# Marine fisheries in India

## 1. Introduction

Marine fishery is associated with the culture and capture of fishes in marine waters. Fishes being the foremost component of marine food webs serves as food for marine mammals. Apart from its role in marine environment, fish also serves as a significant source of protein in human and animal diets, both the rural and urban population. Fisheries sector greatly contributes in provides livelihood to millions of people directly and indirectly, income generation and offer foreign exchange.

Overall, the marine catch accounts for 17% of global animal protein consumption. In terms of annual consumption of fish per person, the global average yearly utilization is 20 kg per person in 2014. The average consumption of fish per person in developed nations is roughly three times that of developing countries. Nevertheless it creates large demand for marine fish production.

Consequently total world fish production increased steadily from 19.3 million tonnes in 1950 to more than 134 million tons in 2002. According to Food and Agricultural Organization (FAO, 2005), the current rates of world population growth, the total world supply of fish as a food from all sources (marine, freshwater and aquaculture) would have to grow from roughly 142 million tons in 2008 to nearly 180 million tons by 2030 to maintain today's per capita fish supplies. In this, marine capture fisheries are the largest contributors to world fish production. At present, out of the total world fish production almost 63% (84.4 million tons) were produced through the exploitation of wild fish resources of the oceans. However, over the last two decades, there has been a rapid expansion of marine and inland water aquaculture, and the relative contribution of marine capture fisheries to the total world fish production has diminished. Nevertheless, total catches had continued to increase, but at a slower rate than aquaculture.

## 2. Indian marine fisheries

Indian marine fishery is a fast developing sector with significant growth potential and plays a vital role in the foreign exchange. India has a coastline of 8118 kms, an Exclusive Economic Zone (EEZ) of 2.02 million $km^2$, and more than 1 billion people (nearly 20 percent) live in the coastal areas. Fisheries and aquaculture sector plays an important role in her economy and livelihood. India's marine fish production has increased more than seven times, from 0.53 million tons in 1950 to an all-time high 3.9 million tonnes in 2012, even as exports of marine fish and fish products increased from Rs. 35 crores in 1970 to Rs. 37, 870.90 crore in 2016 (1 crore = 10 million Indian rupees; 65 Indian rupees = US$1). Export earnings from fish and fishery products totaled about USD 7.2 billion in 2017, with shrimps contributing over 65 percent. In terms of total fisheries and aquaculture production, in 2008-2010 and in 2012 India was the second major producer in the world and in 2017 ranked third. According to the estimates for 2017, the sector provided about 13 million jobs (4.1 million in aquaculture, 6.3 millions in inland capture, 1.9 million in marine capture and 0.5 million for others including subsistence), with women representing about 32 percent of the people employed in the sector. There are about

239,000 fishing crafts engaged in marine capture fisheries, of which 59,000 are mechanized crafts, 76,000 motorized and the rest non-mechanized. In mechanized sector, there are about 29,000 trawlers. Though fishing is concentrated mainly in the depth zone up to100 m, trawlers operate up to 400 m depth zone. The sector is prominent in India's development programmes due to its vital contribution to employment, food security and foreign exchange earnings.

**STATISTICS AT A GLANCE OF INDIAN FISHERIES**

| | | | |
|---|---|---|---|
| **1. Area of the country** | 3.29 million sq. km. | | |
| **2. Length of Coastline** | 8118 kms | | |
| **3. Exclusive Economic Zone (EEZ)** | 2.02 million sq. km. | | |
| **4. Continental shelf area (approx.)** | 0.53 million sq. km. | | |
| **5. Fish Production in 2017-18 (million metric tonnes)** | Marine | Inland | Total |
| | 3.69 | 8.90 | 12.59 |
| **6. Export of fisheries products, 2017-18** | | | |
| a) Quantity (‘000 Tonnes) | 1377.24 | | |
| b) Value (`crores) | 45,106.89 | | |

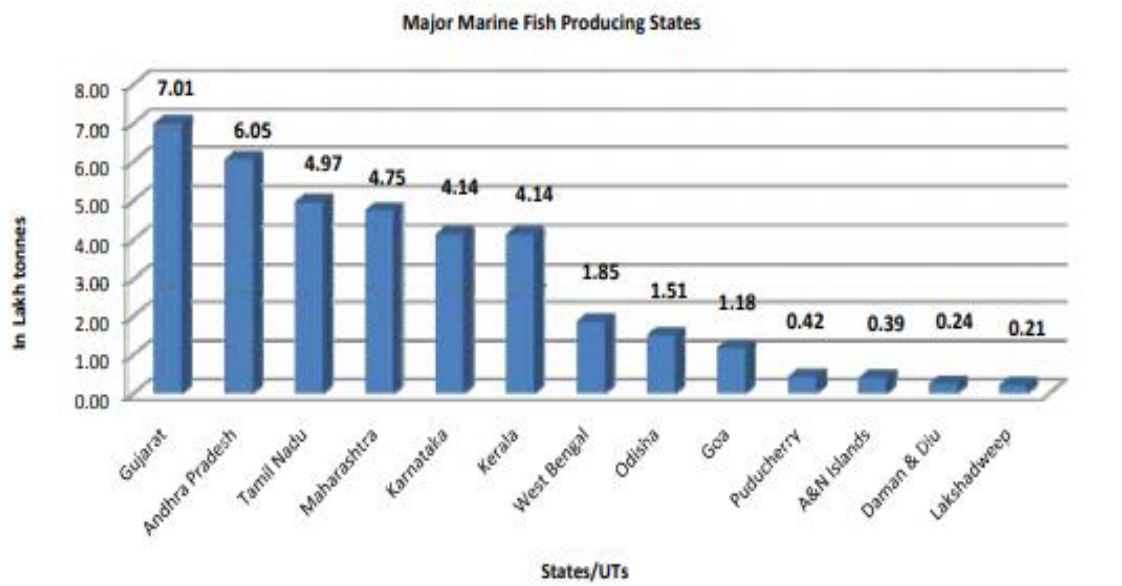
**TABLE 1 MARINE FISH PRODUCTION IN INDIA FOR THE PERIOD 2004-05 TO 2017-18**

| S.No. | Years | Marine Fish production (In Lakh tonnes) |
|---|---|---|
| **1** | 2004-05 | 27.79 |
| **2** | 2005-06 | 28.16 |
| **3** | 2006-07 | 30.24 |
| **4** | 2007-08 | 29.20 |
| **5** | 2008-09 | 29.78 |
| **6** | 2009-10 | 31.04 |
| **7** | 2010-11 | 32.50 |
| **8** | 2011-12 | 33.72 |
| **9** | 2012-13 | 33.21 |
| **10** | 2013-14 | 34.43 |
| **11** | 2014-15 | 35.69 |
| **12** | 2015-16 | 36.00 |
| **13** | 2016-17 | 36.25 |
| **14** | 2017-18 | 36.88 |

Source: State Governments/Union Territory Administration

**3. Marine Fisheries in different states of India-**Among the states of the country, Gujarat is the first among all states in marine fish production in the year 2017-18. This state has the longest coastline (1640 km) with excellent estuarine potential.

## MARINE FISH PRODUCING STATES/UTS 2017- 18




Gujarat is followed by Andhra Pradesh (coastline of 980 km) in the production of marine fish catch. The year wise data of marine fish production for different states is given in the table given below.

### TABLE 2. STATE/UT WISE MARINE FISH PRODUCTION DURING 2011-12 TO 2017-18 (IN LAKH TONNES)

| S. No. | States/UTs | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 |
|---|---|---|---|---|---|---|---|---|
| 1 | Andhra Pradesh | 4.33 | 4.14 | 4.38 | 4.75 | 5.20 | 5.80 | 6.05 |
| 2 | Goa | 0.86 | 0.74 | 1.10 | 1.15 | 1.07 | 1.14 | 1.18 |
| 3 | Gujarat | 6.92 | 6.94 | 6.96 | 6.98 | 6.97 | 6.99 | 7.01 |
| 4 | Karnataka | 3.47 | 3.57 | 3.57 | 4.00 | 4.12 | 3.99 | 4.14 |
| 5 | Kerala | 5.53 | 5.31 | 5.22 | 5.24 | 5.17 | 4.31 | 4.14 |
| 6 | Maharashtra | 4.34 | 4.49 | 4.67 | 4.64 | 4.34 | 4.63 | 4.75 |
| 7 | Odisha | 1.14 | 1.18 | 1.20 | 1.33 | 1.45 | 1.53 | 1.51 |
| 8 | Tamil Nadu | 4.27 | 4.28 | 4.32 | 4.57 | 4.67 | 4.72 | 4.97 |
| 9 | West Bengal | 1.82 | 1.52 | 1.88 | 1.79 | 1.78 | 1.77 | 1.85 |
| 10 | A and N Islands | 0.35 | 0.36 | 0.37 | 0.37 | 0.37 | 0.39 | 0.39 |
| 11 | Daman and Diu | 0.17 | 0.19 | 0.19 | 0.32 | 0.23 | 0.23 | 0.24 |
| 12 | Lakshadweep | 0.12 | 0.12 | 0.19 | 0.13 | 0.16 | 0.30 | 0.21 |
| 13 | Puducherry | 0.38 | 0.36 | 0.38 | 0.42 | 0.47 | 0.46 | 0.42 |
| | **India** | **33.72** | **33.21** | **34.43** | **35.69** | **36.00** | **36.25** | **36.88** |
| | ***Source :*** *Director of Fisheries State Govt. / UTs Administration* | | | | | | | |

## 4.WORLDWIDE MARINE FISHERY STATUS

### TABLE 3. MAJOR COUNTRIES FOR MARINE CAPTURE FISHERIES 2012 TO 2016 (IN TONES)

| S. No | Country | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|
| 1 | China | 13869604 | 13967764 | 14811390 | 15314000 | 15246234 |
| 2 | Indonesia | 5420247 | 5624594 | 6016525 | 6216777 | 6109783 |
| 3 | United States of America | 5107559 | 5115493 | 4954467 | 5019399 | 4897322 |
| 4 | Russian Federation | 4068850 | 4086332 | 4000702 | 4172073 | 4466503 |
| 5 | Peru | 4807923 | 5827046 | 3548689 | 4786551 | 3774887 |
| 6 | India | 3402405 | 3418821 | 3418821 | 3497284 | 3599693 |
| 7 | Japan | 3611384 | 3621899 | 3630364 | 3423099 | 3167610 |
| 8 | Vietnam | 2418700 | 2607000 | 2711100 | 2607214 | 2678406 |
| 9 | Norway | 2149802 | 2079004 | 2301288 | 2293462 | 2033560 |
| 10 | Phillippines | 2127046 | 2130747 | 2137350 | 1948101 | 1865213 |
| 11 | Malaysia | 1472239 | 1482899 | 1458126 | 1486050 | 1574443 |
| 12 | Chile | 2572881 | 1770945 | 2175486 | 1786249 | 1499531 |
| 13 | Morocco | 1158474 | 1238277 | 1350147 | 1349937 | 1431518 |
| 14 | Republic of Korea | 1660165 | 1586059 | 1718626 | 1640669 | 1377343 |
| 15 | Thailand | 1612073 | 1614536 | 1559746 | 1317217 | 1343283 |
| 16 | Mexico | 1467790 | 1500182 | 1396205 | 1315851 | 1311089 |
| 17 | Myanmar | 2332790 | 2483870 | 2702240 | 1107020 | 1185610 |
| 18 | Iceland | 1449452 | 1366486 | 1076558 | 1318916 | 1067015 |
| 19 | Spain | - | 981451 | 1103537 | 967240 | 905638 |
| 20 | Canada | - | 823640 | 835196 | 823155 | 831614 |
| 21 | Taiwan | - | 925171 | 1068244 | 989311 | 750021 |
| 22 | Argentina | - | 858422 | 815355 | 795415 | 736337 |
| 23 | Ecuador | - | 514415 | 663439 | 643176 | 715357 |
| 24 | United Kingdom | - | 630047 | 754992 | 651506 | 701749 |
| 25 | Denmark | - | 668339 | 745019 | 868892 | 670207 |
| 26 | **Total of the above country** | **60709384** | **66923439** | **66953612** | **66338564** | **63939966** |
| 27 | **Total Other Countries** | **18996526** | **14039681** | **14595741** | **14909278** | **15336882** |
| 28 | **World Total** | **79705910** | **80963120** | **81549353** | **81247842** | **79276848** |

*Source: SOFIA 2018 - State of Fisheries and Aquaculture in the world 2014,2016 and 2018 - FAO*

***Notes***: *The countries or areas listed in The above table are the major fish producing countries in terms of total production, in inland and marine waters.*

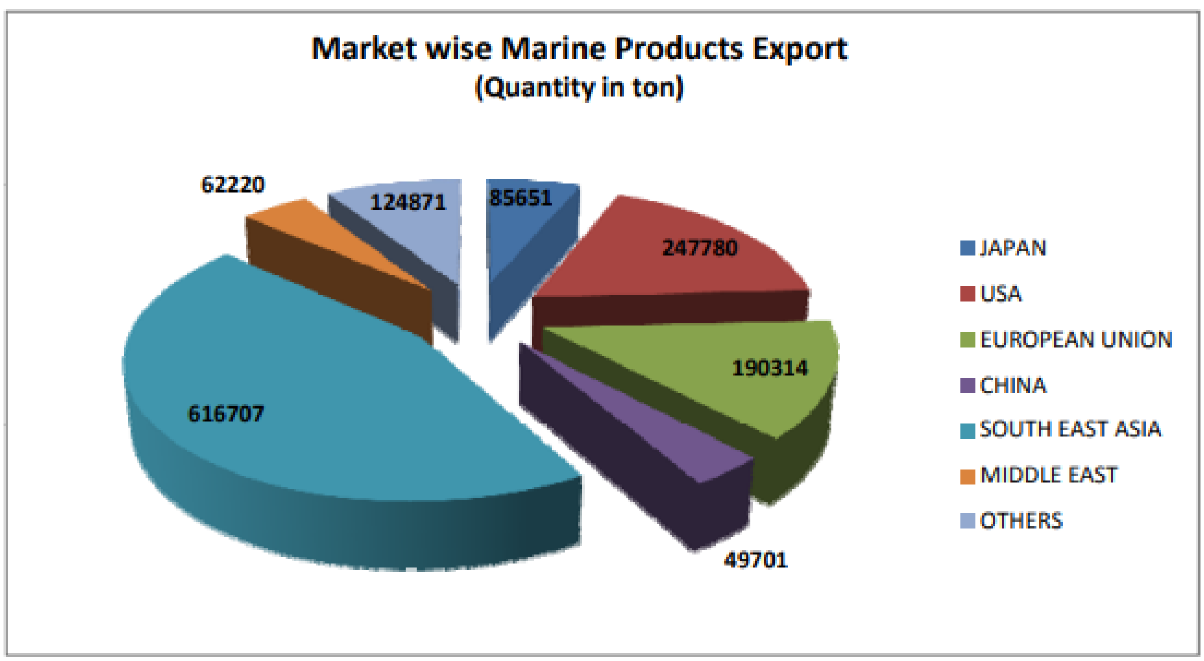
*Fishery statistical data presented in the above table exclude the production for mammals, crocodiles, corals, sponges, pearls, mother- of- pearls and aquatic plants.*

## TABLE 4. PERCENTAGE CONTRIBUTION OF INDIA TO WORLD FISH PRODUCTION DURING YEARS 2000 -16

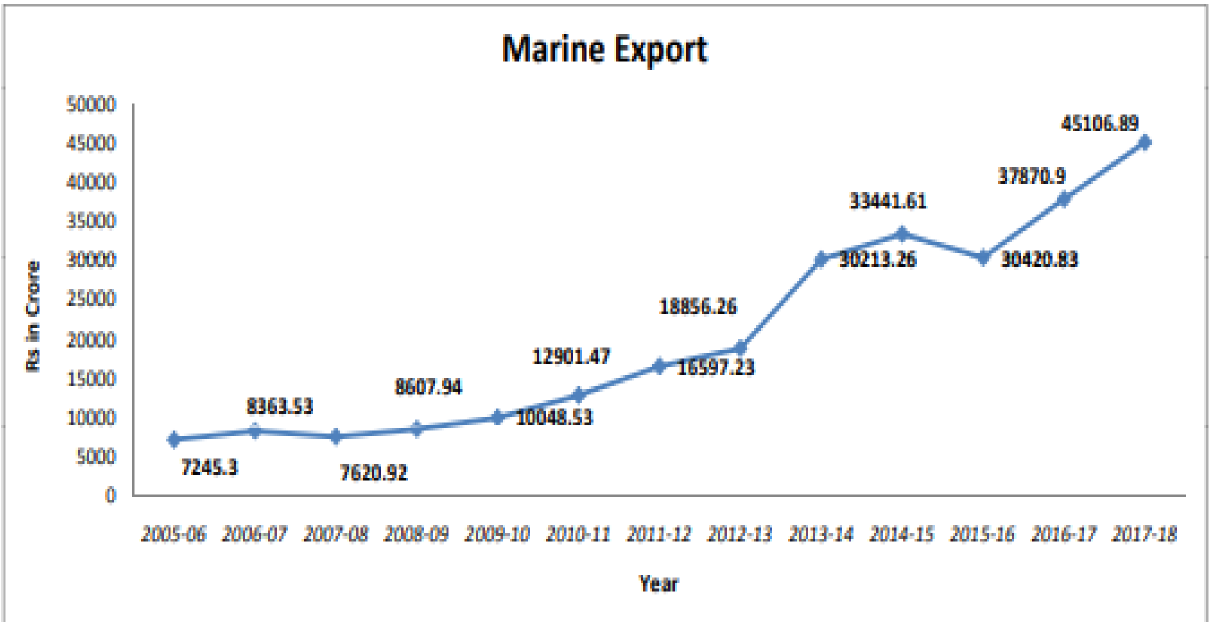
| Year | Contribution of India to World Fish Production (Percentage) | | |
|---|---|---|---|
| | Total | Marine | Inland |
| 2000 | 4.45 | 2.85 | 9.80 |
| 2001 | 4.70 | 2.95 | 10.19 |
| 2002 | 4.64 | 3.08 | 9.36 |
| 2003 | 4.74 | 3.16 | 9.15 |
| 2004 | 4.60 | 2.91 | 9.24 |
| 2005 | 4.87 | 2.92 | 9.83 |
| 2006 | 5.11 | 3.15 | 9.70 |
| 2007 | 4.96 | 3.17 | 8.94 |
| 2008 | 5.56 | 3.47 | 9.94 |
| 2009 | 5.39 | 3.39 | 9.41 |
| 2010 | 5.73 | 3.42 | 9.96 |
| 2011 | 5.76 | 3.12 | 11.37 |
| 2012 | 5.92 | 3.23 | 11.13 |
| 2013 | 6.08 | 3.28 | 11.32 |
| 2014 | 6.34 | 3.35 | 11.84 |
| 2015 | 6.41 | 3.35 | 11.97 |
| 2016 | 6.56 | 3.38 | 12.02 |

*Source: FAO Fisheries and Aquaculture Statistics and Information Branch, 2018. Global* production by production source 1950-2016

## MARKET WISE MARINE PRODUCTS EXPORT 2017-18 (QUANTITY IN TONES)



**TREND OF INDIAN MARINE FISHERIES EXPORT**




## 5. Classification of fisheries (realm-wise):

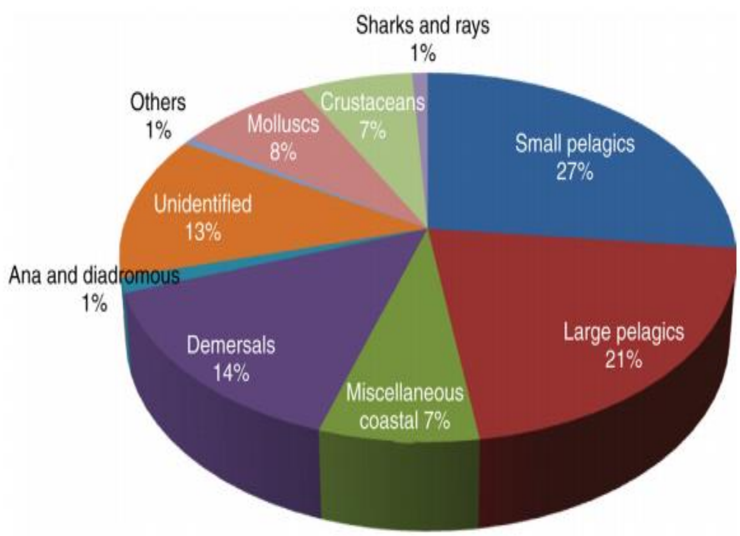
### 5.1. Pelagic Fishery

Pelagic fishes are highly migratory and generally show shoaling behaviour. The important pelagic fishes are clupeids such as wolf herring, oil sardine, lesser sardine, Hilsa, anchovies and others include Bombay duck, halfbeaks, fullbacks, flying fishes, ribbon fishes, carangids, Indian mackerels, seer fishes, tunas, billfishes, barracudas, mullets and unicorn cod. Among these groups, more than 1 lakh tonnes are contributed by oil sardines, lesser sardines, anchovies, mackerels, Bombay duck, Carangids and ribbon fishes. Annual average marine fish production of India for 1985–2005 was 2.3 million tons, of which the pelagic contributed 1.4 billion tons against an annual catchable potential yield of 1.92 million tons from the Indian EEZ. During last decade pelagic finfish resources contributed 46%–55% of total marine fish production.

### 5.2. Demersal Fishery

Demersal fishes are one of the major components in the marine fish landings along the Indian coast. Demersal fish groups such as sharks, groupers, threadfins, pomfrets and Indian halibut are commercially valuable and contribute substantially to the economy of Indian halibut are commercially valuable and contribute substantially to the economy of Indian marine fisheries. Other groups includes rays, eels, catfishes, lizard fishes, pigface bream, perches, goatfishes, sciaenids, silver bellies, white fish, mullets, unicorn cod, flounders and soles. Compared with the pelagic, the demersal fishes are less affected by the environmental changes namely, temperature, currents and so on.

The data on marine fish catch compiled by FAO showed that the larger portions of the global marine catches are pelagic species, with small pelagics such as herrings, sardines and anchovies representing around 26% of the total catch in 2002, down from 29% in the1950s. Demersal fishes such as flounders, halibuts, soles, cods, hakes, haddocks and miscellaneous demersal have contributed 15% of the total catches in 2002, compared with almost 26% of the world catches in the 1950s and1970s. Miscellaneous coastal fishes remained stable at 6% and then 7%, while crustaceans such as crabs, lobsters, shrimps, prawns, and krill increased from 4% in the 1950s and 1970s to 7% in 2002. The contribution of molluscs (abalones, conchs, oysters, mussels, scallops, clams, squids, and octopus) increased slightly from 6% in the 1950s and 1970s to 8% in 2002. There was a slight increase in the proportion of unidentified fish in 2002 with 13% of the total catches up from 11% in the1950s and 1980s.




**WORLD MARINE CATCH (MILLION TONNES) BY MAJOR SPECIES GROUPS.**

**6. Fisheries of important species**

**6.1. Clupeoids:** This group contributes 1/3rd of marine fish landings in india. The major representatives of the group are sardines, anchovies, white bait, rainbow sardine.

**6.2. Oil sardines:** They serve as a valuable fish beacause of its food value. Sardinella longiceps or Indian oil sardine is a small fish with maximum size 28 cm. This species is a planktivore and feed diatoms, dinoflagellates and copepods. It contributes 15% of total marine catches in India.

**6.3. Mackerels:** Mackerels belong to the family Scombridae. This group includes Indian mackerels, Island mackerel and Short mackerel. *R. kanagurta* constitutes the second most important species after the Indian oil sardine.

**6.4. Bombay ducks:** It represent the single species of the genus and distributed in the indo pacific regions along the sea coasts and estuaries. It is a piscivorous feeds on various fish species notably *Coila dussumieri* and crustaceans (*Acetes sp*.)

**6.5. Silver bellies:** They are also known as slipmouths or pony fishes and represented in indian seas by *Secutor ruconicus, S. insidiator, Leiognathus dussumieri, L.equulus, L. bindus* and *Gazza minuta*. *L. equulus* is the most abundant of all.

**6.6. Soles:** they are represented by *Psettodes, Poecilopsetta, bothus* and *Pseudorhombus, solea, cynoglossus.* They constitute as an important element in the ground fish resources of the indian seas.

**6.7. Grey Mullets:** They are the coastal species entering estuaries, lagoon and backwaters. The main reprenstatives are *Mugil cephalus, M. macrolepis, L. tade* , etc.

**6.8. Elasmobranchs:** Elasmobranchs consists of shark, guitarfishes, skates, rays and chimaeras. More than 155 species of elasmobranchs are found in India. The smallest shark found in Indian water is *Eridacnis radcliffei* and the largest is *Rhincodon typus*. Elasmobranchs are carnivores and predacious in nature. Sharks mainly feeds on pelagic teleosts such as sardine, mackerel, Bombay duck etc. and cephalopods, except whale shark, Basking shark, skates and rays feeds on crustaceans, molluscs, polycheates, amphipods and teleosts. Elasmobranchs have gained commercial importance in India only recently because of increasing demands for shark's fin in the Southeast Asia countries.

**6.9. Crustaceans:** India is one of the major contributors of marine crustaceans in the world market. Crustacean fisheries consists of -

a. **Penaeid prawns:** This group is represented by no. of species i.e. *Penaeus indicus, P. monodon, P. monoceros, Metapenaeus dobsoni, M. affinis, and Solenocera indicus.*
b. **Non- penaeid prawns:** The group chiefly includes *Palaemon tenuipes, P. styliferus,* and *Acetes sp.*
c. **Other crustaceans:** these comprise of lobsters and crabs.

**6.10 Molluscs:** This group represents gastropods and bivalves (clams, mussels, edible oysters and pearl oysters) that mainly feed on dead and decayed matter, algae, polychaetes and phytoplankton. However, the helmet shells, the hairy tritons, the murex shells feed on animals such as sea urchins and small clams. Presently, these molluscs occupy an important place in the commercial shell-craft industry. Additionally, Cephalopods also contributes majorly in molluscan fishery. 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.

## 7. References:

FAO (Food and Agriculture Organization of the United Nations). 2005. Globefish Research Program: World Tuna Markets, Vol. 74. Rome, Italy:FAO, GLOBEFISH, Fishery Industries Division, 104.

Fish Base, 2017. World Wide Web Electronic Publication. , Available from: www.fishbase.org.

Hannah, L. (2015). *Ecosystem Services. Climate Change Biology, 281–300.* doi:10.1016/b978-0-12-420218-4.00013-5

http://fsi.gov.in/LATEST-WB-SITE/pdf_files/statistics/hofs-2018.pdf

http://www.fao.org/fishery/facp/IND/en

Rajan, P. T. (2018). Marine fishery resources and species diversity of tropical waters. In *Biodiversity and Climate Change Adaptation in Tropical Islands* (pp. 323-354). Academic Press.