

UNIT -3

6TH SEM

Fisheries can be categorized into two types.

1. Fin fisheries
2. Non-fin fisheries.

The fin fisheries of true fishes, whereas the non-fin fisheries is the fisheries of organisms other than true fish like prawn, crab, lobster, mussel, oyster, sea cucumbers, frog, sea weeds, etc.

Fin fisheries can be further categorized into two types

1. Capture fisheries
2. Culture fisheries.

Capture fisheries is exploitation of aquatic organisms without stocking the seed. Recruitment of the species occurs naturally. This is carried out in the sea, rivers, reservoirs, etc. Fish yield decreases gradually in capture fisheries due to indiscriminate catching of fish including brooders and juveniles. Overfishing destroys the fish stocks. Pollution and environmental factors influence the fish yield. The catches include both desirable and undesirable varieties.



Capture fisheries is intended for catching fishes and also prawns, lobsters, crabs, sea-cucumbers, whales, pearl oysters, edible bivalve and copious other organisms of other than fishes etc.. In the earlier days, the mixture of carnivore fish fingerlings and carp fish fingerlings were stocked together in tanks. Later, they were segregated and stocked selecting the required variety. **Capture of fishes can be broadly divided in to two types;**

- a) Capture by Human effort
- b) Capture by observing the behavioral pattern of Fishes.

Inland capture fishery of India

It has an important place; and contributes to about 30% of the total fish production. The large network of inland water masses will continue to provide great potential, for economic capture fishery which consequently will compete well with fast growing fish-culture practices. The freshwater inland water bodies fall into five major categories, distinguished as:

The Ganga

The Brahmaputra

The Indus system of the Northern India, and

The East and the West coast river systems of the Southern (peninsular) India.

These river systems have certain characteristics of their own with respect to their ecology, climatic conditions and fish populations of commercial food fishes. Besides, there are a number of land-locked lakes especially those situated at high altitudes which have started supporting cold water fisheries of both indigenous and exotic species. In addition to the above-mentioned freshwaters, there are also rich fisheries offered by extensive brackish waters, including important :

Estuaries (Hooghly - Matlah, Mahanadi and Godavari estuaries),

Lagoons (Chilka lake, Pulicat lake) and

Backwaters (Vembanad) and paddy fields (Pokkali in Kerala).

wetlands (bheries), mangrove swamps, etc

Recent additions to the natural inland water bodies are man-made reservoirs. There are at present some 300 reservoirs which hold very good prospects, after restocking, both for capture as well as for culture fisheries. Some of these reservoirs have responded fairly well to attempts to restock them with indigenous as well as exotic species.

Inland capture fishery is a continually expanding industry bringing under its fold newer fisheries of a local or regional nature, while improving upon those which are existing already. Introduction of exotic species from abroad and inter-regional transplantation of fish from Northern to Southern waters have been most welcome and rewarding. The inland capture fishery, however, stands at a critical juncture, which draws a special attention at the national level. Rapid industrialization movements in the country have given a serious blow to the growth of the inland fisheries which was struggling to come out of the old-fashioned style to a more rational and scientific style.

- Constructions of dams have been the cause of decline and damage to several regionally important fisheries.

- Discharge from industrial establishments, multiplying at mushroom growth, into inland water bodies is polluting the water in very serious proportions, and is damaging the fish populations tremendously.
- Already, old-age practices of indiscriminate fishing of fingerlings and juveniles, supporting local and seasonal fisheries, especially in breeding or nursery grounds, have been doing enormous damage, and needed effective controls for conservation.
- Likewise, time-old practice of sewage disposal into rivers was a menacing practice causing heavy pollution. Great harm is also being done from agricultural wash coming to inland waters, which brings to fish a very toxic principle of the numerous pesticides used in the agricultural practices.

India is the third largest producer of fish and second largest producer of inland fish in the world. The fisheries sector provides employment to over 11 million people engaged fully, partially or in subsidiary activities pertaining to the sector, with an equally impressive segment of the population engaged in ancillary activities. Potential of fish production from marine and inland sources has been estimated at 3.9 million tonnes and 4.5 million tonnes, respectively.

CAPTURE FISHERY RESOURCES IN INDIA

Inland Capture Fisheries

India is endowed with vast and varied aquatic resources (marine and Inland) amenable for capture fisheries and aquaculture. While the marine water bodies are used mainly for capture fisheries resources, the inland water bodies are widely used both for culture and capture fisheries. Inland capture fisheries of India have an important place; it contributes to about 30% of the total fish production. The large network of inland water masses provides great potential for economic capture fishery. Most of the inland water bodies are captive ecosystems where intensive human intervention in the biological production process can be possible and thereby holding enormous potential for many fold increase in fish output.

.,The inland water resources available in India are given in Table-3.1. Table-8.1. Inland water resources in India Resource Extent Type of fisheries

a. Rivers	29,000km	capture fisheries
b. Canals & streams	1,42,000km	capture fisheries
c. Lakes	0.72m ha	capture fisheries
d. Reservoirs	3.152m ha	
Large	1,140,268 ha	capture fisheries
Medium	527,541 ha	capture fisheries
Small	1,485,557 ha	capture-based fisheries

e. Ponds & tanks	2.85 m ha	Culture fisheries
f. Flood plain wetlands (Beels / Ox-bow lakes)	202,213	culture-based fisheries
g. Swamps and Derelict waters	53,471 ha	Nil (not known)
h. Upland lakes	720,000 ha	Not known
i. Brackish water	2.7 m ha	
Estuaries	300,000 ha	capture fisheries
Back waters	48,000 ha	capture fisheries
Lagoons	140,000 ha	capture fisheries
Wetlands (Bheries)	42,600 ha	capture fisheries
Coastal lands for aquaculture	1.42, m ha	capture fisheries.

Of these, the rivers, canals, streams, lakes, large and medium reservoirs, estuaries, and associated backwaters and lagoons support the capture fisheries.

Whereas freshwater ponds, tanks, swamps and estuarine wetlands (bheries), paddy fields, small shallow coastal lagoons and coastal pond farms support the culture fisheries or aquaculture.

Marine Capture Fisheries: The capture marine fishery resource of India comprises of a **long coastline (8118 kms.) and Exclusive Economic Zone (EEZ) (2.025 sq. kms)**. Marine capture fisheries play a vital role in India's economy, providing employment and income to nearly two million people. The marine fishing fleet is estimated to be 280491 nos., consisting of traditional crafts (181284 nos.), motorized traditional craft (44578 nos.) and mechanized boats (53684 nos.). In the total marine fish production, the share of traditional, motorized and mechanized sector is estimated at 9%, 26% and 65% respectively.

Coastal resources up to 100 m depth are subject to intensive fishing pressure and is exploited at levels close to or exceeding optimum sustainable limit. While the inshore waters have been almost exploited to the Maximum Sustainable Yield (MSY) levels, the contribution from the deep sea has been insignificant, hitherto directed at shrimps only. Having almost reached a plateau in production from the coastal waters, the scope for increasing fish production from marine sources now lies in the deep sea.

Fisheries resources: The commercially important marine fisheries resources are oil sardines, mackerels, Bombay ducks, tunas and the prawns. Other marine resources are the catfishes, polynomids, pomfrets, crabs, oysters, marine algae, etc.

Classification of marine fish species

The marine fish species are grouped as follows:

- i. Pelagic fishes– high-value (PHV): Seer fish, oceanic tunas (yellow fin tuna, skipjack tuna), large carangids (*Caranx* sp.), pomfrets, pelagic sharks, mullets.
- ii. Pelagic fishes – low-value (PLV): Sardines, mackerel, anchovies, Bombay duck, coastal tunas, scads, horse mackerel, barracudas
- iii. Demersal fishes – high-value (DHV): Rock cods, snappers, lethrinids, big-jawed jumper (*Lactarius*), threadfins (Polynemids)
- iv. Demersal fishes – low-value (DLV): Rays, silver bellies, lizard fishes, catfishes, goat fishes, nemipterids, soles
- v. Crustaceans – high-value (Shrimp): Shrimps, lobsters
- vi. Molluscs and others (Molluscs): Cephalopods (squids, cuttlefishes and octopus), mussels, oysters, non-penaeid prawns, etc.

Culture fisheries are the cultivation of selected fishes in confined areas with utmost care to get maximum yield. The seed is stocked, nursed and reared in confined waters, and then the crop is harvested. Culture takes place in ponds, which are fertilized and supplementary feeds are provided to fish to get maximum yield. In order to overcome the problems found in capture fisheries to increase the production, considerable attention is being given to the culture fisheries.

Culture fisheries are conducted in freshwater, brackish water and sea waters. With the development and expansion of new culture systems, farming of a wide variety of aquatic organisms like prawns, crabs, molluscs, frogs, sea weeds, etc. have come under culture fisheries. Due to the culture of a variety of aquatic organisms, culture fisheries have been termed as aquaculture.

On the basis of Fish Culture System

1. On the basis of culture-

Monoculture: Raising only one species of fish in available water body. Eg: Raising of anyone of tilapia, rainbow trout, catfish etc.

Monosex culture: Raising of either male or female of single fish species. It is practiced for maintaining breeding male or female fish.

Advantages:

Cultivation practice such as feeding, disease diagnosis and treatment is easier for eg: Feeding is easier for single species due to uniform feeding habit.

Typical characteristics of fish can be study more accurately.

Disadvantages

Productivity of pond not fully utilized

Market supply cannot be fulfilled and more risky.

Polyculture: Culturing 2 or more than 2 species of fish on same water body. Eg Rearing of bighead carp and grass carp.

Polysex culture: Either male or female of 2 or more species is reared. Eg: Male of rohu, catla etc on same pond.

Advantages

Productivity of pond is fully utilized

Yields per unit area is higher, less risky.

Disadvantages:

Cultivation practices is difficult

Selective harvesting is difficult

Costly and lablour intensive.

On the basis of enclosure

Pond Fish culture

Cage Culture

Pen/enclosure fish culture

On the basis of density

Intensive fish farming system

Semi-intensive fish farming system

Extensive fish farming system

On the basis of Integration

Pig-cum fish farming

Duck-cum fish farming

Paddy cum fish farming

Horticulture crop cum fish farming