M. Sc. IV Sem.

Paper Elective Paper II

Fishery Science, Capture Fishery

Estuarine fisheries and resources

Estuaries are the transitional zones between the rivers and sea and have specific ecological properties and biological composition. Estuaries offer immense biological wealth characterized by the diversified rich flora and fauna including fisheries. The term estuary may be defined as the tidal mouth of a great river, where the tide meets the current. It is a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with freshwater derived from land drainage.

A more comprehensive definition that an estuary is "an inlet of the sea reaching into a river valley as far as the upper limit of tidal rise, usually being divided into three sectors-

1 A marine or lower estuary, having free connection with the open sea,
2 A middle estuary subject to strong salt and freshwater mixing,
3 An upper or fluvial estuary, characterized by freshwater but subject to daily tidal action.

Estuarine water resources of India

The total estuarine water resources of India are estimated to be 1.44 million ha. The state–wise break up (in lakh ha) is as follows: West Bengal 2.10, Odisha 4.17, Andhra Pradesh 0.79, Tamil Nadu 0.56, Puducherry 0.01, Kerala 2.43, Karnataka 0.08, Goa 0.12, Maharashtra 0.10, Gujarat 3.76, and Andaman and Nicobar 0.37. The Odisha, Gujarat, Kerala, West Bengal and Andhra Pradesh have rich estuarine resources. The major estuaries, viz. Hooghly–Matlah (8029 Km^2), Mahanandi, Godavari, Krishna, Cauvery, Vellar and Brackish water lakes of Chilka (1165 Km^2) and Pulicat on east coast and the estuaries of the Narmada, Tapti, Mahi, Manovi-Zuari and backwater of Kerala and Vembanad lake on west coast fishery resources .

Classification of estuaries

Based on Environment

There is a lack of uniformity among tropical estuaries in the terms of size, depth, physical and chemical features and other environmental factor such as the nature of the adjacent marine and freshwater habitats. The tropical estuarine environment can be divided into four broad categories viz.

(I) Open estuaries, (II) estuarine coastal waters, (III) Blind estuary (IV) Coastal Lake

Open estuary

These estuaries are never isolated from the sea. The extensive delta of the Ganga river forms the county largest esturine system (Hooghly-Maltah) in the Indian ocean. The tidal impact of the system is felt up to 200 km from the mouth. The Mahanadi and Godavari are also open type of estuaries.

Estuarine coastal waters

The effect of the discharge from the Ganga (Hooghly) is felt more than 100 Km in the Bay of Bengal. The shallow nature of such tropical coastal waters and their physical conditions of lowered salinity and high turbidity make them at least partly estuarine in character, particularly as regards their fish fauna.

Blind estuaries

The estuaries in this category are usually relatively small, both in length and catchment areas. During summer, these estuaries are temporarily closed by a sand bar across sea mouth and during this period there is no tidal range and thus no tidal currents. The mouth opens only during the rainy season and at that time a normal estuarine salinity gradient is established. A number of this type of estuarinies is located in Tamil Nadu and Karnataka coasts.

Coastal lakes

The coastal lakes have some form of connection to the sea and at the same time they receive freshwater through a river or number of rivers. Two of the best examples of coastal lakes in the country are chilka lake (Odisha) and Pulicat lake (Andhra Pradesh) on the east coast. Both support important fisheries. The former is the largest brackish water lake in India.

Estuarine Ecosystem

In general, estuarine are the most productive natural ecosystem in the world. The reasons for its productivity are- (1) abundant availability of primary productive units (autotrops), phytoplankton, phytobenthos and green rooted plants (mostly mangrove trees), (2) high oxygen content, (3) rapid regeneration and conservation of nutrients, (4) receives enormous quantities of organic detritus, (5) the estuary is often called as ‘nutrient trap’ as it receive abundant quantities of nutrients from the fresh water discharge of river as well as land drainage.

Fishery

A total of 172 species of fishes are recorded from the estuary of which 73 occupy the fresh water zone and 99 the higher saline (lower) zone. The impact of the fishery resources of the estuary after commissioning of barrage is the improvement of general habitat of certain prawn and fish resources. As a result, the annual average prawn and fish yield from the estuarine system increased from 3,204 tonnes during 1960 to 1963 to 61,194 tonnes during 1998 to 1999 and 117,639 tonnes 2010 to 2011 (CIFRI data).

The average contribution of the fish species in this fishery were *Hilsa ilish* (51%), *Harpodon nehereus* (11.3%), *Pama pama* (5.7%), *Setipinna* spp (4.7%), *Trichurus* spp (4.2%) and Penaeid prawns (4.35%). Other important fish species were *Polynemus paradiseus*, *Polydactylus indicus*, *Eleutheronema tetradactylum*, *Lates calcarifer*, *Coilia dusumieri*, *Pangasius pangasius*, *Liza parsia, L. tade*, *Rhinomugil corsula*, *Pampus argenteus*, *Mystus* spp., *Johnius dussumieri*, *Sillaginopsis parijus* etc. Among prawn species, *Penaeus monodon, P. indicus*, *Metapenaeus brevicornis*, *M. monoceros*, P*arapenaeopsis sculptilis*, *P. stilifera*, *Macrobrachium* spp were the most important. Whereas certain freshwater fish species namely *Eutropiichthys vacha*, *Clupisoma garua, Wallago attu, Sperata seenghala, Ompok bimaculatus* and *Rita rita* made their appearance in the freshwater stretch of the estuarine system. The size range of fish, season of abundance, feeding habit, size at first maturity recorded from this estuarine system are varied from year to year.

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