

## Mangrove: The Treasure Trove of Coastal India

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### **Abstract**

Mangroves, the majestic coastal forests thriving in tropical and subtropical intertidal zones, hold a prominent position as the world's most productive ecosystems. These remarkable habitats form a crucial link between land and sea, offering a plethora of benefits to both the environment and communities. From ensuring food security and supporting diverse biodiversity to providing valuable timber, defending against coastal erosion, and serving as natural cyclone shelters and tsunami dissipaters, mangroves stand as nature's green custodian on India's coastlines.

**Keywords:** Coastal bio-shield, Green Protectors, IUCN (International Union for Conservation of Nature), Medicinal Importance, Mitigating Climate Change

### **Introduction:**

Mangrove forests are the coastal rainforests. These are among the world's most productive ecosystems, situated at the interface between land and sea in tropical and subtropical latitudes. They are also known as 'tidal forests' or 'coastal woodlands', specially adapted to survive in harsh interface between land and sea and in conditions of high salinity, extreme tides, strong winds, high temperatures, low oxygen and muddy soil. Mangrove are certain shrubs and trees that belong primarily to the families Rhizophoraceae, Acanthaceae, Lythraceae, Combretaceae and Arecaceae, that grow in dense forests along the tidal estuaries, in salt marshes and on muddy coasts and that characteristically have prop roots that is the exposed supporting roots. Respiratory or knee roots (pneumatophores) are characteristic of many species, they project above the mud and have small openings (lenticels) through which air enters, passing through the soft spongy tissue to the roots beneath the mud. Mangroves have a dominant role in the ecosystem as they nurture and nourish biodiversity as nursery grounds for many coastal and marine species and support fisheries. Biomass in mangroves is greater than any other aquatic systems.



**Source: India State of Forest Report**

### **Distribution:**

In India mangroves cover about 4,975 sq km, constituting 3% of the global mangrove forest area and 8% of Asia's mangrove forest area, with the Bay of Bengal holding around 60% of these forests, the Arabian Sea 27%, and the Andaman and Nicobar Islands containing the remaining 13%. Most spectacular mangroves are found in Sundarbans in West Bengal with the maximum of mangrove cover (46.39%) in the country, followed by Gujarat (22.55%) and 12 Journal of Coastal Environment Andaman & Nicobar Islands (13.26%). In the Andaman and Nicobar Islands, many tidal estuaries, small rivers and lagoons support rich mangrove flora.

Sundarbans (South 24 Parganas) in West Bengal are the largest mangrove forest regions in the world. It is listed as a UNESCO World Heritage Site. The forest is home to the Royal Bengal tigers, Gangetic dolphins, sea turtles, fishing cat and estuarine crocodiles.

### **As a Saviour of Biodiversity and Livelihood:**

Mangroves are used for timber, mining, agriculture, harbor development and human settlements. These forest ecosystems in India hold up diverse groups of organisms with a total of 4011 that includes 920 floral species and 3091 faunal species (Kathiresan, 2000) perhaps the largest biodiversity record in the world mangrove ecosystems



- Mangroves provide important nesting and breeding sites for fish and shellfish, prawns, crabs, migratory birds and sea turtles. This increased their importance to coastal fishing communities.
- Mangroves also act as great carbon sinks.
- Mangroves are an ecosystem with multi-dimensional use. It is held that they are the “best form of coastal bioshield” as they perform a “critical role in reducing the impact of cyclonic storms, hurricanes and tsunami on human lives and properties”.
- It controls/reduces soil erosion. Additionally, they supply organic and inorganic nutrients. They are also rich in biodiversity and act as habitats for wildlife.
- The highly intricate and very structured roots of mangroves promote the trapping of sediments (i.e. from rivers) and organic debris helping them to adjust with the sea level rise, making them invaluable in promoting climate resilient coasts.
- People’s interest in mangrove tourism is also increasing like hiking, camping, boat rides, birdwatching, lookout towers and fishing. This can generate millions of dollars in visitor expenditure and increase community earnings.

<b>Some Mangrove diversity in India</b>	
Genera of Plants found in Indian Mangroves: <i>Avicennia</i> , <i>Acgiceras</i> , <i>Acanthus</i> , <i>Bruguirea</i> , <i>Sonneratia</i> , <i>Carapa</i> , etc.	
Sundari tree: <i>Heritiera littoralis</i>	
Endemic Mangroves Species in India	
<i>Rhizophora annamalaya</i>	Pichavaram, Tamil Nadu
<i>Heritiera kanikensis</i>	Bhitarkanika, Odisha

#### **They also have significant medicinal importance:**

Mangrove extracts are used in indigenous medicine, for example, *Bruguiera* species (leaves) are used for reducing blood pressures and *Excoecaria agallocha* for the treatment of leprosy and epilepsy. Seeds of *Xylocarpus* species have antidiarrheal properties and *Avicennia* species have tonic effect, whereas *Ceriops* produce hemostatic activity. Barks of *Rhizophora* species have astringent, antidiarrhea and antiemetic activities. Tender leaves of *Acrostichum* are used as a vegetable and a beverage is prepared from the fruits of *Sonneratia spp.* Extracts from mangroves seem to have a potential for human, animal and plant pathogens and for the treatment of terminal viral diseases like AIDS.

Regrettably, these green protectors face a lot of threats, leading to their decline in many regions across the globe. Alarming statistics show that for every one percent of mangrove loss, a staggering 200 million tons of carbon, once trapped in mangroves, is released into the atmosphere.

### **Threats to the mangroves:**

India has lost approximately 40% of its mangroves due to factors such as urbanization, industrialization, pollution and unsustainable practices which lead to habitat loss of animal species that are restricted to mangrove habitat at an elevated risk of extinction under the IUCN categories and criteria.

Fragmentation of mangrove forests is another consequence of unplanned human expansions. It affects dispersal and movement of species. Saltpan and aquaculture cause damage to the mangroves.

Some species like *Bruguiera cylindrica* and *Sonneratia acida* are at the verge of extinction. Some mangrove species can be killed by freezing temperatures for even a few hours and temperature fluctuations of ten degrees in a short period of time can harm plants.

### **What is the way forward?**

- Systemic and periodic environmental monitoring of existing mangroves has to be done. The various floral and faunal species dependent on these forests must be documented.
- Community participation for conservation and management is utmostly required.
- Instead of monoculture plantation of mangrove species, restoration efforts should involve sufficient species diversity.
- Private sector establishments (NGO's) near the mangrove can be incentivized to take up conservation activities.
- A major need is the enforcement of legislative mandate.
- Using of bio-restoration to revive degraded stretches of mangroves. These techniques help to maintain the original biodiversity.
- Cultural advantages can be leveraged in mangrove conservation. For example- *Bon Bibi* is a forest goddess worshipped by people of different faiths in the Sundarbans. The *Bon Bibi* faith checks excessive acquisition and greed in Sundarbans- people enters the forest only when absolutely necessary i.e. for livelihood.

**Conclusion:**

India's mangroves serve as crucial coastal protectors, uniquely equipped to combat climate change and preserve vibrant ecosystems. Recognizing their significance, implementing robust conservation measures and fostering collaboration between communities, governments and international organizations will ensure the long-term survival of these invaluable ecosystems. By safeguarding India's coastlines, we can create a resilient and thriving future for both local communities and the planet as a whole, especially as about 20% of India's population resides on the coast, making the conservation of mangroves vital for their protection against sea level rise and extreme weather events.

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