

Mangroves and Fisheries

The occurrence of mangrove forests and swamps in the intertidal regions is characteristic of the tropical coastline. The word mangrove refers to the community of salt loving trees and shrubs which colonise soft muddy shores bordering protected bays, lagoons, backwaters and river estuaries. Wherever they have developed as forests, they are the concern of forest and revenue departments and in other places where their formation has been reduced to shrubs and marshes they are considered as wasteland or derelict forests. The important role the mangroves play in nature and their ecological significance have been realised of late and the Government, the scientific institutes and universities are paying increasing attention to the biology, conservation and management of mangrove areas. The Department of Environment has constituted a National Mangrove Committee in which Dr E. G. Silas, Director is a Member. CMFRI's team on mangrove investigations led by Shri M. S. Rajagopalan has carried out surveys of the important mangrove areas such as Andaman and Nicobar islands, Gulf of Kutch, Cochin and Killai backwaters, Kakinada and Tuticorin for understanding the characteristics of the ecosystem with special reference to fish and fisheries.

The long coastline of our country is blessed with extensive estuarine areas of large rivers, backwaters and lagoons and one would therefore expect extensive mangrove areas. But as per a recent estimate, the extent of mangrove areas in the mainland coasts is about 256,000 ha and in

the Andaman Nicobar islands it is about 100,000 ha. This is a small fraction when compared to the estimated area of about 10 million ha in the Indo-west Pacific region.

In India, one of the richest

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mangrove formations occurs, in the Sunderbans in the estuarine areas of Hoogly and Matla river system where the mangroves extend to about 100 miles inland from the coastal area. Next in importance are the rivermouth regions of Mahanadhi, Godavari, Krishna and Coleroon. Along the west coast, mangrove formations of lesser extent occur around Gulf of Kutch, Gulf of Cambay and as isolated patches of shrubbery or tree forms in the estuaries of Mandovi-Zuari, Nethravathi and the Cochin backwaters. Among



Lithograph* of Mangroves near Goa, on the west coast of India, at ebb tide
Source: Davis Ainsworth. J. R. 1907. Science in Modern Life.
(from Dr P. Vijayaraghavan's collection)

these the mangrove of the Andaman Nicobar islands are comparatively well preserved.

Economic Importance

The importance of mangrove to mankind has to be viewed from different angles. As a forest resource of economic importance, mangroves have been exploited rather indiscriminately for timber, fuel wood, charcoal and extraction of tannin from barks. Mangrove foliage is used as feed for cattle and camels.

The essential constituents of mangrove flora are trees and bushes comprising only a small number of species under the genera such as *Avicennia*, *Rhizophora*, *Bruguiera*, *Aegiceras*, *Excoecaria*, *Clerodendron* and *Acanthus* but representing families not very nearly related to one another. These plants with their anchoring and radial roots, breathing roots and proproots help in conso-

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olidating the loose muddy soils and build up a natural barrier between the tidal action from the sea and floods from the river. The dense stands of mangrove canopy help in minimising the fury of physical forces such as cyclones and storms.



Oyster encrusting on mangrove proproots in the inter-tidal region

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The swampy areas formed by the mangroves and the net work of canals, creeks and waterways in estuarine areas attract a large number of fish, prawns and molluscs especially in the critical stages of their early life history and provide shelter and food. In addition to these visiting fauna, the mangroves have their own characteristic resident fauna belonging to both aquatic and terrestrial environments, consisting of aquatic birds, mammals and reptiles at the higher trophic levels and fish, crustaceans, filter feeders, and phytoplankton at the lower levels. The considerable quantities of litter fall from mangroves and their degradation by fungi and bacteria enriches the surrounding water bodies with detrital food which not only sustains the food web within the ecosystem but also enriches the adjoining inshore marine environment on which coastal fisheries are dependent.

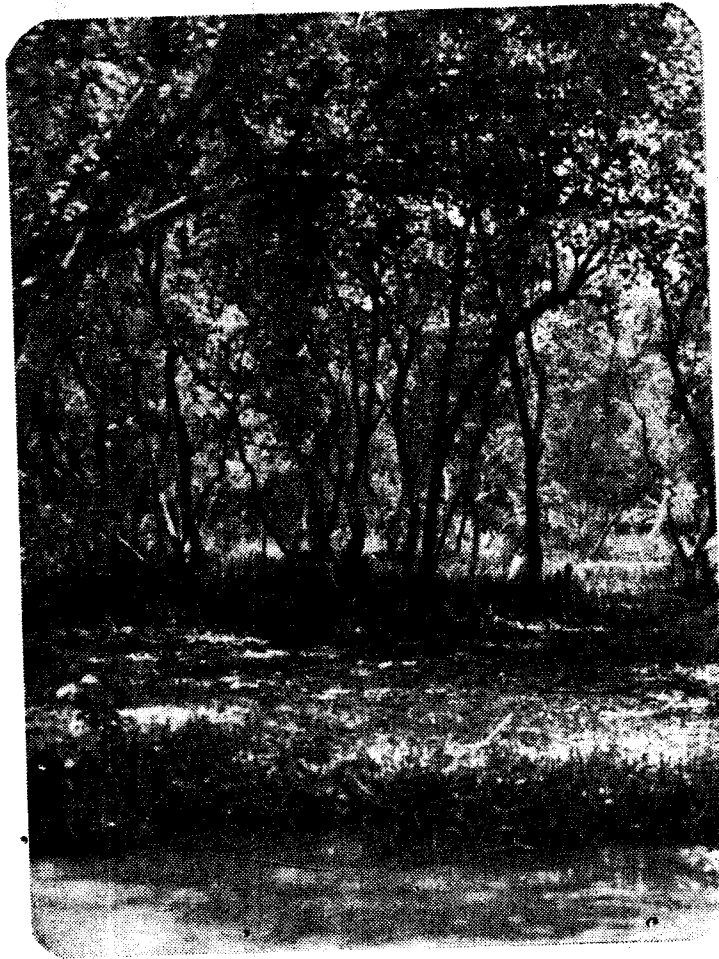
The migratory habits of fish and prawns along with tidal inflow and outflow in mangrove areas are exploited by local fishermen who operate fixed stake nets, bag nets, or use cast nets for a sustenance type of fishery. The migration of juveniles of prawns and fish into the mangrove areas is taken advantage of in the traditional methods of coastal aquaculture as it is practised in Kerala and West Bengal. In South East Asian countries the system of converting mangrove areas (Tambake) for milk fish culture has been in vogue since a long time.

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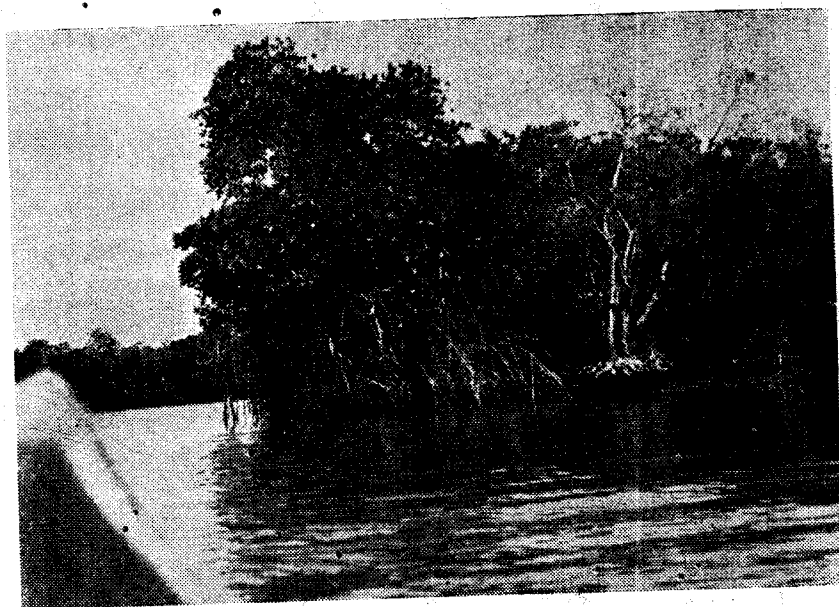
The Pichavaram mangroves in the Killai backwaters (Tamil Nadu) comparatively rich with 10-15 species of mangrove flora spreading to an approximate area of 10,000 ha are one of the best studied mangroves in the marine environment. The meandering waterways and creeks support abundant quantities of post larvae and juveniles of cultivable species of penaeid prawns, mullets, pearl spot and milk fish and the area is recognised as one of the richest for seed resources. From the adjacent sea more than 100 species of commercially important fishes ingress into the mangrove canals which are exploited by the village fishermen. The FAO/BOBP has a project in this area to help the local fisherman in the culture of prawns in pens. This area would provide an ideal situation for coastal aquaculture if proper farm management systems with measures to protect the mangroves are worked out.

Mangroves as sanctuary for wildlife

Mangroves forests also afford sanctuary for wildlife. The Sunderbans forests shelter the famous Bengal tiger, wild pig, rhesus monkey among mammals; king cobra,



Deforestation of mangroves due to indiscriminate felling



*Soil erosion in the inter-tidal region affecting the mangroves
(Note tree in the foreground)*

python, lizards, monitor and crocodiles among reptiles. The Bittorkanika sanctuary in Orissa is famous for its marshy crocodile farm. The aquatic birds are represented by sea-gulls, open bill storks, pelicans, ibis, herons, egrets etc. The migratory flamingos annually visit the swamps of Kutch and Point Calimere for nesting and feeding.

A versatile ecosystem in jeopardy

The versatile ecosystem which is of importance to mankind has been in jeopardy due to tremendous human pressure. The large scale felling

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of mangroves for timber, poles, firewood and charcoal has considerably eroded its extent in Sunderbans, Gulf of Kutch and other areas. The continuous removal of leaves for fodder has denuded even shrubby mangroves in Gujarat.

Large extent of mangrove swamps have been reclaimed for residential flats, industrial estates, harbour extension and docks as in Bombay and Cochin.

In the Cochin estuarine system, mangrove areas have been progressively converted into coconut groves, paddy and prawn culture fields. The construction of barrages and bunds for irrigation have brought about imbalances in

number of estuaries.

Common sources of marine pollution such as oil spillage from tankers, sewage, effluents from industries and agriculture pesticides have also been a threat to the mangrove fauna.

The destruction of mangroves will affect the natural habitats of reptiles, aquatic birds and mammals, some of which are endangered species.

Visitors

Tuticorin

N. Cdr. S. C. Rampal,
Commanding Officer,
Bihar Naval Unit NCC
Patna.

Principal,
Fisheries Staff Training
Institute, Madras.

Shri H. Mahmood,
Manager, Coastex,
New Delhi.

Shri V. N. Srinivasan
Superintendent of Police,
Tirunelveli (West).

Shri S. R. Sunil Kumar
S P I C,
Tuticorin.

Shri D. Rajasekhar Kamak
17, Great Cotton Road,
Tuticorin.

Shri C. P. Singaram,
District & Sessions Judge,
Tirunelveli.

Shri R. Vasudevan,
Special Deputy Collector (RS)
Tirunelveli.