

CAPTURE OF FISHERIES

Key words: Aquaculture, Seafood, Inland resources



Fig – 8.1

INTRODUCTION

Aquaculture has been defined in many ways. It has been called as the rearing of aquatic organisms under controlled or semi controlled condition - thus it is underwater agriculture. The other definition of aquaculture is the art of cultivating the natural produce of water, the raising or fattening of fish in enclosed ponds. Another one is simply the large-scale husbandry or rearing of aquatic organisms for commercial purposes. Aquaculture can be a potential means of reducing over need to import fishery products, it can mean an increased number of jobs, enhanced sport and commercial fishing and a reliable source of protein for the future.

Fish is a rich source of animal protein and its culture is an efficient protein food production system from aquatic environment. The main role of fish culture is its contribution in improving the nutritional standards of the people. Fish culture also helps in utilising water and land resources. It provides inducement to establish other subsidiary industries in the country.

Fisheries can be categorised into two types - **fin fisheries** and **non-fin fisheries**. The former is fisheries of true fishes, whereas the latter 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 – **capture fisheries** and **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.

A culture fishery is 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, 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 has been termed as aquaculture.

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. Primitive human beings were acquainted with capture fishery centuries passed for him to observe and understand for the possibilities of culturing fish. Then also he depended mostly on the culture of fishes with parental care. Later, he tried to collect the fingerlings in canals, distribution canals. 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 behavioural pattern of Fishes.

Inland capture fishery of India has an important place; it 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 and 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). Chilka lake in the state of Orissa is an open shallow brackish water lake having an area of 906 sq. km. in summer and 1165 sq. km. in rainy season. A long canal joins it with sea. Waters from river Daya (Mahanadi) and other smaller streams flow into it. 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.

CAPTURE FISHERY IN INDIA

Capture fisheries is intended for catching fishes, prawns, lobsters, crabs, molluscs etc. India is endowed with vast and varied aquatic resources (Marine and Inland) amenable for capture fisheries. 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



Fig – 8.2

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. Inland water bodies include freshwater bodies like rivers, canals, streams, lakes, flood plain wetlands or beels (ox-bow lakes, back swamps, etc.), reservoirs, ponds, tanks and other derelict water bodies, and brackish water areas like estuaries and associated coastal ponds, lagoons (Chilka lake, Pulicat lake) and backwaters (Vembanad backwaters), wetlands (bheries), mangrove swamps, etc., 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	202,213 ha	culture-based fisheries

(Beels / Ox-bow lakes)		
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
Mangroves	356,000 ha	subsistence
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.

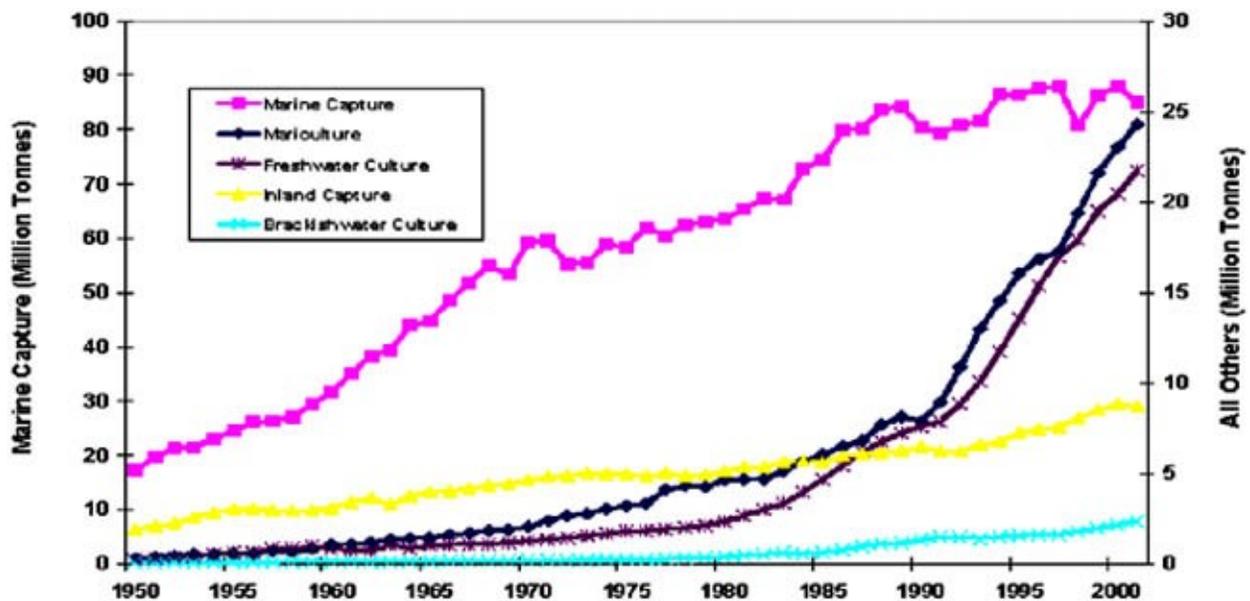


Fig – 8.3

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.

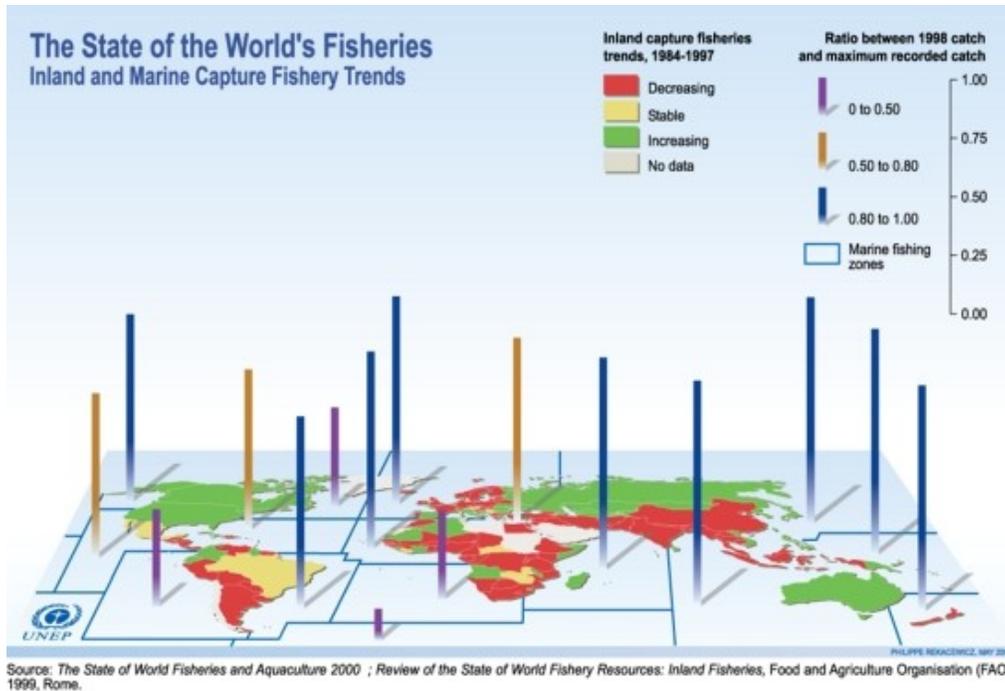


Fig – 8.4

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. Of the many options to harness deep-sea fishery resources, diversification of the existing deep sea fishing fleet and introduction of resource specific vessels for long lining, purse seining and squid jigging is catching more attention.

Capture Fisheries in Kerala

Kerala has a coastline of 590 kms, EEZ of 147740 sq. kms and continental shelf of 39139 kms. The fishermen population in the state is 10.89 lakhs. At present there are 5504 nos. of mechanized boats, 29395 nos. of motorized boats and 21956 nos. of non-motorized crafts operating from Kerala. On the inland sector the state is rich with 44 rivers, 53 reservoirs, and 53 backwaters. Net production of fish and prawns from Kerala during 2004-05 was estimated at 6.78 and 0.73 lakh MT respectively. Kerala exported 87378 MTs of marine products worth Rs. 115807 lakhs during the same period.

In capture fisheries, the wild populations are simply harvested from the natural waters with little human intervention in modifying the ecosystem i.e. hunting. Example: marine fishery. On the other hand, in a culture fishery, the whole operation is based on captive stocks with a high degree of effective human control over the water quality and other habitat variables. Example: Culture of fish and shell-fish in ponds. When the fish harvest in an open water system depends solely or mainly on artificial recruitment (stocking), it is generally referred to as culture-based fisheries.

Culture-based fishery is the most common method of enhancing the fish production being followed in some inland water-bodies in India.

Seafood Watch:

Seafood Watch defines sustainable seafood as originating from sources, whether fished or farmed that can maintain or increase production in the long-term without jeopardizing the structure or function of affected ecosystems.

The following **guiding principles** illustrate the qualities that capture fisheries must possess to be considered sustainable by the Seafood Watch program. Species from sustainable capture fisheries:

- Have a low vulnerability to fishing pressure, and hence a low probability of being overfished, because of their inherent life history characteristics;
- Have stock structure and abundance sufficient to maintain or enhance long-term fishery productivity;
- Are captured using techniques that minimize the catch of unwanted and/or unmarketable species;
- Are captured in ways that maintain natural functional relationships among species in the ecosystem, conserves the diversity and productivity of the surrounding ecosystem, and do not result in irreversible ecosystem state changes; and
- Have a management regime that implements and enforces all local, national and international laws and utilizes a precautionary approach to ensure the long-term productivity of the resource and integrity of the ecosystem.

Seafood Watch has developed a set of five sustainability **criteria**, corresponding to these guiding principles, to evaluate capture fisheries for the purpose of developing a seafood recommendation for consumers and businesses. These criteria are:

1. Inherent vulnerability to fishing pressure
2. Status of wild stocks
3. Nature and extent of discarded bycatch
4. Effect of fishing practices on habitats and ecosystems
5. Effectiveness of the management regime

Each criterion includes:

- Primary factors to evaluate and rank
- Secondary factors to evaluate and rank
- Evaluation guidelines² to synthesize these factors
- A resulting **rank** for that criterion

Once a rank has been assigned to each criterion, an **overall seafood recommendation** for the species in question is developed based on additional evaluation guidelines. The ranks for each criterion, and the resulting overall seafood recommendation, are summarized in a table. Criterion

ranks and the overall seafood recommendation are color-coded to correspond to the categories of the Seafood Watch pocket guide:

1 “Fish” is used throughout this document to refer to finfish, shellfish and other wild-caught invertebrates.

2 Evaluation Guidelines throughout this document reflect common combinations of primary and secondary factors that result in a given level of conservation concern. Not all possible combinations are shown – other combinations should be matched as closely as possible to the existing guidelines.

Best Choices/Green: Consumers are strongly encouraged to purchase seafood in this category. The wild-caught species is sustainable as defined by Seafood Watch.

Good Alternatives/Yellow: Consumers are encouraged to purchase seafood in this category, as they are better choices than seafood in the Avoid category. However there are some concerns with how this species is fished and thus it does not demonstrate all of the qualities of a sustainable fishery as defined by Seafood Watch.

Avoid/Red: Consumers are encouraged to avoid seafood in this category, at least for now. Species in this category do not demonstrate enough qualities to be defined as sustainable by Seafood Watch.

Source:

<http://nptel.ac.in/courses/120108002/8>