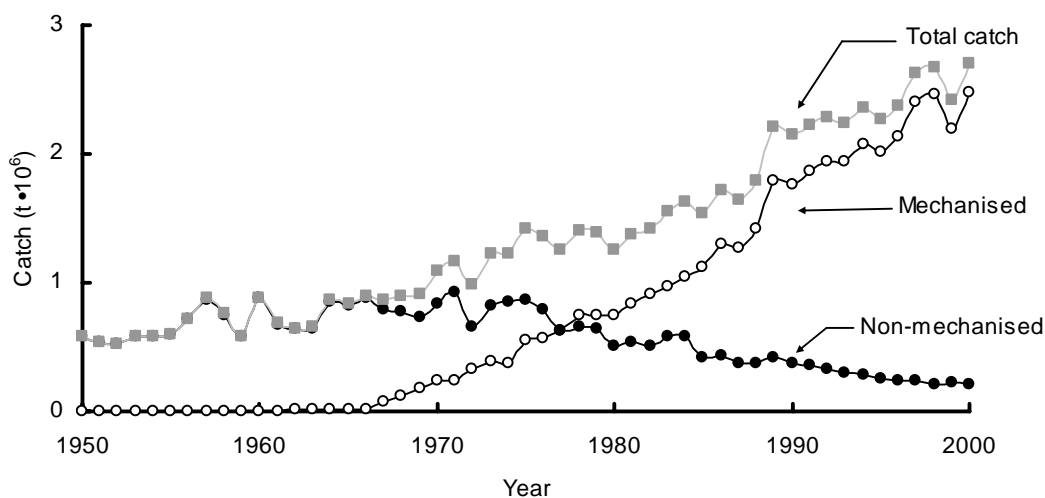
**FIGURE 48.** Trend of FiB index in Andaman & Nicobar Islands from 1950 to 2000 (open squares and circles represent data points not included in the analysis).

## SUMMARY AND CONCLUSIONS

### SUMMARY AND CONCLUSIONS

The results presented in Chapter 5 indicate that Indian marine fisheries are unsustainable at the ecosystem level. In summary, the time series of Indian catches illustrates that the catches have increased gradually from 1950s, with the rate of increase accelerating since the late 1980s and early 1990s. This increase, however, is limited to only mechanized and motorized sector because they can fish farther offshore. Conversely, the catches of the non-mechanized sector, mainly from coastal areas are declining since 1970s (Srinath, 2003: Figure 49). This has led to frequent conflicts among different sectors (see Chapter 1; page 18).

One of the major reason for these conflicts is the occurrence of Malthusian overfishing (Pauly, 1994a) in Indian waters. My preliminary analysis of two fishing sectors (mechanised and non-mechanised) for all of India from 1950 to 2000 shows similar results as presented by Pauly (1994) for 5 Indian states from 1969-1977. The redistribution illustrated in the Figure 49, with an overall ceiling on catches agrees with the Pauly's model of fishery development, which suggests that increasing competition results in transfer of catch from one sector to another. This also clearly indicates that the coastal systems cannot continue to absorb excess labour and generate ever increasing catches (Pauly, 1994a).



**FIGURE 49.** Marine fisheries catch (million tonnes) trends for the whole of India, 1950-2000, showing total catches that have ceased to increase (squares), and the transfer of an increasingly larger fraction of the catch from the non-mechanized (open dots) to the mechanized sector (closed dots).

Existing intra-fleet and interfleet competition in India is one cause of fisheries overexploitation. Along with Malthusian overfishing, growth overfishing, recruitment overfishing and, economic overfishing are also reported in Indian waters (GOI, 2002; James, 1992a; Luther and Sastry, 1993; Menon and Pillai, 1996; Pillai and Parakal, 2000; Sathiadas, *et al.*, 1995; Silas, *et al.*, 1980) (see Chapter 1; page 19). Overfishing in combination with other factors, such as water pollution, habitat degradation etc., have pushed India's coastal resources into downward spiral, with no reversal in sight (other than finding new offshore areas for exploitation, as shown for India in the following section on the FiB index). The existing situation calls for an in-depth evaluation of the current state of affairs and for taking immediate measures, such as reducing effort, increasing enforcement, increasing mesh sizes used in trawl nets etc., in order to avoid further depletion of the resources.

In this study two indicators, i.e., Marine Trophic Index (MTI) and Fishing in Balance (FiB) index are used. The results indicate that the deployment of the mechanized fleet increased the catches, but had a strong

negative impact on the mean trophic level of the landings, i.e., on the MTI. The fishing down marine food web phenomenon is happening all over India, i.e., in each state and union territory. This trend was generally not visible when the small pelagics, i.e., mainly Indian mackerel and Oil sardine are included, i.e., their variability masked the fishing down phenomenon when the MTI was based on the mean trophic level of all shelf species (Pauly and Watson, 2004). On the other hand, application of a cutoff trophic level of 3.25 (i.e. excluding small pelagics and most invertebrates) revealed the fishing down effect for all states and union territories, (more pronounced on the west coast, which contributes 72% of India's total landings) while revealing the unsustainable state of India's ecosystems.

This analysis thus confirms the potential usefulness of the MTI, recently adopted by the Convention on Biological Diversity (CBD) as one of the 8 indicators of biodiversity (CBD, 2004). It also confirms that the use of MTI, jointly with a cutoff point that excludes small pelagic fishes (e.g.,  $^{3.25}$ MTI) better reveals underlying trends than overall the mean TL.

The regression analyses tend to show high coefficients of correlation (r) between MTI and time (shown in graphs of Chapter 5). It must be noted, however, that this is due in part because the points used in the analyses are not really independent, as some of the underlying catch data were interpolated. As well, the straightness of line was used to identify which points to include in the regression. Overall, however, it is evident that there was a strong decline in mean marine TL of landings occurring in India, as in rest of the world (Table 5), whatever statistical test may be applied.

**Table 5.** Comparison of rate of TL decline per decade of India's maritime states and union territories with declines in other parts of the world.

Location	Years covered	TL decline	Source
Goa	1973-1993	0.024	This study
West Bengal	1967-1993	0.031	This study
Andhra Pradesh	1968-1993	0.036	This study
Lakshadweep	1965-1993	0.055	This study
Andaman & Nicobar Islands	1950-1993	0.076	This study
Gujarat State	1961-1993	0.120	This study
Pondicherry	1955-1993	0.123	This study
Tamil Nadu	1956-1993	0.128	This study
Iceland	1990-1999	0.004	Valtýsson & Pauly (2000)
West coast of Canada	1895-1995	0.032	Pauly <i>et al.</i> (2001)
Gulf of Thailand	1963-1982	0.100	Christensen (1998)
East coast of Canada	1950-1995	0.100	Pauly <i>et al.</i> (2001)
Greece	1964-1997	0.100	Stergiou & Koulouris (2000)

Time series of the FiB index show an overall increase in overall of India, suggesting that fisheries expanded geographically. However, a closer examination of individual states illustrates a decline in earlier years, i.e., generally before 1970s, in spite of the poor quality of the underlying data. As mentioned above, seaworthy crafts capable of going offshore were not available before 1970s and thus, in the 1950s and 1960s, fishing effort was concentrated in coastal areas, where the resources were rapidly depleted. Subsequent geographic expansion masked the decline of coastal resources. Moreover, in later years, a stagnation or decline in FiB index is visible in almost all areas. This indicates a serious problem, presumably the end of the expansion phase of Indian marine fisheries. However, the last years data are not reliable and hence, this issue remains uncertain.

As illustrated in Table 5, India, though a developing country is not behaving any differently than the rest of the world. The historical review clearly indicates that Indian marine fisheries have also suffered from sequential depletions. Indeed, a forward extrapolation of current the fishing down trend in India would imply the disappearance of large fishes from the ecosystems and an increase in low-TL organisms, perhaps even jellyfish as reported from other parts of the world (Pauly and Palomares, 2001).

Thus, based on present study, there is an immediate need to curb the existing overcapacity. The remaining effort must be redistributed across trophic levels from large predators to small prey species as suggested for other parts of the world (Pauly, *et al.*, 2003b). Since millions of people depend upon fisheries, thus implementation of any measure demands thorough evaluation of social as well as economic factors. Ecosystem models can nowadays also be used to search for suitable policy options. For example, Christensen and Walters (2004) have shown, for the Gulf of Thailand, that how ecosystem modelling can be used to explore policy scenarios, while incorporating possible tradeoffs among social, economic and ecological objectives.

So far, the main focus of Indian fisheries policy is to reduce conflicts among sectors, promote development (still ongoing), and generate food and foreign exchange, rather than controlling fishing effort, which was not perceived as a threat until recently. Thus, the CMFRI and other research institutes in India have recommended the creation of an independent fisheries department at the national level (Srinath, *et al.*, 2003) to be responsible for all fisheries management in India. Also, a need was expressed to introduce more regulations. However, promulgation of new regulations will not by itself bring any dramatic transformation in the existing condition of resources. Thus, monitoring and implementation of existing regulations is also required, as an expression of the political will to implement change.

In order to promote sustainable fisheries in India, various other factors need attention, such as community level involvement in the management processes, increasing the understanding of how people operate and on the factors that induce them to operate in a particular way, with emphasis on education (presently, the illiteracy rate is 70% among fishers (Kochary, *et al.*, 1996)). As well, there is a need to increase awareness about the advantages of sustainable use, to study the placement potential and effectiveness of no take zones and many other measures, which can be addressed in future studies.

In conclusion, given the long time series of mean trophic levels and FiB index and their overall trend, Indian fisheries appear to be unsustainable at the ecosystem level. This will undoubtedly have serious social and economic implications, especially in terms of food security in India, where fish is one of the cheap sources of protein and employment, with fisheries providing full time employment to 1 million (in 1998) fishers. Sustainability of fisheries is given some importance in the latest (Tenth) Five Year Plan, but the concept of sustainable fisheries is just emerging in India. I hope that my research will bring some focus towards a problem that was not apparent before and hence lead to more thorough analysis of this issue.

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## APPENDICES

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### APPENDIX 1. LIST OF THE FREQUENTLY USED ACRONYMS

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CMFRI	Central Marine Fisheries Research Institute, Kochi
DAHD	Department of Animal Husbandry and Dairying, New Delhi
DSFP	Deep Sea Fishing Policy
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FiB	Fishing in Balance Index
ICAR	Indian Council of Agriculture Research, New Delhi
MFRAs	Marine Fisheries Regulation Acts
MPEDA	Marine Products Export Development Authority, Kochi
MTI	Marine Trophic Index
<sup>3.25</sup> MTI	Marine Trophic Index with cutoff point at TL = 3.25
SOFT	Start Of the Fishing down Trend
TL	Trophic Level

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## APPENDIX 2. CATCH DATA FOR INDIA AND ITS INDIVIDUAL STATES AND UNION TERRITORIES

In the tables with the catches for States and Union Territories, bold values (except for total) represent interpolated and extrapolated data (see text for procedure). The tables add up to the all Indian catches in the first table, for India as a whole.

The Indian catches differ from the official (CMFRI) data because (1) the latter do not include all catches for Union Territories (see page 36); (2) the “miscellaneous fishes” in this official statistics have been distributed among the functional groups; (3) the statistics presented here include discarded bycatch and the catches of industrial vessels, omitted by CMFRI (see page 39) and; (4) various published sources have been used to fill in years with missing data.

**Table A : Marine fisheries catch (thousand tonnes) data for India, 1950-2000.**

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
<b>1 Elasmobranchs</b>																		
a Sharks	9851	15965	17916	6622	7717	11714	13389	13900	14049	13432	19475	17305	21854	25349	19464	15620	19259	16815
b Skates	510	816	828	397	330	474	548	606	569	546	1187	1064	1613	1434	1218	952	1064	858
c Rays	8150	12564	18155	8195	7474	8515	9112	8440	9114	9186	14020	14867	17250	17781	15050	15550	16893	11875
<b>2 Eels</b>	8516	8442	9071	11946	11286	12351	2943	5781	8969	5909	6038	11794	9254	8828	2286	2550	2637	2595
<b>3 Catfishes</b>	13708	17279	19040	22718	20972	18756	25597	27766	30102	20553	25277	10815	19290	18116	23005	17977	22293	24322
<b>4 Clupeids</b>																		
a Wolf herring	8500	3290	2202	2263	5154	4495	7058	5888	5459	5325	5260	6778	9179	8072	7781	7556	8016	9244
b Oil sardine	36048	18028	15251	50960	33414	31568	9655	193056	125360	70033	193088	169392	112299	66114	281534	265038	251141	261486
c Other sardines	69669	52073	46388	20923	19492	42927	39562	45855	39813	41578	32111	19726	19613	28098	41518	43467	59409	32794
d Hilsa shad	2435	2348	2265	2111	1968	2349	943	1099	972	789	3342	1110	1683	2832	3539	1415	1077	890
e Other shads	1241	1212	1201	1092	1043	1085	1092	1361	2521	2649	8186	6294	8929	5472	6692	7875	8745	7075
f Anchovies																		
i <i>Anchoviella</i>	22035	42317	29676	18908	21371	19373	21076	12256	29023	24375	35870	22325	19376	29759	25729	24507	27130	29564
ii <i>Thrissocles</i>	7066	17950	12243	10925	9428	6895	7995	4478	3875	8132	7449	4983	5993	5857	6791	4990	9048	9511
g Other clupeids	24751	13218	21491	19537	24897	19765	35215	30712	15121	21083	20841	15208	12355	15063	17261	19256	23821	22754
<b>5 Bombay duck</b>	13574	6940	23982	47505	33941	102588	125489	118179	66970	53406	107289	93726	85355	93831	82379	75636	79109	76088
<b>6 Lizard fishes</b>	600	189	489	872	889	1364	1148	383	370	719	603	1002	1448	760	1641	599	2269	1801
<b>7 Half beaks and Full</b>	651	594	622	636	606	641	628	449	397	423	247	521	165	1219	1626	1182	1465	1295
<b>8 Flying fishes</b>	2565	2584	1781	937	2271	4897	4033	2067	1251	2401	7159	1632	4559	1124	1043	515	3910	3331
<b>9 Perches</b>	16	16	16	16	16	16	16	23	19	24	32	32	30	41	44	53	126	129
a Rock cods	1925	325	641	402	314	294	508	365	651	579	554	1013	488	543	635	463	770	531
b Snappers	1925	319	672	476	348	405	448	402	549	570	553	1064	548	610	775	541	859	561
c Pig face breams	2491	188	540	399	386	385	513	406	624	663	608	1151	426	576	543	513	844	626
d Threadfin breams	9042	4791	7144	3205	1766	2003	4429	2773	6181	3855	4218	6638	4860	4201	6733	3692	5552	3517
e Other perches	10844	2184	4067	2300	1857	2900	2832	2420	3551	3253	3461	5598	2756	3107	4154	3497	4300	3308
<b>10 Goatfishes</b>	1686	1876	1107	1186	1301	2281	11389	4024	2177	1724	2716	2404	1779	2527	5237	2153	4768	1422
<b>11 Threadfins</b>	15799	15226	14818	15712	14487	14400	9028	14747	5851	7466	6411	5873	2825	4476	2215	1716	4674	2666
<b>12 Croakers</b>	32076	32279	24299	36262	71883	51432	59031	29373	24451	19596	23901	30124	32613	23348	25821	24044	26467	25920
<b>13 Ribbon fishes</b>	19498	18600	34954	57320	29739	28413	25894	38819	41890	31831	17498	19697	21176	17342	26471	41898	45494	29604
<b>14 Carangids</b>																		
a Horse mackerel	7180	10051	9764	7251	11624	11901	20027	10893	18139	9903	21841	23224	7588	18537	27556	18195	20039	24911
b Scads	4456	3483	3365	3407	3263	3745	3376	3173	3035	3137	3279	3299	3385	3398	3499	3409	3478	3469
c Leather-jackets	9909	9523	9468	9234	9347	9791	10732	3282	2993	2658	4207	3559	3564	3352	2543	3190	3569	2975
i <i>Trachinotus</i>	83	80	82	79	81	84	83	83	81	23	24	23	25	25	72	41	30	72
d Other Carangids	315	285	291	274	273	291	283	277	271	271	280	295	729	180	206	191	201	301
i <i>Coryphaena</i>	347	337	331	325	330	346	375	143	253	206	253	145	176	30	92	99	207	341
ii <i>Elacate</i>	427	410	435	399	400	413	459	293	576	279	258	216	262	175	231	243	152	168
<b>15 Silverbellies</b>	151	433	283	135	29	24	18	16	13	9	8	6	3	4	4	5	6	6
a <i>Leiognathus</i>	8743	10992	7867	4756	11784	6552	18432	16681	12986	13379	15920	16208	18886	18531	29264	26689	38057	44367
b <i>Gazza</i>	446	385	449	347	643	512	1082	921	324	291	608	218	229	140	121	111	91	109
<b>16 Big jawed jumper</b>	7173	8450	6033	4261	7584	5982	10964	8884	17715	15673	16397	10259	8489	9091	6726	6011	6019	8929
<b>17 Pomfrets</b>																		
a Black pomfret	3028	4597	2611	6759	5803	4092	5243	4941	5332	6583	6457	5222	10830	5890	6440	5266	5050	8033
b Silver pomfret	2332	4527	3248	14063	12029	9655	8091	11326	11234	16696	15336	11668	15287	11682	13337	12756	13015	19792
c Chinese pomfrets	41	153	32	140	134	38	98	40	66	55	52	45	253	70	73	44	43	75
<b>18 Mackerel</b>																		
a Indian mackerel	90565	102745	83697	69814	27416	22652	18490	89626	124023	62967	134152	35139	33726	88130	36628	56743	45779	38642
b Other mackerels	6	6	6	6	6	6	6	6	7	8	7	6	8	7	7	8	9	9
<b>19 Seer fishes</b>																		
a <i>S. commersoni</i>	3029	2635	2368	2441	3743	2997	7571	5673	5060	4100	4785	6730	6185	5018	6317	4967	5699	5614
b <i>S. guttatus</i>	5787	4307	3741	1927	2272	3194	4905	3203	2623	2586	3696	4702	4756	4298	5007	4596	4490	4436
c <i>S. lineolatus</i>	35	80	43	18	64	55	242	84	116	71	119	53	50	63	64	40	41	54
d <i>Acanthocybium spp.</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
<b>20 Tunnies</b>																		
a <i>E. affinis</i>	3710	625	638	656	1744	2631	3059	2200	2154	2153	3649	5125	1473	2804	3626	2440	1855	2007
b <i>Auxis spp.</i>	592	110	121	115	273	369	507	300	388	499	873	1009	188	541	381	431	291	342
c <i>K. pelamis</i>	393	384	383	382	384	387	390	391	389	381	386	661	123	475	410	267	191	277
d <i>T. tonggol</i>	44	35	36	35	38	39	42	38	40	42	50	68	20	48	40	33	25	32
e Other tunnies	636	194	171	195	341	508	604	688	813	339	720	1027	648	740	1143	613	776	1186
<b>21 Bill fishes</b>	285	228	222	224	215	243	222	210	202	208	217	216	220	222	228	222	227	227
<b>22 Barracudas</b>	244	239	1486	336	4013	507	3858	660	985	1131	2099	1442	1182	1356	1727	1999	1097	4517
<b>23 Mulletts</b>	116	116	377	259	165	227	287	1079	747	592	965	843	1034	1647	3086	1490	1563	3222
<b>24 Unicorn cod</b>	2180	4733	3191	15559	9388	3196	1325	1152	3912	3387	6114	3945	3312	5517	3822	5731	2771	2203
<b>25 Flatfishes</b>																		
a Halibut	23	20	19	19	19	20	19	18	18	18	20	19	19	19	21	22	24	21
b Flounders	347	272	263	266	255	292	264	249	239	247	258	262	269	265	273	266	271	270
c Soles	31205	1976	6431	4563	1635	5609	11046	3743	13114	12194	14652	7992	18186	9170	6427	9086	6980	5868
<b>26 Crustaceans</b>																		
a Penaeid prawns	33630	33434	31091	33458	48568	40318	71968	76259	29579	34957	32543	39790	49482	42752	64934	38412	56430	63497
b Non-Penaeid prawns	44147	43030	45750	62972	100238	66831	95014	62754	57222	37325	38722	25409	38653	41296	32291	43010	35791	31730
c Lobsters	24	23	20	18	15	17	19	42	102	143	192	111	58	134	218	136	193	183
d Crabs	169	222	157	107	108	149	168	652	1134	1597	1983	1812	941	1805	4403	2377	3494	4194
e Stomatopods	234	457	269	105	104	202	103	92	180	283	348	179	93	228	184	57	149	142
<b>27 Molluscs</b>	7	7	7	6	6	6	7	6	6	6								

Table A : Continued.

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1 Elasmobranchs																	
a Sharks	17141	18679	34433	35941	42422	37687	51881	52566	45149	52906	56186	48946	49556	51758	59521	58309	50412
b Skates	1109	951	1840	1768	2127	2082	3351	3178	2595	3005	3089	2257	2700	2698	4849	5876	4477
c Rays	13442	16678	31812	30471	27839	28325	44175	42261	37631	38658	37012	30712	34576	31049	31491	39558	32688
2 Eels	3466	3127	9909	5632	6202	5376	6259	8369	12039	18297	12927	10746	17492	7104	10279	11435	9925
3 Catfishes	24244	27717	84813	79845	66163	70429	97225	100676	72662	83636	61996	80701	65042	93838	103201	90429	85782
4 Clupeids																	
a Wolf herring	10853	9586	9409	9625	9773	11692	9863	12434	10990	12636	11857	11052	13503	12054	15722	17318	17641
b Oil sardine	308307	182495	235680	215297	136652	150956	134493	172571	181682	164604	182323	160420	116832	230995	217650	188092	192562
c Other sardines	33833	53498	55701	62396	46259	112988	88552	118947	104556	69896	56255	71714	69696	64304	57497	80598	69773
d Hilsa shad	851	833	1098	1769	688	463	4049	9505	8463	4408	10298	12888	7198	5615	3305	4006	6084
e Other shads	7999	8040	9639	10473	12355	12445	8422	7884	8900	15513	13980	9592	9758	18309	13837	16643	21407
f Anchovies																	
i <i>Anchoviella</i>	18681	32512	24927	20171	19604	26702	43734	33792	33293	38056	44527	31689	39078	58423	63314	108591	102562
ii <i>Thrissocles</i>	8119	9325	14695	11417	11858	13958	12345	10354	18098	10526	15141	17242	19952	14257	20259	20689	21696
g Other clupeids	25992	26947	27905	24795	29226	37628	47532	56024	60922	44255	40381	36356	39871	28328	27620	35398	40310
5 Bombay duck	83793	77204	79276	72168	52486	67112	68414	105592	94002	90138	136029	139737	100589	139951	88696	104367	122044
6 Lizard fishes	2276	3589	5614	8038	7374	5978	18652	22289	7769	13901	16931	17503	16876	17917	19380	22747	23191
7 Half beaks and Full	1113	1026	1855	1047	723	1187	4779	2108	1229	2507	1898	1645	1715	1964	2755	2721	1783
8 Flying fishes	4073	4302	3011	9693	1596	6880	1205	2171	1744	855	1954	2859	1442	3506	2221	1702	2972
9 Perches	139	120	194	185	252	357	430	510	476	571	1511	652	897	714	977	1308	1439
a Rock cods	598	862	1183	1138	1253	1498	2543	2367	1293	2377	3570	2529	2403	2630	3464	3788	5176
b Snappers	638	861	1070	1079	1258	1373	1956	2305	1515	2279	2754	1818	2384	2138	3636	5371	6568
c Pig face breams	700	983	1097	1144	1272	1148	1866	1868	1268	1800	2385	1544	1690	1598	3820	3959	3064
d Threadfin breams	3809	5795	11561	10609	11493	18743	33004	30197	13980	30008	48539	36058	33477	25862	37035	41829	59246
e Other perches	3382	4643	6429	7456	8042	9116	14815	16875	10203	14399	19758	15026	17151	16850	21438	28527	35879
10 Goatfishes	1874	3583	3204	6599	9473	5884	10288	4525	9148	3788	4838	4887	4060	5344	8520	9597	6801
11 Threadfins	2491	3547	10345	11309	10206	13331	16606	20192	21286	5901	8095	8688	9071	6145	9884	8499	11254
12 Croakers	26715	35851	64812	58639	61254	126986	121442	170095	134580	148711	150132	145868	133938	120206	126569	144353	160318
13 Ribbon fishes	26170	32151	27621	45991	37653	55236	66231	61162	67898	44580	83165	74730	65289	42494	50344	40100	54828
14 Carangids																	
a Horse mackerel	16549	22057	18975	21544	28829	27192	20464	21779	23422	29139	17328	23759	10596	2941	3612	3231	3885
b Scads	3518	3464	3427	3459	3467	3732	3810	3618	3648	3543	3606	3535	3617	6897	7366	11287	13595
c Leather-jackets	3231	2506	2183	2299	3112	2977	4032	3623	3464	4397	3541	3515	4423	5077	5884	10415	9427
i <i>Trachynotus</i>	130	303	342	246	290	333	159	76	59	46	41	34	264	568	851	1002	1232
d Other Carangids	221	624	1124	332	354	319	485	8003	9925	8154	4789	13475	14921	23833	24581	29301	33612
i <i>Coryphaena</i>	228	252	264	69	235	239	304	464	293	302	167	184	163	187	216	261	294
ii <i>Elacate</i>	194	335	549	474	441	377	252	493	493	501	433	624	1315	2174	3017	3750	4552
15 Silverbellies	7	8	13	128	85	40	3	1	8	14	24	33	35	38	45	52	645
a <i>Leiognathus</i>	37198	45409	77752	55320	49857	74801	75338	61305	67673	54616	68310	86060	83614	106304	111111	139915	90949
b <i>Gazza</i>	146	143	276	249	378	406	485	500	430	378	393	716	502	414	348	1066	1077
16 Big jawed jumper	5550	4879	8210	10523	12609	22201	13999	17720	17818	15875	12579	7151	11225	12347	20117	28434	21202
17 Pomfrets																	
a Black pomfret	8604	7087	8192	10648	9399	11397	10563	12704	15342	13934	15052	14843	14162	14718	19586	17345	23797
b Silver pomfret	19657	17424	18435	21919	18257	20980	23165	23599	39782	36700	47973	45719	41314	53849	52396	58815	48548
c Chinese pomfrets	155	65	92	210	164	186	131	149	131	185	194	120	106	905	535	425	794
18 Mackerel																	
a Indian mackerel	32926	93357	144172	212320	117783	87253	40394	48408	68838	67901	95405	75609	55572	51292	29419	32016	43529
b Other mackerels	8	9	10	9	14	25	15	29	21	27	83	21	31	34	45	49	62
19 Seer fishes																	
a <i>S. commersoni</i>	6703	5833	6643	9750	11242	9869	10989	9604	10346	12471	10807	14364	13519	12994	20654	18587	19010
b <i>S. guttatus</i>	6204	5798	6785	8764	10476	10737	9888	10222	10787	9793	11601	16384	13329	15057	14146	17812	18084
c <i>S. lineolatus</i>	97	94	170	265	291	175	216	124	190	232	219	278	247	303	297	482	491
d <i>Acanthocybium spp.</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	67	79
20 Tunnies																	
a <i>E. affinis</i>	2378	2126	1709	3951	3852	3119	7378	7426	14157	9552	8049	17656	13520	12008	12262	9752	12159
b <i>Auxis spp.</i>	441	280	316	715	841	647	1382	1493	2975	1649	1588	3567	2485	1384	2122	1903	2076
c <i>K. pelamis</i>	422	591	515	697	496	928	1147	1662	1204	1095	1773	2396	1557	1895	2532	2946	3710
d <i>T. tonggol</i>	42	49	46	64	55	79	107	140	141	113	164	288	177	166	209	200	440
e Other tunnies	635	579	600	892	912	1237	1504	1565	2222	1719	3310	3720	3427	3092	4447	1895	2577
21 Bill fishes	229	229	227	229	230	245	250	238	241	234	240	233	1310	615	2127	1090	1285
22 Barracudas	1609	2086	1656	1397	2486	3559	5059	2286	2498	2841	4152	2701	1799	2600	3763	3929	3897
23 Mulletts	3230	2784	3794	6138	2438	4639	7158	5277	3912	3366	4565	2264	2573	3102	3543	4805	4942
24 Unicorn cod	1937	1797	2320	4476	5682	4450	2011	1253	618	260	294	804	1094	571	570	570	3070
25 Flatfishes																	
a Halibut	22	24	36	37	42	33	36	33	34	38	40	55	65	747	2097	2513	1971
b Flounders	274	270	426	414	396	428	449	415	440	403	415	402	457	1780	141	504	660
c Soles	11444	12272	23575	22615	17191	22290	28732	18520	16662	17777	22797	19567	19706	22558	36020	39279	60936
26 Crustaceans																	
a Penaeid prawns	70636	74352	149097	127745	127098	211980	173973	217287	185668	151038	204217	172444	164422	130670	166270	175934	193091
b Non-Penaeid prawns	32525	34705	44251	101880	112599	92029	76595	111729	110951	103876	71768	87959	83318	86452	69799	67097	85891
c Lobsters	138	192	351	467	568	674	821	4275	3681	1760	2480	1689	1001	2254	2501	1915	4640
d Crabs	3509	5690	14967	12572	16365	17225	21173	26968	29382	29856	20499	27259	25926	42004	37063	28927	43433
e Stomatopods	112	182	284	3572	957	1992	3160	5024	1885	1958	2606	7086	26738	28043	43831	32919	44485
27 Molluscs	6	6	12	17													

**Table A : Continued.**

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1 Elasmobranchs																
a Sharks	49767	50204	43962	53234	44414	36118	47145	67549	68499	82325	84006	75707	74820	67014	70166	60609
b Skates	4999	4954	5926	3487	3402	2439	1826	2972	2251	7906	6965	8734	8547	14623	10891	8624
c Rays	24113	24356	33341	27321	31443	36683	27749	25186	28780	38926	39763	38600	38886	44482	44976	38690
2 Eels	11596	11136	8640	5996	7216	7224	9697	8662	9577	14324	11168	16190	17892	25989	55982	18066
3 Catfishes	64825	78270	60550	91569	78762	56381	57816	53627	62159	103579	95781	107167	114783	108077	101789	112605
4 Clupeids																
a Wolf herring	18244	15153	17011	13593	15992	13904	16708	18360	18112	26621	24250	26352	27986	31332	24015	19027
b Oil sardine	122826	80787	101314	131646	265780	266131	186537	109761	100924	96574	110142	119940	192213	128280	186986	262580
c Other sardines	62533	72097	98891	80308	85457	79841	91423	101068	91858	95694	100560	103442	110515	126111	116029	129398
d Hilsa shad	9003	3980	4858	2603	15502	15797	29894	26458	33501	37657	45424	53015	51617	47207	37896	40606
e Other shads	12283	15706	18121	11550	7830	6796	13676	11044	9540	12413	12631	11470	13123	14956	12198	14778
f Anchovies																
i <i>Anchoviella</i>	84414	102153	75927	126461	104853	98123	133631	116983	107817	91779	95505	78198	71147	83235	81576	66085
ii <i>Thrissocles</i>	29061	28043	32883	37205	24056	23771	36137	52085	33827	24863	25689	21108	22879	27387	22021	17329
g Other clupeids	36705	39979	41992	46680	58200	52500	58025	65894	47891	53748	54748	76297	73314	59952	50711	60297
5 Bombay duck	115271	94376	77163	69504	125666	135268	140754	126233	100868	159900	149253	195192	226464	180261	177967	164119
6 Lizard fishes	21356	22263	24498	38523	34543	38525	43629	45000	38860	31282	37763	31670	23049	23792	22925	21466
7 Half beaks and Full	2196	2018	2104	4000	2648	2831	2944	2724	2616	4130	9291	7270	6720	6383	6790	9225
8 Flying fishes	1400	1744	1365	4437	14408	1751	6810	5836	2202	3203	2698	2168	2567	1369	956	3153
9 Perches	1361	1888	2583	2899	3145	3760	4108	4514	4322	3794	3315	3233	3439	3129	5222	8180
a Rock cods	5054	4017	6865	7453	8566	6965	9617	12953	16192	13489	11937	9645	7899	13126	6678	6608
b Snappers	6348	4143	5746	6286	6100	4463	3672	4531	4984	6197	6457	8570	9083	12068	10163	10900
c Pig face breams	3686	4466	3184	4816	3203	6143	8536	7080	10613	7899	7910	7235	7600	16533	14293	19394
d Threadfin breams	60869	91262	69799	79841	114506	131589	101656	106047	135053	115937	117031	114577	87838	76940	82809	90110
e Other perches	34614	37742	45963	38222	36547	39644	39734	46814	58972	50242	48288	45777	38504	70467	71437	73045
10 Goatfishes	8940	12342	16768	43239	35663	34495	54975	27950	21494	35880	36644	35879	34688	36710	36241	37857
11 Threadfins	13138	10391	12180	6944	11911	11554	11905	13127	8826	16227	15821	17268	18176	20959	33820	33377
12 Croakers	145577	154812	154100	141405	155333	179705	212855	241106	225426	268755	254020	411008	444424	350954	379367	381987
13 Ribbon fishes	86698	99029	84339	70151	68155	76734	98838	119663	94096	105319	95872	158104	148950	97830	132854	131267
14 Carangids																
a Horse mackerel	3740	10279	7596	21451	15758	22449	19705	11538	23494	66712	77186	78393	63193	38258	60152	53585
b Scads	8047	43013	16921	39863	63622	69230	89378	102178	61668	44378	38267	28758	36350	59574	55146	52046
c Leather-jackets	8996	3917	5804	5166	3577	3380	4520	5572	4258	5322	5947	5224	5703	5509	6484	7515
i <i>Trachynotus</i>	1459	1796	1953	2173	2409	2607	2812	3030	3208	3414	8581	7042	4965	4988	4848	3877
d Other Carangids	35022	71235	50904	60506	46914	49302	44713	49213	49954	44735	43619	42216	39730	32102	30908	28280
i <i>Coryphaena</i>	254	306	235	248	407	281	263	260	283	283	300	296	297	324	428	281
ii <i>Elacate</i>	4942	6004	6191	6892	8252	8369	8966	9680	10294	12747	12546	12967	16286	18362	17120	14292
15 Silverbellies	499	81	219	1553	1904	1842	3951	4106	1711	1698	1713	1767	1740	1581	1593	1664
a <i>Leiognathus</i>	84416	115638	100292	95520	78067	83125	80648	78709	93747	91085	96259	104147	102448	85738	85292	85297
b <i>Gazza</i>	703	340	436	405	160	132	283	213	204	2178	2154	2302	2496	2483	3016	1469
16 Big jawed jumper	36145	22751	18322	17917	10845	13396	14535	9894	6323	13890	16609	20187	20902	22287	18718	16758
17 Pomfrets																
a Black pomfret	15282	15628	20119	21319	20682	20228	21298	15389	18225	25509	26681	27090	28859	30021	33668	32187
b Silver pomfret	32184	28552	31026	38738	44381	37679	40319	33989	40993	59074	61534	61752	65733	71100	65730	59734
c Chinese pomfrets	208	489	493	519	779	640	211	404	1456	1992	2599	3168	3118	3449	3271	2386
18 Mackerel																
a Indian mackerel	62375	84020	80720	105659	295986	185027	116761	141902	252565	196990	194826	270313	195643	188377	188377	132606
b Other mackerels	68	76	82	86	89	116	108	94	102	141	175	196	206	816	1506	1278
19 Seer fishes																
a <i>S. commersoni</i>	16938	24119	18817	21352	22371	16693	17886	25735	21278	35354	38835	31715	33148	35860	31381	32335
b <i>S. guttatus</i>	17838	9981	13093	15627	19136	13691	20328	17760	21649	23150	32695	28553	20066	18240	17540	16544
c <i>S. lineolatus</i>	512	836	957	1634	1422	1560	1929	2234	2166	4675	4875	4974	5121	4261	3225	2063
d <i>Acanthocybium spp.</i>	46	101	159	216	271	181	95	11	12	15	15	15	15	892	430	692
20 Tunnies																
a <i>E. affinis</i>	16962	18761	14590	16105	27297	33954	18884	24773	17957	22232	26620	28992	28070	19768	25383	22876
b <i>Auxis spp.</i>	3359	8963	4967	6503	8015	7531	4968	6895	5402	7344	11990	15622	12637	11479	12195	11239
c <i>K. pelamis</i>	3429	4276	5761	5071	6022	5799	6317	7302	14990	14378	15530	15666	14938	18834	17543	15595
d <i>T. tonggol</i>	1420	495	783	1575	1213	1174	3981	2954	4295	3869	5210	5465	5659	5602	5559	5603
e Other tunnies	7159	2663	5441	2929	4422	6141	4303	3016	8431	9970	13092	14093	17038	20546	20261	20663
21 Bill fishes	1222	1175	931	946	1205	1288	1001	1573	1958	2069	1964	1811	1762	1705	2505	2131
22 Barracudas	3436	4629	5819	7945	9373	11826	14177	13208	12131	10427	12943	13559	13688	22086	14799	13851
23 Mulletts	7724	5176	8059	11644	13724	6663	10833	8303	8141	18401	16605	21853	26723	39605	37969	29188
24 Unicorn cod	1049	838	1226	1164	854	472	1716	1410	1141	1073	1025	1351	1498	1795	1352	1426
25 Flatfishes																
a Halibut	2653	1750	2562	2471	2535	4315	3770	2922	2598	3752	4565	5930	8368	9843	11615	12496
b Flounders	1131	1483	1824	1767	2513	3062	3278	3723	2832	4324	3537	4100	3975	4633	3555	3028
c Soles	42420	40891	39906	37312	53211	41608	53042	91132	67117	64743	59385	58501	62814	61805	69574	67847
26 Crustaceans																
a Penaeid prawns	177985	201056	226512	223229	233016	245821	284469	278055	250832	279780	233923	234923	251630	296449	275400	286404
b Non-Penaeid prawns	92314	97060	42228	66544	111025	112105	139949	125796	96366	178602	171352	192816	155889	167732	148101	162725
c Lobsters	5752	4287	3667	2258	2385	2672	3307	3086	2418	37341	36016	38563	36484	34055	33471	24937
d Crabs	33494	32229	34234	26270	25989	37078	44240	41551	41133	61516	42582	19416	28281	48945	43201	48379
e Stomatopods	48477	70755	143634	103249	119560	102685	97981	115541	129509	105636	96061	86695	77060	62312	73531	70703
27 Molluscs	51	199	76	69	108	35	163	266	1115	3052	2724	9136	7836	3297	3203	3019
28 Cephalopods	46217	61683	45747	55673	87446	85389	98719	134945	140741	164771	166389	173730	206553	130368	123511	124642
Total	1862805	2064837	2012380	2178940	27											

**Table B : Marine fisheries catch (thousand tonnes) data for the state of Gujarat, 1950-2000.**

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1 Elasmobranchs																		
a Sharks	26	27	142	75	654	683	1151	1835	951	645	4956	1544	9224	4647	5372	2311	2629	1938
b Skates	3	3	11	5	53	56	94	151	78	53	408	128	758	382	441	190	216	160
c Rays	8	8	46	24	212	221	373	594	308	209	1606	500	2988	1505	1740	748	851	628
2 Eels	5239	5551	5210	4408	3991	4033	731	1929	2940	1003	2398	193	345	661	554	80	51	47
3 Catfishes	147	76	116	635	718	1148	1378	1273	1991	494	3323	1158	8070	4739	4971	2325	2641	1835
4 Clupeids																		
a Wolf herring	83	88	83	27	89	230	815	502	226	375	228	115	215	368	309	597	632	440
b Oil sardine	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Other sardines	59	62	58	43	33	29	23	3	2	1	2	3	10	2	7	5	2	3
d Hilsa shad	1258	1333	1251	1058	958	1099	279	422	476	372	2702	469	1113	2040	1199	662	226	469
e Other shads	540	572	537	454	411	416	425	632	1328	1319	4129	2337	3304	1452	2138	1228	2123	2608
f Anchovies																		
i <i>Anchoviella</i>	60	64	42	334	50	44	58	48	37	23	18	8	8	1	2	3	4	5
ii <i>Thrissoles</i>	138	146	95	774	114	102	133	109	76	33	34	17	27	63	147	229	244	50
g Other clupeids	5806	2971	5367	5108	3010	3013	6234	7758	2337	2579	1818	1087	873	1962	1323	5412	6513	5243
5 Bombay duck	4444	2461	7876	22065	17922	34809	50433	57637	26135	23465	75703	64816	53764	66303	59205	49390	45850	44548
6 Lizard fishes	46	26	81	227	184	358	185	167	147	110	116	102	85	71	52	37	19	2
7 Half beaks and Full	9	9	9	8	7	7	7	6	5	3	3	2	1	1	1	1	1	1
8 Flying fishes	41	43	41	34	31	31	32	17	1	7	17	25	33	41	48	57	65	73
9 Perches																		
a Rock cods	10	3	52	27	9	5	3	5	15	2	4	6	4	2	2	2	5	5
b Snappers	13	4	69	35	11	7	4	7	20	2	5	8	5	3	3	2	7	7
c Pig face breams	10	3	52	27	9	5	4	5	15	2	4	6	4	2	2	2	5	5
d Threadfin breams	162	38	810	3	132	80	55	85	227	37	56	91	58	28	33	24	86	86
e Other perches	129	31	643	2	105	62	43	67	181	29	44	72	46	22	26	19	67	68
10 Goatfishes	94	131	151	60	147	208	273	227	180	134	144	127	109	90	70	51	32	29
11 Threadfins	92	97	72	69	205	3104	2043	5299	1631	2001	4414	3154	720	227	400	136	399	234
12 Croakers	4067	4773	2064	6979	13887	6996	7827	4974	3095	1444	2248	1327	4388	2516	2461	1635	1566	1421
13 Ribbon fishes	1970	862	957	8007	3526	1820	2253	1898	1867	406	197	538	279	475	336	647	1183	1449
14 Carangids																		
a Horse mackerel	9	9	9	21	52	48	210	28	33	10	14	77	72	125	112	931	922	876
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Leather-jackets	386	409	384	324	294	297	303	301	95	83	452	251	137	206	158	37	29	22
i <i>Trachinotus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d Other Carangids	20	22	20	17	16	16	16	16	16	13	16	16	16	16	13	27	44	58
i <i>Coryphaena</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ii <i>Elacate</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15 Silverbellies	151	433	283	135	29	24	18	16	13	9	8	6	3	4	4	5	6	6
a <i>Leiognathus</i>																		
b <i>Gazza</i>																		
16 Big jawed jumper	38	108	71	34	7	7	6	729	1421	1777	1612	1089	551	3	2	12	71	130
17 Pomfrets																		
a Black pomfret	54	7	108	480	425	536	253	656	525	834	1484	748	681	911	888	834	760	703
b Silver pomfret	286	41	585	2611	2306	2909	1374	3561	2854	4526	8060	4058	3700	4953	4820	4529	4130	3819
c Chinese pomfrets	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18 Mackerel																		
a Indian mackerel	79	84	79	67	60	61	62	60	56	45	48	43	37	32	25	19	13	7
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19 Seer fishes																		
a <i>S. commersoni</i>	1	1	1	1	7	9	19	11	11	13	20	15	8	19	9	21	29	30
b <i>S. guttatus</i>	22	23	46	33	211	255	554	309	289	366	593	433	237	572	270	624	842	866
c <i>S. lineolatus</i>																		
d <i>Acanthocybium spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20 Tunnies																		
a <i>E. affinis</i>	5	5	5	6	8	11	13	5	9	11	19	24	8	32	13	3	2	2
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	1	1	1	2	3	4	5	2	4	5	8	9	3	12	5	1	1	1
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22 Barracudas	8	8	8	28	45	66	86	106	124	120	73	1	3	8	3	3	3	1
23 Mulletts	51	54	51	43	39	177	194	526	424	518	636	529	484	459	302	390	663	1024
24 Unicorn cod	738	1716	1068	4106	2489	823	346	55	699	12	18	21	2	7	9	1	8	15
25 Flatfishes																		
a Halibut	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b Flounders																		
c Soles	69	73	452	32	20	58	105	100	38	1401	6	4	8	8	24	42	86	98
26 Crustaceans																		
a Penaeid prawns	5831	6146	6147	7276	10878	6982	10238	16912	5030	8431	4803	2979	1494	1721	1331	3983	4138	3662
b Non-Penaeid prawns	13682	14425	14426	17075	25526	16382	24056	18461	16851	7183	358	189	851	2005	838	515	455	419
c Lobsters	4	4	4	3	3	3	3	3	1	8	19	10	3	5	22	40	57	11
d Crabs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Stomatopods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
27 Molluscs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
28 Cephalopods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	45908	42975	49604	82804	88899	87248	112736	127521	72776	60130	122839	88348	94747	98719	89711	77827	77693	73121



**Table B** : Continued.

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
<b>1 Elasmobranchs</b>																	
a Sharks	2321	2553	6472	6781	7103	3821	11525	11770	7724	17003	12616	5895	14936	12748	14666	9390	9466
b Skates	191	210	533	557	584	314	948	969	636	1399	1037	485	1229	1049	1206	766	605
c Rays	752	827	2096	2196	2301	1238	3734	3813	2502	5508	4087	1910	4838	4128	4749	5625	5214
<b>2 Eels</b>	400	153	1552	1242	1746	1920	3961	3540	4616	11773	2970	4510	12390	2971	3806	6186	4311
<b>3 Catfishes</b>	2233	2426	6384	5487	5977	2805	8856	3513	2965	12283	6457	9019	7608	13939	17025	13980	12976
<b>4 Clupeids</b>																	
a Wolf herring	423	565	861	2237	2342	1282	1966	2354	2135	3311	1994	2226	3967	2861	3457	3308	2873
b Oil sardine	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3
c Other sardines	1	5	9	11	96	75	59	27	2	4	7	8	10	11	13	16	75
d Hilsa shad	451	433	616	580	156	47	289	3376	1069	321	52	257	57	16	147	809	71
e Other shads	2689	3004	4321	5114	5322	6433	3756	3890	3333	5517	6081	4332	4146	9848	4874	3641	4867
f Anchovies																	
i <i>Anchoviella</i>	5	6	7	8	9	51	108	138	892	1655	2590	3605	4139	4521	5358	6240	6980
ii <i>Thrissocles</i>	91	133	613	214	113	179	283	123	277	109	674	806	994	1269	4873	3859	2586
g Other clupeids	5594	5037	4674	3297	3958	2041	13630	13791	11357	9722	14637	6478	9228	6995	3938	2876	5073
<b>5 Bombay duck</b>	53085	48867	42992	34958	28885	28355	35065	46669	35885	33255	59481	74809	39712	53668	38371	51053	58144
<b>6 Lizard fishes</b>	236	471	1131	1460	1816	774	2505	1797	3934	58	129	10	125	150	1101	874	2291
<b>7 Half beaks and Full</b>	1	1	1	1	1	1	1	1	10	10	16	21	1	1	1	1	2
<b>8 Flying fishes</b>	80	88	96	103	112	124	153	128	119	112	113	112	97	82	76	71	64
<b>9 Perches</b>																	
a Rock cods	8	8	26	19	68	103	125	145	204	53	206	52	114	206	151	463	957
b Snappers	11	11	34	25	90	138	167	193	273	71	276	71	152	276	202	983	885
c Pig face breams	8	8	26	19	68	105	126	146	207	53	208	53	115	209	190	176	158
d Threadfin breams	132	131	395	293	1067	1629	1967	2281	3218	831	3241	826	1785	3248	2387	1657	6005
e Other perches	105	104	314	232	847	1290	1557	1806	2548	660	2568	654	1413	2574	1892	3715	4089
<b>10 Goatfishes</b>	18	6	8	6	3	1	2	383	757	859	3	10	177	318	437	568	356
<b>11 Threadfins</b>	128	157	1603	3657	2477	4003	8468	12283	8592	366	523	1242	965	2120	4781	4848	5333
<b>12 Croakers</b>	1498	2211	6403	5335	5891	55245	39182	64695	40212	55416	53321	48399	46474	47903	36660	41187	44917
<b>13 Ribbon fishes</b>	1515	1419	1612	1108	1423	950	2158	1135	12497	14423	7572	5185	11612	8156	9465	6377	8191
<b>14 Carangids</b>																	
a Horse mackerel	880	730	367	759	229	249	1267	1065	1690	1036	300	599	501	754	335	468	1026
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	76	39
c Leather-jackets	15	7	204	105	6	212	92	48	11	340	292	449	912	2260	2183	1066	2266
i <i>Trachinotus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d Other Carangids	71	86	101	116	196	139	88	14	23	31	44	56	62	65	157	427	620
i <i>Coryphaena</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ii <i>Elacate</i>	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
<b>15 Silverbellies</b>	7	8	13	128	85	40	3	1	8	14	24	33	35	38	45	52	645
a <i>Leiognathus</i>																	
b <i>Gazza</i>																	
<b>16 Big jawed jumper</b>	188	247	490	566	654	1052	1599	7629	10921	10227	5294	1347	3717	5142	8756	16122	10348
<b>17 Pomfrets</b>																	
a Black pomfret	714	673	1577	1298	808	716	1597	977	366	1567	2929	1969	2279	3210	2216	3059	3430
b Silver pomfret	3873	3658	8569	7051	4384	3896	8671	5306	1984	8511	15902	10690	12377	17433	12034	10179	8941
c Chinese pomfrets	1	1	2	2	2	1	2	1	1	1	3	2	1	3	1	79	158
<b>18 Mackerel</b>																	
a Indian mackerel	7	4	2	1	1	3	5	5	6	8	10	12	35	28	25	20	16
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>19 Seer fishes</b>																	
a <i>S. commersoni</i>	27	34	35	83	95	141	28	66	56	69	138	105	152	183	207	228	134
b <i>S. guttatus</i>	809	987	997	2398	2751	4085	785	1909	1625	2020	3998	3041	4389	5324	2706	3891	3890
c <i>S. lineolatus</i>																	
d <i>Acanthocybium spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>20 Tunnies</b>																	
a <i>E. affinis</i>	2	1	1	1	1	139	345	288	379	173	251	260	152	799	176	267	928
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	1	1	1	18	35	54	133	112	147	66	97	100	58	309	81	12	592
<b>21 Bill fishes</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	653	87	14
<b>22 Barracudas</b>	7	13	19	25	30	26	55	23	8	136	206	283	321	349	411	408	58
<b>23 Mulletts</b>	1468	1007	1793	2604	1311	1530	2085	848	1539	1248	1985	1289	1521	1521	1679	3179	3362
<b>24 Unicorn cod</b>	23	30	37	44	53	61	79	96	120	145	183	430	833	455	392	323	254
<b>25 Flatfishes</b>																	
a Halibut	1	1	2	2	2	1	2	1	1	1	2	2	1	1	516	513	584
b Flounders																	
c Soles	96	81	124	80	575	1977	2224	4000	3938	956	399	668	3421	4997	3357	1549	8449
<b>26 Crustaceans</b>																	
a Penaeid prawns	3211	2610	4241	4446	3103	14390	9594	18847	16040	12233	12406	14690	21188	14867	16567	13775	15219
b Non-Penaeid prawns	501	651	1521	220	337	96	241	3376	10912	1749	4867	5746	6046	6455	5647	12042	12048
c Lobsters	1	5	18	23	31	34	49	2275	1598	450	406	277	229	817	502	512	1728
d Crabs	1	1	3	5	611	1030	8	14	315	3437	920	1347	7323	22568	10420	3874	20428
e Stomatopods	1	1	2	2	2	1	2	1	1	1	2	2	1	1	7016	3066	5813
<b>27 Molluscs</b>	1	1	2	2	2	1	2	1	1	1	2	2	1	1	1	1	1
<b>28 Cephalopods</b>	1	1	3	3	5	1	11	867	3215	2003	3087	9206	5118	3742	4126	5537	3270
<b>Total</b>	<b>83895</b>	<b>79684</b>	<b>102913</b>	<b>94930</b>	<b>87778</b>	<b>142813</b>	<b>169572</b>	<b>226747</b>	<b>200882</b>	<b>221213</b>	<b>234618</b>	<b>223594</b>	<b>236974</b>	<b>270606</b>	<b>240052</b>	<b>249493</b>	<b></b>

**Table B : Continued.**

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>1 Elasmobranchs</b>																
a Sharks	14527	9817	10026	12903	10538	10099	18322	21860	29855	23082	32655	22029	30408	18990	21584	20542
b Skates	1122	1196	1188	566	419	414	119	224	428	404	641	661	651	592	596	623
c Rays	3130	2678	3110	2308	3263	9358	4307	3876	2827	2714	4705	4847	4767	4327	4353	4550
<b>2 Eels</b>	4938	5502	2369	1919	3194	2983	4662	3782	3651	<b>4024</b>	<b>4464</b>	5021	7035	4377	31911	3508
<b>3 Catfishes</b>	14977	16072	13747	13283	13575	16899	15078	16155	17816	20168	19106	25749	30014	27268	<b>28074</b>	29972
<b>4 Clupeids</b>																
a Wolf herring	7241	4746	6353	3808	4654	3659	5346	5726	5223	5902	4792	2708	3036	<b>3391</b>	<b>3646</b>	<b>3130</b>
b Oil sardine	3	3	3	2	1	1	1	1	1	2	2	1	2	2	2	2
c Other sardines	128	20	148	19	10	2	5	7	5	23	20	13	15	14	14	15
d Hilsa shad	364	247	425	675	748	116	1346	1069	175	1185	1893	2774	2732	<b>1507</b>	<b>1715</b>	<b>2294</b>
e Other shads	5363	5340	3357	2133	3027	3240	3592	3903	3715	4520	3974	2448	3017	<b>2805</b>	<b>2830</b>	<b>2981</b>
f Anchovies																
i <i>Anchoviella</i>	11355	12540	9760	10051	15701	19817	26339	16356	16038	20161	19084	20664	16175	<b>10582</b>	<b>12021</b>	<b>8942</b>
ii <i>Thrissocles</i>	8400	3384	5853	5572	5108	5040	8079	6825	6045	6652	5479	3148	3599	<b>4116</b>	<b>4675</b>	<b>3477</b>
g Other clupeids	7697	4442	4348	3903	4943	4714	4809	4581	5097	7221	7419	5230	7258	<b>10007</b>	<b>12767</b>	<b>11754</b>
<b>5 Bombay duck</b>	41624	48563	43813	36385	91774	80404	79106	84114	62526	89794	63892	113229	122614	<b>89941</b>	<b>88403</b>	<b>86763</b>
<b>6 Lizard fishes</b>	1765	333	454	985	917	3509	4486	1687	2053	<b>2037</b>	<b>2056</b>	<b>2121</b>	<b>2089</b>	<b>1897</b>	<b>1911</b>	<b>1997</b>
<b>7 Half beaks and Full</b>	3	4	4	4	4	3	2	2	4	4	4	4	4	4	4	4
<b>8 Flying fishes</b>	57	49	1	1	1	13	4	2	2	2	2	2	2	2	2	2
<b>9 Perches</b>																
a Rock cods	568	330	1323	226	957	520	855	914	1340	1890	1935	761	766	<b>696</b>	<b>701</b>	<b>733</b>
b Snappers	1080	348	395	366	673	513	120	187	454	734	750	295	297	<b>270</b>	<b>272</b>	<b>284</b>
c Pig face breams	64	66	58	84	71	110	60	370	401	566	578	228	229	<b>208</b>	<b>209</b>	<b>219</b>
d Threadfin breams	6262	8408	2935	3903	3592	4987	7016	5737	8169	11552	11820	4648	4682	<b>4253</b>	<b>4285</b>	<b>4478</b>
e Other perches	6345	4484	3646	2932	4702	3555	4947	5467	6646	9459	9657	3789	3808	6144	9311	10398
<b>10 Goatfishes</b>	549	121	442	626	2156	655	372	1226	2147	<b>2130</b>	<b>2150</b>	<b>2218</b>	<b>2184</b>	<b>1984</b>	<b>1998</b>	<b>2089</b>
<b>11 Threadfins</b>	6933	4522	3380	3010	3820	3790	4409	5375	3722	<b>3796</b>	<b>3935</b>	4166	4700	2762	2520	3318
<b>12 Croakers</b>	49848	42161	39498	33950	50673	57246	98768	118054	98019	145321	121056	275774	320151	240387	291990	289789
<b>13 Ribbon fishes</b>	18798	29336	19664	15599	24689	25494	29933	43531	39899	46648	36171	96641	84198	<b>29510</b>	<b>59776</b>	<b>34992</b>
<b>14 Carangids</b>																
a Horse mackerel	629	1665	1033	1339	2355	2188	3960	2342	3286	6459	6940	<b>6990</b>	<b>6998</b>	<b>6507</b>	<b>6565</b>	<b>6915</b>
b Scads	1	1	3	1	25	6	19	10	1	20	21	21	21	20	20	21
c Leather-jackets	1639	1349	1288	1105	819	639	1433	752	797	1885	2002	975	1252	<b>957</b>	<b>2213</b>	<b>2868</b>
i <i>Trachynotus</i>	1	1	1	1	1	1	1	1	1	6	6	6	6	6	6	6
d Other Carangids	896	416	1090	836	976	899	811	1292	1278	2743	2947	<b>2968</b>	<b>2972</b>	<b>2763</b>	<b>2787</b>	<b>2936</b>
i <i>Coryphaena</i>	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
ii <i>Elacate</i>	2	2	2	2	2	2	2	2	2	28	31	31	31	29	29	31
<b>15 Silverbellies</b>	499	81	219	1553	1904	1842	3951	4106	1711	<b>1698</b>	<b>1713</b>	<b>1767</b>	<b>1740</b>	<b>1581</b>	<b>1593</b>	<b>1664</b>
a <i>Leiognathus</i>																
b <i>Gazza</i>																
<b>16 Big jawed jumper</b>	25433	9356	10524	6424	4513	3926	5042	3958	1855	<b>3613</b>	<b>4934</b>	7452	7628	<b>6930</b>	<b>6980</b>	<b>7295</b>
<b>17 Pomfrets</b>																
a Black pomfret	2397	3681	2931	2645	1196	842	2230	1800	1802	2183	2321	3252	4753	2439	4540	4566
b Silver pomfret	11208	8021	7303	9222	9754	6784	8788	8499	10245	10736	10709	14165	15778	11783	14485	13107
c Chinese pomfrets	75	180	51	10	12	11	11	11	11	10	8	9	9	8	8	8
<b>18 Mackerel</b>																
a Indian mackerel	12	13	5	24	40	7	49	119	83	<b>83</b>	<b>85</b>	<b>85</b>	<b>86</b>	<b>80</b>	<b>80</b>	<b>84</b>
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>19 Seer fishes</b>																
a <i>S. commersoni</i>	1305	3840	2327	1476	2661	2070	2620	2694	3419	3939	5847	2862	2393	<b>1922</b>	<b>2203</b>	<b>2674</b>
b <i>S. guttatus</i>	5349	1874	3342	2112	3438	1827	4241	5229	8600	8849	13136	6430	5376	<b>4317</b>	<b>4948</b>	<b>6008</b>
c <i>S. lineolatus</i>																
d <i>Acanthocybium</i> spp.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>20 Tunnies</b>																
a <i>E. affinis</i>	2768	579	549	414	283	169	1089	283	611	<b>695</b>	<b>1037</b>	<b>1044</b>	<b>1045</b>	<b>972</b>	<b>981</b>	<b>1033</b>
b <i>Auxis</i> spp.	2	217	5	70	215	259	166	152	126	<b>192</b>	<b>286</b>	<b>288</b>	<b>289</b>	<b>268</b>	<b>271</b>	<b>285</b>
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	52	<b>36</b>	21	2	1	<b>18</b>	<b>1812</b>	2031	2924	<b>2328</b>	<b>3474</b>	<b>3499</b>	<b>3503</b>	<b>3257</b>	<b>3286</b>	<b>3461</b>
e Other tunnies	4718	441	2877	641	1804	2612	1812	432	5096	<b>3743</b>	<b>5584</b>	<b>5624</b>	<b>5631</b>	<b>5236</b>	<b>5282</b>	<b>5564</b>
<b>21 Bill fishes</b>	25	16	146	4	20	74	62	179	374	<b>154</b>	<b>157</b>	<b>158</b>	<b>158</b>	<b>147</b>	<b>148</b>	<b>156</b>
<b>22 Barracudas</b>	84	23	34	198	557	429	1068	562	373	<b>1346</b>	<b>2366</b>	<b>3382</b>	<b>4388</b>	<b>5010</b>	<b>5391</b>	<b>5774</b>
<b>23 Mulllets</b>	4544	3044	4364	7595	11064	3920	4200	3206	2709	3187	4072	6973	9938	<b>9029</b>	<b>9095</b>	<b>9505</b>
<b>24 Unicorn cod</b>	176	<b>102</b>	31	58	15	4	2	3	1	1	1	1	1	1	1	1
<b>25 Flatfishes</b>																
a Halibut	1132	308	273	392	495	352	729	446	724	<b>718</b>	<b>725</b>	<b>748</b>	<b>736</b>	<b>669</b>	<b>674</b>	<b>704</b>
b Flounders																
c Soles	3893	1623	3852	2071	2408	3112	6843	5381	3811	<b>3782</b>	<b>3817</b>	<b>3938</b>	<b>3877</b>	<b>3522</b>	<b>3548</b>	<b>3708</b>
<b>26 Crustaceans</b>																
a Penaeid prawns	17521	20362	23161	22261	21353	28226	36597	41199	27937	54179	48340	31339	31894	65390	73438	76127
b Non-Penaeid prawns	9945	14183	9861	11245	47713	57367	72388	74472	50933	69657	74541	41828	37522	<b>34088</b>	<b>34337</b>	<b>35885</b>
c Lobsters	1029	665	1162	906	1061	589	983	973	1022	<b>926</b>	<b>847</b>	<b>783</b>	<b>680</b>	<b>633</b>	<b>653</b>	<b>699</b>
d Crabs	13206	6505	6428	5637	5062	11396	10443	7525	3329	9815	14380	2026	2427	1556	2157	2499
e Stomatopods	5268	4831	6141	3488	3062	2717	5511	6869	2907	<b>2885</b>	<b>2912</b>	<b>3003</b>	<b>2957</b>	<b>2687</b>	<b>2706</b>	<b>2828</b>
<b>27 Molluscs</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	571	665	695
<b>28 Cephalopods</b>	6360	9744	9851	4060	10792	7803	18558	18569	20305	34577	24232	29291	34296	23573	30476	34573
<b>Total</b>	<b>333320</b>	<b>297877</b>	<b>275182</b>	<b>241012</b>	<b>382817</b>	<b>397237</b>	<b>517510</b>	<b>544134</b>	<b>472314</b>	<b>640436</b>	<b>595723</b>	<b>780118</b>	<b>842826</b>	<b>661992</b>	<b>805141</b>	<b>758543</b>

**Table C : Marine fisheries catch (thousand tonnes) data for the state of Goa, 1950-2000.**

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1 Elasmobranchs																		
a Sharks	8	8	8	8	8	8	8	8	8	6	13	10	37	54	71	88	120	59
b Skates	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	3	3	1
c Rays	1	1	1	1	1	1	1	1	1	1	2	2	7	10	13	17	23	11
2 Eels	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
3 Catfishes	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
4 Clupeids																		
a Wolf herring	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
b Oil sardine	16	16	16	16	16	16	16	16	16	23	175	14	31	32	33	33	39	16
c Other sardines	15	15	15	15	15	15	15	15	15	20	155	13	27	28	29	29	34	14
d Hilsa shad	4	4	4	4	4	4	4	4	4	3	7	2	4	4	4	4	5	2
e Other shads	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
f Anchovies																		
i <i>Anchoviella</i>	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	2	1
ii <i>Thrissocles</i>	1	1	1	1	1	1	1	1	1	2	13	1	2	3	3	3	3	1
g Other clupeids	76	76	76	76	76	76	76	76	76	276	841	81	158	153	140	127	130	48
5 Bombay duck	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
6 Lizard fishes	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
7 Half beaks and Full	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
8 Flying fishes	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
9 Perches																		
a Rock cods	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
b Snappers	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
c Pig face breams	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
d Threadfin breams	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
e Other perches	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
10 Goatfishes	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
11 Threadfins	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
12 Croakers	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
13 Ribbon fishes	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
14 Carangids																		
a Horse mackerel	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
b Scads	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
c Leather-jackets	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
i <i>Trachinotus</i>																		
d Other Carangids	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
i <i>Coryphaena</i>																		
ii <i>Elacate</i>																		
15 Silverbellies																		
a <i>Leiognathus</i>	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
b <i>Gazza</i>	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
16 Big jawed jumper	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
17 Pomfrets																		
a Black pomfret	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
b Silver pomfret	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
c Chinese pomfrets	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
18 Mackerel																		
a Indian mackerel	1	1	1	1	1	1	1	1	1	1	2	226	4074	8094	12132	16168	23264	11811
b Other mackerels																		
19 Seer fishes																		
a <i>S. commersoni</i>	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
b <i>S. guttatus</i>	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
c <i>S. lineolatus</i>	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
d <i>Acanthocybium spp.</i>																		
20 Tunnies																		
a <i>E. affinis</i>	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
e Other tunnies	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
22 Barracudas	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
23 Mulletts	19	19	19	19	19	19	19	19	19	1	38	47	87	80	69	57	51	15
24 Unicorn cod	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
25 Flatfishes																		
a Halibut	1	1	1	1	1	1	1	1	1	1	2	1	1	1	3	4	6	3
b Flounders	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
c Soles	5	5	5	5	5	5	5	5	5	1	11	1	44	93	141	191	275	140
26 Crustaceans																		
a Penaeid prawns	5	5	5	5	5	5	5	5	5	8	64	5	96	190	284	378	545	277
b Non-Penaeid prawns	1	1	1	1	1	1	1	1	1	1	2	2	9	13	17	21	28	14
c Lobsters	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
d Crabs	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
e Stomatopods	1	1	1	1	1	1	1	1	1	1	2	2	4	4	4	4	5	2
27 Molluscs	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
28 Cephalopods	4	4	4	4	4	4	4	4	4	1	11	1	1	3	3	3	3	2
<b>Total</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>394</b>	<b>1439</b>	<b>450</b>	<b>4635</b>	<b>8819</b>	<b>13003</b>	<b>17186</b>	<b>24600</b>	<b>12460</b>

**Table C : Continued.**

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1 Elasmobranchs																	
a Sharks	88	109	506	1615	934	436	571	797	1349	810	1085	1646	1041	1295	653	897	729
b Skates	2	2	11	34	19	8	11	15	27	16	21	31	20	25	24	24	24
c Rays	17	21	97	308	178	82	109	152	256	153	207	314	199	247	242	59	294
2 Eels	1	1	4	9	4	3	2	108	96	91	84	54	8	28	22	6	40
3 Catfishes	1	110	318	718	1062	612	621	2302	1311	1438	2063	1316	1621	3246	2791	2173	1826
4 Clupeids																	
a Wolf herring	1	3	11	13	22	35	83	32	54	32	80	124	124	187	78	80	163
b Oil sardine	21	1440	1152	2023	3899	3479	2229	7539	1389	819	1435	3080	2374	7877	5781	6091	1831
c Other sardines	19	1283	2737	73	2226	1292	1241	3921	11132	4126	5286	2512	1803	2377	1009	721	2668
d Hilsa shad	3	3	3	3	3	3	3	3	3	3	3	2	8	2	2	2	2
e Other shads	1	1	1	1	1	1	1	1	1	1	2	14	14	27	17	5	1
f Anchovies																	
i <i>Anchoviella</i>	1	33	35	45	126	148	94	31	20	9	5	129	250	112	24	477	376
ii <i>Thrissocles</i>	2	105	84	162	123	64	86	123	291	297	1342	926	781	614	2240	1119	1589
g Other clupeids	52	48	37	264	195	122	292	420	669	528	662	384	303	353	284	402	548
5 Bombay duck	1	1	2	2	4	6	8	10	46	20	28	9	12	1	7	13	12
6 Lizard fishes	1	4	4	9	4	3	2	254	39	374	425	162	280	1038	579	771	1057
7 Half beaks and Full	1	1	1	1	1	1	1	1	8	13	57	13	6	2	10	32	4
8 Flying fishes	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	1	1
9 Perches																	
a Rock cods	1	1	4	9	4	3	2	2	2	2	3	2	1	4	7	6	597
b Snappers	1	1	4	9	4	3	2	2	2	2	3	2	1	4	7	3	1
c Pig face breams	1	1	4	9	4	3	2	2	9	16	23	6	7	13	17	23	27
d Threadfin breams	1	2	19	77	45	5	7	35	226	368	554	148	176	825	628	1799	1525
e Other perches	1	2	22	85	49	5	9	39	248	404	606	162	193	903	663	327	231
10 Goatfishes	1	1	4	26	15	16	61	130	102	81	61	42	21	88	76	64	55
11 Threadfins	1	1	15	128	49	35	79	106	50	2	2	9	14	21	14	7	1
12 Croakers	1	82	363	906	1059	455	1576	5133	4151	4353	4954	2321	2155	2364	3304	3850	2407
13 Ribbon fishes	1	128	61	23	12	49	117	356	1126	456	517	557	1092	708	1084	1163	523
14 Carangids																	
a Horse mackerel	1	2	195	388	588	774	1008	1080	796	1166	1850	1365	730	117	98	82	405
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	78	152
c Leather-jackets	1	1	1	2	3	3	4	54	103	45	57	142	71	46	63	18	37
i <i>Trachynotus</i>																	
d Other Carangids	1	1	1	1	1	1	1	1	1	1	53	193	1077	585	1433	1035	1619
i <i>Coryphaena</i>																	
ii <i>Elacate</i>																	
15 Silverbellies																	
a <i>Leiognathus</i>	1	450	1244	1333	1085	404	2535	1017	1409	717	1071	1371	2424	3035	1448	1907	2384
b <i>Gazza</i>	1	1	4	9	4	3	2	2	5	5	5	5	8	12	6	9	11
16 Big jawed jumper	1	7	52	43	427	452	666	318	531	587	674	453	865	1204	1389	2274	1128
17 Pomfrets																	
a Black pomfret	1	6	45	162	95	51	137	138	126	371	447	171	290	153	414	213	162
b Silver pomfret	1	2	11	43	23	13	34	34	31	92	111	44	72	28	96	223	296
c Chinese pomfrets	1	1	4	9	4	3	2	2	2	2	2	2	1	1	1	1	39
18 Mackerel																	
a Indian mackerel	17965	22806	14818	35770	20560	7734	8368	6791	6466	7774	3460	4464	2453	4078	2731	241	2933
b Other mackerels																	
19 Seer fishes																	
a <i>S. commersoni</i>	1	23	25	76	48	47	201	154	349	150	493	778	512	463	118	282	44
b <i>S. guttatus</i>	1	8	9	28	17	17	74	57	129	56	182	288	190	171	547	510	352
c <i>S. lineolatus</i>	1	2	2	5	3	3	14	11	24	10	34	54	35	32	101	178	248
d <i>Acanthocybium spp.</i>																	
20 Tunnies																	
a <i>E. affinis</i>	1	1	2	2	2	2	2	2	17	81	231	566	268	146	5	21	123
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	4	17	49	121	57	31	1	4	26
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	2	10	28	68	32	18	1	2	15
e Other tunnies	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	5	79	158	234
22 Barracudas	1	1	2	2	3	4	4	5	6	6	7	7	171	39	29	7	26
23 Mulletts	12	4	34	111	68	32	9	209	6	72	49	22	15	302	92	24	134
24 Unicorn cod	1	7	6	11	8	4	5	8	9	7	7	7	7	9	9	11	11
25 Flatfishes																	
a Halibut	4	6	7	9	15	5	7	5	5	11	12	28	37	22	17	24	73
b Flounders	1	1	4	9	4	3	2	2	2	2	2	2	1	1	3	3	3
c Soles	214	271	446	547	836	253	350	27	215	525	634	1389	1847	1067	887	1209	3320
26 Crustaceans																	
a Penaeid prawns	420	534	2349	2384	2121	2088	2585	2967	7300	2249	2506	2480	2610	3285	5019	11055	6967
b Non-Penaeid prawns	21	26	75	333	110	40	34	47	53	38	40	51	58	70	81	90	100
c Lobsters	1	1	4	9	4	3	2	10	5	11	20	9	25	13	35	11	9
d Crabs	1	1	7	26	8	16	46	115	458	299	242	644	856	772	1300	1052	1586
e Stomatopods	3	3	15	68	19	37	107	268	1069	699	566	1501	1866	3186	5038	3800	6645
27 Molluscs	1	1	4	9	4	3	2	17	22	25	18	26	30	13	24	59	59
28 Cephalopods	3	3	11	34	15	21	23	145	201	232	170	243	266	125	214	527	527
<b>Total</b>	<b>18888</b>	<b>27559</b>	<b>24883</b>	<b>47976</b>	<b>36125</b>	<b>18888</b>	<b>23441</b>	<b>35004</b>	<b>41962</b>	<b>29677</b>	<b>32533</b>	<b>30466</b>	<b>29388</b>	<b>41398</b>	<b>40849</b>	<b>45226</b>	<b>46206</b>

**Table C** : Continued.

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1 Elasmobranchs																
a Sharks	302	925	193	417	87	235	203	270	557	285	563	675	1462	1044	846	1778
b Skates	25	23	24	39	49	51	50	52	34	15	24	25	48	30	68	11
c Rays	184	91	43	49	66	22	13	70	2	6	19	31	81	66	79	53
2 Eels	6	7	17	13	10	4	4	5	3	3	3	3	3	4	4	4
3 Catfishes	2442	534	1957	6146	10955	2952	1378	288	1250	1021	2188	202	1103	1164	1436	1225
4 Clupeids																
a Wolf herring	457	342	198	335	102	104	236	511	231	233	197	203	252	237	235	234
b Oil sardine	4309	551	9869	16672	13515	12537	27581	4728	884	214	68	1331	6205	9860	17942	18571
c Other sardines	985	2388	7025	3677	1312	4708	8317	15279	2096	3529	4180	5546	8399	9356	3887	1675
d Hilsa shad	2	2	2	2	2	2	2	3	2	2	1	1	1	1	1	1
e Other shads	2	1	4	4	4	4	5	6	4	4	3	4	4	4	4	4
f Anchovies																
i <i>Anchoviella</i>	165	829	68	23	427	31	239	50	75	83	78	88	446	5	18	26
ii <i>Thrissocles</i>	3020	4379	953	7588	385	324	3828	16280	222	228	195	205	1039	13	43	58
g Other clupeids	803	1008	365	1430	1562	191	802	1580	328	5346	1359	2212	1722	663	523	1010
5 Bombay duck	10	8	7	6	4	3	4	6	4	4	4	4	6	6	6	6
6 Lizard fishes	651	335	1351	644	1292	295	427	832	238	223	192	201	242	269	298	272
7 Half beaks and Full	129	118	22	35	10	32	75	48	22	10	102	200	366	456	562	669
8 Flying fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9 Perches																
a Rock cods	297	3	1	3	6	9	4	5	3	4	3	25	5	4	4	4
b Snappers	113	57	7	17	35	51	63	82	66	92	74	751	168	127	153	150
c Pig face breams	33	58	89	66	45	2	2	2	2	1	1	12	3	2	2	2
d Threadfin breams	1042	1758	2697	61	39	7	26	19	8	190	267	3598	966	838	1112	1184
e Other perches	454	318	746	852	1500	405	610	1327	1107	1116	650	4492	624	236	44	7
10 Goatfishes	45	31	23	33	52	42	28	16	2	1	1	2	2	2	2	2
11 Threadfins	7	54	53	55	66	86	101	122	96	98	93	106	139	1547	802	495
12 Croakers	3308	5205	3553	3110	2672	1289	2408	1995	1043	1804	1287	2026	6689	6318	5885	5370
13 Ribbon fishes	1485	1545	2293	3738	421	364	620	4196	1431	1682	1622	1881	2586	2679	149	1460
14 Carangids																
a Horse mackerel	154	173	420	3985	3298	2234	1386	992	285	267	115	192	308	162	64	1435
b Scads	1282	289	144	5033	3532	1633	1369	791	13	34	25	63	143	115	134	134
c Leather-jackets	55	40	36	68	40	7	301	348	7	10	6	14	30	23	28	219
i <i>Trachinotus</i>																
d Other Carangids	1601	3148	745	2331	2039	1513	4364	6747	1523	2674	1877	3408	4093	1567	1549	1542
i <i>Coryphaena</i>																
ii <i>Elacate</i>																
15 Silverbellies																
a <i>Leiognathus</i>	1098	1951	1214	2588	830	435	1360	947	70	226	161	1581	7347	2204	1372	2777
b <i>Gazza</i>	6	11	7	17	6	4	13	12	2	4	4	4	5	2	2	2
16 Big jawed jumper	3100	4007	939	1630	525	512	846	713	191	195	183	192	529	587	651	594
17 Pomfrets																
a Black pomfret	752	232	960	1608	1978	1551	431	349	248	339	67	508	650	949	1204	1234
b Silver pomfret	315	60	128	243	157	174	96	145	118	242	55	461	619	938	737	672
c Chinese pomfrets	17	15	13	11	10	7	2	9	11	10	1	9	10	11	12	11
18 Mackerel																
a Indian mackerel	5957	605	6189	12263	66768	30222	3966	10980	72711	38902	36758	39299	23898	20390	19721	16932
b Other mackerels																
19 Seer fishes																
a <i>S. commersoni</i>	16	144	384	236	121	602	1064	2228	111	1489	391	464	838	1319	665	1013
b <i>S. guttatus</i>	971	706	507	295	163	114	159	148	272	1173	183	155	218	174	141	215
c <i>S. lineolatus</i>	309	377	439	489	585	615	850	1063	821	895	215	144	201	161	131	199
d <i>Acanthocybium spp.</i>																
20 Tunnies																
a <i>E. affinis</i>	200	77	62	29	48	123	251	399	363	447	445	529	743	782	853	930
b <i>Auxis spp.</i>	43	49	355	481	42	45	81	122	107	247	209	216	267	252	249	248
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	23	23	23	36	34	28	15	20	81	81	69	71	88	83	82	82
e Other tunnies	1	1	1	18	37	53	87	124	88	89	75	77	96	90	89	89
21 Bill fishes	118	7	7	7	7	7	9	10	7	7	6	6	8	7	7	7
22 Barracudas	29	93	1	15	31	42	70	61	42	46	40	41	39	26	14	14
23 Mullets	155	65	50	23	43	33	13	38	5	6	4	20	11	29	58	74
24 Unicorn cod	14	16	19	25	34	18	25	37	33	28	19	22	28	19	18	18
25 Flatfishes																
a Halibut	123	29	3	3	4	4	4	5	3	4	4	2	5	4	4	4
b Flounders	3	3	3	3	4	4	4	5	3	4	4	2	5	4	4	4
c Soles	4289	3516	2369	1893	1374	904	1684	2089	5048	6252	4470	1775	4567	3246	2604	3692
26 Crustaceans																
a Penaeid prawns	5057	6260	8230	6206	9515	4148	7067	7028	3565	6471	6646	6149	6728	4746	3221	4140
b Non-Penaeid prawns	113	115	121	133	175	187	186	199	138	126	109	114	137	152	169	154
c Lobsters	33	5	109	13	12	11	9	2	6	2952	2110	47	932	4	4	4
d Crabs	2588	3900	3302	778	674	1251	951	778	1441	1296	1093	1120	1317	1430	846	1459
e Stomatopods	9481	16878	19785	23313	16149	9304	15503	28865	38311	28454	18732	13576	9043	1962	2177	1986
27 Molluscs	43	191	68	61	99	26	155	258	1107	1337	1417	7396	5756	387	95	150
28 Cephalopods	396	1722	618	550	882	244	1395	2312	9958	12029	9556	9801	8316	3484	858	1352
<b>Total</b>	<b>58620</b>	<b>65281</b>	<b>78812</b>	<b>109402</b>	<b>143839</b>	<b>79806</b>	<b>90748</b>	<b>115600</b>	<b>146398</b>	<b>122536</b>	<b>98228</b>	<b>111285</b>	<b>109532</b>	<b>80237</b>	<b>71870</b>	<b>75658</b>

**Table D : Marine fisheries catch (thousand tonnes) data for the Union Territory of Daman and Diu, 1950-2000.**

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1 Elasmobranchs																		
a Sharks	1	1	1	1	8	9	14	23	12	10	63	19	115	57	67	28	32	24
b Skates	1	1	1	1	6	7	11	17	9	7	47	14	86	42	50	21	24	18
c Rays	1	1	1	1	6	7	11	18	9	8	48	15	88	44	51	22	25	18
2 Eels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3 Catfishes	2	1	1	9	11	18	21	19	31	9	51	17	120	69	74	34	39	27
4 Clupeids																		
a Wolf herring	3	3	3	1	5	12	42	26	12	24	12	6	11	19	16	30	32	22
b Oil sardine	12	12	12	12	12	12	12	326	261	196	131	67	2	1	1	13	26	38
c Other sardines	129	129	130	114	99	82	66	10	5	1	4	8	30	6	19	13	4	10
d Hilsa shad	68	68	68	69	69	78	19	30	34	32	193	33	78	140	83	46	16	33
e Other shads	22	22	22	22	22	22	22	33	71	85	220	123	172	74	111	63	109	134
f Anchovies																		
i <i>Anchoiella</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ii <i>Thrissocles</i>	1	1	1	8	1	1	2	1	1	1	1	1	1	1	2	3	3	1
g Other clupeids	82	39	76	87	57	56	113	142	44	58	34	20	16	35	24	97	117	95
5 Bombay duck	56	30	100	332	299	574	813	938	434	466	1247	1056	868	1051	951	787	729	714
6 Lizard fishes																		
7 Half beaks and Full	63	63	64	64	64	64	64	55	46	37	28	19	10	1	4	5	5	5
8 Flying fishes																		
9 Perches																		
a Rock cods																		
b Snappers	2	1	8	5	2	1	1	1	3	1	1	1	1	1	1	1	1	1
c Pig face breams																		
d Threadfin breams	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other perches	1	1	6	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1
10 Goatfishes	20	25	31	15	40	56	72	60	48	43	38	33	28	23	18	13	8	8
11 Threadfins	1	1	1	1	4	63	40	105	33	49	89	63	14	4	8	3	8	5
12 Croakers	12	13	6	24	53	26	29	19	12	7	8	5	16	9	9	6	6	5
13 Ribbon fishes	44	18	22	216	105	54	65	55	56	14	6	16	8	13	10	18	34	42
14 Carangids																		
a Horse mackerel	1	1	1	1	1	1	3	1	1	1	1	1	1	2	1	11	11	11
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Leather-jackets	69	69	69	70	70	70	70	70	22	24	107	59	32	47	36	8	7	5
i <i>Trachinotus</i>	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5
d Other Carangids	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	3	4	6
i <i>Coryphaena</i>																		
ii <i>Elacate</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15 Silverbellies																		
a <i>Leiognathus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b <i>Gazza</i>																		
16 Big jawed jumper																		
17 Pomfrets																		
a Black pomfret	14	2	29	155	151	189	88	228	187	355	524	260	235	310	305	285	259	241
b Silver pomfret	56	7	115	609	595	743	343	898	734	1394	2058	1021	923	1216	1199	1117	1017	948
c Chinese pomfrets																		
18 Mackerel																		
a Indian mackerel	149	149	150	150	150	151	150	146	140	135	121	106	91	76	61	46	31	16
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19 Seer fishes																		
a <i>S. commersoni</i>	1	1	1	1	1	1	3	1	1	2	3	2	1	3	1	3	4	4
b <i>S. guttatus</i>	1	1	1	1	2	2	5	3	3	4	5	4	2	5	2	6	7	8
c <i>S. lineolatus</i>																		
d <i>Acanthocybium spp.</i>																		
20 Tunnies																		
a <i>E. affinis</i>	2	2	2	3	5	6	8	3	6	9	11	14	5	19	8	2	2	1
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22 Barracudas	1	1	1	5	9	12	16	20	23	27	14	1	1	1	1	1	1	1
23 Mullet	1	1	1	1	1	1	1	2	1	2	2	2	1	1	1	1	2	3
24 Unicorn cod																		
25 Flatfishes																		
a Halibut	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b Flounders																		
c Soles	3	3	22	2	1	4	6	6	2	104	1	1	1	1	1	3	5	6
26 Crustaceans																		
a Penaeid prawns	36	36	39	55	90	57	83	137	42	84	39	24	12	14	11	32	33	29
b Non-Penaeid prawns	26	25	27	38	63	40	57	44	41	21	1	1	2	5	2	1	1	1
c Lobsters	1	1	1	1	1	1	1	1	1	3	6	3	1	1	7	12	18	3
d Crabs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Stomatopods																		
27 Molluscs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
28 Cephalopods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	905	751	1037	2096	2025	2443	2273	3461	2350	3236	5136	3038	2994	3314	3157	2754	2639	2503

**Table D** : Continued.

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
<b>1 Elasmobranchs</b>																	
a Sharks	29	32	67	73	82	49	119	141	100	207	133	61	170	157	182	117	118
b Skates	21	24	49	55	62	37	88	104	74	154	100	45	126	117	136	86	69
c Rays	22	24	52	57	63	38	91	108	77	158	103	46	130	121	140	167	153
<b>2 Eels</b>	1	1	1	1	1	1	1	1	1	4	1	1	4	1	1	3	1
<b>3 Catfishes</b>	33	36	79	71	84	44	109	50	46	178	81	111	103	205	253	209	193
<b>4 Clupeids</b>																	
a Wolf herring	22	29	45	116	120	64	85	114	106	164	92	97	187	147	174	165	141
b Oil sardine	38	23	63	103	143	183	223	263	303	342	383	423	463	503	543	582	623
c Other sardines	2	16	24	32	272	205	139	73	6	11	16	22	27	32	37	42	203
d Hilsa shad	32	30	43	41	11	3	17	223	72	22	3	15	4	1	10	55	5
e Other shads	139	156	225	268	275	323	164	192	168	276	284	191	198	512	249	183	241
f Anchovies																	
i <i>Anchoviella</i>	1	1	1	1	1	1	1	1	3	6	8	11	13	16	19	21	23
ii <i>Thrissocles</i>	1	2	7	2	1	2	3	1	3	1	7	8	10	15	55	43	28
g Other clupeids	102	92	85	61	71	36	207	237	199	170	238	100	153	127	70	51	88
<b>5 Bombay duck</b>	855	789	696	569	462	442	474	712	560	517	862	1023	587	866	607	797	894
<b>6 Lizard fishes</b>																	
<b>7 Half beaks and Full</b>	2	1	2	1	5	2	5	3	91	94	131	167	5	4	1	8	14
<b>8 Flying fishes</b>																	
<b>9 Perches</b>																	
a Rock cods																	
b Snappers	2	2	4	3	13	21	20	27	41	9	33	8	20	39	30	143	128
c Pig face breams																	
d Threadfin breams	1	1	1	1	3	4	4	5	9	3	8	1	4	9	7	4	17
e Other perches	1	1	3	3	9	15	15	20	30	7	25	6	15	29	22	43	46
<b>10 Goatfishes</b>	5	2	1	1	1	1	1	96	206	219	1	3	41	82	114	149	94
<b>11 Threadfins</b>	3	3	27	63	46	82	139	233	176	7	9	20	17	42	95	96	105
<b>12 Croakers</b>	6	8	20	18	20	210	120	229	154	200	168	146	156	174	136	153	165
<b>13 Ribbon fishes</b>	44	41	47	32	41	26	52	31	348	400	196	127	307	235	267	178	225
<b>14 Carangids</b>																	
a Horse mackerel	11	9	5	9	3	3	13	12	20	12	3	6	6	9	4	6	12
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	840	424
c Leather-jackets	3	2	48	25	1	47	18	10	3	76	60	88	193	522	494	238	498
i <i>Trachynotus</i>	5	5	5	5	4	4	4	4	4	4	3	3	3	3	3	3	3
d Other Carangids	8	9	11	12	20	14	8	1	2	3	4	5	6	7	16	43	62
i <i>Coryphaena</i>																	
ii <i>Elacate</i>	1	1	1	1	1	1	1	1	12	12	12	12	12	12	12	12	12
<b>15 Silverbellies</b>																	
a <i>Leiognathus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b <i>Gazza</i>																	
<b>16 Big jawed jumper</b>																	
<b>17 Pomfrets</b>																	
a Black pomfret	246	233	455	391	261	256	458	325	131	530	862	560	719	1097	766	1064	1183
b Silver pomfret	967	914	1788	1536	1025	1003	1800	1274	515	2082	3385	2203	2826	4314	3010	2561	2232
c Chinese pomfrets																	
<b>18 Mackerel</b>																	
a Indian mackerel	16	11	6	1	4	7	10	13	16	19	22	25	80	69	58	48	37
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>19 Seer fishes</b>																	
a <i>S. commersoni</i>	4	4	4	11	12	18	3	8	7	9	16	12	18	24	26	29	17
b <i>S. guttatus</i>	7	9	9	22	25	35	6	16	14	17	32	23	36	48	24	34	33
c <i>S. lineolatus</i>																	
d <i>Acanthocybium spp.</i>																	
<b>20 Tunnies</b>																	
a <i>E. affinis</i>	1	1	1	1	1	81	176	166	223	101	137	135	84	487	105	158	540
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	1	1	1	1	1	2	5	4	6	3	4	4	2	13	3	1	24
<b>21 Bill fishes</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	254	33	5
<b>22 Barracudas</b>	1	2	3	4	6	4	8	4	1	24	34	44	53	63	73	72	10
<b>23 Mulletts</b>	4	3	4	7	4	4	5	3	4	4	5	3	4	4	5	10	10
<b>24 Unicorn cod</b>																	
<b>25 Flatfishes</b>																	
a Halibut	1	1	1	1	1	1	1	1	1	1	1	1	1	1	53	53	60
b Flounders																	
c Soles	6	5	7	4	32	122	111	231	245	57	20	32	187	297	202	93	507
<b>26 Crustaceans</b>																	
a Penaeid prawns	26	21	28	31	23	120	64	145	134	96	85	97	155	118	133	111	122
b Non-Penaeid prawns	1	2	3	1	1	1	1	8	28	4	9	11	13	15	14	29	28
c Lobsters	1	2	4	7	9	11	12	678	515	137	108	70	66	251	156	160	535
d Crabs	1	1	1	1	1	1	1	1	1	1	1	1	3	9	4	1	8
e Stomatopods																	
<b>27 Molluscs</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>28 Cephalopods</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>Total</b>	<b>2681</b>	<b>2557.1</b>	<b>3937</b>	<b>3652.7</b>	<b>3231</b>	<b>3533.8</b>	<b>4791</b>	<b>5777.8</b>	<b>4665</b>	<b>6349</b>	<b>7695</b>	<b>5978.2</b>	<b>7217</b>	<b>10805</b>	<b>8592</b>	<b>8902.6</b>	<b>9944</b>

**Table D : Continued.**

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>1 Elasmobranchs</b>																
a Sharks	192	127	126	157	132	129	241	288	382	300	631	5330	5861	1901	1911	1883
b Skates	134	140	137	62	47	48	15	26	50	48	102	857	942	993	236	240
c Rays	97	82	94	66	97	284	134	121	86	84	177	1492	1642	1060	412	417
<b>2 Eels</b>	1	1	1	1	1	1	1	1	1	1	2	27	2	225	200	201
<b>3 Catfishes</b>	237	249	209	193	202	259	238	255	274	314	241	393	204	2469	2476	2427
<b>4 Clupeids</b>																
a Wolf herring	362	238	311	188	231	182	265	286	260	269	269	240	200	315	126	401
b Oil sardine	663	703	743	496	249	2	2	2	2	175	333	428	273	288	104	16
c Other sardines	357	54	403	53	29	5	13	21	14	22	28	32	33	63	56	60
d Hilsa shad	25	17	28	45	50	8	91	72	12	79	587	379	375	838	664	844
e Other shads	271	272	167	106	152	163	180	197	187	193	191	170	150	252	203	216
f Anchovies																
i <i>Anchoviella</i>	39	43	33	34	54	68	90	56	55	68	46	67	29	188	280	287
ii <i>Thrissocles</i>	94	38	64	61	57	56	90	76	67	67	66	58	51	83	66	71
g Other clupeids	136	79	75	68	87	83	84	81	90	126	153	362	486	1907	372	396
<b>5 Bombay duck</b>	653	766	674	563	1433	1254	1232	1318	979	1394	1533	1228	892	2172	1515	953
<b>6 Lizard fishes</b>																
<b>7 Half beaks and Full</b>	28	33	41	34	35	31	23	22	33	135	227	279	201	263	156	167
<b>8 Flying fishes</b>																
<b>9 Perches</b>																
a Rock cods																
b Snappers	167	52	59	51	98	76	19	29	67	82	99	87	84	170	147	149
c Pig face breams																
d Threadfin breams	18	24	9	11	10	15	21	16	23	26	31	26	25	50	44	45
e Other perches	78	53	43	33	54	42	60	67	79	91	105	89	86	171	148	150
<b>10 Goatfishes</b>	153	34	118	160	566	177	103	340	579	634	702	578	482	858	663	674
<b>11 Threadfins</b>	145	93	68	58	76	76	93	112	76	79	65	153	139	176	83	29
<b>12 Croakers</b>	195	162	148	123	188	217	386	461	372	560	615	131	630	771	325	1535
<b>13 Ribbon fishes</b>	527	827	541	431	689	710	833	1218	1116	1144	1130	1002	889	1487	484	519
<b>14 Carangids</b>																
a Horse mackerel	8	20	12	16	28	26	47	28	39	76	1049	24	211	211	62	67
b Scads	7	14	36	7	277	63	206	110	9	44	75	93	104	209	194	208
c Leather-jackets	368	304	284	245	183	143	320	169	178	225	262	265	262	481	376	521
i <i>Trachynotus</i>	3	3	3	3	3	3	3	3	3	102	192	246	212	344	268	288
d Other Carangids	91	42	108	83	98	91	82	131	129	153	169	165	160	287	246	264
i <i>Coryphaena</i>																
ii <i>Elacate</i>	12	12	12	12	12	12	12	12	12	66	116	144	124	202	157	169
<b>15 Silverbellies</b>																
a <i>Leiognathus</i>	1	1	1	1	1	1	1	1	1	421	340	114	212	358	260	248
b <i>Gazza</i>																
<b>16 Big jawed jumper</b>																
<b>17 Pomfrets</b>																
a Black pomfret	880	1323	1033	896	416	300	817	660	643	789	640	279	281	818	8	404
b Silver pomfret	2977	2086	1863	2258	2451	1748	2330	2255	2644	2809	2278	991	1001	2909	597	1645
c Chinese pomfrets																
<b>18 Mackerel</b>																
a Indian mackerel	29	31	12	58	94	17	115	284	198	356	494	557	269	921	314	336
b Other mackerels	1	1	1	1	1	1	1	1	4	45	81	103	117	236	84	92
<b>19 Seer fishes</b>																
a <i>S. commersoni</i>	164	485	286	183	332	258	326	338	428	436	427	375	331	549	438	470
b <i>S. guttatus</i>	47	16	29	18	30	16	37	46	75	75	72	63	54	88	68	73
c <i>S. lineolatus</i>																
d <i>Acanthocybium spp.</i>																
<b>20 Tunnies</b>																
a <i>E. affinis</i>	1641	345	319	242	167	99	641	168	361	375	374	335	359	698	633	678
b <i>Auxis spp.</i>	3	244	6	77	238	286	185	169	141	152	157	144	133	230	190	204
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	65	121	156	117	160	101	109
d <i>T. tonggol</i>	6	5	3	1	1	2	226	254	366	344	311	253	204	332	259	277
e Other tunnies	194	18	116	26	74	106	74	18	208	189	162	125	107	174	136	146
<b>21 Bill fishes</b>	10	7	56	1	7	28	23	69	59	66	71	68	58	95	74	79
<b>22 Barracudas</b>	15	4	6	34	98	76	188	99	66	67	66	59	52	87	69	74
<b>23 Mulletts</b>	15	9	13	22	34	12	13	10	9	10	6	15	31	87	93	95
<b>24 Unicorn cod</b>																
<b>25 Flatfishes</b>																
a Halibut	124	32	28	40	51	37	79	48	76	78	81	63	54	96	75	78
b Flounders										56	196	20	327	583	450	458
c Soles	248	102	237	121	145	192	436	343	236	241	250	193	163	294	127	26
<b>26 Crustaceans</b>																
a Penaeid prawns	149	169	189	175	173	233	312	352	232	455	482	116	177	529	132	310
b Non-Penaeid prawns	25	35	24	26	114	141	183	187	125	173	257	211	188	356	104	751
c Lobsters	339	215	367	275	330	188	324	320	327	337	353	277	236	430	62	100
d Crabs	6	3	3	3	1	4	4	3	1	4	2	6	4	3	3	49
e Stomatopods																
<b>27 Molluscs</b>	1	1	1	1	1	1	1	1	1	78	157	180	173	351	302	341
<b>28 Cephalopods</b>	1	1	1	1	1	1	3	3	3	4	4	5	4	7	5	5
<b>Total</b>	<b>11939</b>	<b>9617.8</b>	<b>9140</b>	<b>7822.6</b>	<b>9900</b>	<b>7975</b>	<b>11204</b>	<b>11149</b>	<b>11381</b>	<b>14183</b>	<b>16578</b>	<b>19050</b>	<b>19399</b>	<b>28825.5</b>	<b>16560</b>	<b>20247</b>



**Table E** : Marine fisheries catch (thousand tonnes) data for the state of Maharashtra, 1950-2000.

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1 Elasmobranchs																		
a Sharks	37	370	511	163	483	1869	2338	5389	3343	3832	2209	2075	1970	3158	2841	1957	3260	4490
b Skates	1	10	14	4	13	48	60	140	87	100	58	54	51	82	74	51	84	117
c Rays	10	101	140	44	132	510	637	1470	911	1045	602	566	538	861	775	534	889	1225
2 Eels	3045	2682	3651	7334	7093	8102	2089	3700	5777	4602	3317	10543	7947	7071	1488	2038	2169	1975
3 Catfishes	486	1265	1216	2548	1973	3996	3751	10387	9184	4647	4139	2109	2285	4546	2235	2531	5122	5142
4 Clupeids																		
a Wolf herring	18	17	186	79	139	309	2395	1344	1352	1253	678	914	779	778	1003	807	1049	1733
b Oil sardine	4068	91	1049	1333	75	850	417	9188	4196	2961	1627	464	5211	1688	880	67	65	361
c Other sardines	1115	2018	1191	125	34	566	590	4486	3723	10380	663	269	720	234	490	1123	961	931
d Hilsa shad	216	206	218	260	234	279	154	187	222	119	229	176	185	160	16	148	97	69
e Other shads	40	38	40	48	43	45	45	85	86	133	980	291	186	311	757	1727	391	298
f Anchovies																		
i <i>Anchoviella</i>	10	9	7	64	10	9	12	12	167	55	138	225	350	148	79	310	535	174
ii <i>Thrissocles</i>	456	436	348	3154	484	433	603	654	509	690	570	937	638	951	1435	723	750	647
g Other clupeids	11499	5377	10920	6677	8466	8206	17280	14084	4746	8133	7250	6762	4100	5342	7832	7360	6563	8737
5 Bombay duck	8788	4396	15859	24906	15568	67026	74037	59086	39968	28883	29562	27149	30079	24795	21489	24798	31790	28797
6 Lizard fishes	91	46	163	254	158	678	540	4	2	23	5	16	27	24	503	28	1453	56
7 Half beaks and Full	201	192	203	242	217	228	229	266	56	32	37	141	13	120	9	56	65	154
8 Flying fishes	173	166	157	164	126	112	91	63	16	5	2	26	2	7	11	17	22	26
9 Perches																		
a Rock cods	30	86	149	102	26	12	14	21	18	16	27	141	147	96	208	46	112	18
b Snappers	35	100	173	118	30	14	16	24	20	18	30	163	169	111	240	52	131	22
c Pig face breams	2	6	10	6	2	1	1	1	1	1	2	10	10	6	14	3	7	1
d Threadfin breams	545	1578	2731	1878	466	228	264	374	323	275	481	2580	2687	1758	3805	828	2063	341
e Other perches	50	145	252	173	43	21	25	34	29	26	44	238	248	162	351	77	190	32
10 Goatfishes	240	188	382	214	515	757	987	703	419	224	268	367	368	229	4273	1222	1492	198
11 Threadfins	10204	9786	9400	10244	8364	7933	5858	8866	3327	4668	771	1490	722	2041	369	208	2838	1093
12 Croakers	9039	8412	8456	18235	38926	20149	22943	11003	8198	5134	4963	10860	9239	8093	9073	8345	8083	7763
13 Ribbon fishes	4055	2864	1959	22991	9556	5223	5354	6479	5236	1874	1769	2457	1853	2420	8962	7044	5130	5270
14 Carangids																		
a Horse mackerel	143	93	52	69	257	218	277	294	321	253	433	533	118	416	1876	734	417	743
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Leather-jackets	568	543	576	685	616	647	648	640	619	418	262	414	149	133	88	189	270	120
i <i>Trachinotus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	6	33
d Other Carangids	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	46
i <i>Coryphaena</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ii <i>Elacate</i>	1	1	1	1	1	1	35	114	172	65	21	24	22	2	2	7	11	12
15 Silverbellies																		
a <i>Leiognathus</i>	226	584	128	124	93	19	125	151	793	245	47	223	144	225	271	830	480	3243
b <i>Gazza</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16 Big jawed jumper	245	632	138	134	101	20	136	13	140	10	95	148	93	62	125	115	71	191
17 Pomfrets																		
a Black pomfret	173	30	359	1732	1338	1206	868	1364	1359	2251	827	1254	886	792	1224	1365	1608	3077
b Silver pomfret	692	121	1434	6927	5348	4822	3468	5459	5438	9002	3307	5014	3546	3166	4893	5459	6433	12306
c Chinese pomfrets	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18 Mackerel																		
a Indian mackerel	1023	7125	10132	13470	4076	3544	1647	4608	1728	7067	12175	358	2056	4735	2109	792	180	327
b Other mackerels																		
19 Seer fishes																		
a <i>S. commersoni</i>	127	122	88	60	102	201	1238	435	351	401	233	296	287	382	1218	1018	738	626
b <i>S. guttatus</i>	85	81	58	40	67	134	824	290	235	268	155	198	191	255	812	679	492	417
c <i>S. lineolatus</i>																		
d <i>Acanthocybium spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20 Tunnies																		
a <i>E. affinis</i>	2	1	1	1	1	7	7	21	39	4	26	23	11	9	13	7	24	62
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c <i>K. pelamis</i>	1	1	1	1	1	1	1	3	6	1	4	3	2	1	2	1	3	9
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	25	3	15	15	10	97	87	272	512	60	338	310	145	115	177	92	310	822
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22 Barracudas	1	1	28	17	1	7	54	5	9	5	22	21	16	8	5	12	119	1740
23 Mulllets	1	1	24	19	11	3	3	2	125	4	142	54	115	25	109	499	188	231
24 Unicorn cod	1435	3011	2116	11447	6892	2366	973	1091	3207	3369	6089	3916	3298	5496	3795	5708	2736	2158
25 Flatfishes																		
a Halibut	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b Flounders	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Soles	88	237	1077	168	68	197	546	301	34	261	129	66	28	18	18	87	345	32
26 Crustaceans																		
a Penaeid prawns	10799	10392	11415	16906	27807	18549	25961	33128	6685	6375	9946	8798	8936	5288	14620	10170	10148	8331
b Non-Penaeid prawns	28659	27580	30294	44865	73795	49226	68901	42056	37082	28625	37097	23427	37313	38207	29978	41956	34273	29057
c Lobsters	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d Crabs	12	11	13	18	31	20	33	163	23	18	51	50	2	14	18	60	139	36
e Stomatopods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
27 Molluscs																		
28 Cephalopods	1	1	1	1	1	1	1	1	1	47	13	57	59	28	22	7	27	2
<b>Total</b>	<b>98773</b>	<b>91170</b>	<b>117348</b>	<b>198075</b>	<b>213806</b>	<b>208904</b>	<b>246578</b>	<b>228473</b>	<b>150813</b>	<b>137894</b>	<b>131848</b>	<b>116225</b>	<b>127956</b>	<b>124587</b>	<b>130603</b>	<b>131907</b>	<b>134339</b>	<b>133302</b>

**Table E : Continued.**

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
<b>1 Elasmobranchs</b>																	
a Sharks	3505	5382	4612	4497	5964	7993	6852	8714	7793	8341	10873	12986	8310	10474	11940	11046	9855
b Skates	92	140	119	116	155	207	178	226	203	217	282	337	216	247	1493	2945	2347
c Rays	956	1467	1258	1227	1627	2180	1869	2376	2126	2275	2965	3541	2266	2843	3193	3864	3385
<b>2 Eels</b>	2525	2392	7389	3742	4162	2759	917	1526	5950	5383	7549	5435	4391	3211	5163	4063	3885
<b>3 Catfishes</b>	4651	6929	14813	23585	16729	12563	9855	11412	13592	11633	15537	14059	12047	15485	14670	16146	18175
<b>4 Clupeids</b>																	
a Wolf herring	1196	1693	732	1215	1287	2209	1169	3045	2635	2791	3212	1763	2088	2978	4454	5421	6316
b Oil sardine	227	408	305	410	3646	2548	1115	1762	2600	114	65	16	679	635	359	112	1310
c Other sardines	1160	1251	3462	1876	2919	3158	1275	3218	2147	1085	911	950	1396	429	486	546	259
d Hilsa shad	58	35	28	22	13	91	4	17	168	373	1636	1097	1042	541	442	826	566
e Other shads	448	1035	1568	1128	1420	871	824	1195	723	1036	489	440	622	2246	1360	1645	2571
f Anchovies																	
i <i>Anchoviella</i>	108	70	492	997	212	588	280	553	229	285	357	391	80	17572	10733	10795	13442
ii <i>Thriposocles</i>	573	715	758	1584	1254	3087	895	961	1396	1779	1912	2902	1302	963	2011	2352	2069
g Other clupeids	8259	8531	6604	8839	9623	15413	14304	21957	18533	24144	14287	16060	17305	3215	3049	4381	5532
<b>5 Bombay duck</b>	26444	25740	34308	34219	21558	35079	30878	53560	54108	53840	72213	61134	58778	83820	46167	46448	59432
<b>6 Lizard fishes</b>	120	289	226	193	753	1344	867	302	1555	1587	2545	3199	1472	1834	1558	4361	2939
<b>7 Half beaks and Full</b>	84	257	439	128	110	120	34	54	33	34	54	129	43	47	160	206	47
<b>8 Flying fishes</b>	31	16	1	49	13	1	2	2	3	4	5	1	1	2	2	2	2
<b>9 Perches</b>																	
a Rock cods	32	78	129	50	81	196	129	155	94	187	439	195	232	165	449	81	279
b Snappers	37	90	148	57	94	226	150	179	108	217	506	226	269	189	58	512	477
c Pig face breams	2	5	8	4	5	14	8	10	6	13	29	13	15	11	9	11	11
d Threadfin breams	580	1428	2351	918	1482	3585	2367	2836	1717	3427	8031	3580	4259	3023	5925	7844	6342
e Other perches	53	132	216	85	137	331	218	262	158	316	740	330	393	280	1239	2662	814
<b>10 Goatfishes</b>	444	690	367	672	1478	1344	954	143	709	239	482	1158	642	1377	2311	1938	1241
<b>11 Threadfins</b>	395	625	4501	1290	2837	3177	2446	2256	5888	1206	2677	2156	2751	997	648	663	677
<b>12 Croakers</b>	7347	10976	17673	17428	14743	19498	23758	28510	28237	23896	24119	28791	19429	24500	21397	24582	30592
<b>13 Ribbon fishes</b>	5810	4902	5053	6606	8669	13715	9869	9785	10995	6717	10919	11253	11829	8213	12630	11161	11824
<b>14 Carangids</b>																	
a Horse mackerel	629	3987	4458	2295	1391	825	2610	1926	1290	1237	1994	2371	1347	138	200	392	521
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Leather-jackets	92	896	281	88	174	457	184	150	132	244	315	426	366	367	637	1291	1039
i <i>Trachynotus</i>	60	86	113	138	165	194	5	5	5	5	5	5	5	5	5	5	5
d Other Carangids	9	449	883	135	29	86	284	431	642	335	47	398	354	920	1637	2747	3569
i <i>Coryphaena</i>	2	2	3	3	4	4	9	15	22	12	2	13	12	31	55	92	120
ii <i>Elacate</i>	2	1	202	104	6	129	22	38	58	30	4	36	32	83	147	247	321
<b>15 Silverbellies</b>																	
a <i>Leiognathus</i>	120	926	331	302	350	1300	644	394	328	253	216	439	241	73	87	461	484
b <i>Gazza</i>	1	1	101	165	237	323	399	290	281	248	237	535	324	108	140	791	893
<b>16 Big jawed jumper</b>	221	541	801	376	420	1035	587	597	918	345	1172	579	626	701	3384	4240	3352
<b>17 Pomfrets</b>																	
a Black pomfret	2158	2613	1153	1512	1790	2236	1820	2314	5133	4838	3660	4026	2807	4157	3621	4199	3677
b Silver pomfret	8636	10452	4612	6049	7158	8942	7277	9257	20531	19351	14638	16107	11228	19878	18980	26152	22318
c Chinese pomfrets	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	1	3
<b>18 Mackerel</b>																	
a Indian mackerel	476	21153	17493	4681	5588	2430	2664	1929	2126	927	826	1491	295	295	264	428	1003
b Other mackerels																	
<b>19 Seer fishes</b>																	
a <i>S. commersoni</i>	657	1577	913	911	1271	1089	886	1151	1389	2047	1836	2475	1978	1752	2364	2546	1691
b <i>S. guttatus</i>	438	1051	608	608	848	727	591	767	925	1365	1224	1651	1319	1119	1229	4823	3152
c <i>S. lineolatus</i>																	
d <i>Acanthocybium</i> spp.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>20 Tunnies</b>																	
a <i>E. affinis</i>	11	9	19	20	21	53	21	20	35	23	143	127	120	95	250	1612	2698
b <i>Auxis</i> spp.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	10	17
c <i>K. pelamis</i>	2	1	3	3	3	7	3	3	5	3	20	18	17	7	8	9	10
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	151	116	260	271	274	702	271	261	466	304	1873	1670	1577	1172	3008	182	155
<b>21 Bill fishes</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	73	195	101	187
<b>22 Barracudas</b>	10	28	37	45	55	22	22	18	55	232	407	84	34	16	192	285	219
<b>23 Mulletts</b>	227	292	101	94	72	89	30	42	273	67	143	51	33	49	36	210	80
<b>24 Unicorn cod</b>	1878	1722	2234	4374	5569	4324	1860	1082	416	32	22	283	163	13	71	134	2698
<b>25 Flatfishes</b>																	
a Halibut	1	1	1	1	1	1	1	1	1	1	1	1	1	48	570	1079	750
b Flounders	1	1	1	1	1	1	1	1	1	1	1	1	1	109	7	84	161
c Soles	63	419	1972	1181	722	3727	683	675	2217	1741	2350	3105	2502	2344	3425	3644	6128
<b>26 Crustaceans</b>																	
a Penaeid prawns	11621	14874	39603	24790	26322	23004	20026	34160	58201	37307	57614	61498	32623	30447	45563	48550	59509
b Non-Penaeid prawns	31184	31941	38925	97514	109544	86405	68096	95624	90933	93674	62050	75741	65863	74103	54827	43304	53137
c Lobsters	1	1	1	1	1	1	1	339	598	607	851	672	313	544	977	443	1304
d Crabs	14	147	7703	1279	635	935	1324	762	73	130	208	699	413	157	637	443	1070
e Stomatopods	1	1	1	1	1	1	1	1	1	1	1	1	1	538	3220	1539	2490
<b>27 Molluscs</b>																	
<b>28 Cephalopods</b>	104	150	446	481	368	682	406	668	3552	834	6389	5335	1658	2461	6423	8912	10362
<b>Total</b>	<b>123916</b>	<b>168721</b>	<b>230833</b>	<b>258366</b>	<b>264002</b>	<b>272035</b>	<b>221953</b>	<b>307943</b>	<b>352321</b>	<b>317342</b>	<b>341093</b>	<b>351991</b>	<b>278116</b>	<b>327106</b>	<b>304114</b>	<b>323587</b>	<b>367530</b>

**Table E** : Continued.

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>1 Elasmobranchs</b>																
a Sharks	8770	8717	10702	12143	10478	9349	11377	10592	8593	8769	7860	9671	8220	9600	8878	6420
b Skates	2616	2138	1639	1672	1723	870	523	618	881	924	828	1018	865	1010	935	676
c Rays	3518	3520	2175	1847	2026	1506	1121	1482	1772	1846	1655	2036	1731	2021	1869	1351
<b>2 Eels</b>	4775	3770	4760	2089	1822	1774	1997	1643	2026	<b>4079</b>	<b>2166</b>	<b>3774</b>	<b>3058</b>	2625	2095	3199
<b>3 Catfishes</b>	14921	15599	15277	27892	19451	12401	16343	11161	14505	9690	7806	10894	12828	16844	14519	12711
<b>4 Clupeids</b>																
a Wolf herring	4089	2667	1992	1578	1260	1853	2819	3073	2709	3281	2978	4338	5550	5249	2927	2394
b Oil sardine	1876	836	1289	4202	<b>2554</b>	637	1020	213	228	56	28	900	2133	4722	5137	9332
c Other sardines	344	463	2970	311	1852	3525	3969	3781	7011	<b>7379</b>	<b>6921</b>	<b>7376</b>	<b>7559</b>	7135	4829	2990
d Hilsa shad	454	507	623	90	90	217	301	241	307	815	352	813	548	325	159	644
e Other shads	1320	1550	3049	1450	1027	481	752	192	109	<b>181</b>	<b>232</b>	<b>313</b>	<b>387</b>	427	368	362
f Anchovies																
i <i>Anchoviella</i>	13522	10934	7797	8192	12951	12694	12668	8487	8754	13456	13245	15500	14313	17779	15786	17436
ii <i>Thrissocles</i>	2555	2963	4593	5250	2340	3184	3712	5137	4503	<b>4932</b>	<b>4805</b>	<b>5310</b>	<b>5634</b>	5499	5380	3661
g Other clupeids	2900	1904	3852	6862	11657	6299	6831	4697	1602	4388	3484	1756	4172	6762	3175	1482
5 Bombay duck	71054	43120	30430	31052	26974	39189	48864	18831	15048	57332	58377	54428	77111	52662	55550	45432
<b>6 Lizard fishes</b>	2559	3814	1969	4612	6119	4256	3602	4472	3412	6804	9101	5306	2877	2273	1779	1737
<b>7 Half beaks and Full</b>	282	80	76	72	102	8	10	85	66	118	73	605	335	179	764	430
<b>8 Flying fishes</b>	2	<b>15</b>	<b>28</b>	<b>41</b>	<b>56</b>	<b>66</b>	<b>78</b>	<b>91</b>	103	<b>108</b>	<b>101</b>	<b>107</b>	<b>109</b>	<b>103</b>	<b>100</b>	<b>100</b>
<b>9 Perches</b>																
a Rock cods	373	846	1022	2171	3489	2630	1954	2713	2827	<b>2584</b>	<b>2075</b>	<b>1763</b>	<b>1415</b>	<b>902</b>	<b>494</b>	94
b Snappers	311	1196	1219	1425	1024	287	708	854	545	<b>846</b>	<b>1064</b>	<b>1388</b>	<b>1742</b>	<b>1871</b>	2115	<b>2175</b>
c Pig face breams	19	1	4	5	<b>38</b>	<b>69</b>	<b>100</b>	128	25	<b>27</b>	<b>25</b>	<b>27</b>	<b>28</b>	<b>26</b>	<b>26</b>	<b>27</b>
d Threadfin breams	3602	5981	7099	16331	14303	14421	14892	18106	15665	<b>16620</b>	<b>15889</b>	<b>16696</b>	<b>17565</b>	<b>16231</b>	<b>16107</b>	<b>16560</b>
e Other perches	943	2411	2906	3115	3959	771	1169	994	1062	<b>1074</b>	<b>976</b>	<b>973</b>	<b>967</b>	842	<b>1023</b>	1245
<b>10 Goatfishes</b>	863	2558	1621	3745	2777	1645	982	663	532	13429	14899	13787	8876	9114	9225	11745
<b>11 Threadfins</b>	2073	2704	5328	874	2642	1975	1709	1583	590	1472	847	677	363	391	880	1642
<b>12 Croakers</b>	29591	33190	29787	31451	30952	30723	31120	33695	31965	33484	26304	28887	28914	27818	29067	25165
<b>13 Ribbon fishes</b>	19381	16553	13717	23800	20483	22754	30884	31237	23246	<b>24227</b>	<b>22500</b>	<b>23747</b>	<b>24095</b>	22522	28020	48629
<b>14 Carangids</b>																
a Horse mackerel	1190	4327	860	6588	5924	1959	3119	2529	4085	5077	4115	4209	5224	3292	2688	2016
b Scads	10	2359	2460	4446	10153	8910	3961	6031	3482	<b>3650</b>	<b>3409</b>	<b>3619</b>	<b>3693</b>	<b>3472</b>	<b>3373</b>	<b>3392</b>
c Leather-jackets	1410	525	1302	256	542	141	73	421	291	<b>323</b>	<b>319</b>	<b>356</b>	<b>382</b>	<b>376</b>	382	421
i <i>Trachynotus</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
d Other Carangids	2655	3987	2238	2452	6579	3057	2389	2216	3005	<b>2681</b>	<b>2067</b>	<b>1731</b>	<b>1292</b>	770	<b>748</b>	<b>752</b>
i <i>Coryphaena</i>	90	134	76	83	221	103	80	75	101	<b>90</b>	<b>69</b>	<b>59</b>	<b>44</b>	26	<b>25</b>	<b>26</b>
ii <i>Elacate</i>	239	358	201	221	591	274	215	199	270	<b>241</b>	<b>186</b>	<b>156</b>	<b>116</b>	70	<b>68</b>	<b>68</b>
<b>15 Silverbellies</b>																
a <i>Leiognathus</i>	265	61	90	107	19	3	58	22	12	613	829	938	843	982	1198	557
b <i>Gazza</i>	523	130	202	254	47	8	162	67	36	<b>1951</b>	<b>1939</b>	<b>2115</b>	<b>2307</b>	2291	2796	1298
<b>16 Big jawed jumper</b>	2721	3017	1226	1930	1007	1311	3715	1245	841	1721	2326	1586	3615	3789	1407	1505
<b>17 Pomfrets</b>																
a Black pomfret	3667	3020	6897	11232	7644	5884	6308	2879	5286	4853	7800	5220	4323	3069	1457	1578
b Silver pomfret	10913	7913	11030	15806	15429	11664	15703	7758	7041	8619	18052	15573	16562	15180	14394	11577
c Chinese pomfrets	4	33	104	16	20	13	5	16	30	17	31	23	22	<b>21</b>	<b>20</b>	<b>21</b>
<b>18 Mackerel</b>																
a Indian mackerel	901	1269	4660	1409	23906	17913	11875	11624	29425	2597	19603	30498	28611	32088	35225	44363
b Other mackerels																
<b>19 Seer fishes</b>																
a <i>S. commersoni</i>	2648	6055	3560	2065	1097	1424	1350	982	1777	3108	4066	5551	6924	7694	8625	7364
b <i>S. guttatus</i>	3102	2454	3394	6300	8693	5820	9107	3995	4300	1431	6664	9371	1970	3302	<b>3207</b>	<b>3225</b>
c <i>S. lineolatus</i>																
d <i>Acanthocybium</i> spp.	1	1	1	1	1	1	4	6	6	6	6	6	6	6	6	6
<b>20 Tunnies</b>																
a <i>E. affinis</i>	1859	1734	974	1296	3474	1672	2170	1201	2836	<b>3136</b>	<b>3080</b>	<b>3432</b>	<b>3667</b>	<b>3603</b>	<b>3650</b>	3822
b <i>Auxis</i> spp.	23	30	36	43	51	182	550	917	1280	1725	4227	8655	6407	5207	4264	4288
c <i>K. pelamis</i>	11	11	12	13	15	15	24	18	21	<b>26</b>	<b>28</b>	<b>34</b>	<b>40</b>	<b>41</b>	<b>45</b>	<b>50</b>
d <i>T. tonggol</i>	1	1	35	29	27	20	16	11	170	<b>178</b>	<b>166</b>	<b>177</b>	<b>180</b>	<b>169</b>	<b>165</b>	<b>165</b>
e Other tunnies	51	105	233	32	29	123	79	57	129	<b>812</b>	<b>1390</b>	<b>2146</b>	<b>2874</b>	3345	<b>3250</b>	<b>3268</b>
<b>21 Bill fishes</b>	179	162	104	180	606	570	442	276	473	<b>496</b>	<b>463</b>	<b>492</b>	<b>502</b>	<b>472</b>	<b>458</b>	<b>461</b>
<b>22 Barracudas</b>	149	70	88	137	373	236	817	979	969	<b>1015</b>	<b>948</b>	<b>1007</b>	<b>1027</b>	<b>966</b>	<b>938</b>	<b>943</b>
<b>23 Mulletts</b>	250	443	258	38	154	35	43	50	34	536	220	410	372	265	380	853
<b>24 Unicorn cod</b>	748	420	897	826	581	241	1513	1196	936	798	762	987	1041	1122	449	1106
<b>25 Flatfishes</b>																
a Halibut	543	764	1030	754	1046	1221	1069	1008	585	1235	1479	1703	3879	<b>4891</b>	6149	5901
b Flounders	<b>239</b>	<b>308</b>	390	<b>307</b>	<b>249</b>	<b>158</b>	<b>81</b>	3	3	3	1	1	3	3	3	3
c Soles	5120	5501	7131	3890	4733	4310	7590	8045	8552	7092	5269	4388	7815	8697	<b>8630</b>	<b>8873</b>
<b>26 Crustaceans</b>																
a Penaeid prawns	70299	61324	63123	39957	53291	75004	78325	76501	74643	63994	48014	76900	58730	49893	41509	39451
b Non-Penaeid prawns	74896	75941	28887	49668	58469	48378	59492	44032	37319	71452	61933	102933	73358	90057	75921	74865
c Lobsters	3399	2688	945	631	550	1060	993	597	314	<b>351</b>	<b>353</b>	<b>391</b>	<b>430</b>	415	446	657
d Crabs	671	478	523	27												

**Table F : Marine fisheries catch (thousand tonnes) data for the state of Karnataka, 1950-2000.**

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
<b>1 Elasmobranchs</b>																		
a Sharks	693	1761	1137	332	1546	2671	1978	1758	2608	1875	1832	1067	1838	3109	859	1113	1568	863
b Skates	2	4	2	1	4	6	5	4	6	4	4	2	4	7	2	2	3	2
c Rays	24	61	40	12	53	93	69	61	91	65	63	37	63	107	30	39	54	30
<b>2 Eels</b>	<b>27</b>	<b>26</b>	<b>31</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>3</b>	<b>6</b>	<b>27</b>	<b>12</b>	<b>11</b>	<b>10</b>	<b>9</b>	<b>7</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>1</b>
<b>3 Catfishes</b>	<b>1053</b>	<b>4380</b>	<b>4403</b>	<b>2436</b>	<b>1955</b>	<b>3653</b>	<b>3175</b>	<b>1690</b>	<b>2277</b>	<b>6681</b>	<b>2353</b>	<b>506</b>	<b>527</b>	<b>546</b>	<b>617</b>	<b>535</b>	<b>641</b>	<b>1799</b>
<b>4 Clupeids</b>																		
a Wolf herring	69	66	65	5	71	105	124	22	70	376	205	82	88	212	137	59	97	91
b Oil sardine	16781	1957	5267	8376	3098	4179	1359	5817	472	3328	2785	1428	14233	3231	86506	41079	45470	22076
c Other sardines	4475	8992	3855	510	289	2109	1036	1580	1027	1740	1681	296	239	1415	2119	819	1143	402
d Hilsa shad	28	27	32	26	26	30	21	22	22	30	38	45	54	139	589	351	100	54
e Other shads	137	131	158	128	127	126	130	132	132	109	12	40	48	265	11	56	98	45
f Anchovies																		
i <i>Anchoviella</i>	17	19	18	19	16	16	17	17	1	531	1412	95	87	272	24	108	106	362
ii <i>Thrissocles</i>	379	422	404	423	371	382	388	386	296	1225	576	725	210	574	396	282	1492	165
g Other clupeids	264	253	410	161	211	190	119	743	270	273	359	399	292	945	457	245	765	383
<b>5 Bombay duck</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>1</b>	<b>7</b>	<b>12</b>	<b>19</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>6 Lizard fishes</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>38</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>5</b>	<b>7</b>	<b>10</b>	<b>29</b>	<b>6</b>	<b>20</b>	<b>19</b>
<b>7 Half beaks and Full</b>	<b>114</b>	<b>109</b>	<b>131</b>	<b>107</b>	<b>106</b>	<b>105</b>	<b>108</b>	<b>22</b>	<b>22</b>	<b>2</b>	<b>41</b>	<b>69</b>	<b>20</b>	<b>88</b>	<b>42</b>	<b>69</b>	<b>27</b>	<b>134</b>
<b>8 Flying fishes</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>9 Perches</b>																		
a Rock cods	3	3	1	1	3	2	4	5	6	7	5	2	4	6	7	5	8	2
b Snappers	18	16	4	5	16	12	24	29	32	38	25	13	21	36	38	26	42	13
c Pig face breams	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d Threadfin breams	85	75	16	25	73	54	114	139	157	186	124	60	99	174	187	129	203	63
e Other perches	26	23	5	8	22	16	35	43	48	57	38	19	30	54	58	40	63	19
<b>10 Goatfishes</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>14</b>	<b>10</b>	<b>7</b>	<b>4</b>	<b>1</b>
<b>11 Threadfins</b>	<b>31</b>	<b>30</b>	<b>42</b>	<b>24</b>	<b>15</b>	<b>19</b>	<b>14</b>	<b>14</b>	<b>8</b>	<b>2</b>	<b>19</b>	<b>14</b>	<b>71</b>	<b>122</b>	<b>65</b>	<b>25</b>	<b>25</b>	<b>5</b>
<b>12 Croakers</b>	<b>3306</b>	<b>4138</b>	<b>3019</b>	<b>863</b>	<b>2291</b>	<b>1008</b>	<b>1772</b>	<b>2345</b>	<b>1444</b>	<b>2074</b>	<b>1621</b>	<b>3143</b>	<b>6856</b>	<b>1272</b>	<b>1277</b>	<b>1355</b>	<b>1549</b>	<b>530</b>
<b>13 Ribbon fishes</b>	<b>1030</b>	<b>325</b>	<b>65</b>	<b>68</b>	<b>114</b>	<b>205</b>	<b>252</b>	<b>46</b>	<b>42</b>	<b>77</b>	<b>152</b>	<b>59</b>	<b>675</b>	<b>182</b>	<b>21</b>	<b>140</b>	<b>333</b>	<b>370</b>
<b>14 Carangids</b>																		
a Horse mackerel	605	937	298	121	939	534	503	122	102	124	661	310	213	627	388	538	289	1107
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Leather-jackets	794	761	916	744	737	734	755	196	351	46	89	11	18	55	13	26	434	233
i <i>Trachynotus</i>	7	7	8	7	7	7	7	7	7	7	7	5	3	1	1	1	8	23
d Other Carangids	59	57	69	56	55	55	57	57	57	57	57	54	50	50	45	43	38	37
i <i>Coryphaena</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ii <i>Elacate</i>	147	141	170	138	137	136	140	60	207	41	35	30	24	16	12	8	5	1
<b>15 Silverbellies</b>																		
a <i>Leiognathus</i>	329	765	562	324	438	96	227	1901	371	861	522	368	4080	1643	433	442	820	639
b <i>Gazza</i>	3	6	5	3	4	1	2	2	3	3	3	5	4	4	4	5	5	5
<b>16 Big jawed jumper</b>	<b>497</b>	<b>1158</b>	<b>850</b>	<b>490</b>	<b>663</b>	<b>144</b>	<b>421</b>	<b>357</b>	<b>572</b>	<b>753</b>	<b>1090</b>	<b>129</b>	<b>254</b>	<b>529</b>	<b>38</b>	<b>303</b>	<b>226</b>	<b>214</b>
<b>17 Pomfrets</b>																		
a Black pomfret	7	94	18	64	80	10	25	3	6	15	42	16	19	41	38	12	20	25
b Silver pomfret	48	634	123	426	538	68	168	23	39	103	283	113	127	282	255	81	132	166
c Chinese pomfrets	1	14	2	10	12	2	4	1	1	2	6	2	3	6	5	2	3	3
<b>18 Mackerel</b>																		
a Indian mackerel	11196	33749	48348	42074	15331	11745	3154	56116	65759	29391	82134	7335	11555	20341	7498	19074	7297	16222
b Other mackerels																		
<b>19 Seer fishes</b>																		
a <i>S. commersoni</i>	40	379	132	7	301	226	1426	402	630	351	633	137	129	251	241	94	102	168
b <i>S. guttatus</i>	27	258	90	5	205	153	971	273	429	238	431	94	88	171	164	64	69	114
c <i>S. lineolatus</i>	6	58	20	1	46	34	216	61	96	53	96	21	19	38	36	15	15	26
d <i>Acanthocybium spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>20 Tunnies</b>																		
a <i>E. affinis</i>	99	10	12	11	35	333	86	24	211	109	205	230	155	85	26	73	11	114
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>21 Bill fishes</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>22 Barracudas</b>	<b>3</b>	<b>3</b>	<b>49</b>	<b>26</b>	<b>12</b>	<b>25</b>	<b>180</b>	<b>10</b>	<b>26</b>	<b>4</b>	<b>5</b>	<b>20</b>	<b>1</b>	<b>19</b>	<b>21</b>	<b>4</b>	<b>3</b>	<b>1</b>
<b>23 Mulletts</b>	<b>1</b>	<b>1</b>	<b>107</b>	<b>61</b>	<b>35</b>	<b>9</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>7</b>	<b>15</b>	<b>3</b>	<b>20</b>	<b>53</b>	<b>5</b>	<b>28</b>	<b>37</b>
<b>24 Unicorn cod</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>25 Flatfishes</b>																		
a Halibut	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b Flounders	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Soles	3306	474	957	620	101	398	719	173	1619	265	391	357	223	587	334	335	491	1208
<b>26 Crustaceans</b>																		
a Penaeid prawns	763	1618	928	315	334	688	303	1351	655	1607	423	633	2591	1518	1074	819	1743	1358
b Non-Penaeid prawns	2	5	4	1	1	2	1	1	7	8	9	12	10	7	6	5	4	2
c Lobsters	2	6	4	1	1	2	1	1	1	1	1	1	1	2	3	4	5	5
d Crabs	66	139	79	27	29	59	26	10	4	19	17	16	9	11	4	2	12	4
e Stomatopods	207	439	252	85	91	186	83	32	12	59	54	51	28	32	13	5	40	15
<b>27 Molluscs</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>28 Cephalopods</b>	<b>16</b>	<b>15</b>	<b>18</b>	<b>15</b>	<b>15</b>	<b>14</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>14</b>	<b>1</b>	<b>8</b>	<b>14</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>8</b>
<b>Total</b>	<b>46819</b>	<b>64572</b>	<b>73155</b>	<b>59209</b>	<b>30597</b>	<b>30687</b>	<b>20294</b>	<b>76110</b>	<b>80264</b>	<b>52847</b>	<b>100591</b>	<b>18108</b>	<b>45128</b>	<b>39176</b>	<b>104218</b>	<b>68476</b>	<b>65630</b>	<b>49185</b>

**Table F** : Continued.

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1 Elasmobranchs																	
a Sharks	1562	1206	2815	6397	8872	3371	3315	3545	2808	6485	4657	5034	4520	8145	8503	5440	2340
b Skates	3	2	6	14	20	8	7	9	6	15	12	10	19	16	13	52	52
c Rays	54	42	97	222	307	116	115	124	98	224	162	175	156	282	626	265	233
2 Eels	11	9	16	19	16	17	14	172	82	6	19	2	5	10	13	1	3
3 Catfishes	4717	4266	19003	3207	6386	4906	3443	6861	8367	10718	6665	20457	8625	15554	18507	10410	6102
4 Clupeids																	
a Wolf herring	252	167	131	189	407	259	802	422	193	811	288	279	163	129	440	221	493
b Oil sardine	56676	37143	35686	12693	18507	18314	24363	53988	43513	35245	54437	35796	40797	71948	61619	21550	35746
c Other sardines	1313	4382	2145	527	1853	1376	267	794	673	204	2998	5143	3948	5842	3522	6044	5358
d Hilsa shad	2	1	22	19	40	59	30	1	24	50	10	11	8	1	15	2	15
e Other shads	41	32	99	15	6	39	1	10	31	128	35	56	24	38	50	16	1
f Anchovies																	
i <i>Anchoviella</i>	145	261	150	104	147	278	60	10	57	197	516	1862	5367	6535	13823	10895	11306
ii <i>Thrissocles</i>	329	209	1064	193	682	311	1265	352	945	940	1071	477	812	325	1044	1558	1103
g Other clupeids	624	1080	1019	391	828	816	1122	582	480	1898	1016	2465	1039	1042	674	3101	5103
5 Bombay duck	4	22	56	11	1	20	6	2	7	5	5	14	9	1	11	2	2
6 Lizard fishes	17	2	155	846	36	23	5	160	366	799	217	320	818	307	451	1952	969
7 Half beaks and Full	155	178	192	41	32	21	6	37	91	65	48	53	172	252	312	96	96
8 Flying fishes	1	1	1	1	1	9	18	22	29	40	49	52	53	46	31	15	1
9 Perches																	
a Rock cods	5	1	4	7	8	6	9	38	22	77	9	10	43	21	32	36	69
b Snappers	25	8	19	43	48	33	46	207	117	411	54	49	229	110	101	84	77
c Pig face breams	1	1	2	2	2	2	2	4	2	8	7	6	5	2	13	19	31
d Threadfin breams	123	37	89	205	229	161	223	992	569	1983	264	239	1105	531	534	5488	2500
e Other perches	38	11	27	63	70	50	68	307	176	613	80	74	342	164	368	730	1074
10 Goatfishes	2	19	64	22	130	6	5	6	284	39	73	62	61	41	2	24	2
11 Threadfins	91	22	41	108	138	17	27	6	6	6	7	4	3	6	5	23	21
12 Croakers	866	1313	3885	3164	4240	2095	5493	3946	6289	5735	4068	4842	5638	4758	4198	5821	3287
13 Ribbon fishes	260	159	295	354	887	163	355	224	612	268	471	1291	1431	258	1187	2250	721
14 Carangids																	
a Horse mackerel	1377	1753	907	472	612	1449	904	764	689	860	235	1194	1004	1095	425	430	282
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	14	51	24	1506
c Leather-jackets	26	28	16	5	339	14	84	56	84	573	15	64	64	162	419	1367	1423
i <i>Trachinotus</i>	37	53	65	80	104	121	135	50	36	20	3	14	243	546	827	976	1206
d Other Carangids	33	30	25	23	21	17	13	94	70	46	50	2589	4528	2663	2085	2508	4204
i <i>Coryphaena</i>	1	1	1	1	1	1	1	24	24	26	27	25	22	25	26	23	23
ii <i>Elacate</i>	5	10	12	9	4	34	63	32	34	50	64	37	437	966	1459	1716	2118
15 Silverbellies																	
a <i>Leiognathus</i>	1542	2112	2749	3183	1594	5499	3524	2640	7990	3387	9985	3227	7579	3389	4357	10041	5494
b <i>Gazza</i>	5	7	12	14	12	12	12	15	14	15	19	16	13	6	5	13	7
16 Big jawed jumper	287	323	1158	1173	1803	3599	2647	1054	422	210	466	893	1608	1068	1498	1620	1397
17 Pomfrets																	
a Black pomfret	523	48	93	265	156	302	65	57	110	66	586	66	142	110	3572	1861	1936
b Silver pomfret	3515	322	622	1783	1059	2037	443	388	731	442	3934	441	957	742	1944	789	890
c Chinese pomfrets	78	7	14	39	24	45	10	9	16	10	87	10	21	17	36	6	87
18 Mackerel																	
a Indian mackerel	6051	14659	48874	68686	38234	41920	11366	12773	23572	29665	59096	43375	18747	21674	6160	2167	12141
b Other mackerels																	
19 Seer fishes																	
a <i>S. commersoni</i>	430	435	893	1467	1616	847	980	433	768	1131	930	972	1011	1356	5475	3317	4083
b <i>S. guttatus</i>	292	295	608	998	1100	577	667	295	523	770	633	661	688	923	2151	687	759
c <i>S. lineolatus</i>	65	66	136	223	245	129	149	66	117	172	141	147	154	206	4	36	1
d <i>Acanthocybium spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20 Tunnies																	
a <i>E. affinis</i>	105	121	4	551	159	147	461	217	604	703	714	1855	907	2759	2493	1347	782
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	35	406	126
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	27	52
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	28
e Other tunnies	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	84	159
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	1	1	80	3	53	43	6
22 Barracudas	1	6	14	23	38	154	30	14	9	3	26	44	37	82	74	99	12
23 Mulletts	65	71	78	60	24	68	36	17	12	8	2	2	2	2	14	16	69
24 Unicorn cod	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25 Flatfishes																	
a Halibut	1	1	2	2	2	2	2	2	2	2	2	2	2	2	13	11	2
b Flounders	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	97	384
c Soles	290	359	1294	1581	3197	1295	4070	794	1246	2045	4285	1802	1260	1130	2478	3554	9889
26 Crustaceans																	
a Penaeid prawns	5723	4402	15536	10650	16161	17031	21737	6546	5072	6925	19829	9597	4991	8545	13895	11283	9035
b Non-Penaeid prawns	1	1	2	22	34	2	2	11	20	29	42	12	206	8	51	74	125
c Lobsters	6	8	16	22	20	21	19	26	16	8	92	31	177	166	88	37	5
d Crabs	4	7	16	1024	166	465	717	1303	74	104	419	1361	4454	1347	1810	763	780
e Stomatopods	13	22	54	3224	527	1466	2265	4106	231	326	1326	4289	13459	18073	17924	11022	16129
27 Molluscs	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2
28 Cephalopods	14	63	23	17	50	39	34	373	5997	2004	3169	140	197	551	276	1401	546
Total	87822	75793	140323	124469	111211	109781	91516	104993	114340	116582	183432	151661	138387	184019	185803	133918	152395

**Table F : Continued.**

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>1 Elasmobranchs</b>																
a Sharks	2460	3205	2177	2770	2417	1254	1599	1265	894	1929	4629	3056	3148	1767	1878	869
b Skates	17	29	6	26	181	450	44	120	18	30	61	35	30	28	28	19
c Rays	366	681	304	749	1023	849	411	533	323	786	2029	1407	1500	865	853	763
<b>2 Eels</b>	2	13	27	6	70	13	14	17	46	113	232	319	375	428	95	11
<b>3 Catfishes</b>	2417	13240	4264	13697	5614	2352	1620	420	72	349	896	1208	747	600	489	593
<b>4 Clupeids</b>																
a Wolf herring	765	468	556	403	322	328	237	252	442	426	501	492	464	248	156	97
b Oil sardine	30063	27658	41797	44788	39585	28529	12697	7687	4633	10612	21016	12976	18526	9955	14780	11247
c Other sardines	4220	4942	5737	3125	5061	6106	6072	12195	3882	4238	5573	6045	6248	6355	4383	1938
d Hilsa shad	3	5	6	6	355	35	166	157	64	62	73	71	67	63	62	43
e Other shads	6	30	110	196	96	461	10	129	19	18	21	21	20	18	18	13
f Anchovies																
i <i>Anchoviella</i>	5600	14643	7646	18263	7356	9877	10921	5141	7033	3430	8545	4011	5286	2462	4091	2462
ii <i>Thrissocles</i>	994	2291	2535	3529	2132	3304	2878	3624	2000	857	2137	1003	1322	615	1023	615
g Other clupeids	1019	5251	2532	3559	2546	3343	2083	3027	2804	5067	10389	8763	3878	3273	2992	1410
<b>5 Bombay duck</b>	16	30	23	18	12	7	1	8	14	13	16	16	15	14	14	9
<b>6 Lizard fishes</b>	731	1524	3586	4609	4668	1893	2871	1924	916	1246	3158	2907	2422	2263	2210	1531
<b>7 Half beaks and Full</b>	130	242	186	278	286	156	189	123	316	305	359	352	332	311	306	213
<b>8 Flying fishes</b>	10	20	15	10	6	6	6	6	6	5	6	6	6	5	5	4
<b>9 Perches</b>																
a Rock cods	101	34	704	1303	290	331	349	527	1158	983	986	900	744	695	679	470
b Snappers	59	5	28	2	8	28	388	19	63	54	53	50	41	39	38	26
c Pig face breams	21	8	6	5	4	2	3	3	3	2	3	3	1	1	1	1
d Threadfin breams	2100	4806	7193	9219	5708	2486	3669	3217	4612	3915	3925	3585	2965	2771	2706	1874
e Other perches	819	2731	6362	4941	2835	1744	3969	1999	2387	2079	2140	2004	1698	2369	1594	1104
<b>10 Goatfishes</b>	252	466	643	1454	825	288	52	199	191	3239	3960	3912	3576	3342	3263	2260
<b>11 Threadfins</b>	5	8	4	3	2	7	9	13	16	14	17	17	15	14	14	10
<b>12 Croakers</b>	2405	3793	6267	6185	6315	7953	7222	6633	4767	7797	13179	9655	11135	7085	4854	3362
<b>13 Ribbon fishes</b>	1381	7689	8374	4339	2112	3908	2950	4689	2343	2295	2746	2740	2627	2497	3079	7019
<b>14 Carangids</b>																
a Horse mackerel	549	1693	2359	3773	1545	3653	5917	2094	1294	1247	1468	1441	1360	1273	1253	873
b Scads	673	1540	2253	7918	7295	6420	14850	16693	4491	4738	6059	6422	6510	6512	6823	5038
c Leather-jackets	1262	235	406	549	482	258	180	926	468	451	531	521	492	460	453	316
i <i>Trachinotus</i>	1431	1768	1922	2141	2376	2572	2776	2993	3170	3272	7139	5598	3615	3383	3331	2319
d Other Carangids	6901	16382	18143	12265	6821	6191	7241	7041	5460	5069	5740	5412	4899	4390	5361	2326
i <i>Coryphaena</i>	22	24	23	22	22	22	22	22	21	21	24	24	22	21	21	14
ii <i>Elacate</i>	2512	3101	3369	3752	4162	4505	4861	5240	5549	5726	4467	5136	6662	6236	6140	4275
<b>15 Silverbellies</b>																
a <i>Leiognathus</i>	4361	18547	3425	4060	4817	5012	3192	2307	2319	5279	3371	5811	3105	2097	3086	2144
b <i>Gazza</i>	5	19	3	3	4	5	3	2	2	1	3	3	3	3	4	3
<b>16 Big jawed jumper</b>	1451	2502	2324	4551	1652	1921	2558	1196	782	1960	3168	4401	3438	3213	3138	2173
<b>17 Pomfrets</b>																
a Black pomfret	3030	2012	2485	2116	2381	2638	4241	2512	2176	2260	2763	2729	2495	2331	2277	1577
b Silver pomfret	278	493	625	601	987	1092	231	595	765	1287	2018	2431	2624	2827	3126	2419
c Chinese pomfrets	47	2	21	22	226	167	78	81	344	999	1808	2365	2690	3009	2848	1973
<b>18 Mackerel</b>																
a Indian mackerel	24421	21894	25781	22165	99230	43330	21026	14370	42354	25211	29313	52381	26113	26537	18667	7522
b Other mackerels																
<b>19 Seer fishes</b>																
a <i>S. commersoni</i>	2630	3602	1975	1683	2378	1285	1149	1530	1386	2507	3036	2328	1899	1487	1308	1630
b <i>S. guttatus</i>	474	238	349	412	899	415	316	200	135	244	295	227	185	145	127	159
c <i>S. lineolatus</i>	4	1	5	9	13	15	19	22	25	406	929	1046	1126	1096	1152	957
d <i>Acanthocybium spp.</i>	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1
<b>20 Tunnies</b>																
a <i>E. affinis</i>	2019	3979	1416	1565	4288	2125	486	6063	327	1636	2397	2170	1293	1493	2670	2462
b <i>Auxis spp.</i>	168	2604	858	596	384	132	11	741	92	462	676	612	365	421	753	694
c <i>K. pelamis</i>	77	109	101	100	97	177	255	333	406	466	683	618	369	426	760	701
d <i>T. tonggol</i>	626	45	69	888	594	710	1055	2	5	23	34	31	19	21	38	35
e Other tunnies	79	83	43	302	79	84	4	161	1	4	6	6	4	5	7	7
<b>21 Bill fishes</b>	20	63	150	100	5	11	10	71	20	20	23	23	22	20	20	14
<b>22 Barracudas</b>	91	155	170	631	529	287	440	428	227	219	257	253	239	223	220	153
<b>23 Mullets</b>	10	19	64	22	13	41	11	57	47	166	324	316	413	374	290	219
<b>24 Unicorn cod</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>25 Flatfishes</b>																
a Halibut	50	27	207	130	21	30	81	46	87	771	990	1667	1766	1650	1612	1888
b Flounders	696	910	1088	1398	2008	2040	2139	2238	2543	4059	3085	3858	3343	3295	2259	1565
c Soles	6736	10941	7257	5648	4776	4829	6962	25943	11466	16171	10923	12214	9504	8440	6396	5628
<b>26 Crustaceans</b>																
a Penaeid prawns	7779	8054	13621	13432	15888	11048	13793	15305	6702	8191	12781	10245	9005	6065	8712	4797
b Non-Penaeid prawns	174	432	270	39	4	213	200	156	3	3	3	3	3	3	3	2
c Lobsters	40	32	6	2	4	3	3	11	19	31749	30975	35306	32120	30019	29316	20306
d Crabs	1032	2999	3816	1184	1452	1569	1805	2957	1723	1599	2120	2260	2215	2211	2171	2014
e Stomatopods	16359	25295	66924	38214	46780	32259	30007	36582	26802	21719	25295	23742	20565	18158	22991	15925
<b>27 Molluscs</b>	2	2	2	2	2	2	2	2	2	1005	1081	1001	964	841	886	614
<b>28 Cephalopods</b>	415	3465	4252	3034	4619	3785	5289	3031	13025	11936	12996	11195	12241	6506	11491	7959
<b>Total</b>	<b>142385</b>	<b>227077</b>	<b>266872</b>	<b>256811</b>	<b>306659</b>	<b>214560</b>	<b>191643</b>	<b>205875</b>	<b>173260</b>	<b>210747</b>	<b>263434</b>	<b>269350</b>	<b>228875</b>	<b>193277</b>	<b>199324</b>	<b>138671</b>



**Table G : Continued.**

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
<b>1 Elasmobranchs</b>																	
a Sharks	3124	4339	9975	7314	8914	10081	11286	11943	10400	7224	11099	8646	7344	6460	7499	13323	9991
b Skates	104	144	331	242	294	334	373	395	344	238	367	287	243	214	606	58	19
c Rays	1011	1405	3229	2369	2886	3263	3655	3867	3367	2339	3592	2799	2377	2091	2668	1274	2161
<b>2 Eels</b>	2	9	2	63	9	5	73	19	19	10	62	17	9	5	32	53	30
<b>3 Catfishes</b>	4237	6385	29599	30832	21875	26945	49664	51337	24605	13439	14773	19110	20412	17206	16191	26319	18459
<b>4 Clupeids</b>																	
a Wolf herring	396	315	907	476	419	559	890	675	867	592	1359	1151	1031	988	1092	1108	1398
b Oil sardine	250830	143127	198204	199911	110167	126211	105726	108423	133078	127005	125589	119571	71660	149240	147546	157444	149962
c Other sardines	7841	9698	6348	11692	7163	64164	32437	37544	36835	22460	12265	16287	11332	7746	7611	5403	6138
d Hilsa shad	1	4	6	9	20	16	13	11	13	39	191	6	14	8	40	170	202
e Other shads	86	50	13	6	3	40	34	44	49	15	72	37	22	15	20	24	29
f Anchovies																	
i <i>Anchoviella</i>	5739	11090	8218	11116	11259	9190	20147	12754	10724	10936	22202	6706	7994	4359	14008	55954	42301
ii <i>Thrissoctes</i>	1313	1192	4767	2408	2111	1709	1367	1827	2934	1784	1987	1831	2305	644	998	1191	1417
g Other clupeids	1034	1625	1619	1710	1420	1190	1370	1113	1261	554	1019	690	590	958	3189	6838	5453
<b>5 Bombay duck</b>	1	1	1	1	45	46	19	21	22	22	22	1	1	1	1	1	1
<b>6 Lizard fishes</b>	590	558	1926	2832	2469	1755	13094	17783	191	8741	10112	8985	10370	10240	9308	9366	10004
<b>7 Half beaks and Full</b>	116	85	31	99	93	190	343	310	151	304	294	263	371	574	1035	491	321
<b>8 Flying fishes</b>	4	4	3	2	2	1	2	2	1	4	7	10	13	16	1	2	3
<b>9 Perches</b>																	
a Rock cods	67	96	313	298	274	536	1243	929	237	955	1619	1366	1044	1321	484	659	770
b Snappers	16	24	78	75	68	134	311	231	60	238	405	341	261	137	572	158	244
c Pig face breams	16	24	78	75	68	134	311	231	60	238	405	341	261	164	194	173	69
d Threadfin breams	1289	1842	6034	5726	5251	10308	23919	17873	4563	18387	31152	26290	20091	11592	15545	12471	32575
e Other perches	284	407	1332	1265	1160	2276	5281	3946	1008	4060	6877	5805	4435	2170	2193	3560	9186
<b>10 Goatfishes</b>	503	1583	504	3193	5124	2375	5749	36	4976	406	277	214	1	59	414	261	120
<b>11 Threadfins</b>	81	145	40	1155	42	881	4	165	236	117	57	49	12	85	200	302	722
<b>12 Croakers</b>	3686	3267	10466	8414	10624	18114	13658	26471	13429	20234	21119	8835	9028	5659	6083	10490	15437
<b>13 Ribbon fishes</b>	1007	7613	5089	17820	11034	24564	31254	16930	8254	8052	25348	26321	13307	7174	11368	1130	6588
<b>14 Carangids</b>																	
a Horse mackerel	4901	3622	2650	5077	15664	14682	5445	8022	11251	16962	7536	12628	3525	56	949	403	192
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1714	2139	5307	5808
c Leather-jackets	82	56	80	50	862	49	75	151	285	584	155	131	127	323	550	495	229
i <i>Trachinotus</i>	19	6	6	6	2	3	5	7	8	8	20	1	1	1	1	1	1
d Other Carangids	53	4	39	3	38	37	76	95	6	84	75	1068	1147	3035	9437	10597	7705
i <i>Coryphaena</i>	12	1	1	1	97	157	97	68	60	30	20	49	28	27	28	27	28
ii <i>Elacate</i>	30	52	122	307	80	53	36	69	114	171	174	123	68	67	68	67	67
<b>15 Silverbellies</b>																	
a <i>Leiognathus</i>	7208	14334	29214	17475	8729	28413	25950	8205	5266	13035	4922	6068	6076	5085	14829	16315	6233
b <i>Gazza</i>	16	18	34	43	26	6	7		8	8	8	7	9	8	9	8	8
<b>16 Big jawed jumper</b>	1798	1330	2608	6071	5252	10296	4302	1548	904	1392	2482	427	1261	1582	2733	1887	2622
<b>17 Pomfrets</b>																	
a Black pomfret	455	553	576	2255	1539	1286	1022	855	711	2888	1201	1348	611	1105	3302	1674	1127
b Silver pomfret	514	626	651	2550	1740	1454	1155	967	801	3264	1358	1523	691	1348	3886	1552	1090
c Chinese pomfrets	19	25	25	97	68	56	44	38	31	125	52	59	26	18	22	203	354
<b>18 Mackerel</b>																	
a Indian mackerel	3654	30654	56518	97572	36414	20332	10698	16657	21452	21610	27138	19020	19003	16448	11041	12893	11971
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>19 Seer fishes</b>																	
a <i>S. commersoni</i>	1821	490	848	1361	693	823	2409	2150	3022	1668	1665	3044	1835	1604	3731	4518	3246
b <i>S. guttatus</i>	2013	541	938	1504	766	911	2662	2376	3339	1843	1840	3365	2028	1771	2017	2518	3033
c <i>S. lineolatus</i>	8	2	3	6	3	3	10	9	13	8	7	13	8	6	39	24	13
d <i>Acanthocybium spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	55	29
<b>20 Tunnies</b>																	
a <i>E. affinis</i>	1391	740	938	2309	2831	2053	4540	4825	10234	5370	5074	11656	8077	4139	5424	3867	4275
b <i>Auxis spp.</i>	384	204	259	637	781	566	1252	1330	2822	1480	1399	3214	2227	1141	1523	848	1424
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	52	2	5
d <i>T. tonggol</i>	7	4	5	12	16	11	25	26	56	29	27	63	43	22	44	10	35
e Other tunnies	97	52	66	162	199	144	319	339	719	378	356	819	568	291	458	1118	547
<b>21 Bill fishes</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	131	261	97	326
<b>22 Barracudas</b>	502	347	82	178	1187	2398	4001	442	530	382	755	488	339	824	676	1157	1130
<b>23 Mulletts</b>	189	65	278	1114	158	159	1415	117	50	64	2	66	221	216	56	199	110
<b>24 Unicorn cod</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>25 Flatfishes</b>																	
a Halibut	1	1	2	2	2	2	1	2	2	2	2	2	1	284	307	275	94
b Flounders	1	1	2	2	2	2	1	2	2	2	2	2	1	2	2	77	3
c Soles	9640	10264	18453	17877	10593	13213	18918	10915	6887	9771	11779	7570	6436	8774	19401	22518	28281
<b>26 Crustaceans</b>																	
a Penaeid prawns	25744	35105	66751	63524	62090	130987	88607	121570	66573	67897	72907	49804	77092	40069	45365	51076	56624
b Non-Penaeid prawns	36	35	25	3083	1231	1516	1502	1189	106	294	638	127	2552	288	110	180	1176
c Lobsters	1	1	2	2	2	2	1	49	97	68	62	44	26	90	160	117	84
d Crabs	173	427	965	1019	263	2642	4105	2716	2439	7502	3382	12378	477	302	589	814	747
e Stomatopods	7	17	40	43	10	110	170	113	102	313	141	516	10194	5092	6833	10885	11301
<b>27 Molluscs</b>	1	1	2	2	2	2	1	2	2	2	2	2	1	2	2	2	



**Table G : Continued.**

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>1 Elasmobranchs</b>																
a Sharks	7761	6923	4551	7822	3291	4639	3114	3858	4844	5321	3977	4379	4030	3034	3964	2992
b Skates	19	25	10	53	261	27	114	98	60	106	80	87	80	838	79	59
c Rays	1603	2037	1976	2392	4525	6553	2463	1304	2042	2244	1677	1846	1699	2579	1672	1262
<b>2 Eels</b>	5	6	19	23	2	50	23	19	74	<b>171</b>	<b>340</b>	<b>467</b>	<b>436</b>	468	277	<b>257</b>
<b>3 Catfishes</b>	8123	12798	6811	15124	7071	4410	2884	1629	936	650	<b>621</b>	557	285	334	385	150
<b>4 Clupeids</b>																
a Wolf herring	630	719	821	750	1404	732	716	990	1768	1286	<b>1343</b>	1285	1328	1381	<b>356</b>	<b>230</b>
b Oil sardine	80918	41278	45724	61676	186985	181171	107762	55983	52133	15886	12610	28530	90108	80189	134180	208878
c Other sardines	2526	9080	8893	12946	13909	13036	24065	17552	23948	<b>19583</b>	<b>20480</b>	<b>19632</b>	<b>19704</b>	20501	27267	<b>26120</b>
d Hilsa shad	20	15	8	16	54	323	<b>201</b>	79	89	73	<b>62</b>	<b>47</b>	<b>32</b>	<b>34</b>	<b>31</b>	<b>30</b>
e Other shads	33	2	2	33	<b>20</b>	8	96	486	261	<b>189</b>	<b>172</b>	<b>138</b>	<b>111</b>	83	10	<b>10</b>
f Anchovies																
i <i>Anchoviella</i>	37001	27603	16973	46895	45641	27164	45912	49879	51925	<b>40434</b>	<b>40056</b>	23430	20756	32602	30183	18335
ii <i>Thriassocles</i>	1231	3185	3411	5891	2849	2384	3680	7941	5447	<b>5134</b>	<b>6119</b>	4295	4567	8642	2590	1814
g Other clupeids	4368	7023	8883	8244	11082	8339	15876	26414	13666	11573	9258	31079	29835	10985	7566	16932
5 Bombay duck	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>6 Lizard fishes</b>	9898	9457	7618	20370	13703	18466	18851	22360	21678	15721	17557	15451	11207	13496	<b>13360</b>	<b>12434</b>
<b>7 Half beaks and Full</b>	678	567	765	1294	643	638	821	421	418	402	3381	437	678	659	660	550
<b>8 Flying fishes</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>26</b>	<b>50</b>	<b>73</b>	<b>1440</b>	<b>10</b>	<b>5</b>	<b>4</b>	<b>15</b>	<b>8</b>	<b>6</b>	<b>4</b>	<b>4</b>
<b>9 Perches</b>																
a Rock cods	756	499	1383	1364	2171	1607	1197	4792	5728	<b>4411</b>	<b>4348</b>	4062	2776	8431	2548	2949
b Snappers	215	191	585	1338	1793	1863	306	193	475	<b>572</b>	<b>802</b>	1016	694	2263	637	738
c Pig face breams	317	429	108	623	333	365	380	139	212	<b>426</b>	<b>724</b>	1016	694	1472	637	738
d Threadfin breams	37943	57092	34064	37978	73743	87138	53551	58239	86314	<b>71641</b>	<b>76594</b>	78205	53433	43763	49043	56752
e Other perches	8922	10296	7901	7750	6503	17478	12578	16035	24513	<b>18841</b>	<b>18529</b>	17266	11797	10576	10827	12529
<b>10 Goatfishes</b>	157	317	1000	14935	10385	11140	31133	12003	3901	<b>1509</b>	<b>243</b>	<b>335</b>	<b>441</b>	562	<b>556</b>	<b>518</b>
<b>11 Threadfins</b>	245	40	54	153	735	<b>873</b>	1088	51	171	117	<b>88</b>	<b>51</b>	13	504	238	54
<b>12 Croakers</b>	13549	19013	11928	12861	19678	17499	14581	24698	22969	<b>20428</b>	<b>23303</b>	25292	14768	21082	11820	<b>11001</b>
<b>13 Ribbon fishes</b>	25679	12074	15640	9125	7261	9854	2198	6374	7651	<b>8057</b>	<b>10413</b>	<b>11990</b>	<b>14166</b>	17089	15505	<b>14853</b>
<b>14 Carangids</b>																
a Horse mackerel	90	1479	1292	4541	674	11044	3335	1805	5276	38323	<b>42533</b>	43252	26820	5600	29697	18066
b Scads	4321	35974	7102	19772	37028	41211	65301	72602	48223	<b>31442</b>	<b>24073</b>	14162	21557	44225	<b>40216</b>	<b>38525</b>
c Leather-jackets	265	394	482	263	149	735	133	210	616	<b>491</b>	<b>500</b>	<b>465</b>	<b>451</b>	454	396	<b>379</b>
i <i>Trachynotus</i>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
d Other Carangids	8438	34908	14408	23402	12941	16809	11067	13439	21750	<b>17438</b>	<b>17854</b>	<b>16727</b>	<b>16377</b>	16586	12346	<b>11827</b>
i <i>Coryphaena</i>	<b>28</b>	<b>27</b>	<b>28</b>	<b>28</b>	<b>27</b>	<b>27</b>	<b>27</b>	<b>28</b>	<b>28</b>	<b>24</b>	<b>26</b>	<b>25</b>	<b>26</b>	<b>28</b>	<b>25</b>	<b>24</b>
ii <i>Elacate</i>	<b>67</b>	<b>67</b>	<b>67</b>	<b>67</b>	<b>67</b>	<b>67</b>	<b>67</b>	<b>68</b>	<b>69</b>	<b>58</b>	<b>62</b>	<b>62</b>	<b>64</b>	<b>68</b>	<b>62</b>	<b>59</b>
<b>15 Silverbellies</b>																
a <i>Leiognathus</i>	5369	8945	8809	9859	9240	9975	9333	7092	10121	5512	5589	6474	7022	8033	<b>7953</b>	<b>7401</b>
b <i>Gazza</i>	<b>8</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>8</b>	<b>7</b>
<b>16 Big jawed jumper</b>	1636	2141	903	1247	2278	3768	1030	1068	1421	1479	783	3152	2658	4734	2556	2127
<b>17 Pomfrets</b>																
a Black pomfret	1094	2000	2517	1242	1534	2501	1720	1817	1172	1263	1661	2642	1539	2907	2887	2687
b Silver pomfret	286	712	582	1143	1434	1626	334	2170	2139	1648	1626	1994	910	1356	1332	1239
c Chinese pomfrets	19	55	4	52	33	56	2	130	848	601	532	565	209	223	222	207
<b>18 Mackerel</b>																
a Indian mackerel	18488	22234	10290	44786	86243	79163	54739	39216	62099	98542	74233	119698	79323	63391	77301	30479
b Other mackerels	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>19 Seer fishes</b>																
a <i>S. commersoni</i>	4586	4298	4618	8283	7319	4842	4588	8548	6445	4905	5268	4334	3928	4853	2291	3730
b <i>S. guttatus</i>	4053	638	680	2075	549	587	77	486	321	223	215	154	116	111	52	85
c <i>S. lineolatus</i>	<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>14</b>	11	11	10	11	<b>11</b>	<b>10</b>	<b>10</b>
d <i>Acanthocybium spp.</i>	<b>1</b>	<b>64</b>	<b>128</b>	<b>191</b>	252	<b>168</b>	<b>85</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	879	417	679
<b>20 Tunnies</b>																
a <i>E. affinis</i>	6065	9375	6132	7835	15041	25514	8965	12235	10003	<b>10858</b>	<b>14311</b>	16707	15415	5246	7304	6338
b <i>Auxis spp.</i>	2841	5011	3091	4515	5746	5819	2826	3636	2890	<b>3816</b>	5591	<b>4815</b>	<b>4254</b>	3790	5312	4609
c <i>K. pelamis</i>	45	38	226	65	585	110	83	31	<b>33</b>	<b>69</b>	<b>103</b>	<b>140</b>	188	332	288	
d <i>T. tonggol</i>	396	65	283	70	237	94	553	76	66	<b>70</b>	<b>90</b>	<b>103</b>	<b>122</b>	147	166	144
e Other tunnies	713	540	1118	677	934	1423	869	801	953	<b>1075</b>	<b>1450</b>	<b>1720</b>	<b>2077</b>	2546	3486	3025
<b>21 Bill fishes</b>	158	189	155	176	173	248	114	248	256	<b>242</b>	<b>289</b>	<b>313</b>	<b>352</b>	409	<b>372</b>	<b>356</b>
<b>22 Barracudas</b>	917	1334	950	1922	2168	3883	4270	4185	3167	2498	4425	3853	3364	10082	2645	<b>2534</b>
<b>23 Mulletts</b>	1125	547	1229	29	135	63	170	104	306	864	978	555	276	182	190	<b>176</b>
<b>24 Unicorn cod</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>12</b>	<b>9</b>	<b>6</b>	<b>6</b>	<b>5</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>5</b>
<b>25 Flatfishes</b>																
a Halibut	30	28	162	352	104	783	155	548	33	<b>23</b>	<b>21</b>	<b>16</b>	<b>12</b>	8	<b>8</b>	<b>7</b>
b Flounders	6	36	247	15	217	702	855	1263	144	<b>107</b>	<b>100</b>	<b>87</b>	<b>76</b>	64	<b>64</b>	<b>59</b>
c Soles	17768	13986	14494	19319	34623	23355	22965	43216	32134	<b>25726</b>	<b>26491</b>	<b>26010</b>	<b>25912</b>	26215	39520	36780
<b>26 Crustaceans</b>																
a Penaeid prawns	41924	55378	76056	100962	88983	72967	96043	79077	74016	92200	59826	65358	82674	92567	65160	83783
b Non-Penaeid prawns	317	155	373	244	30	3	439	98	202	132	252	193	635			

**Table H : Marine fisheries catch (thousand tonnes) data for the Union Territory of Lakshadweep, 1950-2000.**

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1 Elasmobranchs																		
a Sharks	1	1	1	1	1	1	1	1	1	1	1	22	20	27	27	64	94	149
b Skates																		
c Rays	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	8	11	16
2 Eels																		
3 Catfishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4 Clupeids																		
a Wolf herring																		
b Oil sardine																		
c Other sardines	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3
d Hilsa shad																		
e Other shads																		
f Anchovies																		
i <i>Anchoviella</i>																		
ii <i>Thrissocles</i>																		
g Other clupeids																		
5 Bombay duck																		
6 Lizard fishes																		
7 Half beaks and Full	1	1	1	1	1	1	1	1	1	1	1	1	1	17	14	1	12	7
8 Flying fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	20	16	14	22	21
9 Perches	1	1	1	1	1	1	1	1	1	1	1	1	1	13	18	15	70	60
a Rock cods																		
b Snappers	1	1	1	1	1	1	1	1	1	1	1	1	1	6	8	7	30	26
c Pig face breams																		
d Threadfin breams																		
e Other perches	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10 Goatfishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18	23
11 Threadfins																		
12 Croakers																		
13 Ribbon fishes																		
14 Carangids																		
a Horse mackerel	1	1	1	1	1	1	1	1	1	1	1	2	5	2	4	2	37	35
b Scads																		
c Leather-jackets																		
i <i>Trachynotus</i>																		
d Other Carangids																		
i <i>Coryphaena</i>																		
ii <i>Elacate</i>																		
15 Silverbellies																		
a <i>Leiognathus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b <i>Gazza</i>																		
16 Big jawed jumper																		
17 Pomfrets																		
a Black pomfret																		
b Silver pomfret																		
c Chinese pomfrets																		
18 Mackerel																		
a Indian mackerel																		
b Other mackerels																		
19 Seer fishes																		
a <i>S. commersoni</i>	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	9	23	25
b <i>S. guttatus</i>	1	1	1	1	1	1	1	1	1	1	1	1	6	6	6	13	35	39
c <i>S. lineolatus</i>																		
d <i>Acanthocybium spp.</i>																		
20 Tunnies																		
a <i>E. affinis</i>	5	5	5	5	5	5	5	5	5	5	5	8	1	6	5	3	2	3
b <i>Auxis spp.</i>	24	24	24	24	24	24	24	24	24	24	24	41	6	29	23	16	11	16
c <i>K. pelamis</i>	369	369	369	369	369	369	369	369	369	369	369	636	89	448	365	243	161	247
d <i>T. tonggol</i>	24	24	24	24	24	24	24	24	24	24	24	41	6	29	23	16	11	16
e Other tunnies	52	52	52	52	52	52	52	52	52	52	52	90	13	63	52	34	22	34
21 Bill fishes	18	18	18	18	18	18	18	18	18	18	18	16	15	17	17	16	17	17
22 Barracudas	1	1	1	1	1	1	1	1	1	1	1	1	1	8	4	1	4	8
23 Mullet																		
24 Unicorn cod																		
25 Flatfishes																		
a Halibut																		
b Flounders																		
c Soles																		
26 Crustaceans																		
a Penaeid prawns																		
b Non-Penaeid prawns																		
c Lobsters																		
d Crabs																		
e Stomatopods																		
27 Molluscs																		
28 Cephalopods	1	1	1	1	1	1	1	1	1	1	1	1	1	13	7	9	12	5
<b>Total</b>	<b>509</b>	<b>509</b>	<b>509</b>	<b>509</b>	<b>509</b>	<b>509</b>	<b>509</b>	<b>509</b>	<b>509</b>	<b>509</b>	<b>509</b>	<b>872</b>	<b>180</b>	<b>713</b>	<b>600</b>	<b>476</b>	<b>596</b>	<b>756</b>

**Table H : Continued.**

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1 Elasmobranchs																	
a Sharks	128	134	349	256	276	333	478	616	619	509	429	757	484	408	513	582	586
b Skates																	
c Rays	15	15	38	28	31	37	52	69	68	57	48	83	53	47	44	182	263
2 Eels																	
3 Catfishes	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
4 Clupeids																	
a Wolf herring																	
b Oil sardine																	
c Other sardines	3	4	4	4	5	5	5	4	5	5	4	4	4	4	4	4	4
d Hilsa shad																	
e Other shads																	
f Anchovies																	
i <i>Anchoviella</i>																	
ii <i>Thrissocles</i>																	
g Other clupeids																	
5 Bombay duck																	
6 Lizard fishes																	
7 Half beaks and Full	14	16	18	10	22	112	30	31	38	66	154	107	105	118	91	202	65
8 Flying fishes	24	26	22	15	20	47	49	32	47	34	35	17	31	17	26	26	16
9 Perches	83	52	90	71	111	194	230	269	258	279	270	323	489	479	536	593	340
a Rock cods																	
b Snappers	36	23	40	31	49	84	101	118	112	121	118	141	213	203	292	211	204
c Pig face breams																	
d Threadfin breams																	
e Other perches	1	1	2	2	2	2	4	4	4	4	5	5	8	50	63	46	65
10 Goatfishes	28	37	60	19	23	78	67	71	112	56	65	62	51	54	63	74	71
11 Threadfins																	
12 Croakers																	
13 Ribbon fishes																	
14 Carangids																	
a Horse mackerel	58	50	35	22	35	71	69	66	108	73	64	61	85	110	225	154	47
b Scads																	
c Leather-jackets																	
i <i>Trachinotus</i>																	
d Other Carangids																	
i <i>Coryphaena</i>																	
ii <i>Elacate</i>																	
15 Silverbellies																	
a <i>Leiognathus</i>	1	1	2	2	2	2	2	11	10	10	12	12	9	11	12	11	15
b <i>Gazza</i>																	
16 Big jawed jumper																	
17 Pomfrets																	
a Black pomfret																	
b Silver pomfret																	
c Chinese pomfrets																	
18 Mackerel																	
a Indian mackerel																	
b Other mackerels																	
19 Seer fishes																	
a <i>S. commersoni</i>	30	27	25	21	23	14	41	28	40	18	17	11	9	21	42	25	25
b <i>S. guttatus</i>	45	41	39	32	36	19	62	43	60	28	27	15	14	31	62	37	37
c <i>S. lineolatus</i>																	
d <i>Acanthocybium spp.</i>																	
20 Tunnies																	
a <i>E. affinis</i>	5	8	7	9	6	11	15	20	15	14	20	30	19	23	32	34	43
b <i>Auxis spp.</i>	25	36	32	43	30	57	71	104	75	66	100	148	94	117	156	172	216
c <i>K. pelamis</i>	394	566	491	665	465	897	1104	1619	1157	1027	1560	2302	1462	1829	2431	2691	3372
d <i>T. tonggol</i>	25	36	32	43	30	57	71	104	75	66	100	148	94	117	156	172	216
e Other tunnies	56	80	70	94	66	126	156	229	163	145	220	324	207	258	343	379	476
21 Bill fishes	17	19	19	19	20	19	19	18	20	19	18	18	18	18	18	44	44
22 Barracudas	12	8	7	8	9	12	20	18	23	17	19	12	15	13	11	20	15
23 Mulletts																	
24 Unicorn cod																	
25 Flatfishes																	
a Halibut																	
b Flounders																	
c Soles																	
26 Crustaceans																	
a Penaeid prawns																	
b Non-Penaeid prawns																	
c Lobsters																	
d Crabs																	
e Stomatopods																	
27 Molluscs																	
28 Cephalopods	11	11	16	31	33	43	31	40	78	44	48	35	25	30	51	37	41
<b>Total</b>	<b>1011</b>	<b>1193</b>	<b>1398</b>	<b>1428</b>	<b>1296</b>	<b>2224</b>	<b>2678</b>	<b>3517</b>	<b>3086</b>	<b>2658</b>	<b>3336</b>	<b>4615</b>	<b>3491</b>	<b>3961</b>	<b>5198</b>	<b>5688</b>	<b>6164</b>

**Table H** : Continued.

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1 Elasmobranchs																
a Sharks	540	444	119	667	917	593	773	840	908	1269	1603	1205	950	1011	1039	822
b Skates																
c Rays	244	167	172	310	218	185	231	247	256	345	415	304	228	232	112	108
2 Eels																
3 Catfishes	3	5	7	4	4	4	6	6	7	5	6	11	5	8	7	6
4 Clupeids																
a Wolf herring																
b Oil sardine																
c Other sardines	4	4	4	4	4	4	4	5	5	5	5	4	5	4	6	5
d Hilsa shad																
e Other shads																
f Anchovies																
i <i>Anchoviella</i>																
ii <i>Thrissocles</i>																
g Other clupeids																
5 Bombay duck																
6 Lizard fishes																
7 Half beaks and Full	41	45	33	71	72	86	115	145	175	212	219	132	176	354	417	337
8 Flying fishes	6	14	15	19	37	38	46	55	63	72	95	28	103	62	153	137
9 Perches	220	326	602	501	330	528	333	321	309	212	92	45	440	610	688	629
a Rock cods																
b Snappers	155	167	265	166	206	189	197	272	336	292	242	270	525	811	658	368
c Pig face breams																
d Threadfin breams																
e Other perches	24	63	172	105	179	236	147	142	141	96	63	68	106	147	157	147
10 Goatfishes	96	208	258	97	78	167	231	259	296	239	231	135	287	432	433	340
11 Threadfins																
12 Croakers																
13 Ribbon fishes																
14 Carangids																
a Horse mackerel	53	53	61	50	47	57	60	63	65	69	73	43	163	107	138	112
b Scads																
c Leather-jackets																
i <i>Trachynotus</i>																
d Other Carangids																
i <i>Coryphaena</i>																
ii <i>Elacate</i>																
15 Silverbellies																
a <i>Leiognathus</i>	17	23	33	18	19	21	28	31	34	27	29	56	27	39	37	28
b <i>Gazza</i>																
16 Big jawed jumper																
17 Pomfrets																
a Black pomfret																
b Silver pomfret																
c Chinese pomfrets																
18 Mackerel																
a Indian mackerel																
b Other mackerels																
19 Seer fishes																
a <i>S. commersoni</i>	26	16	21	32	24	23	33	43	54	67	61	23	29	44	68	98
b <i>S. guttatus</i>	35	23	33	48	35	33	49	65	82	102	91	35	44	65	104	146
c <i>S. lineolatus</i>																
d <i>Acanthocybium spp.</i>																
20 Tunnies																
a <i>E. affinis</i>	41	128	251	288	375	440	531	627	724	751	867	834	865	1328	1184	886
b <i>Auxis spp.</i>	197	269	378	357	407	434	493	552	613	601	695	741	765	1130	969	724
c <i>K. pelamis</i>	3104	3904	5138	4611	5043	5197	5748	6292	6835	6528	7342	7316	6731	9683	8068	6037
d <i>T. tonggol</i>	199	235	291	248	258	255	273	289	305	279	348	370	345	568	537	403
e Other tunnies	437	501	605	502	511	491	453	473	491	489	480	437	448	672	586	472
21 Bill fishes	78	47	38	31	23	31	35	40	44	49	68	40	76	73	100	81
22 Barracudas	8	8	6	7	5	20	19	18	17	15	18	24	104	57	100	99
23 Mulletts																
24 Unicorn cod																
25 Flatfishes																
a Halibut																
b Flounders																
c Soles																
26 Crustaceans																
a Penaeid prawns																
b Non-Penaeid prawns																
c Lobsters																
d Crabs																
e Stomatopods																
27 Molluscs																
28 Cephalopods	38	50	60	36	51	77	99	107	114	88	93	177	82	116	135	113
<b>Total</b>	<b>5569</b>	<b>6699</b>	<b>8562</b>	<b>8172</b>	<b>8843</b>	<b>9110</b>	<b>9903</b>	<b>10892</b>	<b>11874</b>	<b>11814</b>	<b>13136</b>	<b>12300</b>	<b>12504</b>	<b>17551</b>	<b>15696</b>	<b>12098</b>

**Table I :** Marine fisheries catch (thousand tonnes) data for the state of Tamil Nadu, 1950-2000.

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1 Elasmobranchs																		
a Sharks	977	1479	2623	1214	1084	1070	1072	898	1043	1065	1504	1690	1939	1893	1687	2037	2117	1271
b Skates	54	82	145	67	63	61	62	52	61	61	87	97	111	109	97	117	122	73
c Rays	4726	7151	12683	5870	5494	5430	5434	4556	5288	5396	7625	8567	9834	9600	8551	10332	10734	6442
2 Eels	41	40	40	39	41	43	46	52	95	141	121	75	164	140	76	23	45	58
3 Catfishes	813	2585	4250	10159	6751	3660	4224	3550	4653	2406	2005	2158	3722	3587	3731	4088	5278	3945
4 Clupeids																		
a Wolf herring	3289	550	1135	1448	2504	1248	2511	3078	2449	1958	2319	3136	6263	4580	3521	3800	3974	4349
b Oil sardine	916	15	1680	1490	1394	5078	560	402	147	100	50	1	1	1	141	34	38	33
c Other sardines	19510	11543	13344	7053	5611	11156	12289	9023	7199	7631	7817	6105	5642	8206	15603	9934	13268	11092
d Hilsa shad	61	59	59	58	61	72	11	6	51	23	36	52	195	86	1320	13	17	15
e Other shads	11	11	11	10	11	11	11	40	34	156	243	550	984	1649	2881	4632	5680	3447
f Anchovies																		
i <i>Anchoviella</i>	4564	19530	13031	6812	8761	4994	4944	2715	16143	9996	10756	9514	6927	9227	7090	7071	11115	6729
ii <i>Thrissodes</i>	1955	8370	5585	2919	3999	2280	2256	1403	770	1428	1785	1487	2382	993	1689	1838	2137	3865
g Other clupeids	586	573	711	2325	1958	1849	2685	1495	1717	2446	2545	3436	3047	2089	2914	1447	3961	1811
5 Bombay duck	2	2	2	2	2	1	1	2	16	29	1	3	5	1	8	78	6	6
6 Lizard fishes	9	9	18	72	310	106	203	136	106	313	327	580	823	352	636	291	544	565
7 Half beaks and Full	63	61	61	60	63	66	64	71	134	251	82	101	87	777	1397	801	1065	751
8 Flying fishes	1692	1169	575	314	1783	3174	2287	895	321	1599	6249	1154	4089	988	896	154	3430	3016
9 Perches																		
a Rock cods	1743	101	317	256	262	255	332	273	391	449	406	795	284	393	364	349	579	425
b Snappers	1763	102	321	258	267	259	337	277	396	455	412	807	288	400	369	354	587	431
c Pig face breams	2440	142	444	358	366	356	465	381	549	629	569	1113	396	553	510	489	811	595
d Threadfin breams	5351	312	975	784	768	747	975	800	1148	1316	1192	2332	832	1157	1069	1024	1700	1248
e Other perches	9207	536	1677	1349	1342	1303	1700	1397	2004	2298	2080	4070	1453	2018	1864	1788	2966	2177
10 Goatfishes	276	81	82	284	508	227	2994	1381	806	1045	1078	1347	196	433	298	413	313	688
11 Threadfins	79	77	45	423	845	223	341	289	540	494	652	723	847	757	930	804	863	561
12 Croakers	4269	5164	3588	4349	7964	5001	9096	4643	4562	4794	5362	7320	5815	4977	5560	4396	6087	7459
13 Ribbon fishes	3068	4984	16548	12043	7254	11330	8249	10691	22356	18249	11016	7904	12924	8533	8085	7445	10843	6768
14 Carangids																		
a Horse mackerel	1435	1634	3900	3548	6660	5635	10870	5177	8611	6296	9081	15816	5061	10049	7118	9084	8028	8650
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Leather-jackets	2773	2716	2718	2662	2781	2906	2835	1409	696	1042	1914	1479	1871	1726	1551	1829	1528	1905
<i>Trachinotus</i>	59	57	57	56	59	61	60	61	60	2	4	5	7	8	53	20	1	4
d Other Carangids	96	94	94	92	97	101	98	100	98	99	99	118	553	4	37	12	8	5
<i>Coryphaena</i>	182	178	178	174	176	184	180	76	119	123	104	94	62	3	21	60	174	258
<i>Elacate</i>	182	178	178	174	176	184	180	77	119	123	105	104	143	54	167	145	82	108
15 Silverbellies																		
<i>Leiognathus</i>	2050	1084	2863	2382	4047	3089	6733	4514	5037	4962	6055	6461	6512	7475	16644	10845	20027	20134
<i>Gazza</i>	228	121	318	265	461	352	766	252	147	141	41	89	152	57	46	38	34	56
16 Big jawed jumper	1519	804	2121	1764	2856	2181	4147	3343	11486	9065	5590	6007	5162	4341	4315	2077	2124	1851
17 Pomfrets																		
a Black pomfret	1393	1040	1049	994	974	947	1504	1340	1202	1653	1725	1544	1900	1614	1163	921	831	1442
b Silver pomfret	380	284	286	271	268	260	413	369	331	454	474	425	522	443	320	253	228	396
c Chinese pomfrets	8	6	6	6	6	6	9	8	7	10	10	9	12	10	7	5	5	9
18 Mackerel																		
a Indian mackerel	5345	2039	1064	297	484	862	1032	1144	314	785	944	4638	2584	2690	2432	435	1618	2780
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19 Seer fishes																		
a <i>S. commersoni</i>	222	268	739	1640	2586	1394	3396	3484	3172	2364	2430	4068	3714	2675	2939	2285	3324	3393
b <i>S. guttatus</i>	24	28	78	172	255	137	335	344	313	233	240	402	367	264	291	225	328	336
c <i>S. lineolatus</i>	1	1	2	6	8	4	11	11	10	8	8	14	12	9	9	7	10	12
d <i>Acanthocybium spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20 Tunnies																		
a <i>E. affinis</i>	1628	276	308	333	866	1106	1242	1257	628	308	312	1369	220	515	2017	671	604	581
b <i>Auxis spp.</i>	41	7	8	9	22	28	31	32	16	8	8	35	5	13	50	17	16	15
c <i>K. pelamis</i>	10	2	2	2	5	7	8	8	4	2	2	8	1	3	13	4	4	3
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	352	60	66	71	185	237	267	270	135	65	67	294	47	110	433	144	129	124
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22 Barracudas	103	101	650	211	1945	216	1506	280	398	459	622	1130	1016	973	1057	1030	600	1270
23 Mulletts	1	1	72	48	24	1	26	62	43	34	50	76	232	609	1856	334	242	1177
24 Unicorn cod	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25 Flatfishes																		
a Halibut	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b Flounders	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Soles	10	10	237	10	339	750	121	153	114	329	641	1096	942	428	1107	673	755	813
26 Crustaceans																		
a Penaeid prawns	418	1961	2668	1895	2217	3656	7801	1446	933	1499	1725	1712	2384	3232	3736	2505	5738	6604
b Non-Penaeid prawns	13	60	82	58	76	125	265	334	901	186	281	1051	10	111	152	87	127	157
c Lobsters	1	1	1	1	1	1	2	8	17	24	27	44	25	37	133	73	90	131
d Crabs	2	11	15	10	14	22	47	227	509	715	777	1263	730	1071	3850	2104	2598	3779
e Stomatopods	1	1	1	1	1	1	1	4	9	12	13	22	13	19	66	36	45	65
27 Molluscs																		
28 Cephalopods	17	17	17	16	17	18	17	18	17	17	17	5	2	30	71	80	186	135
Total	85966	77778	99736	77193	87074	84481	107057	74326	108419	95346	99723	114501	103520	102085	122942	99710	137845	124021

**Table I : Continued.**

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
<b>1 Elasmobranchs</b>																	
a Sharks	1421	2299	4474	4281	3243	3266	5484	5240	4856	4804	3955	3254	4026	3378	4330	4715	3947
b Skates	82	127	247	236	178	180	303	289	267	266	219	179	223	186	671	1172	246
c Rays	7203	11116	21634	20700	15682	15795	26517	25343	23483	23229	19122	15734	19470	16332	15649	24578	15460
<b>2 Eels</b>	59	273	304	219	69	181	415	165	932	358	501	184	131	140	232	323	475
<b>3 Catfishes</b>	3690	4184	9943	10764	7891	14773	14481	11186	7562	23478	8091	8688	6216	5698	9062	7060	6917
<b>4 Clupeids</b>																	
a Wolf herring	4557	4105	3745	3086	2429	3354	1692	1905	2125	2680	1881	1966	2876	1920	2823	2960	2872
b Oil sardine	430	19	48	47	153	47	221	400	565	773	39	1081	341	206	1148	1442	1299
c Other sardines	10546	18271	17558	24634	22042	27499	16071	37452	25986	28437	22806	35591	31947	25787	24666	40552	28516
d Hilsa shad	3	121	16	200	178	11	15	127	23	371	174	44	39	55	184	615	1226
e Other shads	3234	2670	2418	2932	2186	1424	709	1218	2407	6264	4514	2952	3291	3709	4248	6660	5643
f Anchovies																	
i <i>Anchoviella</i>	5379	12461	7997	5397	4584	9608	11191	11435	8124	14498	8068	11826	14006	9329	10471	11320	16578
ii <i>Thrissocles</i>	3318	3528	4330	5194	5526	5087	4838	3289	8633	3257	5113	5925	5386	6819	5202	5899	8396
g Other clupeids	2759	2491	2404	2293	3253	3911	2932	5686	16365	2872	3297	3810	1956	5314	5867	7817	6162
5 Bombay duck	4	103	2	14	50	248	123	1	8	15	9	1	6	3	2	7	4
6 Lizard fishes	759	1700	1685	2080	1361	1305	1678	1537	1237	883	1695	2317	1725	2186	2895	2796	3599
7 Half beaks and Full	586	443	842	514	422	712	4113	1559	740	1705	822	667	799	864	874	1450	1002
8 Flying fishes	3699	3916	2177	8756	1351	6565	756	1743	1272	570	1183	1710	1180	2595	1712	1145	2346
<b>9 Perches</b>																	
a Rock cods	477	670	692	728	796	626	1005	1038	682	1039	1209	778	899	825	1939	2505	2429
b Snappers	483	679	700	737	805	634	1017	1050	690	1052	1225	787	909	831	1797	1626	1190
c Pig face breams	667	938	968	1018	1114	876	1407	1453	956	1455	1695	1089	1258	1158	3380	3464	2727
d Threadfin breams	1397	2059	2124	2235	2443	1922	3085	3187	2095	3192	3716	2390	2760	2530	5599	5278	4746
e Other perches	2439	3542	3653	3845	4203	3305	5307	5483	3603	5489	6392	4111	4749	4351	5860	8947	8360
<b>10 Goatfishes</b>	591	985	1617	1891	1933	1513	2748	2345	941	1285	3024	2240	1657	1677	2183	3700	2897
11 Threadfins	943	1612	2668	2408	1336	2706	1230	2005	2921	2458	1088	546	966	355	568	592	783
12 Croakers	8105	8923	13953	8193	9171	15891	13950	15121	15870	21240	21937	29306	30023	19743	33008	20081	20941
13 Ribbon fishes	9064	6755	7073	11393	10992	10157	8716	18702	19672	4975	31056	22495	8389	8021	6741	5840	12944
<b>14 Carangids</b>																	
a Horse mackerel	5051	8981	6770	8872	7444	5935	5403	4679	3830	3217	2419	1597	806	17	161	61	80
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1334	681	853	2839
c Leather-jackets	2273	1132	1261	1404	1094	890	1605	1146	667	1587	1052	902	1185	641	745	3795	1743
i <i>Trachinotus</i>	5	149	148	12	8	5	2	3	4	6	8	9	10	11	13	14	15
d Other Carangids	1	3	25	25	30	9	2	6715	8610	7042	3918	8338	6317	13432	6519	7685	11291
i <i>Coryphaena</i>	191	229	184	43	25	34	80	81	79	83	83	82	82	81	82	84	84
ii <i>Elacate</i>	115	227	175	32	293	79	105	107	106	112	113	112	113	112	113	118	119
<b>15 Silverbellies</b>																	
a <i>Leinognathus</i>	23836	23684	37603	28200	31789	33158	33539	30176	44533	27512	46765	66569	58675	76471	78710	94908	65718
b <i>Gazza</i>	99	98	103	7	91	51	39	34	48	29	48	65	55	71	70	83	56
<b>16 Big jawed jumper</b>	1968	1068	1357	954	1987	4229	1013	2729	1164	1143	1294	2046	1441	1229	1017	546	1374
<b>17 Pomfrets</b>																	
a Black pomfret	1481	1339	1940	972	532	1997	790	1526	966	758	951	1061	1568	787	1137	964	1180
b Silver pomfret	407	365	529	265	144	545	216	416	263	207	259	289	429	215	787	985	580
c Chinese pomfrets	9	7	11	6	3	12	4	9	6	5	6	6	9	5	109	23	2
<b>18 Mackerel</b>																	
a Indian mackerel	1982	1967	2112	3119	8207	9332	2749	6127	10828	6145	1574	3765	7714	4130	4710	6422	7112
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>19 Seer fishes</b>																	
a <i>S. commersoni</i>	2838	2307	2733	4746	5677	5486	4865	3890	3525	6276	4594	5042	6910	5168	4634	4414	6308
b <i>S. guttatus</i>	280	242	287	499	597	576	511	409	371	660	483	530	727	543	545	338	420
c <i>S. lineolatus</i>	9	7	8	16	18	18	16	13	11	21	15	16	22	17	86	186	179
d <i>Acanthocybium</i> spp.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9	48
<b>20 Tunnies</b>																	
a <i>E. affinis</i>	597	1139	654	875	552	528	1411	1504	2418	2810	1015	2751	3619	3230	2670	1655	1850
b <i>Auxis</i> spp.	15	29	17	22	14	14	35	38	61	70	26	69	92	81	393	443	235
c <i>K. pelamis</i>	4	7	4	5	3	3	8	9	15	17	7	17	22	20	5	37	60
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	140
e Other tunnies	128	246	142	189	119	114	305	325	523	608	220	594	783	698	336	48	500
<b>21 Bill fishes</b>	1	1	1	1	1	1	1	1	1	1	1	1	994	156	273	135	268
<b>22 Barracudas</b>	859	1502	1432	915	1044	905	833	1584	1604	1843	2326	1564	616	1000	1893	1541	2004
<b>23 Mulletts</b>	885	977	1068	1218	392	2171	366	2345	428	1425	1277	354	490	615	766	690	697
<b>24 Unicorn cod</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>25 Flatfishes</b>																	
a Halibut	1	1	1	1	1	1	1	1	2	2	2	2	2	307	520	401	183
b Flounders	1	1	1	1	1	1	1	1	2	2	2	2	2	44	10	20	54
c Soles	784	688	933	1027	764	1023	1749	1176	1366	1402	2434	3615	3216	1800	4359	4250	2587
<b>26 Crustaceans</b>																	
a Penaeid prawns	5290	5743	6562	5423	7212	6782	11348	17121	13372	12755	20345	15826	14019	20168	21162	20703	24319
b Non-Penaeid prawns	414	299	750	92	219	1935	65	856	255	247	380	1389	1460	1048	565	423	2332
c Lobsters	107	160	286	385	457	541	579	696	789	442	901	526	138	358	467	543	933
d Crabs	3097	4866	6002	8833	13718	11306	13377	20812	24661	17013	14313	9099	9483	13775	18981	15557	14149
e Stomatopods	53	111	138	201	313	258	304	347	370	401	422	447	465	476	3141	1343	1078
<b>27 Molluscs</b>																	
<b>28 Cephalopods</b>	181	305	107	580	366	638	1340	4423	2180	2123	1605	2943	2261	2535	4852	5930	6088
<b>Total</b>	<b>124862</b>	<b>151876</b>	<b>186619</b>	<b>192743</b>	<b>186512</b>	<b>220177</b>	<b>212678</b>	<b>268266</b>	<b>275080</b>	<b>252612</b>	<b>261693</b>	<b>289307</b>	<b>268958</b>	<b>274589</b>	<b>311630</b>	<b>347757</b>	<b>318329</b>

**Table I : Continued.**

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1 Elasmobranchs																
a Sharks	2673	5880	7693	6524	7589	1417	4373	12059	8495	7462	6590	4889	4555	4463	3325	3420
b Skates	281	104	1375	161	89	77	209	714	145	142	141	120	132	144	137	141
c Rays	10955	11191	20757	15405	12227	10875	14290	12553	15862	16777	17977	16377	19077	24180	23984	24668
2 Eels	244	245	340	152	245	186	398	457	401	97	264	283	829	1260	1172	847
3 Catfishes	3321	2780	3543	3184	3031	2392	3936	3707	3753	2189	2308	3438	5489	5532	5020	4156
4 Clupeids																
a Wolf herring	2214	3295	3816	3935	4035	2710	3269	4015	3679	7816	6456	9123	8134	11436	10704	8542
b Oil sardine	3176	6540	943	2233	13857	35630	34237	33606	38518	50794	51412	50727	50839	380	297	303
c Other sardines	22969	32395	49929	36598	28475	22050	34712	37220	36649	36598	39068	42204	45294	55596	53956	55060
d Hilsa shad	275	330	293	223	24	22	14	33	180	1404	1668	2145	1022	2264	1958	1867
e Other shads	2576	2243	4685	2363	1013	1308	906	1860	2119	1984	1993	2033	2067	2296	2275	2322
f Anchovies																
i <i>Anchoviella</i>	9488	15386	16069	31139	16352	14156	20552	20191	8973	4405	4620	6415	6019	9940	9508	9725
ii <i>Thrissodes</i>	7389	5780	11069	5077	6377	5386	8845	5347	6776	2817	2425	2639	1800	1863	1445	1479
g Other clupeids	5515	4453	11383	12187	13992	14716	13668	11440	7496	1513	1307	1812	3019	3389	2980	3933
5 Bombay duck	8	10	13	15	210	52	7	41	48	237	431	636	847	1162	1139	60
6 Lizard fishes	3172	3040	6262	4848	5902	8159	12159	12031	8019	2414	2571	2699	2013	1918	1709	1559
7 Half beaks and Full	780	718	663	1781	1038	1237	1112	1372	1090	2115	4257	4439	3930	3569	3365	5295
8 Flying fishes	663	1353	1065	3311	12498	884	5613	3553	1513	1241	1158	1361	1100	228	168	2253
9 Perches																
a Rock cods	2885	2214	2302	2330	1534	1554	5111	3852	4465	2771	2419	1810	1828	1918	1902	1957
b Snappers	1513	801	2102	1440	905	914	1273	1493	1828	1135	990	740	748	785	778	801
c Pig face breams	3153	3868	2901	3939	2669	5575	7953	6373	9946	6502	5960	4678	4943	12967	12550	17871
d Threadfin breams	4498	6640	10327	7680	12343	17755	16896	13493	13201	8192	7148	5351	5406	5672	5626	5786
e Other perches	7507	8091	10512	10136	10739	8964	10082	14127	14719	11777	12586	11148	13009	37065	35208	30744
10 Goatfishes	3509	3606	5785	17055	14117	15565	16006	9646	10336	8759	6978	9137	11413	11975	11878	12216
11 Threadfins	642	771	1076	668	960	1367	1153	874	468	1647	1595	2519	2205	4234	3889	3655
12 Croakers	12670	11899	17818	17797	19484	19418	21814	19268	17047	15723	18884	20699	18658	19776	19118	16558
13 Ribbon fishes	8655	21855	10450	3094	2958	3460	14714	15593	3805	2891	2229	1587	913	237	201	1145
14 Carangids																
a Horse mackerel	109	89	12	340	673	40	173	21	6088	11379	16425	16082	15891	14483	13266	17517
b Scads	261	598	2826	2023	3576	8871	2856	2887	2721	2843	2835	2800	2657	2947	2921	2980
c Leather-jackets	3067	633	1481	1833	744	776	1437	1681	1154	1266	1456	1634	1721	1565	1494	1524
i <i>Trachinotus</i>	16	17	19	21	22	24	24	26	27	26	237	1184	1124	1247	1236	1261
d Other Carangids	11178	7850	9722	14046	13734	16355	15307	14496	11971	10215	8969	7420	5408	1081	1003	3704
i <i>Coryphaena</i>	84	82	83	83	84	87	85	84	82	86	85	85	80	89	88	90
ii <i>Elacate</i>	120	118	120	121	122	127	126	125	123	116	240	238	225	250	248	253
15 Silverbellies																
a <i>Leiognathus</i>	60403	73776	70486	71165	55943	59580	58383	56703	67428	61130	67642	72705	67549	56769	54752	60262
b <i>Gazza</i>	50	60	55	55	41	44	41	39	46	42	40	38	36	35	34	37
16 Big jawed jumper	987	780	502	1085	370	995	329	601	267	577	1043	635	1180	2229	1899	1556
17 Pomfrets																
a Black pomfret	299	957	271	191	402	621	555	210	589	1344	769	104	73	77	76	78
b Silver pomfret	244	430	1770	1852	1896	1453	2299	1613	1983	4871	2990	432	320	2823	2489	2952
c Chinese pomfrets	3	159	154	169	9	6	3	3	11	25	15	2	1	2	2	2
18 Mackerel																
a Indian mackerel	6668	10990	14313	9680	10485	7820	16676	34000	13397	12523	14059	11057	11337	20864	20564	17403
b Other mackerels	1	1	1	1	1	26	16	1	1	1	1	1	1	1	1	1
19 Seer fishes																
a <i>S. commersoni</i>	2768	2896	3127	3793	3428	3274	3909	5440	4146	7307	8250	8188	8124	9563	8952	10027
b <i>S. guttatus</i>	837	358	448	495	429	251	338	302	324	570	644	639	634	746	698	783
c <i>S. lineolatus</i>	24	44	57	555	74	2	43	15	48	85	95	95	94	111	104	116
d <i>Acanthocybium spp.</i>	42	34	28	23	16	10	3	2	3	4	4	4	4	5	5	5
20 Tunnies																
a <i>E. affinis</i>	859	1366	3309	2823	2336	2595	3538	3154	1705	1596	1604	1636	1663	1847	1831	1868
b <i>Auxis spp.</i>	52	515	224	354	924	372	650	603	145	136	137	139	142	157	156	159
c <i>K. pelamis</i>	14	26	38	50	1	61	9	328	7425	6951	6983	7124	7243	8042	7971	8134
d <i>T. tonggol</i>	113	81	54	296	17	11	4	80	64	60	60	61	62	69	69	70
e Other tunnies	541	552	210	429	652	932	545	303	90	1516	1772	1649	3200	2520	3996	5606
21 Bill fishes	286	165	111	243	76	89	116	224	202	189	190	194	197	219	217	221
22 Barracudas	1435	2276	3372	3885	4631	5278	6267	5560	5806	2507	2624	3243	3090	4284	4016	3272
23 Mulllets	693	385	870	626	512	478	1458	957	729	242	608	704	476	13163	12667	1347
24 Unicorn cod	1	138	112	85	58	31	3	3	2	2	2	2	2	2	2	2
25 Flatfishes																
a Halibut	478	290	527	564	650	1736	1401	501	659	814	1101	1610	1790	2331	2762	3301
b Flounders	34	23	14	6	11	91	100	84	41	33	34	39	36	38	37	38
c Soles	1970	2218	2288	2894	3749	3671	4288	3497	2871	2728	3159	4160	4293	5675	5318	5469
26 Crustaceans																
a Penaeid prawns	18071	25154	27625	24945	26470	30005	30061	32507	30096	21322	19083	5984	20485	29540	28057	32385
b Non-Penaeid prawns	264	325	52	655	82	107	1035	279	290	10147	11087	10825	8052	8348	7969	7344
c Lobsters	714	537	817	200	259	574	597	811	627	887	1191	1521	1811	2214	2119	2179
d Crabs	10626	9745	11891	10692	9238	10741	16387	14301	16388	1914	1985	9097	16063	24169	23584	25223
e Stomatopods	464	790	1030	1523	531	228	224	373	349	332	336	345	343	359	356	367
27 Molluscs																
28 Cephalopods	7177	6477	6174	6392	8753	11691	14754	25859	13360	33336	28773	28028	27820	12097	11532	14202
<b>Total</b>	<b>251683</b>	<b>306422</b>	<b>367363</b>	<b>357466</b>	<b>343662</b>	<b>364882</b>	<b>437343</b>	<b>452591</b>	<b>410792</b>	<b>398524</b>	<b>410963</b>	<b>408716</b>	<b>428514</b>	<b>454211</b>	<b>436784</b>	<b>448103</b>

**Table J : Marine fisheries catch (thousand tonnes) data for the Union Territory of Pondicherry, 1950-2000.**

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
<b>1 Elasmobranchs</b>																		
a Sharks	67	67	67	67	67	65	65	54	64	65	92	101	116	110	102	122	128	76
b Skates	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1
c Rays	71	71	71	71	71	68	69	57	68	68	97	107	123	116	107	128	135	80
<b>2 Eels</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>33</b>	<b>35</b>	<b>67</b>	<b>98</b>	<b>84</b>	<b>52</b>	<b>112</b>	<b>93</b>	<b>52</b>	<b>16</b>	<b>30</b>	<b>41</b>
<b>3 Catfishes</b>	<b>233</b>	<b>233</b>	<b>233</b>	<b>233</b>	<b>233</b>	<b>122</b>	<b>144</b>	<b>120</b>	<b>159</b>	<b>82</b>	<b>68</b>	<b>72</b>	<b>125</b>	<b>116</b>	<b>125</b>	<b>137</b>	<b>178</b>	<b>132</b>
<b>4 Clupeids</b>																		
a Wolf herring	118	118	118	118	118	57	116	141	114	90	107	142	284	201	159	171	182	198
b Oil sardine	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Other sardines	489	489	489	489	489	942	1057	766	622	654	668	514	474	668	1314	834	1127	936
d Hilsa shad	3	3	3	3	3	3	1	1	2	1	1	2	8	3	55	1	1	1
e Other shads	1	1	1	1	1	1	1	1	1	1	1	1	2	4	6	10	13	8
f Anchovies																		
i <i>Anchoviella</i>	1670	1670	1670	1670	1670	924	931	505	3052	1801	2012	1754	1274	1646	1307	1299	2066	1243
ii <i>Thrissocles</i>	471	471	471	471	471	261	263	161	90	166	206	169	271	109	193	209	246	441
g Other clupeids	419	419	419	419	419	384	568	312	364	516	535	712	630	419	604	298	827	376
<b>5 Bombay duck</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>
<b>6 Lizard fishes</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>6</b>	<b>12</b>	<b>8</b>	<b>7</b>	<b>19</b>	<b>20</b>	<b>34</b>	<b>49</b>	<b>21</b>	<b>38</b>	<b>17</b>	<b>32</b>	<b>33</b>
<b>7 Half beaks and Full</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>8 Flying fishes</b>	<b>104</b>	<b>104</b>	<b>104</b>	<b>104</b>	<b>104</b>	<b>179</b>	<b>130</b>	<b>50</b>	<b>18</b>	<b>91</b>	<b>355</b>	<b>65</b>	<b>229</b>	<b>53</b>	<b>50</b>	<b>8</b>	<b>194</b>	<b>169</b>
<b>9 Perches</b>																		
a Rock cods	1	1	1	1	1	1	2	1	2	2	2	4	1	2	2	2	3	2
b Snappers	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Pig face breams	2	2	2	2	2	2	2	2	2	3	2	5	2	2	2	2	3	3
d Threadfin breams	40	40	40	40	40	37	49	40	59	67	60	116	42	56	53	51	85	62
e Other perches	49	49	49	49	49	46	61	49	72	82	74	144	51	69	66	63	105	77
<b>10 Goatfishes</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>8</b>	<b>109</b>	<b>49</b>	<b>29</b>	<b>38</b>	<b>39</b>	<b>49</b>	<b>7</b>	<b>15</b>	<b>11</b>	<b>14</b>	<b>11</b>	<b>24</b>
<b>11 Threadfins</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>4</b>	<b>6</b>	<b>5</b>	<b>9</b>	<b>8</b>	<b>11</b>	<b>12</b>	<b>14</b>	<b>12</b>	<b>15</b>	<b>14</b>	<b>14</b>	<b>9</b>
<b>12 Croakers</b>	<b>830</b>	<b>830</b>	<b>830</b>	<b>830</b>	<b>830</b>	<b>506</b>	<b>937</b>	<b>473</b>	<b>472</b>	<b>492</b>	<b>549</b>	<b>739</b>	<b>585</b>	<b>485</b>	<b>562</b>	<b>442</b>	<b>619</b>	<b>754</b>
<b>13 Ribbon fishes</b>	<b>780</b>	<b>780</b>	<b>780</b>	<b>780</b>	<b>780</b>	<b>1182</b>	<b>876</b>	<b>1120</b>	<b>2382</b>	<b>1930</b>	<b>1161</b>	<b>822</b>	<b>1340</b>	<b>858</b>	<b>841</b>	<b>771</b>	<b>1136</b>	<b>705</b>
<b>14 Carangids</b>																		
a Horse mackerel	454	454	454	454	454	373	732	344	583	422	608	1044	333	641	470	597	534	572
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Leather-jackets	67	67	67	67	67	68	67	33	16	24	45	34	44	38	36	42	35	44
i <i>Trachinotus</i>																		
d Other Carangids	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
i <i>Coryphaena</i>	6	6	6	6	6	6	6	3	4	4	4	3	2	1	1	2	6	9
ii <i>Elacate</i>	6	6	6	6	6	6	6	2	4	4	3	3	4	2	5	4	3	3
<b>15 Silverbellies</b>																		
a <i>Leiognathus</i>	99	99	99	99	99	73	162	108	122	119	145	153	153	171	393	256	477	477
b <i>Gazza</i>																		
<b>16 Big jawed jumper</b>	<b>214</b>	<b>214</b>	<b>214</b>	<b>214</b>	<b>214</b>	<b>159</b>	<b>307</b>	<b>244</b>	<b>854</b>	<b>669</b>	<b>411</b>	<b>435</b>	<b>374</b>	<b>304</b>	<b>313</b>	<b>150</b>	<b>156</b>	<b>135</b>
<b>17 Pomfrets</b>																		
a Black pomfret	77	77	77	77	77	73	117	104	94	128	134	118	145	119	89	70	65	111
b Silver pomfret	19	19	19	19	19	18	29	25	23	32	33	29	35	30	22	17	16	27
c Chinese pomfrets																		
<b>18 Mackerel</b>																		
a Indian mackerel	127	127	127	127	127	221	270	295	82	205	245	1186	659	665	622	111	417	712
b Other mackerels																		
<b>19 Seer fishes</b>																		
a <i>S. commersoni</i>	20	20	20	20	20	10	26	26	24	18	18	30	27	20	21	17	25	25
b <i>S. guttatus</i>	19	19	19	19	19	10	24	24	23	17	17	28	26	19	20	16	23	23
c <i>S. lineolatus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>Acanthocybium spp.</i>																		
<b>20 Tunnies</b>																		
a <i>E. affinis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b <i>Auxis spp.</i>																		
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	2	2	2	2	2	2	2	2	1	1	1	2	1	1	3	1	1	1
<b>21 Bill fishes</b>																		
<b>22 Barracudas</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>2</b>	<b>14</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>6</b>	<b>10</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>6</b>	<b>12</b>
<b>23 Mulletts</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>11</b>	<b>28</b>	<b>88</b>	<b>15</b>	<b>11</b>	<b>56</b>
<b>24 Unicorn cod</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>25 Flatfishes</b>																		
a Halibut	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b Flounders	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Soles	19	19	19	19	19	39	6	8	6	18	34	58	50	22	58	36	40	43
<b>26 Crustaceans</b>																		
a Penaeid prawns	247	247	247	247	247	395	857	156	103	164	188	184	256	336	402	269	622	712
b Non-Penaeid prawns	1	1	1	1	1	1	1	1	3	1	1	3	1	1	1	1	1	1
c Lobsters	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d Crabs	1	1	1	1	1	1	2	7	17	23	25	40	23	34	124	67	85	122
e Stomatopods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>27 Molluscs</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>28 Cephalopods</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>6</b>	<b>6</b>	<b>15</b>	<b>11</b>
<b>Total</b>	<b>6843</b>	<b>6843</b>	<b>6843</b>	<b>6843</b>	<b>6843</b>	<b>6303</b>	<b>8081</b>	<b>5360</b>	<b>9639</b>	<b>8150</b>	<b>8085</b>	<b>9001</b>	<b>7913</b>	<b>7520</b>	<b>8368</b>	<b>6318</b>	<b>9695</b>	<b>8485</b>



**Table J :** Continued.

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1 Elasmobranchs																	
a Sharks	85	137	369	665	403	261	205	117	140	282	154	177	354	315	167	71	466
b Skates	1	2	5	11	7	3	2	2	2	5	3	3	5	5	5	5	15
c Rays	90	138	370	669	406	262	207	117	140	284	155	177	355	317	492	444	308
2 Eels	41	188	29	163	2	3	7	7	10	8	74	142	13	21	3	50	4
3 Catfishes	124	139	253	570	119	200	145	101	113	222	264	82	128	166	34	88	124
4 Clupeids																	
a Wolf herring	208	185	271	293	154	293	60	50	67	64	112	172	101	86	121	127	82
b Oil sardine	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	151
c Other sardines	892	1533	1784	1914	728	504	1254	1044	1960	1180	1196	2059	2825	1361	1434	3665	1247
d Hilsa shad	1	2	4	5	12	18	26	31	32	30	27	27	26	13	1	20	18
e Other shads	7	6	75	168	94	158	180	277	129	44	109	12	55	131	107	357	327
f Anchovies																	
i <i>Anchoviella</i>	996	2289	2526	738	442	701	721	411	190	559	526	357	296	591	398	341	652
ii <i>Thrissocles</i>	380	401	820	358	445	624	541	336	602	413	261	442	400	527	475	415	791
g Other clupeids	574	514	510	112	142	67	74	50	135	208	284	356	282	400	510	529	629
5 Bombay duck	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
6 Lizard fishes	46	101	189	437	202	169	58	81	179	167	207	422	263	401	404	497	237
7 Half beaks and Full	1	1	1	28	3	12	22	55	2	4	5	6	27	58	195	155	11
8 Flying fishes	208	218	258	521	42	18	115	142	176	3	485	880	3	623	181	350	487
9 Perches																	
a Rock cods	2	3	7	11	7	10	4	9	19	8	11	23	15	21	54	3	20
b Snappers	1	1	2	3	2	2	2	2	3	2	3	5	3	5	5	27	5
c Pig face breams	3	4	9	14	8	11	4	13	24	11	14	29	20	28	5	81	24
d Threadfin breams	70	102	188	352	201	288	127	310	571	276	333	704	477	664	890	1416	577
e Other perches	86	124	227	428	244	351	156	378	694	336	405	857	581	808	1240	748	888
10 Goatfishes	21	35	177	209	109	198	169	183	131	52	171	327	247	253	182	128	78
11 Threadfins	16	27	44	25	25	33	56	26	44	8	42	23	10	2	37	17	42
12 Croakers	821	897	821	619	905	1026	557	389	740	418	587	493	526	538	945	781	1348
13 Ribbon fishes	946	700	328	102	404	438	246	313	456	146	140	133	185	220	112	58	232
14 Carangids																	
a Horse mackerel	335	590	237	1064	313	229	492	432	420	363	320	286	247	203	167	132	91
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	164	1658	81	865
c Leather-jackets	53	26	3	23	15	9	2	2	2	5	33	28	2	32	21	33	40
i <i>Trachynotus</i>																	
d Other Carangids	1	1	1	1	1	1	1	609	541	503	223	555	497	1529	739	560	1008
i <i>Coryphaena</i>	7	8	1	2	2	3	5	5	5	5	5	5	5	5	5	5	5
ii <i>Elacate</i>	4	5	6	7	7	7	7	7	7	7	7	7	7	7	7	8	8
15 Silverbellies																	
a <i>Leiognathus</i>	565	557	1128	940	683	895	555	937	822	527	584	1202	1120	1591	907	2948	1683
b <i>Gazza</i>																	
16 Big jawed jumper	143	77	142	84	28	3	27	55	206	284	146	18	48	72	45	32	22
17 Pomfrets																	
a Black pomfret	114	102	143	60	89	108	42	18	60	68	63	45	247	157	170	83	242
b Silver pomfret	28	25	36	16	22	26	11	6	15	18	16	11	63	44	24	88	67
c Chinese pomfrets																	
18 Mackerel																	
a Indian mackerel	508	501	519	689	3336	2671	2415	2255	1703	406	181	437	460	321	548	997	1027
b Other mackerels																	
19 Seer fishes																	
a <i>S. commersoni</i>	21	17	43	40	13	23	35	12	15	17	21	55	44	50	72	104	305
b <i>S. guttatus</i>	20	17	43	40	13	23	35	12	15	17	21	55	44	53	4	23	12
c <i>S. lineolatus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>Acanthocybium spp.</i>																	
20 Tunnies																	
a <i>E. affinis</i>	1	1	1	2	1	1	1	1	1	2	3	4	5	6	22	5	64
b <i>Auxis spp.</i>																	
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	110	68
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	1	2	2	15	1	5	8	5	1	2	3	1	26	50	32	12	35
21 Bill fishes																	
22 Barracudas	8	14	36	103	3	1	29	27	16	9	25	23	57	51	51	31	80
23 Mulllets	43	44	79	11	25	31	2	57	7	23	41	44	81	8	7	78	5
24 Unicorn cod	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25 Flatfishes																	
a Halibut	1	1	2	2	2	2	2	2	2	2	2	2	2	10	10	5	67
b Flounders	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	13	13
c Soles	42	36	108	189	108	351	107	229	433	126	171	261	248	307	379	481	515
26 Crustaceans																	
a Penaeid prawns	571	615	763	458	294	58	66	121	171	177	382	841	781	551	541	483	1481
b Non-Penaeid prawns	1	1	2	2	8	14	5	4	4	3	111	114	68	87	28	16	109
c Lobsters	1	1	2	2	2	2	2	46	56	32	3	8	7	8	45	53	9
d Crabs	100	156	157	282	676	318	448	477	880	480	394	390	283	385	1545	1025	1339
e Stomatopods	1	1	2	2	2	2	2	2	2	2	2	2	2	2	10	12	9
27 Molluscs	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
28 Cephalopods	15	25	15	82	36	33	62	106	360	101	56	81	66	72	142	191	67
<b>Total</b>	<b>8213</b>	<b>10586</b>	<b>12749</b>	<b>12545</b>	<b>10795</b>	<b>10479</b>	<b>9317</b>	<b>9883</b>	<b>12317</b>	<b>7922</b>	<b>8393</b>	<b>12394</b>	<b>11617</b>	<b>13345</b>	<b>15277</b>	<b>18152</b>	<b>18865</b>

**Table J : Continued.**

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>1 Elasmobranchs</b>																
a Sharks	348	21	88	321	83	26	23	99	75	1409	1669	1152	1555	1214	1377	1619
b Skates	24	25	27	26	25	20	14	17	16	46	31	13	15	31	40	43
c Rays	409	268	317	288	269	430	182	375	201	581	373	176	182	376	488	519
<b>2 Eels</b>	5	5	9	26	21	14	7	2	105	158	149	69	33	84	70	66
<b>3 Catfishes</b>	71	1862	55	67	40	8	16	88	67	1588	1490	1611	1555	1236	1101	1059
<b>4 Clupeids</b>																
a Wolf herring	59	118	127	122	28	63	37	42	37	285	276	227	242	163	140	109
b Oil sardine	1459	1971	795	220	3141	6634	1436	3116	1143	2513	3952	3235	2846	2743	2571	2547
c Other sardines	3375	1206	2472	1750	1375	869	1187	2421	855	1087	1222	1511	1558	1433	1376	1398
d Hilsa shad	16	14	12	10	3	185	280	317	270	862	653	499	257	41	64	109
e Other shads	101	27	2	3	2	2	2	5	8	33	56	90	108	112	41	97
f Anchovies																
i <i>Anchoviella</i>	527	855	365	377	156	205	70	168	95	351	346	154	239	610	723	595
ii <i>Thriposocles</i>	691	454	681	299	337	414	710	423	260	407	239	73	79	1575	1680	1567
g Other clupeids	812	626	721	692	583	531	750	415	114	187	247	216	458	286	397	452
<b>5 Bombay duck</b>	3	4	5	7	7	8	9	10	8	10	10	8	12	37	30	67
<b>6 Lizard fishes</b>	298	444	435	119	208	256	230	335	207	482	801	1229	893	766	836	962
<b>7 Half beaks and Full</b>	1	2	2	3	3	16	28	2	6	303	176	233	69	54	11	40
<b>8 Flying fishes</b>	571	261	213	1018	1170	134	485	231	72	1175	734	281	260	117	219	362
<b>9 Perches</b>																
a Rock cods	5	11	16	4	6	6	23	46	20	43	17	15	12	10	10	10
b Snappers	25	30	73	129	59	28	18	2	6	1686	1344	1712	1831	2426	2362	2770
c Pig face breams	64	20	5	83	30	8	27	55	10	22	9	7	6	5	5	5
d Threadfin breams	1467	1001	134	809	476	446	379	459	215	586	285	287	265	319	136	177
e Other perches	1037	535	1184	468	330	614	325	234	335	1429	861	977	980	1248	1078	1008
<b>10 Goatfishes</b>	264	139	214	300	737	691	368	168	134	102	101	111	100	82	83	82
<b>11 Threadfins</b>	40	62	57	34	53	50	39	25	49	667	440	321	189	156	157	155
<b>12 Croakers</b>	842	801	837	835	436	299	254	307	211	1454	1396	1643	1353	942	1062	941
<b>13 Ribbon fishes</b>	40	133	119	2406	101	31	38	101	96	166	224	314	354	348	456	262
<b>14 Carangids</b>																
a Horse mackerel	48	7	5	3	1	11	19	2	722	1586	1450	2006	1995	1674	1677	1690
b Scads	328	119	172	23	94	103	3	2	7	9	11	15	16	15	19	20
c Leather-jackets	20	33	32	20	14	10	5	5	1	133	262	434	539	565	620	695
i <i>Trachynotus</i>																
d Other Carangids	840	465	510	1045	638	696	421	345	228	759	1256	1942	2330	2390	2574	2233
i <i>Coryphaena</i>	5	5	5	6	6	5	5	5	5	5	5	6	5	4	4	4
ii <i>Elacate</i>	7	8	8	8	8	8	7	7	7	7	7	8	7	6	6	6
<b>15 Silverbellies</b>																
a <i>Leiognathus</i>	2473	1954	1541	663	1036	828	725	1181	935	1836	1764	3252	3105	2556	2566	2543
b <i>Gazza</i>																
<b>16 Big jawed jumper</b>	7	120	85	121	152	166	171	227	243	204	21	180	147	141	130	115
<b>17 Pomfrets</b>																
a Black pomfret	56	2	39	60	21	53	21	23	12	1210	497	809	971	998	1172	1121
b Silver pomfret	2	61	44	30	68	20	175	4	16	59	58	64	58	47	48	47
c Chinese pomfrets																
<b>18 Mackerel</b>																
a Indian mackerel	1326	1630	2382	671	1278	1227	926	1896	3477	3407	2966	2821	2956	2566	2452	2269
b Other mackerels																
<b>19 Seer fishes</b>																
a <i>S. commersoni</i>	125	115	156	86	90	67	87	123	62	70	72	59	47	23	25	20
b <i>S. guttatus</i>	17	7	4	1	1	5	10	2	2	3512	3540	3031	2007	996	1057	869
c <i>S. lineolatus</i>	1	1	1	1	1	1	1	1	1	1386	1435	1152	749	355	377	310
d <i>Acanthocybium spp.</i>																
<b>20 Tunnies</b>																
a <i>E. affinis</i>	10	60	5	103	9	26	246	133	10	1026	719	794	741	621	623	628
b <i>Auxis spp.</i>																
c <i>K. pelamis</i>	24	13	72	67	110	62	16	104	110	121	120	133	124	104	104	105
d <i>T. tonggol</i>	1	1	1	1	41	33	25	189	312	501	655	898	1132	949	951	959
e Other tunnies	16	64	41	18	27	34	42	59	219	425	604	869	999	996	965	894
<b>21 Bill fishes</b>	35	94	5	31	15	24	15	55	27	30	30	33	31	26	26	26
<b>22 Barracudas</b>	84	21	45	329	60	177	49	84	110	519	85	297	253	212	212	214
<b>23 Mulletts</b>	13	68	83	16	2	63	14	21	10	1574	1447	1373	1676	2814	2919	3016
<b>24 Unicorn cod</b>	1	48	50	47	41	35	30	25	17	14	9	41	14	12	12	12
<b>25 Flatfishes</b>																
a Halibut	58	55	23	24	4	22	68	36	45	3	80	87	79	65	65	65
b Flounders	13	11	9	10	8	6	5	4	2	2	29	32	29	24	24	24
c Soles	378	437	357	258	284	327	475	331	183	32	1297	1373	1197	951	861	1043
<b>26 Crustaceans</b>																
a Penaeid prawns	1334	966	894	781	915	1802	1137	828	299	4206	4937	3317	4165	4029	4188	4944
b Non-Penaeid prawns	14	97	58	20	39	26	30	43	51	3017	2825	1448	1612	1716	1744	1926
c Lobsters	22	32	28	38	19	22	36	6	8	39	69	111	130	165	19	2
d Crabs	782	582	363	760	182	614	738	594	600	1188	1550	1437	2167	2207	2170	2157
e Stomatopods	5	2	172	2	17	12	5	2	2	2	2	2	2	1	1	1
<b>27 Molluscs</b>	2	2	2	2	2	2	2	2	2	629	66	557	940	1134	1252	1218
<b>28 Cephalopods</b>	78	77	119	56	237	200	368	406	67	97	545	843	1282	1055	1059	1050
<b>Total</b>	<b>20682</b>	<b>18054</b>	<b>16280</b>	<b>15722</b>	<b>15100</b>	<b>18673</b>	<b>12817</b>	<b>16214</b>	<b>12409</b>	<b>45240</b>	<b>45515</b>	<b>45585</b>	<b>46954</b>	<b>45832</b>	<b>46434</b>	<b>47248</b>

**Table K** : Marine fisheries catch (thousand tonnes) data for the state of Andhra Pradesh, 1950-2000.

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1 Elasmobranchs																		
a Sharks	1904	3261	2203	1682	625	1185	835	1092	1299	1253	3004	4263	3971	4194	2796	3090	3115	2282
b Skates	242	415	280	214	80	151	106	139	165	159	382	543	506	534	356	394	397	291
c Rays	1315	2253	1522	1162	432	818	577	754	898	866	2076	2945	2744	2898	1932	2135	2152	1577
2 Eels	94	73	71	71	68	78	21	48	24	37	92	911	666	843	97	376	192	188
3 Catfishes	7081	5730	4636	1964	822	1723	1047	1066	982	799	1545	1420	2545	2171	8536	4472	2332	3592
4 Clupeids																		
a Wolf herring	1108	558	495	517	1894	1860	455	363	581	657	1135	1860	1204	1285	1543	1235	1443	1673
b Oil sardine	1363	1065	1029	1042	997	1145	1032	970	928	959	866	737	616	479	349	200	60	69
c Other sardines	10843	8469	8960	3241	1252	12144	6447	2925	2484	2174	5282	5501	7457	6953	5899	9178	30779	8857
d Hilsa shad	683	533	515	522	500	651	332	354	92	115	97	139	26	59	199	96	564	196
e Other shads	246	192	186	188	180	207	186	254	727	742	2581	2777	4147	1392	482	93	189	352
f Anchovies																		
i <i>Anchoviella</i>	9080	2814	3196	3351	1993	7056	6572	6237	3181	2958	6975	4078	4841	5425	5725	10807	3758	8612
ii <i>Thrissocles</i>	1008	313	355	372	222	784	730	729	619	504	1801	932	1248	1771	1696	602	1185	1141
g Other clupeids	4387	2986	3197	4171	8739	4149	3838	2074	1507	988	1571	1624	1408	1848	2273	2051	2393	2438
5 Bombay duck	273	43	124	188	137	138	92	358	280	466	654	518	465	1111	320	442	516	717
6 Lizard fishes	411	66	187	283	205	207	157	57	99	34	110	250	105	196	286	12	16	924
7 Half beaks and Full	192	150	145	147	140	161	145	9	47	61	19	43	9	54	116	186	72	117
8 Flying fishes	384	935	746	163	65	32	6	4	30	2	10	11	27	10	17	259	170	3
9 Perches																		
a Rock cods	6	7	8	6	2	14	2	6	3	2	7	8	7	6	16	14	7	6
b Snappers	43	45	48	35	11	84	12	38	16	10	41	44	44	38	98	82	42	38
c Pig face breams	1	1	1	1	2	2	2	1	1	1	1	1	1	1	3	2	1	1
d Threadfin breams	415	440	467	334	112	811	122	367	155	100	396	428	427	364	957	798	408	371
e Other perches	687	729	775	552	185	1344	201	607	256	165	657	708	707	601	1584	1320	675	614
10 Goatfishes	959	1393	410	566	50	908	2668	831	221	202	1133	226	513	1138	359	110	58	262
11 Threadfins	181	141	77	114	344	146	81	136	125	101	282	289	394	1060	295	424	354	607
12 Croakers	5135	3146	3263	4093	1842	7176	6268	2980	2133	2125	4094	3835	3870	3296	2399	3574	3095	3174
13 Ribbon fishes	3039	1094	1147	1256	1162	2762	2080	2612	1125	2645	2248	3437	2851	2688	7307	11104	4917	7284
14 Carangids																		
a Horse mackerel	2273	2178	1141	696	405	1622	2506	427	563	107	532	804	453	2029	2260	2207	1671	2889
b Scads	4447	3473	3355	3398	3254	3735	3367	3164	3026	3128	3268	3290	3375	3389	3490	3399	3468	3460
c Leather-jackets	828	647	625	633	606	696	627	92	163	139	646	414	1085	640	391	969	1094	62
i <i>Trachinotus</i>	6	5	5	5	5	5	5	4	3	3	2	2	4	4	3	3	2	2
d Other Carangids	121	95	91	93	89	102	92	86	82	85	89	90	92	92	95	93	95	44
i <i>Coryphaena</i>	11	9	9	9	8	10	9	4	9	5	16	18	68	7	51	26	2	3
ii <i>Elacate</i>	25	20	19	19	18	21	19	11	20	12	36	38	54	41	12	15	19	23
15 Silverbellies																		
a <i>Leiognathus</i>	938	850	368	381	292	942	892	4823	630	1209	2940	1952	2033	3828	1839	3962	2251	5475
b <i>Gazza</i>	104	95	41	42	32	105	99	569	156	128	543	67	19	32	31	29	15	13
16 Big jawed jumper	2430	2206	954	988	757	2444	1865	423	398	326	1020	992	610	1566	904	1963	876	1504
17 Pomfrets																		
a Black pomfret	1056	627	780	797	299	816	818	920	1023	690	1502	916	2423	1456	2183	1486	1200	1526
b Silver pomfret	528	313	390	399	149	407	409	460	511	345	751	458	1211	728	1092	743	600	763
c Chinese pomfrets	16	10	11	13	5	13	12	14	16	11	22	14	37	22	33	22	18	24
18 Mackerel																		
a Indian mackerel	1260	1258	633	823	59	744	1061	903	252	385	2655	1098	576	1119	1880	1114	2033	2025
b Other mackerels																		
19 Seer fishes																		
a <i>S. commersoni</i>	2213	1482	1284	634	397	733	350	303	247	271	395	796	1266	876	949	759	827	659
b <i>S. guttatus</i>	5044	3378	2927	1445	906	1670	797	689	562	618	902	1812	2886	1999	2163	1731	1884	1502
c <i>S. lineolatus</i>	21	15	12	6	4	7	4	3	3	3	4	7	12	9	9	8	8	7
d <i>Acanthocybium</i> spp.																		
20 Tunnies																		
a <i>E. affinis</i>	85	66	3	8	7	22	66	9	11	20	46	106	520	330	526	236	265	133
b <i>Auxis</i> spp.	4	3	2	2	1	1	3	2	1	1	2	5	22	13	22	10	11	6
c <i>K. pelamis</i>	4	3	2	2	1	1	3	2	1	1	2	5	22	13	22	10	11	6
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	3	2	3	1	1	1
e Other tunnies	63	49	2	6	6	16	49	6	8	15	34	79	387	245	391	176	197	98
21 Bill fishes	257	201	194	197	188	216	195	183	175	181	189	190	195	196	202	197	201	200
22 Barracudas	1	1	6	12	16	24	27	14	7	6	8	9	76	106	32	13	82	327
23 Mulletts	3	2	2	2	2	2	2	15	26	8	45	11	6	274	123	74	215	353
24 Unicorn cod	1	1	1	1	1	1	1	1	1	1	1	3	6	8	13	16	22	26
25 Flatfishes																		
a Halibut	14	11	10	11	10	12	11	10	10	10	10	10	11	11	11	11	11	11
b Flounders	340	266	257	260	249	285	258	243	233	241	251	256	263	259	266	260	265	264
c Soles	170	133	4	12	20	2	3	192	63	64	146	207	158	181	234	164	115	266
26 Crustaceans																		
a Penaeid prawns	7994	4249	3609	4743	1949	3169	4218	953	1311	1642	1484	2658	1274	3350	5181	3384	2952	6763
b Non-Penaeid prawns	1316	700	594	781	321	522	704	782	697	776	936	655	365	846	1194	318	616	1966
c Lobsters	9	5	4	6	2	4	5	23	76	100	133	47	21	82	46	1	16	27
d Crabs	66	35	30	39	16	26	37	159	529	700	929	330	146	574	324	6	112	186
e Stomatopods	19	10	8	11	5	7	11	45	151	200	265	94	42	164	93	2	32	53
27 Molluscs																		
28 Cephalopods	4	3	3	3	3	3	3	3	3	3	1	3	5	10	22	17	13	4
Total	82753	59252	51418	42709	32143	64121	52540	40550	28943	29561	56866	54966	60521	64913	71727	76477	80087	76054

**Table K : Continued.**

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
<b>1 Elasmobranchs</b>																	
a Sharks	4710	2141	3419	3678	5818	7131	10218	8250	5883	5185	7213	5612	4432	4482	7312	10133	10388
b Skates	600	273	436	468	740	908	1301	1049	749	661	918	715	564	573	361	610	955
c Rays	3254	1479	2362	2540	4020	4927	7060	5700	4064	3582	4985	3877	3062	3124	2414	2533	4381
<b>2 Eels</b>	418	91	596	158	157	419	735	2762	328	640	1630	357	481	634	828	713	1083
<b>3 Catfishes</b>	4251	3028	3612	4020	5219	<b>6628</b>	<b>7974</b>	<b>8286</b>	9806	8275	4944	5542	3891	6639	4979	5449	8590
<b>4 Clupeids</b>																	
a Wolf herring	2721	1432	1418	1409	2206	2784	2460	2991	1898	1221	1288	977	1150	1125	1251	1938	2035
b Oil sardine	<b>79</b>	<b>86</b>	<b>95</b>	<b>105</b>	<b>114</b>	132	608	134	116	<b>129</b>	<b>149</b>	<b>162</b>	<b>183</b>	<b>198</b>	<b>214</b>	<b>230</b>	<b>246</b>
c Other sardines	8870	13113	18526	19535	7447	12603	33999	33798	23985	11005	7846	6184	14265	15918	13827	17585	21082
d Hilsa shad	251	<b>157</b>	65	779	216	48	<b>63</b>	72	289	41	<b>61</b>	78	98	41	149	62	57
e Other shads	1315	1063	865	753	3030	2941	2532	953	1875	1659	1377	1093	1297	1360	2490	3791	7197
f Anchovies																	
i <i>Anchoviella</i>	5457	5295	4885	1304	1968	5140	10645	7208	11682	8974	7974	5892	6331	14238	6667	8249	4519
ii <i>Thrissocles</i>	906	2737	1271	933	1090	2627	2044	1819	1821	1402	1862	3435	7502	2555	2836	3871	3436
g Other clupeids	4299	4496	2605	5879	8728	9704	10997	7720	8687	2370	1832	2520	5618	5004	5009	5176	6714
<b>5 Bombay duck</b>	654	149	213	762	292	234	135	368	221	963	1122	717	626	856	1542	1080	1023
<b>6 Lizard fishes</b>	505	436	143	165	720	599	435	364	266	1279	1593	2012	1549	1600	2594	1721	1908
<b>7 Half beaks and Full</b>	144	32	313	204	17	3	209	25	14	135	61	100	99	29	48	66	138
<b>8 Flying fishes</b>	22	28	450	242	51	111	<b>108</b>	<b>97</b>	<b>92</b>	84	66	71	44	<b>107</b>	169	74	39
<b>9 Perches</b>																	
a Rock cods	4	3	6	13	13	14	21	44	18	23	18	28	47	55	55	12	24
b Snappers	22	20	37	80	79	84	134	272	104	148	108	168	286	328	516	1594	3344
c Pig face breams	1	1	2	2	1	2	3	8	3	4	3	4	8	11	11	11	9
d Threadfin breams	212	190	356	779	765	821	1299	2646	1008	1435	1055	1625	2779	3201	3845	4495	3365
e Other perches	352	315	590	1290	1265	1359	2151	4380	1670	2375	1746	2691	4602	5311	6754	7228	10697
<b>10 Goatfishes</b>	232	189	366	549	639	341	497	1084	884	460	505	621	581	1068	2378	2162	1486
<b>11 Threadfins</b>	774	902	947	2317	3124	2162	3638	2761	2900	1020	1620	2060	2410	1212	3197	1853	3339
<b>12 Croakers</b>	2546	6741	6298	8787	10403	11757	20149	17565	17419	14880	8434	12873	15804	11007	13737	17459	12614
<b>13 Ribbon fishes</b>	6340	9778	6280	7278	3519	3974	12765	11986	12853	8572	5620	6341	16022	8311	6829	10700	6459
<b>14 Carangids</b>																	
a Horse mackerel	2729	1920	2453	2432	2380	2736	3129	3583	3147	4015	2042	3187	<b>1772</b>	278	712	813	764
b Scads	<b>3509</b>	<b>3455</b>	<b>3418</b>	<b>3450</b>	<b>3458</b>	<b>3722</b>	<b>3800</b>	<b>3609</b>	<b>3639</b>	<b>3534</b>	<b>3597</b>	<b>3525</b>	<b>3608</b>	3568	2728	3797	1910
c Leather-jackets	640	257	196	522	542	1116	1747	1834	1880	532	679	444	727	459	588	1645	1967
i <i>Trachynotus</i>	<b>3</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>6</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
d Other Carangids	<b>42</b>	<b>38</b>	35	15	<b>13</b>	<b>12</b>	<b>9</b>	6	5	78	89	56	<b>754</b>	1433	2438	3477	3146
i <i>Coryphaena</i>	12	8	72	17	104	38	109	257	92	137	25	7	7	7	7	7	7
ii <i>Elacate</i>	26	29	20	2	37	59	2	26	14	7	54	<b>293</b>	<b>546</b>	<b>782</b>	<b>1017</b>	<b>1257</b>	<b>1492</b>
<b>15 Silverbellies</b>																	
a <i>Leiognathus</i>	3186	2381	3912	3316	4247	4354	7875	16942	6199	8627	3276	5229	<b>6292</b>	<b>15198</b>	<b>7929</b>	<b>12167</b>	<b>7795</b>
b <i>Gazza</i>	<b>10</b>	<b>8</b>	9	5	1	5	20	152	77	<b>70</b>	<b>72</b>	<b>70</b>	<b>83</b>	<b>198</b>	<b>102</b>	<b>154</b>	<b>97</b>
<b>16 Big jawed jumper</b>	932	1281	1501	1241	1996	1524	3121	3778	2748	1654	1031	1378	1564	1276	1280	1691	931
<b>17 Pomfrets</b>																	
a Black pomfret	2831	1427	2049	3498	3930	4185	4246	5653	4315	2439	2432	1993	2418	2777	3335	3016	9987
b Silver pomfret	1416	714	1025	1749	1964	2093	2123	2827	2158	1220	1216	996	1208	1392	2926	4388	5388
c Chinese pomfrets	43	22	31	53	60	64	64	86	66	37	36	31	37	45	236	39	96
<b>18 Mackerel</b>																	
a Indian mackerel	2240	1557	2028	1373	5296	2662	1870	1632	2153	1043	2573	2623	6352	3296	2986	6551	6414
b Other mackerels																	
<b>19 Seer fishes</b>																	
a <i>S. commersoni</i>	846	880	1064	998	1739	1302	1455	1643	1071	994	807	1687	925	1096	2488	2379	2697
b <i>S. guttatus</i>	1927	2006	2425	2275	3965	2968	3318	3746	2443	2267	1840	3847	2108	2499	3241	3755	5334
c <i>S. lineolatus</i>	8	9	11	10	17	13	14	16	10	10	8	17	9	13	<b>23</b>	<b>33</b>	<b>43</b>
d <i>Acanthocybium spp.</i>																	
<b>20 Tunnies</b>																	
a <i>E. affinis</i>	260	103	72	157	265	81	402	372	188	246	183	239	235	196	650	729	811
b <i>Auxis spp.</i>	11	4	3	7	11	3	17	15	8	10	8	10	10	<b>8</b>	<b>8</b>	<b>8</b>	10
c <i>K. pelamis</i>	11	4	3	7	11	3	17	15	8	10	8	10	10	<b>8</b>	<b>8</b>	<b>8</b>	8
d <i>T. tonggol</i>	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1
e Other tunnies	193	76	53	117	197	60	299	277	140	183	136	177	174	146	170	32	36
<b>21 Bill fishes</b>	<b>203</b>	<b>200</b>	<b>198</b>	<b>200</b>	<b>200</b>	<b>216</b>	<b>220</b>	<b>209</b>	<b>211</b>	<b>205</b>	<b>208</b>	<b>204</b>	<b>209</b>	207	224	356	66
<b>22 Barracudas</b>	183	147	8	69	86	19	20	122	193	108	44	62	90	126	287	244	158
<b>23 Mulletts</b>	309	282	217	801	169	396	3013	1434	1427	248	357	232	45	284	620	166	146
<b>24 Unicorn cod</b>	<b>31</b>	<b>34</b>	<b>39</b>	<b>43</b>	<b>48</b>	<b>56</b>	<b>63</b>	<b>64</b>	<b>69</b>	<b>71</b>	<b>78</b>	<b>80</b>	<b>87</b>	<b>90</b>	<b>94</b>	<b>98</b>	<b>103</b>
<b>25 Flatfishes</b>																	
a Halibut	<b>11</b>	<b>11</b>	<b>17</b>	<b>16</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>17</b>	<b>18</b>	<b>16</b>	<b>17</b>	<b>16</b>	18	72	91	151	157
b Flounders	<b>268</b>	<b>264</b>	<b>414</b>	<b>397</b>	<b>385</b>	<b>417</b>	<b>439</b>	<b>404</b>	<b>430</b>	<b>393</b>	<b>405</b>	<b>392</b>	448	1620	116	210	42
c Soles	280	101	140	117	307	290	359	459	90	994	523	890	486	1765	1127	1467	737
<b>26 Crustaceans</b>																	
a Penaeid prawns	5760	4224	7704	13160	7346	12588	15896	10669	13862	8925	11727	12270	9019	10228	14435	15368	13348
b Non-Penaeid prawns	341	1723	2904	425	624	1031	4583	5255	3570	7277	2237	4398	6925	2443	6767	8506	1797
c Lobsters	16	11	15	14	40	56	152	153	5	3	30	48	17	2	13	30	19
d Crabs	111	78	105	98	279	395	1066	728	421	841	575	1294	2352	2362	1494	4604	2961
e Stomatopods	32	22	30	28	80	113	305	182	105	210	144	324	<b>479</b>	450	462	925	917
<b>27 Molluscs</b>																	
<b>28 Cephalopods</b>	71	69	1021	168	96	95	269	227	387	596	448	763	782	800	931	784	705
<b>Total</b>	<b>77429</b>	<b>77526</b>	<b>89351</b>	<b>100812</b>	<b>101555</b>	<b>120148</b>	<b>192229</b>	<b>188741</b>	<b>159785</b>	<b>123527</b>	<b>100936</b>	<b>112550</b>	<b>143530</b>	<b>144113</b>	<b>149548</b>	<b>187658</b>	<b>185217</b>

**Table K** : Continued.

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1 Elasmobranchs																
a Sharks	9739	9069	6172	7348	6368	5332	3685	8755	7949	15004	15530	15076	7227	7417	6407	9575
b Skates	400	1165	976	713	475	394	673	1015	399	777	830	842	425	463	1338	1187
c Rays	2478	2588	2434	2651	6052	5175	2730	2959	2705	4602	4129	3251	1097	513	5269	1324
2 Eels	900	721	811	1194	857	945	1244	2000	1862	777	781	2243	2373	4751	13958	6641
3 Catfishes	8142	6130	4998	4203	4283	3196	2910	3896	4966	10830	10890	8652	7766	10955	1193	8330
4 Clupeids																
a Wolf herring	1611	1274	1323	1472	949	1438	1236	1043	1226	1559	1574	1609	1919	2694	1472	1260
b Oil sardine	262	1234	145	1298	5745	968	1791	4382	2229	7649	7721	9312	7677	6953	2933	1260
c Other sardines	22761	16668	12302	17160	28272	21731	8665	8889	12253	17416	17110	14816	15207	18599	12498	32722
d Hilsa shad	174	235	834	97	89	77	253	338	1096	1722	1863	1768	1827	1165	2283	1227
e Other shads	2475	5966	6173	4909	1860	728	8050	3948	2904	4238	4278	3809	4022	5066	3510	4209
f Anchovies																
i <i>Anchoviella</i>	2696	10768	12992	8645	3279	9824	10520	6362	6590	891	899	768	904	846	2138	625
ii <i>Thrissocles</i>	4053	5245	3264	3371	3404	2731	3306	5136	5586	891	899	768	904	846	2138	625
g Other clupeids	8174	5865	4539	4106	4520	4237	5590	6082	8533	4850	4896	6212	3365	4414	5439	6215
5 Bombay duck	578	1062	714	690	1106	1458	1230	602	771	1058	1068	890	875	1021	1067	1506
6 Lizard fishes	1956	3024	2380	1990	1278	1581	824	1146	1822	1707	1717	1155	693	311	233	311
7 Half beaks and Full	38	55	91	130	62	157	30	63	42	120	122	216	242	197	331	296
8 Flying fishes	78	18	14	23	505	481	458	442	419	580	585	354	966	832	292	278
9 Perches																
a Rock cods	33	66	77	41	98	280	104	93	511	92	92	246	299	366	248	305
b Snappers	2678	985	955	1318	1286	512	569	1382	1112	200	201	535	646	792	537	660
c Pig face breams	9	10	8	8	9	8	8	8	8	2	2	6	6	7	5	6
d Threadfin breams	2215	3522	3543	1718	1734	1562	2113	3414	3135	564	567	1510	1825	2237	1516	1864
e Other perches	7646	7263	9309	5326	3793	2927	3980	4717	6004	1081	1087	2892	3495	9744	9352	10522
10 Goatfishes	2146	4154	6046	4108	3274	3488	5009	2729	2513	3684	3705	1086	1934	2163	2233	1505
11 Threadfins	2875	1820	1793	1790	2085	2362	1605	2061	2177	4338	4362	3830	4273	5319	5544	6041
12 Croakers	10535	15274	13138	10265	9163	13072	11587	13668	14709	6558	6594	3323	2111	2404	3855	2034
13 Ribbon fishes	4467	5436	7533	3547	4839	4091	11785	7324	7554	10472	10015	8421	8371	9885	13269	9342
14 Carangids																
a Horse mackerel	526	447	1206	515	345	303	1027	989	1088	623	672	1371	927	1167	808	969
b Scads	1097	1820	1871	618	1586	1990	598	2896	2654	1539	1684	1499	1583	1994	1381	1656
c Leather-jackets	809	360	288	710	361	140	181	411	379	220	241	214	226	284	197	236
i <i>Trachynotus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1
d Other Carangids	2036	3558	3378	3417	2277	2923	1779	2154	3089	1498	1319	1029	934	983	2248	1679
i <i>Coryphaena</i>	7	7	7	7	7	7	7	7	7	4	4	4	4	5	4	4
ii <i>Elacate</i>	1727	1965	2203	2437	2682	2908	3143	3428	3672	5709	6118	5764	7287	9178	6358	7624
15 Silverbellies																
a <i>Leiognathus</i>	8246	9059	13048	5247	4312	5094	3948	7207	9350	9291	9343	5747	5120	4395	5646	6139
b <i>Gazza</i>	102	111	157	62	51	59	44	81	105	131	117	88	82	85	108	116
16 Big jawed jumper	780	813	1784	777	293	543	780	721	552	3929	3951	2392	1506	468	1764	1175
17 Pomfrets																
a Black pomfret	2309	1228	1221	776	2914	2558	1509	1857	2740	4125	4142	4196	5285	7310	4952	6089
b Silver pomfret	2153	1993	1834	4014	2575	3422	3146	3515	4815	7273	7322	7349	9190	12642	9494	8928
c Chinese pomfrets	9	7	37	14	19	22	18	12	8	11	9	7	8	10	7	8
18 Mackerel																
a Indian mackerel	3625	23763	14272	13349	6568	3840	5185	26645	25841	7629	7701	4662	12040	12312	6133	4680
b Other mackerels																
19 Seer fishes																
a <i>S. commersoni</i>	2284	2225	1241	2704	2979	1669	1225	1544	2291	7962	8037	3584	4201	3882	4047	2784
b <i>S. guttatus</i>	2321	2518	2897	2847	2820	2226	2860	5209	4699	2541	2565	2724	3193	2952	3077	2117
c <i>S. lineolatus</i>	14	113	17	10	3	1	7	6	5	18	18	8	10	9	9	6
d <i>Acanthocybium spp.</i>																
20 Tunnies																
a <i>E. affinis</i>	1400	726	1244	1289	1137	1006	752	422	939	1599	1614	1200	1921	2896	3978	3570
b <i>Auxis spp.</i>	24	16	13	9	6	1	4	3	7	12	12	9	14	21	30	26
c <i>K. pelamis</i>	20	31	17	2	2	3	4	18	2	3	3	3	4	7	9	7
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	4	5	4
e Other tunnies	348	247	73	81	10	9	9	36	284	483	487	363	581	876	1202	1079
21 Bill fishes	198	297	21	36	134	68	3	200	507	599	462	285	167	42	890	306
22 Barracudas	428	320	501	395	453	782	333	476	408	1127	1138	447	318	40	274	169
23 Mulletts	535	87	491	2496	641	604	301	1516	1135	2071	2083	1567	3151	5038	4729	6006
24 Unicorn cod	107	112	116	120	125	129	133	140	144	223	225	292	405	632	863	280
25 Flatfishes																
a Halibut	114	216	308	212	160	130	183	285	387	104	83	33	47	130	267	548
b Flounders	141	192	74	27	14	61	93	126	96	60	88	61	156	623	714	878
c Soles	971	1381	860	757	878	730	1419	1868	1994	641	636	327	677	830	562	691
26 Crustaceans																
a Penaeid prawns	11582	18288	9993	11626	11762	12632	15979	16473	24089	14757	14877	14660	14876	21629	26894	16326
b Non-Penaeid prawns	1751	3842	1412	2088	2263	2611	2840	2235	1781	11009	11099	24913	20350	19388	12968	15950
c Lobsters	14	14	6	2	2	6	15	14	5	11	17	19	26	37	25	31
d Crabs	2481	5476	3429	3205	3788	2990	5269	5866	6013	711	715	555	541	580	336	342
e Stomatopods	624	593	602	597	3102	2588	4775	2933	4121	4631	3500	2026	1126	35	631	776
27 Molluscs																
28 Cephalopods	861	1185	1182	821	773	1432	682	1038	2094	1311	1318	2644	252	232	657	436
<b>Total</b>	<b>148764</b>	<b>192625</b>	<b>168369</b>	<b>149388</b>	<b>150424</b>	<b>142249</b>	<b>148209</b>	<b>182791</b>	<b>204378</b>	<b>193520</b>	<b>193120</b>	<b>183634</b>	<b>176660</b>	<b>210678</b>	<b>200322</b>	<b>201508</b>

**Table L : Marine fisheries catch (thousand tonnes) data for the state of Orissa, 1950-2000.**

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
<b>1 Elasmobranchs</b>																		
a Sharks	36	38	149	118	186	197	174	69	98	91	189	136	125	111	204	279	135	149
b Skates	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Rays	16	17	64	50	80	84	74	30	42	39	80	59	53	48	87	119	58	64
<b>2 Eels</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>9</b>	<b>8</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>3 Catfishes</b>	<b>74</b>	<b>77</b>	<b>56</b>	<b>29</b>	<b>1</b>	<b>62</b>	<b>77</b>	<b>78</b>	<b>65</b>	<b>97</b>	<b>103</b>	<b>106</b>	<b>91</b>	<b>163</b>	<b>260</b>	<b>130</b>	<b>112</b>	<b>116</b>
<b>4 Clupeids</b>																		
a Wolf herring	29	30	66	53	148	232	119	84	109	91	180	134	88	67	212	223	96	221
b Oil sardine	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Other sardines	11036	3181	2826	4736	6627	2169	1405	581	815	421	1193	1760	1063	982	1973	2153	3249	1328
d Hilsa shad	67	69	69	68	68	79	95	41	25	75	18	162	8	180	66	83	46	45
e Other shads	212	219	218	216	215	221	219	99	124	18	5	45	15	2	41	49	64	49
f Anchovies																		
i <i>Anchoviella</i>	553	47	119	191	105	168	84	243	167	81	124	198	242	232	345	861	236	252
ii <i>Thrissocles</i>	112	9	24	38	22	34	17	62	85	11	27	22	15	77	145	70	55	106
g Other clupeids	520	150	85	188	50	77	670	164	199	161	140	171	143	94	79	88	81	243
<b>5 Bombay duck</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>	<b>6</b>	<b>3</b>	<b>2</b>	<b>20</b>
<b>6 Lizard fishes</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>3</b>	<b>8</b>	<b>2</b>	<b>4</b>	<b>28</b>	<b>2</b>	<b>7</b>	<b>4</b>
<b>7 Half beaks and Full</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>7</b>	<b>7</b>	<b>6</b>
<b>8 Flying fishes</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>19</b>
<b>9 Perches</b>																		
a Rock cods	2	2	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
b Snappers	15	16	18	13	6	9	13	9	4	17	9	11	6	3	6	3	1	2
c Pig face breams	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d Threadfin breams	11	11	14	10	5	6	10	7	3	13	7	9	5	2	4	2	1	2
e Other perches	155	161	197	134	70	95	134	4	49	179	98	117	61	31	64	2	7	22
<b>10 Goatfishes</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>7</b>	<b>11</b>	<b>13</b>	<b>2</b>	<b>10</b>	<b>20</b>	<b>5</b>	<b>18</b>	<b>7</b>	<b>7</b>	<b>2</b>	<b>7</b>	<b>11</b>	<b>19</b>
<b>11 Threadfins</b>	<b>187</b>	<b>194</b>	<b>485</b>	<b>265</b>	<b>44</b>	<b>86</b>	<b>395</b>	<b>16</b>	<b>96</b>	<b>67</b>	<b>113</b>	<b>69</b>	<b>1</b>	<b>2</b>	<b>9</b>	<b>3</b>	<b>11</b>	<b>66</b>
<b>12 Croakers</b>	<b>15</b>	<b>16</b>	<b>38</b>	<b>1</b>	<b>18</b>	<b>18</b>	<b>55</b>	<b>59</b>	<b>39</b>	<b>27</b>	<b>47</b>	<b>29</b>	<b>58</b>	<b>90</b>	<b>73</b>	<b>92</b>	<b>45</b>	<b>41</b>
<b>13 Ribbon fishes</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>11</b>	<b>18</b>	<b>110</b>	<b>76</b>	<b>48</b>	<b>18</b>	<b>28</b>	<b>29</b>	<b>46</b>	<b>61</b>	<b>55</b>	<b>47</b>	<b>40</b>	<b>57</b>
<b>14 Carangids</b>																		
a Horse mackerel	103	106	43	24	7	6	33	40	1	9	69	220	79	163	35	32	158	203
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Leather-jackets	2	2	2	2	2	2	2	3	6	8	12	9	14	11	15	20	25	34
i <i>Trachyotus</i>																		
d Other Carangids																		
i <i>Coryphaena</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
ii <i>Elacate</i>	2	2	2	2	2	2	2	2	2	2	2	2	2	4	5	6	7	8
<b>15 Silverbellies</b>																		
a <i>Leiognathus</i>	5	6	24	14	32	45	71	245	93	223	149	770	505	467	398	234	796	2087
b <i>Gazza</i>	5	6	5	5	5	5	5	10	15	14	14	50	44	35	27	24	21	17
<b>16 Big jawed jumper</b>	<b>3</b>	<b>3</b>	<b>15</b>	<b>10</b>	<b>20</b>	<b>27</b>	<b>43</b>	<b>1</b>	<b>11</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>43</b>	<b>18</b>	<b>26</b>	<b>59</b>	<b>5</b>
<b>17 Pomfrets</b>																		
a Black pomfret	12	12	28	8	9	23	32	47	76	31	38	41	26	39	34	67	33	101
b Silver pomfret	43	44	102	31	34	86	120	175	283	115	144	152	96	146	127	250	123	375
c Chinese pomfrets	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>18 Mackerel</b>																		
a Indian mackerel	39	40	2	24	5	2	17	84	38	81	45	20	14	20	38	526	23	148
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>19 Seer fishes</b>																		
a <i>S. commersoni</i>	5	5	18	5	10	15	6	6	3	3	7	8	5	5	9	16	5	15
b <i>S. guttatus</i>	120	123	417	129	243	360	155	147	80	89	184	190	122	131	232	381	114	360
c <i>S. lineolatus</i>	1	1	4	1	2	4	2	1	1	1	2	2	1	1	2	4	1	4
d <i>Acanthocybium spp.</i>																		
<b>20 Tunnies</b>																		
a <i>E. affinis</i>	3	3	5	17	16	13	19	14	8	14	2	3	6	49	4	47	34	19
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	4	4	7	24	24	17	26	19	11	19	3	4	9	67	6	64	48	25
<b>21 Bill fishes</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>22 Barracudas</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>10</b>	<b>47</b>	<b>23</b>	<b>12</b>	<b>9</b>	<b>1</b>	<b>10</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>
<b>23 Mulletts</b>	<b>17</b>	<b>18</b>	<b>11</b>	<b>5</b>	<b>1</b>	<b>6</b>	<b>5</b>	<b>2</b>	<b>54</b>	<b>1</b>	<b>23</b>	<b>42</b>	<b>24</b>	<b>3</b>	<b>5</b>	<b>20</b>	<b>19</b>	<b>9</b>
<b>24 Unicorn cod</b>																		
<b>25 Flatfishes</b>																		
a Halibut																		
b Flounders																		
c Soles	3	3	3	3	3	3	3	3	20	58	51	144	106	112	100	86	62	12
<b>26 Crustaceans</b>																		
a Penaeid prawns	46	13	40	19	146	101	1037	289	136	182	228	441	622	1009	611	559	494	2008
b Non-Penaeid prawns	17	18	17	17	17	17	17	18	19	1	1	1	1	1	1	1	1	1
c Lobsters	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d Crabs	2	2	2	2	2	2	2	2	4	1	1	2	2	3	3	2	1	2
e Stomatopods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>27 Molluscs</b>																		
<b>28 Cephalopods</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Total</b>	<b>13510</b>	<b>4686</b>	<b>5218</b>	<b>6496</b>	<b>8278</b>	<b>4337</b>	<b>5293</b>	<b>2773</b>	<b>2917</b>	<b>2334</b>	<b>3387</b>	<b>5224</b>	<b>3736</b>	<b>4509</b>	<b>5357</b>	<b>6613</b>	<b>6316</b>	<b>8291</b>

Table L : Continued.

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1 Elasmobranchs																	
a Sharks	138	294	1189	305	685	776	1567	1188	2927	1913	3460	4535	3786	3384	2927	1985	1754
b Skates	1	1	2	2	1	2	2	2	1	2	1	1	1	1	6	20	46
c Rays	59	126	510	131	293	332	671	510	1254	819	1483	1943	1623	1353	511	149	564
2 Eels	6	7	12	13	32	65	129	65	1	3	4	3	19	35	122	20	14
3 Catfishes	175	119	473	308	451	518	1200	3150	2795	1706	2619	1956	3152	8980	5887	6383	8695
4 Clupeids																	
a Wolf herring	584	590	671	268	193	425	326	409	537	784	1090	1731	1487	1302	1150	1040	857
b Oil sardine	1	245	124	2	20	38	4	60	115	171	221	285	331	384	435	487	547
c Other sardines	3135	3881	3040	2034	1434	2025	1731	998	1720	1280	2554	2830	1926	4610	4143	5281	3358
d Hilsa shad	45	44	268	96	34	150	3255	5101	5687	3075	7859	10500	5184	2120	1134	422	1689
e Other shads	35	20	45	70	6	184	188	82	134	513	861	378	47	359	320	254	211
f Anchovies																	
i <i>Anchoviella</i>	314	371	210	130	278	317	149	397	352	507	1187	532	275	247	648	2806	2076
ii <i>Thrissocles</i>	355	78	268	74	124	53	261	192	110	206	178	311	339	327	212	116	67
g Other clupeids	602	676	1759	332	203	843	525	877	802	812	1351	1507	2623	2084	1604	3081	2415
5 Bombay duck	38	21	13	16	14	31	21	49	90	90	319	473	385	74	182	314	307
6 Lizard fishes	1	22	130	14	11	5	6	9	1	8	7	75	271	159	486	407	186
7 Half beaks and Full	1	2	2	1	2	1	1	5	1	7	13	29	47	2	2	1	8
8 Flying fishes	1	1	1	1	1	1	1	1	2	2	4	4	17	14	12	9	5
9 Perches																	
a Rock cods	1	1	2	2	1	2	2	3	3	2	3	3	4	1	276	8	17
b Snappers	2	2	3	14	6	12	5	23	3	7	20	18	39	15	55	28	11
c Pig face breams	1	1	2	2	1	2	2	2	1	2	1	1	1	1	1	1	7
d Threadfin breams	2	2	3	11	4	9	3	17	3	5	15	13	29	10	1225	737	647
e Other perches	21	3	41	151	55	128	47	243	37	77	215	191	416	154	1083	493	287
10 Goatfishes	26	32	32	8	12	6	30	22	1	2	3	3	424	154	158	307	127
11 Threadfins	37	34	295	93	82	142	329	215	343	669	1879	2230	1615	835	136	23	63
12 Croakers	161	125	439	422	336	203	257	632	468	514	7588	8004	4107	3148	5471	17995	23770
13 Ribbon fishes	80	44	112	63	40	69	42	98	135	182	341	649	945	1012	446	999	1253
14 Carangids																	
a Horse mackerel	545	372	844	91	79	132	27	39	50	61	69	343	459	69	233	197	311
b Scads	1	1	1	1	1	1	1	1	1	1	1	1	1	99	59	213	37
c Leather-jackets	40	88	80	62	65	151	186	145	246	403	828	754	631	199	98	53	145
i <i>Trachinotus</i>																	
d Other Carangids																	
i <i>Coryphaena</i>	2	2	1	1	1	1	1	14	9	7	4	1	6	9	12	21	26
ii <i>Elacate</i>	9	9	10	11	12	13	14	212	145	111	3	1	98	143	191	323	414
15 Silverbellies																	
a <i>Leiognathus</i>	678	885	1437	472	1204	646	591	801	527	381	369	1641	1004	1072	1653	819	505
b <i>Gazza</i>	13	10	12	6	6	6	6	8	6	3	4	16	10	10	16	8	6
16 Big jawed jumper	9	4	85	11	35	9	33	9	1	30	18	7	93	72	12	21	25
17 Pomfrets																	
a Black pomfret	60	70	119	167	145	187	287	614	3184	356	1766	3201	2755	1151	662	516	415
b Silver pomfret	225	260	445	622	538	697	1068	2282	11850	1322	6570	11912	10249	4285	3376	3494	2841
c Chinese pomfrets	1	1	2	2	1	2	2	2	7	2	4	7	7	3	6	14	15
18 Mackerel																	
a Indian mackerel	12	26	1663	375	96	75	199	122	441	203	199	322	270	837	625	2022	419
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19 Seer fishes																	
a <i>S. commersoni</i>	13	22	30	12	12	28	43	20	39	28	43	103	63	93	712	158	224
b <i>S. guttatus</i>	323	528	714	292	284	665	1011	484	927	666	1022	2446	1492	2464	1385	834	803
c <i>S. lineolatus</i>	3	6	8	3	3	7	11	5	9	7	11	25	15	25	40	22	3
d <i>Acanthocybium spp.</i>																	
20 Tunnies																	
a <i>E. affinis</i>	2	1	8	16	10	17	3	7	36	17	260	14	14	107	408	28	12
b <i>Auxis spp.</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	19
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3
d <i>T. tonggol</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other tunnies	3	2	1	22	14	24	5	9	51	22	359	19	20	147	1	10	19
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	5	4
22 Barracudas	19	13	6	9	6	1	5	3	1	3	4	5	8	9	12	31	25
23 Mulletts	5	7	36	20	54	16	36	39	7	7	4	33	1	3	4	6	1
24 Unicorn cod																	
25 Flatfishes																	
a Halibut																	
b Flounders																	
c Soles	27	40	87	11	50	33	140	12	8	119	150	187	99	69	401	460	460
26 Crustaceans																	
a Penaeid prawns	2805	1420	1288	562	513	1001	915	1085	992	1302	3758	4442	1616	1999	3043	2863	2990
b Non-Penaeid prawns	1	1	2	3	8	15	39	93	144	28	17	51	45	83	322	27	31
c Lobsters	1	1	2	2	1	2	2	2	1	2	1	1	1	4	56	4	1
d Crabs	2	2	2	2	1	36	27	12	32	10	6	9	250	217	91	262	145
e Stomatopods	1	1	2	2	1	2	2	2	1	2	1	1	265	214	169	281	66
27 Molluscs																	
28 Cephalopods	1	1	2	9	1	2	2	3	38	26	6	21	141	84	287	168	83
Total	10632	10518	16535	7353	7467	10112	15411	20378	36287	18478	48762	63778	48714	44241	42516	56237	59031

Table L : Continued.

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>1 Elasmobranchs</b>																
a Sharks	1914	4483	1558	1748	2109	2282	1527	3962	1687	5477	3750	3314	3003	3324	10312	4242
b Skates	76	55	471	85	49	24	27	17	32	2338	2798	3323	3645	4621	2606	1395
c Rays	700	798	1296	828	424	389	407	612	1206	6406	5721	6004	6147	7458	5193	2974
<b>2 Eels</b>	711	744	278	557	983	1243	1343	722	1088	2585	2334	3512	3292	11289	5788	2901
<b>3 Catfishes</b>	7443	6222	5826	6294	6761	5839	4958	5523	9071	12766	10368	11037	12930	<b>11913</b>	11037	12527
<b>4 Clupeids</b>																
a Wolf herring	485	873	1173	736	1481	1441	971	1054	1058	4234	4473	4737	5514	4855	3051	1432
b Oil sardine	97	10	1	55	142	13	4	38	123	6948	8631	7698	8958	8341	4703	5796
c Other sardines	3934	3575	7557	2946	3106	5565	1513	948	1784	<b>2342</b>	<b>2302</b>	<b>2442</b>	<b>2632</b>	2711	2981	3661
d Hilsa shad	585	495	634	141	865	1433	2279	572	1891	6294	5987	9178	10682	4661	4520	6657
e Other shads	69	137	365	269	123	226	50	286	178	<b>1019</b>	<b>1676</b>	<b>2412</b>	<b>3205</b>	3858	2911	4535
f Anchovies																
i <i>Anchoviella</i>	2646	5402	1895	963	618	629	1447	2826	1494	2480	2230	723	715	2264	1008	2002
ii <i>Thrissocles</i>	186	84	195	142	239	193	287	74	201	546	779	1054	1353	1594	713	1327
g Other clupeids	3207	7108	1884	2294	2459	4008	1475	1961	2649	5214	4184	5758	6702	5480	3037	4483
<b>5 Bombay duck</b>	226	120	530	238	142	201	543	764	460	1435	2066	740	861	1207	1819	1113
<b>6 Lizard fishes</b>	324	290	441	343	454	108	177	210	513	<b>647</b>	<b>609</b>	<b>599</b>	<b>614</b>	<b>597</b>	<b>586</b>	<b>660</b>
<b>7 Half beaks and Full</b>	<b>9</b>	<b>9</b>	<b>2</b>	<b>1</b>	<b>18</b>	<b>10</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>4</b>
<b>8 Flying fishes</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>98</b>	<b>69</b>	<b>35</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>9 Perches</b>																
a Rock cods	24	4	30	5	7	24	<b>16</b>	<b>8</b>	1	2	2	2	2	2	1	2
b Snappers	31	309	58	<b>33</b>	11	1	8	16	28	495	834	1725	2305	2513	<b>2466</b>	<b>2777</b>
c Pig face breams	6	<b>6</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>3</b>	8	351	605	1259	1688	1844	857	525
d Threadfin breams	472	712	460	695	399	330	350	151	227	289	287	451	505	487	1862	1034
e Other perches	766	1378	3104	2411	1670	2850	1637	1274	1807	1830	1472	1881	1727	<b>1448</b>	1191	3752
<b>10 Goatfishes</b>	590	374	271	352	222	118	115	92	224	<b>1149</b>	<b>1895</b>	<b>2666</b>	<b>3554</b>	4256	<b>4176</b>	<b>4704</b>
<b>11 Threadfins</b>	117	192	224	128	95	252	158	378	190	2987	3365	4415	5172	<b>3846</b>	<b>2612</b>	1632
<b>12 Croakers</b>	21109	21574	23095	21576	14239	27840	15431	15531	24468	25397	23701	24279	21396	4823	10870	8920
<b>13 Ribbon fishes</b>	1900	1339	2232	2185	3538	4670	2803	2266	2248	<b>3342</b>	<b>3620</b>	<b>4154</b>	<b>4779</b>	5198	5878	6259
<b>14 Carangids</b>																
a Horse mackerel	245	179	184	151	717	785	345	466	648	581	722	626	645	<b>629</b>	<b>632</b>	<b>692</b>
b Scads	66	298	54	22	55	23	215	155	67	60	75	65	67	<b>65</b>	<b>66</b>	<b>72</b>
c Leather-jackets	80	29	155	47	161	460	171	215	162	146	181	157	162	<b>158</b>	<b>158</b>	<b>173</b>
i <i>Trachynotus</i>																
d Other Carangids																
i <i>Coryphaena</i>	16	24	13	18	39	29	34	39	38	<b>51</b>	<b>84</b>	<b>91</b>	<b>113</b>	149	258	116
ii <i>Elacate</i>	255	374	209	272	607	465	533	599	591	<b>796</b>	<b>1319</b>	<b>1430</b>	<b>1770</b>	2324	4053	1807
<b>15 Silverbellies</b>																
a <i>Leiognathus</i>	975	304	569	590	329	275	1020	527	640	4055	4424	4669	5470	<b>5975</b>	6506	682
b <i>Gazza</i>	10	3	5	6	3	3	11	5	6	41	45	47	56	<b>60</b>	65	7
<b>16 Big jawed jumper</b>	28	15	35	151	52	251	62	162	167	<b>211</b>	<b>198</b>	<b>195</b>	<b>200</b>	<b>195</b>	<b>191</b>	<b>215</b>
<b>17 Pomfrets</b>																
a Black pomfret	268	1033	1508	174	1333	1445	1890	1774	2160	4099	3837	4997	6307	5695	4765	2956
b Silver pomfret	2161	3805	3308	2434	5110	5137	3509	3361	5932	9091	7163	8082	9022	7316	6886	4768
c Chinese pomfrets	<b>15</b>	<b>17</b>	<b>1</b>	<b>39</b>	<b>86</b>	<b>245</b>	<b>48</b>	<b>54</b>	<b>48</b>	<b>73</b>	<b>57</b>	<b>64</b>	<b>70</b>	<b>68</b>	<b>67</b>	<b>75</b>
<b>18 Mackerel</b>																
a Indian mackerel	586	1032	2051	276	182	74	572	774	971	2004	4329	3626	6031	4370	3373	3183
b Other mackerels	1	1	1	1	1	1	1	1	1	1	1	1	1	485	1343	1101
<b>19 Seer fishes</b>																
a <i>S. commersoni</i>	226	256	939	599	1728	948	1281	1880	716	2996	2882	3404	3963	3947	2141	1857
b <i>S. guttatus</i>	430	876	1115	707	860	1168	1123	795	1859	2620	3632	3848	4480	3380	2267	862
c <i>S. lineolatus</i>	<b>144</b>	<b>285</b>	<b>424</b>	<b>556</b>	<b>732</b>	<b>911</b>	<b>995</b>	<b>1112</b>	<b>1251</b>	1873	2171	2517	2929	2517	1441	465
d <i>Acanthocybium</i> spp.																
<b>20 Tunnies</b>																
a <i>E. affinis</i>	55	334	252	137	28	56	72	47	63	99	158	296	344	268	1666	650
b <i>Auxis</i> spp.	5	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c <i>K. pelamis</i>	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>T. tonggol</i>	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
e Other tunnies	<b>27</b>	<b>36</b>	<b>2</b>	<b>33</b>	<b>46</b>	<b>1</b>	<b>6</b>	<b>63</b>	<b>63</b>	<b>78</b>	<b>72</b>	<b>71</b>	<b>73</b>	<b>71</b>	<b>71</b>	<b>78</b>
<b>21 Bill fishes</b>	<b>2</b>	<b>1</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>35</b>	<b>68</b>	<b>68</b>	<b>84</b>	<b>77</b>	<b>77</b>	<b>78</b>	<b>76</b>	<b>77</b>	<b>84</b>
<b>22 Barracudas</b>	39	94	338	8	4	76	36	28	24	<b>29</b>	<b>27</b>	<b>27</b>	<b>27</b>	<b>27</b>	<b>27</b>	<b>29</b>
<b>23 Mulletts</b>	3	41	21	<b>17</b>	<b>14</b>	<b>9</b>	<b>4</b>	<b>20</b>	<b>34</b>	1377	2008	4816	5642	4095	3928	3844
<b>24 Unicorn cod</b>																
<b>25 Flatfishes</b>																
a Halibut																
b Flounders																
c Soles	950	1050	792	430	232	175	361	403	681	1990	2967	4014	4702	3831	1916	1849
<b>26 Crustaceans</b>																
a Penaeid prawns	3632	4231	2924	2300	3478	5156	2723	3634	3892	4733	4866	5418	7508	5890	9979	10102
b Non-Penaeid prawns	383	318	184	186	16	46	494	451	495	4445	4252	5017	8210	7050	5089	3274
c Lobsters	3	10	<b>7</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>
d Crabs	177	262	494	293	563	211	273	727	922	7	18	20	164	1305	805	1870
e Stomatopods	241	664	1461	1457	710	149	1020	1338	1567	<b>1977</b>	<b>1859</b>	<b>1831</b>	<b>1876</b>	<b>1837</b>	<b>1844</b>	<b>2062</b>
<b>27 Molluscs</b>																
<b>28 Cephalopods</b>	128	176	130	47	115	19	62	80	80	1990	1394	1406	1505	1318	1526	2666
<b>Total</b>	<b>58782</b>	<b>72058</b>	<b>70771</b>	<b>55990</b>	<b>57461</b>	<b>77886</b>	<b>54468</b>	<b>58078</b>	<b>75794</b>	<b>142090</b>	<b>142520</b>	<b>160182</b>	<b>182807</b>	<b>161700</b>	<b>151331</b>	<b>130861</b>



**Table M : Marine fisheries catch (thousand tonnes) data for the state of West Bengal, 1950-2000.**

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1 Elasmobranchs																		
a Sharks	2	1	7	2	13	16	26	11	11	9	18	18	15	15	26	35	17	19
b Skates	2	1	4	1	8	10	16	7	6	5	11	11	9	9	15	21	11	12
c Rays	1	1	3	1	5	6	11	4	4	4	7	7	6	6	10	14	6	7
2 Eels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3 Catfishes	24	12	13	3	1	25	58	57	35	46	50	71	55	107	164	81	71	74
4 Clupeids																		
a Wolf herring	12	6	18	7	61	110	108	76	70	53	105	107	64	53	160	168	72	169
b Oil sardine	1	1	1	1	1	1	3	3	2	2	2	2	2	2	2	2	2	2
c Other sardines	31	4	6	4	20	8	9	4	4	2	5	10	5	6	11	12	17	7
d Hilsa shad	3	1	2	1	3	4	9	4	2	5	1	13	1	15	5	6	3	3
e Other shads	11	5	8	4	12	14	27	12	11	2	1	4	2	1	4	5	6	5
f Anchovies																		
i <i>Anchoviella</i>	422	17	65	46	84	155	149	420	211	92	139	305	343	356	506	1255	350	374
ii <i>Thrissocles</i>	120	5	18	13	24	44	42	152	152	16	43	47	31	168	301	142	116	221
g Other clupeids	846	114	98	96	86	152	2543	605	536	384	341	563	430	307	248	276	255	768
5 Bombay duck	5	3	15	4	6	30	103	147	140	99	87	174	159	537	402	204	137	1280
6 Lizard fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1
7 Half beaks and Full	1	1	1	1	1	1	1	1	1	2	6	8	2	7	10	13	11	10
8 Flying fishes																		
9 Perches																		
a Rock cods	1	1	1	1	1	1	3	3	1	2	1	2	1	1	1	1	1	1
b Snappers	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Pig face breams																		
d Threadfin breams	4	2	4	1	2	3	8	1	2	6	4	6	3	1	3	1	1	1
e Other perches	2	1	2	1	1	1	4	3	1	4	2	4	1	1	2	1	1	1
10 Goatfishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11 Threadfins	49	24	91	22	12	27	240	10	42	25	44	36	1	1	5	2	5	34
12 Croakers	75	37	134	2	93	108	635	666	320	192	345	296	524	885	695	863	429	397
13 Ribbon fishes	27	13	25	12	80	142	1659	1111	517	171	278	369	554	794	680	574	500	715
14 Carangids																		
a Horse mackerel	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b Scads																		
c Leather-jackets	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	3	3	5
i <i>Trachynotus</i>																		
d Other Carangids	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
i <i>Coryphaena</i>																		
ii <i>Elacate</i>																		
15 Silverbellies																		
a <i>Leiognathus</i>	1	1	1	1	1	1	5	18	5	10	7	48	29	30	24	14	48	126
b <i>Gazza</i>																		
16 Big jawed jumper	1	1	1	1	2	3	9	1	2	1	1	1	1	8	3	4	10	1
17 Pomfrets																		
a Black pomfret	2	1	3	1	1	4	12	16	19	7	9	13	7	13	10	19	10	30
b Silver pomfret	6	3	11	1	5	16	42	60	71	25	32	47	27	44	37	72	36	110
c Chinese pomfrets	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18 Mackerel																		
a Indian mackerel	1	1	1	1	1	1	1	7	2	3	3	1	1	1	2	33	1	10
b Other mackerels																		
19 Seer fishes																		
a <i>S. commersoni</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1
b <i>S. guttatus</i>	7	3	15	2	13	23	20	17	7	7	14	20	12	14	24	38	12	37
c <i>S. lineolatus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d <i>Acanthocybium spp.</i>																		
20 Tunnies																		
a <i>E. affinis</i>	1	1	1	1	3	3	7	5	2	3	1	1	2	16	1	14	11	5
b <i>Auxis spp.</i>																		
c <i>K. pelamis</i>																		
d <i>T. tonggol</i>																		
e Other tunnies																		
21 Bill fishes																		
22 Barracudas																		
23 Mulllets	7	3	3	1	1	3	5	3	37	1	14	34	18	2	4	16	14	6
24 Unicorn cod																		
25 Flatfishes																		
a Halibut																		
b Flounders																		
c Soles	1	1	1	1	1	1	1	1	2	5	5	20	14	15	13	11	8	2
26 Crustaceans																		
a Penaeid prawns	73	10	46	9	241	194	3833	1043	358	423	541	1418	1834	3213	1868	1693	1525	6181
b Non-Penaeid prawns	422	205	298	132	430	507	974	1003	757	4	11	22	29	19	19	19	21	21
c Lobsters																		
d Crabs	2	1	1	1	2	2	4	4	6	1	2	2	3	5	5	3	1	4
e Stomatopods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
27 Molluscs																		
28 Cephalopods	3	2	2	1	3	4	8	8	6	5	5	7	12	1	5	3	1	10
<b>Total</b>	<b>2177</b>	<b>492</b>	<b>911</b>	<b>387</b>	<b>1228</b>	<b>1632</b>	<b>10591</b>	<b>5497</b>	<b>3351</b>	<b>1628</b>	<b>2145</b>	<b>3700</b>	<b>4212</b>	<b>6666</b>	<b>5285</b>	<b>5631</b>	<b>3725</b>	<b>10661</b>

Table M : Continued.

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1 Elasmobranchs																	
a Sharks	20	41	162	52	105	127	222	186	462	36	135	247	94	478	793	321	428
b Skates	12	25	97	30	62	77	133	111	277	20	82	148	56	257	318	140	55
c Rays	8	16	65	22	41	50	89	75	185	15	54	99	38	158	756	383	229
2 Eels	1	1	2	2	2	2	4	2	2	18	28	38	40	45	55	16	77
3 Catfishes	121	82	321	259	344	422	849	2453	1468	222	325	283	1194	6691	13755	2170	3568
4 Clupeids																	
a Wolf herring	487	494	605	312	182	423	308	403	340	146	313	525	307	312	666	925	361
b Oil sardine	2	2	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1
c Other sardines	19	23	20	18	10	15	12	7	16	13	6	5	4	4	4	42	25
d Hilsa shad	3	3	26	13	4	16	333	543	1082	81	278	851	716	2817	1181	1021	2154
e Other shads	3	2	6	11	1	26	24	11	20	35	40	49	22	46	86	43	299
f Anchovies																	
i <i>Anchoviella</i>	508	602	369	296	509	612	275	771	899	326	751	272	179	743	951	1263	4016
ii <i>Thrissocles</i>	812	177	662	235	322	145	675	1250	1001	251	399	94	37	70	117	175	58
g Other clupeids	2081	2343	6584	1607	793	3481	2059	3584	2425	967	1692	1956	749	2538	2796	307	1377
5 Bombay duck	2704	1509	990	1615	1172	2650	1682	4197	3052	1409	1967	1561	466	652	1814	4641	2221
6 Lizard fishes	1	5	25	2	2	2	2	2	2	3	2	2	2	2	2	1	2
7 Half beaks and Full	2	3	5	3	3	1	3	11	12	17	16	10	4	1	2	2	3
8 Flying fishes																	
9 Perches																	
a Rock cods	1	1	2	2	2	2	4	4	13	31	52	73	3	11	17	14	15
b Snappers	1	1	2	2	2	2	2	2	2	3	2	2	2	2	2	1	2
c Pig face breams																	
d Threadfin breams	1	1	2	11	3	8	2	14	2	102	172	241	12	229	450	639	947
e Other perches	1	1	2	7	2	4	2	8	26	59	99	140	7	56	62	29	142
10 Goatfishes	2	2	2	2	2	2	2	24	41	84	92	109	106	113	129	139	171
11 Threadfins	21	18	162	63	50	94	187	134	129	41	187	348	307	469	202	59	115
12 Croakers	1679	1307	4489	5352	3861	2492	2740	7404	7604	1817	3811	1851	591	406	1625	1949	4801
13 Ribbon fishes	1103	611	1671	1212	631	1130	655	1600	950	389	981	375	158	170	197	202	5798
14 Carangids																	
a Horse mackerel	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	52
b Scads																	
c Leather-jackets	6	14	14	13	12	28	34	27	50	10	55	86	145	65	86	415	40
i <i>Trachynotus</i>																	
d Other Carangids	1	1	1	2	3	3	3	35	23	17	3	92	54	27	4	6	11
i <i>Coryphaena</i>																	
ii <i>Elacate</i>																	
15 Silverbellies																	
a <i>Leiognathus</i>	44	58	93	37	88	50	40	59	410	23	639	194	56	44	36	107	153
b <i>Gazza</i>																	
16 Big jawed jumper	2	1	15	2	7	2	5	2	2	3	2	2	2	2	2	1	2
17 Pomfrets																	
a Black pomfret	20	23	38	65	52	71	95	221	232	43	129	394	322	12	385	684	449
b Silver pomfret	73	84	141	244	190	265	351	826	864	156	477	1471	1199	4166	5309	8350	3867
c Chinese pomfrets	1	1	2	2	2	2	2	2	2	3	2	2	2	812	99	58	40
18 Mackerel																	
a Indian mackerel	1	2	123	37	8	7	15	10	9	12	10	9	8	7	8	7	33
b Other mackerels																	
19 Seer fishes																	
a <i>S. commersoni</i>	1	2	4	2	1	4	5	3	15	2	3	17	10	1130	724	516	112
b <i>S. guttatus</i>	36	59	87	46	36	90	129	65	370	28	73	405	247	60	180	297	144
c <i>S. lineolatus</i>	1	1	1	2	1	1	1	3	4	3	1	4	2	2	2	2	2
d <i>Acanthocybium spp.</i>																	
20 Tunnies																	
a <i>E. affinis</i>	1	1	1	8	4	7	1	3	7	13	17	19	20	22	27	28	32
b <i>Auxis spp.</i>																	
c <i>K. pelamis</i>																	
d <i>T. tonggol</i>																	
e Other tunnies																	
21 Bill fishes																	
22 Barracudas																	
23 Mulletts	3	7	30	22	50	17	31	38	4	5	4	2	2	2	114	25	18
24 Unicorn cod																	
25 Flatfishes																	
a Halibut																	
b Flounders																	
c Soles	3	6	11	2	9	6	20	2	17	41	52	49	5	6	5	54	61
26 Crustaceans																	
a Penaeid prawns	9458	4796	4259	2301	1894	3919	3083	4013	3889	1106	1251	810	256	361	469	580	3221
b Non-Penaeid prawns	24	24	42	183	482	973	2025	5264	4924	531	1371	318	81	1851	1386	2403	15005
c Lobsters																	
d Crabs	3	2	4	2	3	77	51	26	26	38	34	34	30	91	156	519	179
e Stomatopods	1	1	2	2	2	2	2	2	2	3	2	2	3	11	18	46	37
27 Molluscs																	
28 Cephalopods	21	2	6	181	12	15	9	59	56	77	65	34	7	8	9	26	68
<b>Total</b>	<b>19300</b>	<b>12359</b>	<b>21146</b>	<b>14284</b>	<b>10960</b>	<b>17328</b>	<b>16166</b>	<b>33459</b>	<b>30919</b>	<b>8201</b>	<b>15677</b>	<b>13226</b>	<b>7543</b>	<b>24949</b>	<b>35001</b>	<b>28611</b>	<b>50391</b>

**Table M** : Continued.

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>1 Elasmobranchs</b>																
a Sharks	166	210	178	54	66	448	1610	3097	3367	10884	3572	3852	3539	11924	<b>7879</b>	5168
b Skates	238	5	27	38	44	27	3	4	88	2951	1321	1632	1618	5723	4744	<b>3911</b>
c Rays	390	185	562	292	1082	851	1210	774	1175	2185	504	418	313	<b>311</b>	<b>270</b>	<b>258</b>
<b>2 Eels</b>	7	119	8	15	8	8	2	11	319	2315	431	473	454	477	410	430
<b>3 Catfishes</b>	2573	2560	3574	1131	7357	5188	7880	9890	8563	42903	38884	42499	41017	29021	35526	38765
<b>4 Clupeids</b>																
a Wolf herring	279	313	192	66	1274	1084	1215	1052	1100	<b>923</b>	<b>1019</b>	<b>1023</b>	<b>1014</b>	<b>1006</b>	<b>904</b>	<b>883</b>
b Oil sardine	1	2	4	4	7	8	6	4	<b>1030</b>	1725	4370	4801	4644	4847	4336	4628
c Other sardines	42	127	4	4	73	3	404	57	242	<b>203</b>	<b>224</b>	<b>225</b>	<b>223</b>	<b>221</b>	<b>199</b>	<b>194</b>
d Hilsa shad	7007	1869	1567	675	12398	12345	23715	20420	27198	24140	30593	33620	32528	35542	26022	26502
e Other shads	48	113	182	57	480	149	5	5	5	4	5	5	5	5	4	4
f Anchovies																
i <i>Anchoviella</i>	1052	2743	1841	1316	1681	2950	4096	6542	5631	<b>4727</b>	<b>5216</b>	<b>5234</b>	<b>5192</b>	<b>5150</b>	<b>4630</b>	<b>4518</b>
ii <i>Thrissocles</i>	289	55	60	204	590	507	460	955	2428	<b>2038</b>	<b>2249</b>	<b>2257</b>	<b>2238</b>	<b>2220</b>	<b>1996</b>	<b>1948</b>
g Other clupeids	605	233	918	347	1287	2067	1596	2291	1951	<b>4779</b>	8739	9603	9293	<b>9432</b>	8672	9256
<b>5 Bombay duck</b>	1100	692	952	530	4004	12692	9758	20538	21009	8620	21853	24012	23230	32038	28422	28208
<b>6 Lizard fishes</b>	2	2	1	1	2	2	2	2	2	1	1	1	1	1	1	1
<b>7 Half beaks and Full</b>	3	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2
<b>8 Flying fishes</b>																
<b>9 Perches</b>																
a Rock cods	<b>14</b>	<b>11</b>	<b>8</b>	<b>6</b>	<b>7</b>	<b>5</b>	<b>3</b>	2	136	709	62	61	52	<b>103</b>	<b>89</b>	<b>85</b>
b Snappers	2	2	1	1	2	2	2	2	2	9	1	1	1	1	1	1
c Pig face breams																
d Threadfin breams	<b>1252</b>	<b>1317</b>	<b>1337</b>	<b>1438</b>	<b>2159</b>	<b>2443</b>	<b>2744</b>	<b>3196</b>	<b>3483</b>	2363	215	220	201	317	372	<b>355</b>
e Other perches	72	117	79	154	282	57	230	432	171	1369	161	198	207	477	1504	<b>1437</b>
<b>10 Goatfishes</b>	<b>200</b>	<b>191</b>	<b>181</b>	<b>182</b>	<b>262</b>	<b>284</b>	<b>309</b>	<b>348</b>	<b>370</b>	<b>738</b>	1514	1652	1593	1669	<b>1514</b>	1508
<b>11 Threadfins</b>	5	44	29	23	1199	507	1287	2255	893	<b>556</b>	<b>668</b>	<b>658</b>	<b>641</b>	1669	16500	<b>15770</b>
<b>12 Croakers</b>	1487	1492	7547	2520	547	2903	7720	5016	8727	<b>9837</b>	17281	18885	18231	19078	412	17229
<b>13 Ribbon fishes</b>	4290	2104	3600	1667	801	1091	1729	2749	4256	<b>3914</b>	<b>4695</b>	<b>5090</b>	<b>5424</b>	<b>5751</b>	5505	6171
<b>14 Carangids</b>																
a Horse mackerel	<b>44</b>	<b>38</b>	<b>33</b>	<b>25</b>	<b>23</b>	17	116	3	405	<b>825</b>	<b>1445</b>	<b>1989</b>	<b>2505</b>	<b>3013</b>	3184	<b>3107</b>
b Scads																
c Leather-jackets	21	15	50	69	82	71	285	435	204	<b>171</b>	<b>189</b>	<b>190</b>	<b>188</b>	<b>187</b>	<b>168</b>	<b>164</b>
i <i>Trachynotus</i>																
d Other Carangids	2	6	12	6	122	13	37	55	97	<b>81</b>	<b>90</b>	<b>90</b>	<b>89</b>	<b>89</b>	<b>80</b>	<b>78</b>
i <i>Coryphaena</i>																
ii <i>Elacate</i>																
<b>15 Silverbellies</b>																
a <i>Leiognathus</i>	683	269	106	25	100	255	662	302	368	<b>294</b>	431	480	461	477	<b>432</b>	430
b <i>Gazza</i>																
<b>16 Big jawed jumper</b>	2	2	1	1	2	2	2	2	2	1	1	1	1	1	1	1
<b>17 Pomfrets</b>																
a Black pomfret	520	83	144	208	631	1542	1488	1397	1271	2911	2058	2207	2061	2625	9656	<b>9229</b>
b Silver pomfret	1608	2769	2142	540	3721	3550	3402	3694	4859	11975	8824	9713	9234	11924	<b>10350</b>	<b>9893</b>
c Chinese pomfrets	17	21	<b>109</b>	<b>187</b>	364	112	43	86	146	247	139	124	99	<b>99</b>	<b>86</b>	<b>82</b>
<b>18 Mackerel</b>																
a Indian mackerel	7	4	1	1	1	1	1	<b>29</b>	56	3977	3668	4002	3580	3715	<b>3488</b>	3548
b Other mackerels																
<b>19 Seer fishes</b>																
a <i>S. commersoni</i>	36	37	12	22	9	8	16	115	89	157	120	118	101	94	<b>85</b>	82
b <i>S. guttatus</i>	87	137	137	141	1028	1022	1790	1035	653	1432	1309	1480	1446	1520	1301	1460
c <i>S. lineolatus</i>	2	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1
d <i>Acanthocybium spp.</i>																
<b>20 Tunnies</b>																
a <i>E. affinis</i>	<b>46</b>	<b>60</b>	<b>76</b>	<b>84</b>	<b>111</b>	<b>128</b>	144	41	15	<b>13</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>13</b>	<b>12</b>
b <i>Auxis spp.</i>																
c <i>K. pelamis</i>																
d <i>T. tonggol</i>																
e Other tunnies																
<b>21 Bill fishes</b>																
<b>22 Barracudas</b>																
<b>23 Mulletts</b>	58	2	3	1	207	352	3363	846	991	5698	2157	2358	2277	2385	2064	2154
<b>24 Unicorn cod</b>																
<b>25 Flatfishes</b>																
a Halibut																
b Flounders																
c Soles	98	137	270	30	10	3	21	16	140	<b>88</b>	<b>108</b>	<b>107</b>	<b>106</b>	<b>106</b>	<b>92</b>	<b>88</b>
<b>26 Crustaceans</b>																
a Penaeid prawns	381	587	393	269	861	4266	2079	4777	4956	8863	13648	15006	14962	15694	13715	13639
b Non-Penaeid prawns	4429	1571	896	2098	1926	2779	2349	3287	4605	7973	4549	4922	5191	5471	4758	6843
c Lobsters																
d Crabs	359	140	170	81	43	40	214	49	256	10682	212	240	231	2623	2237	2169
e Stomatopods	9	9	69	2	<b>13</b>	22	183	49	169	<b>107</b>	<b>130</b>	<b>130</b>	<b>129</b>	<b>128</b>	<b>111</b>	<b>106</b>
<b>27 Molluscs</b>																
<b>28 Cephalopods</b>	12	11	37	9	64	136	110	223	494	2669	2157	2358	2277	<b>3241</b>	<b>3661</b>	4308
<b>Total</b>	<b>29543</b>	<b>20400</b>	<b>27514</b>	<b>14530</b>	<b>44931</b>	<b>59940</b>	<b>82293</b>	<b>96085</b>	<b>111924</b>	<b>186064</b>	<b>184833</b>	<b>201951</b>	<b>196617</b>	<b>220393</b>	<b>205398</b>	<b>224628</b>

**Table N :** Marine fisheries catch (thousand tonnes) data for the Union Territory of Andaman & Nicobar Islands, 1950-2000.

Species	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
1 Elasmobranchs																		
a Sharks	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	6	10	12
b Skates	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Rays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2 Eels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3 Catfishes	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	5	9	11
4 Clupeids																		
a Wolf herring	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	4	5	7
b Oil sardine																		
c Other sardines	6	6	6	6	6	6	6	13	10	15	17	13	13	14	12	20	30	38
d Hilsa shad	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Other shads	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	2
f Anchovies																		
i <i>Anchoviella</i>	2	2	2	2	2	2	2	5	6	8	9	10	12	12	12	18	27	34
ii <i>Thrissocles</i>	1	1	1	1	1	1	1	1	1	5	7	14	17	18	16	25	38	47
g Other clupeids	1	1	1	1	1	1	1	2	2	3	2	2	3	4	4	7	11	14
5 Bombay duck																		
6 Lizard fishes																		
7 Half beaks and Full	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	4	5	5
8 Flying fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9 Perches	15	15	15	15	15	15	15	22	18	23	31	31	29	29	25	38	56	69
a Rock cods																		
b Snappers																		
c Pig face breams																		
d Threadfin breams																		
e Other perches																		
10 Goatfishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11 Threadfins	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12 Croakers	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13 Ribbon fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14 Carangids																		
a Horse mackerel	6	6	6	6	6	6	6	7	5	10	9	9	8	10	11	18	28	37
b Scads																		
c Leather-jackets																		
i <i>Trachynotus</i>																		
d Other Carangids	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
i <i>Coryphaena</i>																		
ii <i>Elacate</i>																		
15 Silverbellies																		
a <i>Leiognathus</i>	5	5	5	5	5	5	5	5	5	5	4	9	8	8	7	12	17	21
b <i>Gazza</i>																		
16 Big jawed jumper																		
17 Pomfrets																		
a Black pomfret	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b Silver pomfret	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3
c Chinese pomfrets																		
18 Mackerel																		
a Indian mackerel	2	2	2	2	2	2	2	3	6	9	5	3	10	9	7	10	15	17
b Other mackerels	1	1	1	1	1	1	1	1	2	2	2	1	2	2	2	3	4	4
19 Seer fishes																		
a <i>S. commersoni</i>	4	4	4	4	4	4	4	5	5	4	4	3	7	6	5	9	13	15
b <i>S. guttatus</i>	4	4	4	4	4	4	4	4	4	4	3	3	6	5	5	8	12	14
c <i>S. lineolatus</i>																		
d <i>Acanthocybium spp.</i>																		
20 Tunnies																		
a <i>E. affinis</i>																		
b <i>Auxis spp.</i>																		
c <i>K. pelamis</i>	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	4	4
d <i>T. tonggol</i>																		
e Other tunnies	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22 Barracudas	1	1	1	1	1	1	1	1	2	2	4	2	2	3	2	4	6	8
23 Mullet	1	1	1	1	1	1	1	2	2	6	4	2	2	5	5	10	17	23
24 Unicorn cod																		
25 Flatfishes																		
a Halibut																		
b Flounders																		
c Soles																		
26 Crustaceans																		
a Penaeid prawns	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	5	7
b Non-Penaeid prawns	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
c Lobsters	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
d Crabs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
e Stomatopods																		
27 Molluscs																		
28 Cephalopods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	75	75	75	75	75	75	75	94	90	122	128	130	155	158	147	224	331	410

**Table N** : Continued.

Species	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1 Elasmobranchs																	
a Sharks	11	13	24	26	23	41	39	58	89	107	377	96	61	34	37	289	345
b Skates	2	2	3	3	3	5	5	8	11	13	48	12	8	5	5	37	43
c Rays	2	2	3	3	3	5	5	8	11	13	48	12	8	5	5	37	43
2 Eels	1	1	2	1	2	2	2	2	2	1	5	2	2	2	2	2	2
3 Catfishes	10	12	14	20	24	13	25	23	29	42	175	76	43	27	45	40	154
4 Clupeids																	
a Wolf herring	6	7	11	11	13	5	21	36	34	38	149	40	21	17	15	25	50
b Oil sardine																	
c Other sardines	31	38	43	46	64	67	65	68	89	86	361	118	207	183	739	697	841
d Hilsa shad	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	79
e Other shads	1	1	1	6	11	5	8	13	29	25	115	38	21	18	16	23	21
f Anchovies																	
i <i>Anchoviella</i>	28	34	38	35	69	67	63	81	122	103	342	106	148	159	215	230	292
ii <i>Thrissocles</i>	38	47	52	58	66	69	86	79	85	86	335	85	84	129	197	90	156
g Other clupeids	11	14	6	9	12	5	21	9	10	11	67	29	25	299	630	839	1217
5 Bombay duck																	
6 Lizard fishes																	
7 Half beaks and Full	5	5	8	16	13	10	11	16	36	53	227	79	35	12	22	12	72
8 Flying fishes	1	1	1	1	1	1	1	1	1	1	4	1	1	2	7	7	7
9 Perches	56	67	104	114	140	163	200	241	218	292	1241	329	408	235	440	715	1099
a Rock cods																	
b Snappers																	
c Pig face breams																	
d Threadfin breams																	
e Other perches																	
10 Goatfishes	1	1	2	1	2	2	2	2	3	6	80	36	50	60	73	84	104
11 Threadfins	1	1	2	1	2	2	2	2	2	1	5	2	2	2	2	17	52
12 Croakers	1	1	2	1	2	2	2	2	8	7	27	7	5	5	5	5	38
13 Ribbon fishes	1	1	1	1	1	1	1	1	1	1	4	3	12	17	18	40	71
14 Carangids																	
a Horse mackerel	32	39	52	62	90	106	96	111	130	135	494	120	114	93	102	92	100
b Scads																	
c Leather-jackets																	
i <i>Trachynotus</i>																	
d Other Carangids	1	1	1	1	1	1	1	1	1	12	282	124	125	137	115	216	378
i <i>Coryphaena</i>																	
ii <i>Elacate</i>																	
15 Silverbellies																	
a <i>Leiognathus</i>	17	21	39	59	87	79	82	123	180	144	472	107	138	336	1143	231	485
b <i>Gazza</i>																	
16 Big jawed jumper																	
17 Pomfrets																	
a Black pomfret	1	1	2	3	2	2	4	5	9	9	27	8	4	2	6	13	9
b Silver pomfret	2	3	6	12	10	8	16	17	37	36	106	32	16	6	23	54	38
c Chinese pomfrets																	
18 Mackerel																	
a Indian mackerel	14	16	17	17	39	80	36	94	64	89	316	66	156	109	265	220	423
b Other mackerels	3	4	5	4	9	20	9	24	16	22	78	16	26	29	40	44	57
19 Seer fishes																	
a <i>S. commersoni</i>	12	15	25	23	40	47	39	45	50	62	245	64	52	54	60	72	124
b <i>S. guttatus</i>	11	13	22	21	37	44	36	42	47	57	227	59	48	50	55	66	115
c <i>S. lineolatus</i>																	
d <i>Acanthocybium spp.</i>																	
20 Tunnies																	
a <i>E. affinis</i>																	
b <i>Auxis spp.</i>																	
c <i>K. pelamis</i>	4	5	7	10	7	10	7	7	10	30	171	41	38	24	21	59	129
d <i>T. tonggol</i>																	
e Other tunnies	1	1	2	2	2	3	1	2	3	7	41	10	9	6	5	14	32
21 Bill fishes	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	27	115
22 Barracudas	6	7	12	17	19	13	31	26	51	76	297	85	57	28	54	34	160
23 Mulllets	19	25	75	75	111	127	130	129	155	194	695	167	158	95	150	203	310
24 Unicorn cod																	
25 Flatfishes																	
a Halibut																	
b Flounders																	
c Soles																	
26 Crustaceans																	
a Penaeid prawns	6	7	14	17	19	13	49	43	60	67	1405	88	73	32	77	86	256
b Non-Penaeid prawns	1	1	2	1	2	2	2	2	2	1	5	2	2	2	2	2	2
c Lobsters	1	1	2	1	2	2	2	2	2	1	5	2	2	2	2	4	11
d Crabs	1	1	2	1	2	2	2	2	2	1	5	2	2	17	34	12	38
e Stomatopods																	
27 Molluscs																	
28 Cephalopods	1	1	2	1	2	2	2	2	2	1	5	2	2	2	2	2	2
<b>Total</b>	<b>341</b>	<b>412</b>	<b>600</b>	<b>683</b>	<b>936</b>	<b>1025</b>	<b>1104</b>	<b>1325</b>	<b>1601</b>	<b>1838</b>	<b>8492</b>	<b>2066</b>	<b>2164</b>	<b>2234</b>	<b>4631</b>	<b>4640</b>	<b>7472</b>

**Table N : Continued.**

Species	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>1 Elasmobranchs</b>																
a Sharks	375	385	377	362	340	315	297	605	893	1133	975	1080	862	1324	766	1278
b Skates	47	48	46	44	40	36	33	67	100	126	108	119	97	148	85	319
c Rays	38	70	103	137	171	206	250	278	324	351	383	410	422	495	420	443
<b>2 Eels</b>	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
<b>3 Catfishes</b>	155	220	284	351	417	482	567	607	881	1105	977	915	841	733	524	683
<b>4 Clupeids</b>																
a Wolf herring	53	99	149	201	254	308	363	316	378	407	371	368	333	357	297	317
b Oil sardine																
c Other sardines	889	1174	1448	1714	1977	2237	2496	2693	3115	3270	3427	3596	3639	4123	4576	3560
d Hilsa shad	78	243	426	622	825	1034	1245	3157	2215	1019	1691	1721	1546	766	418	387
e Other shads	20	23	25	26	27	28	28	28	30	30	29	29	27	29	24	26
f Anchovies																
i <i>Anchoviella</i>	323	409	488	563	637	708	777	924	1155	1291	1138	1143	1073	807	1189	1132
ii <i>Thrissocles</i>	159	185	205	222	237	249	261	267	293	295	296	299	293	320	273	687
g Other clupeids	1468	1986	2491	2989	3482	3972	4462	3325	3563	3483	3312	3293	3126	3354	2791	2974
<b>5 Bombay duck</b>																
<b>6 Lizard fishes</b>																
7 Half beaks and Full	74	143	217	295	374	456	538	436	439	400	366	367	382	332	211	1217
8 Flying fishes	7	8	9	9	10	10	10	10	11	11	10	10	10	11	9	9
9 Perches	1141	1562	1981	2398	2815	3232	3775	4193	4013	3581	3222	3188	2998	2519	4534	7551
a Rock cods																
b Snappers																
c Pig face breams																
d Threadfin breams																
e Other perches																
10 Goatfishes	115	142	166	191	213	235	265	260	271	266	265	261	249	272	216	214
11 Threadfins	52	82	114	146	179	211	254	278	378	455	346	356	325	342	581	576
12 Croakers	37	248	484	731	986	1246	1565	1779	1128	391	419	413	388	469	111	83
13 Ribbon fishes	95	137	178	221	264	306	349	384	451	480	507	538	549	627	533	616
<b>14 Carangids</b>																
a Horse mackerel	97	110	118	124	129	132	201	203	211	201	178	169	145	141	117	125
b Scads																
c Leather-jackets																
i <i>Trachynotus</i>																
d Other Carangids	384	473	551	622	690	755	1216	1299	1424	1423	1331	1323	1176	1196	1965	938
i <i>Coryphaena</i>																
ii <i>Elacate</i>																
<b>15 Silverbellies</b>																
a <i>Leiognathus</i>	527	749	972	1196	1421	1647	1938	2389	2471	2403	2335	2320	2187	1853	1484	2086
b <i>Gazza</i>																
<b>16 Big jawed jumper</b>																
<b>17 Pomfrets</b>																
a Black pomfret	9	59	114	171	232	293	90	110	127	135	128	145	121	802	674	669
b Silver pomfret	40	210	397	596	799	1009	305	380	435	464	439	497	416	1355	1792	2487
c Chinese pomfrets																
<b>18 Mackerel</b>																
a Indian mackerel	355	556	763	977	1193	1411	1631	1965	1953	1758	1618	1628	1400	1142	1060	1806
b Other mackerels	63	71	77	81	84	86	88	87	94	92	90	89	85	91	76	81
<b>19 Seer fishes</b>																
a <i>S. commersoni</i>	123	150	170	189	207	223	239	270	355	411	378	425	371	482	532	586
b <i>S. guttatus</i>	116	138	158	175	191	207	221	249	328	379	349	393	343	444	492	541
c <i>S. lineolatus</i>																
d <i>Acanthocybium spp.</i>																
<b>20 Tunnies</b>																
a <i>E. affinis</i>																
b <i>Auxis spp.</i>																
c <i>K. pelamis</i>	125	141	152	160	165	170	174	173	186	182	178	176	168	181	150	160
d <i>T. tonggol</i>																
e Other tunnies	33	75	122	171	220	272	324	491	809	1068	1007	1005	949	4015	1190	435
21 Bill fishes	113	125	131	135	138	137	137	134	140	133	128	123	114	119	116	339
22 Barracudas	157	231	308	385	463	542	620	728	922	1039	948	926	788	1073	892	575
23 Mulletts	324	467	612	758	904	1053	1242	1479	2133	2669	2698	2745	2460	2145	1558	1899
<b>24 Unicorn cod</b>																
<b>25 Flatfishes</b>																
a Halibut																
b Flounders																
c Soles																
<b>26 Crustaceans</b>																
a Penaeid prawns	256	282	300	315	326	334	353	373	405	410	424	431	425	478	392	399
b Non-Penaeid prawns	2	45	92	143	194	249	313	357	425	469	445	409	630	1021	1061	71
c Lobsters	11	14	16	18	19	20	23	24	27	28	30	31	30	34	28	29
d Crabs	37	55	74	92	110	129	153	162	305	430	561	685	775	982	751	989
e Stomatopods																
<b>27 Molluscs</b>																
28 Cephalopods	2	2	2	2	2	2	2	2	2	244	233	229	226	199	119	118
<b>Total</b>	<b>7904.9</b>	<b>11115</b>	<b>14321</b>	<b>17531</b>	<b>20734</b>	<b>23944</b>	<b>26807</b>	<b>30485</b>	<b>32391</b>	<b>32034</b>	<b>31344</b>	<b>31861</b>	<b>29969</b>	<b>34780</b>	<b>32008</b>	<b>36407</b>