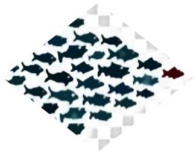
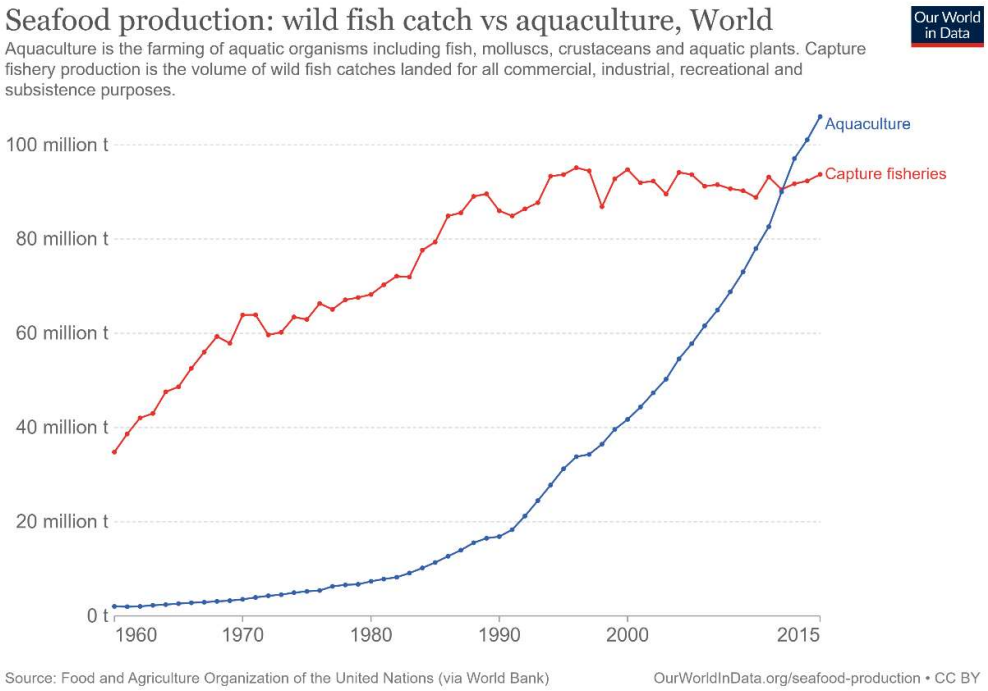
CHAPTER 18
Demersal Fishes



Production of seafood has quadrupled over the last 50 years. With the seafood consumption nearly doubling in the last 50 years there has been increased pressure on fish stocks across the world. Globally, the share of fish stocks which are overexploited are also increasing and sustainability of resources is being attempted at a faster rate since current levels of wild fish catch are unsustainable. Globally, the percentage of fish stocks that are within biologically sustainable levels have decreased from 90 percent in 1974 to 65.8 percent in 2017 (SOFIA, 2020). The volume of global fish production amounted to 177.8 million metric tons in 2019, which rose up by 29.7 t from 148.1 million metric tons in 2010. In the Western Indian Ocean, total landings continued to increase and reached 5.3 million tonnes in 2017. The 2017 assessment estimated that 66.7 percent of the assessed stocks in the Western Indian Ocean were fished within biologically sustainable levels, while 33.3 percent were at biologically unsustainable levels. The Eastern Indian Ocean continues to show a steady increase in catches, reaching an all-time high of 7 million tonnes in 2017. Since 1961, average per capita fish consumption has been increasing in Asia at an annual rate of 2 percent.



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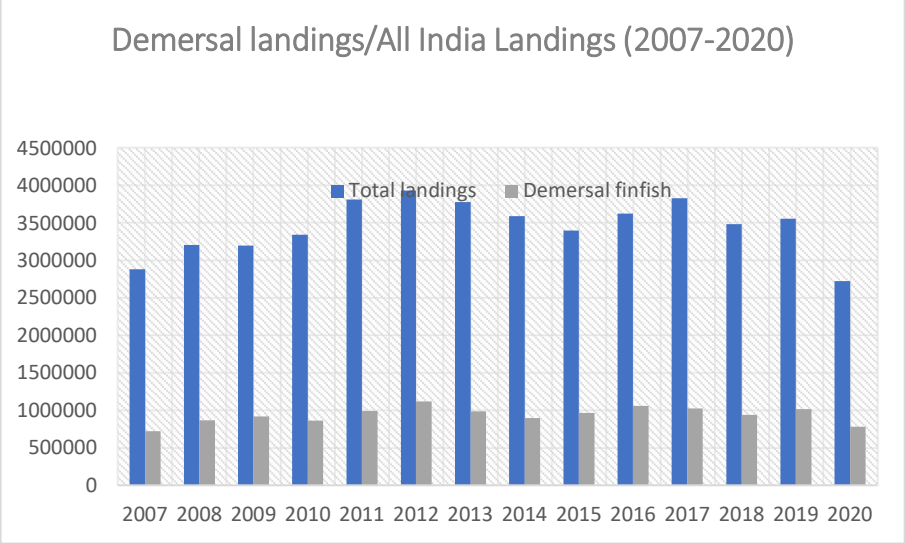
In the Indian scenario, the contribution of demersal raliies around 26 -29 percent of the total fish catch of the country with the last two years the catch contributing to 29 percent of the All India landing.



(Source: CMFRI, 2021)

What is Demersal?

Taking the definition from the UN Atlas of Oceans "demersal, or seafloor perspective, the deep-sea region consists of the continental slopes (starting at the shelf break and corresponding to the mesopelagic and bathypelagic zones) the continental rise which extends down to the abyssal plane at around 6000m, and the trenches. The deep-sea is the largest habitat on earth. The area over 4 000m in depth covers 53% of the sea's surface, which in turn covers 71% of the world's surface! The continental slopes alone occupy 8.8% of the world's surface, compared to 7.5% for the continental shelf and shallow seas. It is a predominately dark and cold environment with much lower productivity than shallower ones."

The seamounts stand out of the abyssal plain.

The continental shelf of Indian EEZ extending upto 200 m depth and is a rich abode of a variety of demersal finfish resources contributing substantially to the total marine fish production in the country. The major demersal fin fish resources are the sharks, rays, guitar fishes, groupers, snappers, sciaenids. catfishes, threadfin breams, silverbellies, lizardfishes, pomfrets ,bulls eye, flatfishes, goatfish and white fish. On the flip side we have several issues adversely affecting the increase in production of the resources such as growth overfishing, recruitment overfishing, increased operation of units through multiday fishing, scraping the benthic biota etc

Major Groups of Demersals

Order: Anguilliformes (Apodes)

The Order Anguilliformes, or true eels, contains 20 families and about 820 species. Species are usually elongate and slender, with single dorsal and anal fins that are continuous with the caudal fin (if present) in most species. All species lack fins and skeleton while some groups lack pectoral fins. Scales are usually absent, or if present, are cycloid and embedded in skin. All have leptocephalus larvae.Most true eels are predators and belong toone of three families Congridae (Conger eels), Muraenidae (Moray Eels) and Ophichthidae (snake eels and worm eels). Some species are excellent food fish and form the basis of very important commercial fisheries.

Order Aulopiformes

Suborder Chlorophthalmoidei -includes 5 families

Family Chlorophthalmidae-Greeneyes

Large eye with teardrop-shaped pupil and distinctive lensless space anteriorly. A hermaphroditic species. Species recorded from India

- *Chlorophthalmus agassizi*-Shortnose greeneye
- *Chlorophthalmus bicornis*-Spiny jaw greeneye

Family Ipnopidae-Deepsea tripod fishes

The family Ipnopidae includes five genera

Bathymicrops, Bathypterois, Bathytyphlops, Discoverichthys and Ipnops and 29 species of slender deep-sea fishes (Nelson, 2006) distributed worldwide demersally in tropical and temperate seas, at depths between 476 and 6000 m (McEachran & Fechhelm 1998). Eyes minute or plate like, directed dorsally.

Family Synodontidae-Lizardfishes

These are generally small with a slender cylindrical body and head that superficially resemble those of lizards. They have a dioecious mode of reproduction. Worldwide, four genera with about 57 species have been recorded.

In India 22 species have been reported in three genera-*Harpadon, Saurida, Trachinocephalus and Synodus*

Family Evermannellidae (Sabertooth Fishes)

Three genera, *Coccorella, Evermannella and Odontostomps* with seven species Family Alepisauridae (Lancetfishes)

Slender elongated body with a large mouth and strong teeth. Two genera, *Alepisaurus* and *Omosudis* reported worldwide (Nelson 2006). However as per Eschmeyer (2015), only one genus *Alepisaurus* has been recorded,

Order Batrachoidiformes

Family Batrachoididae (Toadfishes)

Species recorded from India

- *Allenbatrachus grunniens* (native) Frog fish, Grunting toadfish
- *Austrobatrachus dussumieri* (native) Flat toadfish

Order Beryciformes

The Order has 7 families with 29 genera and 144 species. All species are marine. Four families represented in Indian waters.

Family Berycidae (Alfonsinos)

Dorsal fin without notch, with 4-7 spines increasing in length from first to last, and 12-20 soft rays. 2 genera with about 9 species.

Family Holocentridae (Squirrelfishes, soldierfishes)

Species with a long dorsal fin with spiny portion and soft rayed portion divided by a notch. Holocentrids (squirrelfish and soldierfish) are vocal reef fishes whose calls and sound-producing mechanisms have been studied in some species only. Worldwide, eight genera with 78 species has been reported. In India, 18 species in 4 genera have been recorded.

Elasmobranchs

Sharks are the most diverse and largest group of cartilaginous fishes, comprising eight families, 51 genera, and at least 337 described species.Habitat wise there are pelagic dwelling and demersal dwelling species. The pelagic proportion is largely comprised of those Carcharhiniformes species, nine Lamniformes, and four Myliobatiformes. India, is reportedly the largest shark fishing nation in the ASR and second largest in the world (Dent and Clarke, 2015), contributes 74,000 metric tons of an estimated 831,460 metric tons of global chondrichthyan exports annually (FAO Yearbook, 2020). Chondrichthyan exports from India thus account for ~ 9% of global and ~ 93% of ASR exports of the species. While the FAO reports a 20% decline in global recorded landings of sharks and rays since 2003 (FAO, 2021).

As apex predators, sharks play an important role in the ecosystem by maintaining the species below them in the food chain and serving as an indicator for ocean health. •10 species protected as WLP 1972 •sawfishes - listed in the Appendix I •sharks and rays are listed in the Appendix II •Five species of sharks (oceanic whitetip shark, the porbeagle shark, scalloped, smooth and great hammerhead sharks), and great and reef manta rays were added to Appendix II at Bangkok (Thailand), CITES at the 16th Meeting of the Conference of the Parties (CoP16), in 2013. •In 2016, silky shark, all the thresher sharks and all the devil rays were also added to the CITES lis

Family Lutjanidae

The family Lutjanidae collectively known as snappers, contains 17 genera and 105 species, which are mainly confined to tropical and subtropical marine waters, with few occurring in estuaries (Allen, 1985; Eschmeyer 2012; Anderson, 2003a). •49 species in 10 genera as reliable records and presently known snappers from the Indian Waters (Nair et al., 2014)

Family Serranidae - are mostly marine in habitat with widespread occurrence from tropical and temperate seas. Fishes are characterised by an opercle with three spines with the main spine in centre and one each above and below. •Three subfamilies, Anthiadinae, Epinephelinae and Serraninae are recognized with about 72 genera and 579 species (Parenti and Randall 2020).

Order Pleuronectiformes -Flatfishes

62 species have been reported from India (Nair, 2011)Flounders, Halibut and Soles are the main three groups in India. Major landings are from Kerala and West Bengal. The fishes are mainly landed by trawlers. *Cynoglossus macrostomus* is the major species with size range of 65 -190 mm.

Family Nemipteridae (Threadfin breams, Whiptail breams)

Six species of threadfin breams are known from the seas around India. And form a major fishery along the coastline. Spawning in *N. japonicus* takes place during October-April with a peak during October- December along Gujarat. In Kerala, *N. japonicus and N. randalli* spawn during monsoon and post monsoon periods with peaks during monsoon in the former and during post monsoon in the latter species. The fish is mainly landed by trawlers on the west coast

Catfishes are important demersal resources which have wide distributional range in the IndoPacific region. They are distributed all along the Indian coastal waters upto the middle shelf with preferential concentration on muddy grounds of 30-70 m depths.The fishery had once showed a drastic decline but now is on a path of improvement. They migrate both vertically (diurnal migration) and horizontally (seasonal) in small schools to large shoals in response to seasonal climatic / hydrographic variations. Marine catfishes (family Ariidae – genera Tachysurus (21 species), Osteogeneiosus (1 species), Netuna, and Batrachocephalus (1 species) in Indian waters) of which 11 appear in the commercial fisheries. West coast landed 70% of the total catfish catch and the east coast 30%; north west coast landed

Scaienids:

A major resource landed all along the coast with specific fishery fir its air bladder along the NE coast supported by the *Protonibea diacanthus*. Fishery is present throughout the coast, however taxonomic ambiquities are high. Exploited by trawlers. Major landings in Maharashtra, Gujarat and Andhra Pradesh.

Whitefish

Although distributed all along the coastline, the resource had high landings along the southwest and southeast regions. *Lactarius lactarius* is the only species available in this family. Whitefish production in India shows wide fluctuation along the coast now with catches fluctuating badly along east coast.

References

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