

Mangroves: Afforestation and Sanctuaries

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Abstract

Mangrove is group of typical tropical and specialized trees growing in the saline and brackish water system. India has approximately 700,000 ha of area covered by mangroves along the estuaries and major deltas. The mangrove trees are highly productive and economical which also protect the shoreline from erosion and cyclonic conditions. The Sundarbans mangroves were the first mangroves in the world to be put under scientific management(1892).

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Why conserve/ manage/ restore MANGROVES ???

- a. Buffer Zone between the land and sea.
- b. Protect the land from erosion.
- c. Play an invaluable role as nature's shield against cyclones, ecological disasters and as protector of shorelines.
- d. Breeding and nursery grounds for a variety of marine animals.
- e. Harbour a variety of lifeforms like invertebrates, fish, amphibians, reptiles, birds and even mammals like tigers.
- f. Good source of timber, fuel and fodder.
- g. Main source of income generation for shoreline communities like fisherfolk.
- h. Save the marine diversity, which is fast diminishing.
- i. Purify the water by absorbing impurities and harmful heavy metals and help us to breathe a clean air by absorbing pollutants in the air.

j. Potential source for recreation and tourism

Biodiversity of Mangrooves

o **Phytoplankton-** are epiphytic and grow on the aerial roots of the trees and on the sediments. The algae are green (Chlorophyta), brown (Phaeophyceae), red (Rhodophyta) and blue-green (Cyanophyta).

· **Zooplankton-** Including Rotifers, Copepods and Cladocerans

· **Marine bacteria, fungi and lichens-** Bacteria and fungi initially break down

the leaf litter (depelicans, wood ibises, herons, egrets and roseate spoonbills).

· **Flora-** Submerged and floating macrophytes

· **Fauna-** A number of invertebrates are found in the mangrove ecosystem

· **Macrobenthic species can be commonly found or they could only occasionally been found because they are migrating within it or because they are living in adjacent environments.**

· **Crabs are commonly found in the mangroves. They are keystone species. This means that the presence of this animal in the community makes it possible for many other species to live there. An example of a mangrove crab is the fiddler crab *Uca lacteal*.**

· **An important bivalve is the purple oyster *Lopha frons*. This species encrusts the pneumatophores and prop roots.**

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· Mangrove roots provide an ecologically important habitat for a wide variety of fish.

Jacks (*Caranx* spp.), Sheepshead (*Archosargus probatocephalus*),

Grunts (*Haemulon* spp.),

Gobies (*Gobiosoma* spp.),

Schoolmasters (*Lutjanus apodus*),

Gray snappers (*Lutjanus griseus*),

And small goliath grouper (*Epinephelus itajara*)

(*Megalops atlanticus*) cruise in waters adjacent to mangrove roots.

The spotted seatrout (*Cynoscion nebulosus*) the florida gar (*L.platyrrhincus*) is a top-level carnivore, feeding on a variety of smaller fishes.

Mangrove Afforestation

· **NEED**-Indian mangrove have been deforested and reclaimed to such an extent that the mangroves along the west coast are very much degraded. This has not only affected the coastline but also the fisheries to a large extent. Afforestation of mangrove areas on a large scale is the most urgent need of today, if the coastal environment is to be brought back again to its earlier pristine glory.

· **Dominant Species**

· *Rhizophora mucronata*

· *R. apiculata*

· *Bruguiera gymnorrhiza*

· *B. parviflora*

· *Sonneratia alba*

· *S. caseolaris*

· *Cariops tagal*

· *Heritiera littoralis*

· *Xylocarpus granatum*

· *X. molluscensis*

· *Excoecaria agallocha*

· *Lumnitzera racemosa*

· *Avicennia officinalis*

· *A. marina*

· **WHERE DO THEY GROW**- Mangrove trees are found growing luxuriantly in the intertidal regions along the estuaries, backwater, islands and other protected areas. They generally prefer soft, clay mud for their growth.

· **SPECIES TO GROW**- Out of 45 mangrove species occurring in India, some are true mangrove while others are considered as 'associated' flora. Example-

1. *Rhizophora mucronata*

2. *R. apiculata*

3. *Bruguiera gymnorrhiza*

4. *B. parviflora*

· **SEEDLINGS**- Mangrove seeds (fruits and seedlings) are always available in small quantity throughout the year. The main fruiting or seedling season, however, start from June to September, when plenty of seedlings of all the Rhizophoraceae, *Avicennia* and other can be collected.

Species	Structure of mature seed
Rhizophoraceous trees	Podlike with tapering end
Avicennia fruits	Triangular
Sonneratia	Globular

How to Store

- Different mangrove seedlings have varying sensitivity for the period of storing.
- Species of *Rhizophora*, *Avicennia*, *Bruguiera* and *Ceriops* can be stored for 6 - 7 days in brackishwater.
- Seedlings of *Kandelia* are to be transplanted in the natural swamps or in polyethylene bags in the nursery immediately, where sufficient moisture or tidal water is available.
- *Sonneratia* fruits can be stored for a longer period.
- It is however, always advisable to store these seedlings partially immersed (pointed end in water) in seawater.

• **HOW TO PLANT** -There are two ways of planting the mangrove seedlings

1. Direct planting in the swamp
2. Raising seedling in the nursery

When seedlings are collected, check for any insect borer or other infections and injuries. Discard such seedlings. Select only healthy, non-infected and fully matured seedling

• **PLANNING** -Before starting actual planting it is essential to make a tentative plan of the operation. How much area is available, which species to be planted and at what position of zonation pattern. The

spacing between two plants may be about 1.3 m to 1.5 m.

• **AFTERCARE**-One the plantation is established, then there is not much to be done. Only these plantations are to be protected from the grazing. There is no need of any insecticide, pesticide, fertilizer, or anything but only protection. Plants will grow on their own.

• **SURVIVAL RATE**- If due care is taken in selecting the seedlings used for plantation, then the survival rate is very high (about 90 to 95%). However, in polluted areas the mortality may be high because of toxic substances discharged from the industries.

Mangroove Sanctuaries

Bhitarkanika Mangroves

- ◆ a mangrove wetland in India's Odisha state.
- ◆ cover an area of 650 km² in the river delta of the Brahmani and Baitarani rivers
- ◆ widely considered to be **India's second largest mangrove**, in terms of area
- ◆ In 1975, an area of 672 km² was declared the Bhitarkanika Wildlife Sanctuary
- ◆ Bhitarkanika Mangroves were designated a **Ramsar Wetland of International Importance in 2002.**
- ◆ **Coringa Wildlife Sanctuary**
- ◆ Wildlife sanctuary and estuary situated in Andhra Pradesh, India.
- ◆ It is the second largest surviving stretch of mangrove forests in India
- ◆ **24 mangrove tree species**, and more than 120 bird species.

- ◆ It is home for the critically endangered white-backed vulture, and long billed vulture.
- ◆ **The Sundarbans**
- ◆ natural region in the Bengal region comprising Eastern India and Bangladesh.
- ◆ It is the largest single block of tidal halophytic mangrove forest in the world.
- ◆ The Sundarbans covers approximately 10,000 square kilometres (3,900 sq mi) of which 60 percent is in Bangladesh with the remainder in India.
- ◆ The Sundarbans is a UNESCO World Heritage Site.
- **The Sundarbans has also been enlisted among the finalists in the New 7 Wonders of Nature**



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Mangrove Conservation and Management Issues

Natural Hazards

The natural threats to mangroves observed in Goa and the Middle Andaman islands include the following:

- ◆ cyclones, typhoons and strong wave action ,especially in the geographically vulnerable Andaman and Nicobar Islands;
- ◆ Browsing and trampling by wildlife (e.g. deer, which are numerous in the Middle Andamans) and livestock (goats, buffaloes and cows), which are often left to graze freely, especially in areas close to human habitation;
- ◆ infestation by barnacles which attach to young seedlings, interfering with respiration and photosynthesis and delaying seedling growth (Hong, 1996);
- ◆ damage by oysters to the young leaves and plumules of *Rhizophora* and *Ceriops* plants;
- ◆ crabs, which attack young seedlings, girdle the root collars and eat the fleshy tissues of the propagules - a serious problem in the Middle Andamans, although not noticed in Goa;
- ◆ gastropods that eat young leaves and flowers of mangroves, a big problem in the Middle Andamans;

◆ insect pests such as wood borers, caterpillars (which eat the mangrove foliage and damage the wood as well) (Naskar and Mandal, 1999) and beetles;

◆ weeds such as *Acrostichum aureum* and *Acanthus* species, which often occupy deforested mangrove areas and restrict the regrowth of economic mangrove tree species;

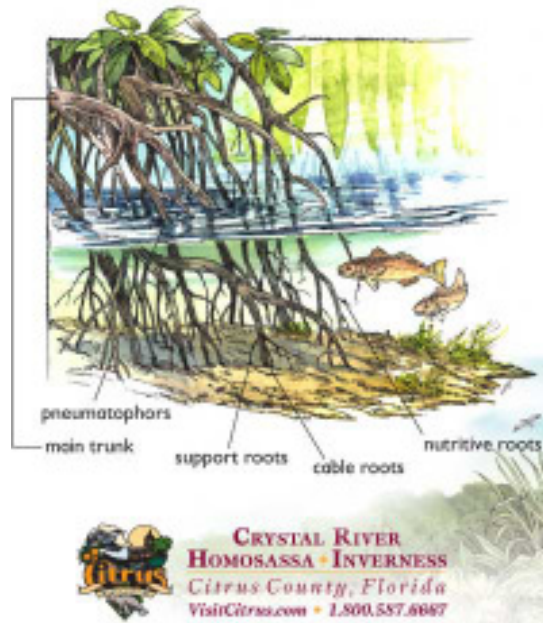
◆ drying and mortality of mangrove trees (e.g. approximately 1 ha of *Bruguiera* trees at Shoal Bay in the South Andamans; 50 ha of *Avicennia* trees at Tarmugli Island; big patches of mangroves at Baludera in the Middle Andaman Islands).

Other Issues

- ◆ Remote and difficult to access.
- ◆ Exploited by the local population.
- ◆ Most of local fishermen depend heavily on the mangroves for their basic needs.
- ◆ poaching and habitat destruction.
- ◆ The increasing industrialisation, aquaculture activities and fishing pressure .
- ◆ Cyclones, typhoons and strong wave action(Natural hazards)
- ◆ Browsing and grazing by animals and oysters, crabs, gastropods.



Mangrove



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