



Mangroves in India

For Prelims: [International Day for the Conservation of the Mangrove Ecosystem](#), [UN Educational, Scientific and Cultural Organization](#), [Indian State Forest Report 2021](#), [Sundarbans](#), [Royal Bengal tiger](#), [Irrawady Dolphin](#), [MISHTI \(Mangrove Initiative for Shoreline Habitats & Tangible Incomes\)](#), [Sustainable Aquaculture In Mangrove Ecosystem \(SAIME\) initiative](#).

For Mains: Significance of Mangroves, Challenges Related to Mangroves in India

Source: [TH](#)

Why in News?

On the [International Day for the Conservation of the Mangrove Ecosystem](#), West Bengal, which is home to **approximately 40% of India's mangrove forests**, unveiled plans to establish a dedicated '**Mangrove Cell**' to streamline mangrove management efforts.

International Day for the Conservation of the Mangrove Ecosystem

- The **International Day for the Conservation of the Mangrove Ecosystem** is celebrated every year on **26 July** and aims to raise awareness of the importance of mangrove ecosystems as **“a unique, special and vulnerable ecosystem”** and to promote solutions for their sustainable management, conservation and uses.
- This International Day was adopted by the General Conference of the [UN Educational, Scientific and Cultural Organization \(UNESCO\)](#) in 2015.

What is the Status of Mangroves in India?

- **About:**
 - Mangroves are a unique type of coastal ecosystem found in **tropical and subtropical regions**. They are dense forests of salt-tolerant trees and shrubs that thrive in **intertidal zones, where land meets the sea**.
 - These ecosystems are characterized by their ability to withstand harsh conditions, such as **saline water, tidal fluctuations, and muddy, oxygen-poor soils**.
- **Characteristics:**
 - **Mangroves exhibit Viviparity mode of reproduction**, where seeds germinate within the tree before falling to the ground. This is an adaptive mechanism to overcome the challenge of germination in saline water.
 - Some mangrove species **secrete excess salt through their leaves**, while others block the absorption of salt at their roots.
 - **Mangrove plants have special roots like prop roots and pneumatophores**, which help impede water flow and provide support in the challenging tidal environment.

▪ **Mangrove Cover in India:**


- According to the [Indian State Forest Report 2021](#), Mangrove cover in India is 4992 sq. Km which is **0.15% of the country's total geographical area**.
- **Sundarbans** in West Bengal are the largest mangrove forest regions in the world. It is listed as a [UNESCO World Heritage Site](#).
- Besides the Sundarbans, the Andamans region, the Kachchh and Jamnagar areas in Gujarat too have substantial mangrove cover.

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MANGROVES IN INDIA

FACTS

- * UNESCO observes **July 26** as the **International Day for the Conservation of the Mangrove Ecosystem**.
- * As per ISFR 2021, the mangrove cover in India is 4,992 sq km, which is **0.15% of the country's total geographical area**.
- * **West Bengal>Gujarat>A&N Islands>Andhra Pradesh>Maharashtra**, have the largest Mangrove cover in India (ISFR 2021).
- * In India, mangroves are protected by the **Environmental (Protection) Act 1986** and Coastal Zone Regulations.
- * **Sunderbans**, a **UNESCO World Heritage Site**, is the **world's largest single patch of Mangrove Forests**.
- * Sundarbans is the first Mangrove forest in the world, which was brought under scientific management, as early as in 1892.
- * The emergence of **shrimp farms** is responsible for at least **35% of the overall loss of mangrove forests**.


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▪ **Significance:**

- **Biodiversity Conservation:** Mangroves provide a unique habitat for a wide variety of plant and animal species, serving as **breeding, nursery, and feeding grounds** for numerous marine and terrestrial organisms.

- For example, sundarban hosts the [Royal Bengal tiger](#), [Irrawady Dolphin](#), [Rhesus macaque](#), [Leopard cats](#), [Small Indian civet](#).
 - **Coastal Protection:** Mangroves act as **natural buffers against** [coastal erosion](#), **storm surges**, and [tsunamis](#).
 - Their dense root systems and tangled network of prop roots stabilize shorelines and reduce the impact of waves and currents.
 - During hurricanes and cyclones, **mangroves can absorb and dissipate a significant amount of energy**, protecting inland areas and human settlements from devastating damage.
 - **Carbon Sequestration:** Mangroves are **highly efficient** [carbon sinks](#), sequestering large amounts of carbon dioxide from the atmosphere and storing it in their biomass and sediments.
 - **Fisheries and Livelihoods:** Mangroves support fisheries by providing **nursery areas for fish and shellfish**, enhancing fishery productivity and contributing to livelihood and local food security.
 - **Water Quality Improvement:** Mangroves act as **natural filters**, trapping and **removing** [pollutants](#) and **excess nutrients** from coastal waters before they reach the open ocean.
 - Their role in purifying water contributes to the **health of marine ecosystems** and helps maintain the balance of fragile coastal ecosystems.
 - **Tourism and Recreation:** Mangroves offer recreational opportunities such as **eco-tourism, birdwatching, kayaking, and nature-based activities**, which can promote sustainable economic growth for local communities.
- **Challenges:**
- **Habitat Destruction and Fragmentation:** Mangroves are often cleared for various purposes, including **agriculture**, [urbanization](#), **aquaculture**, and **infrastructure development**.
 - Such activities lead to the fragmentation and loss of mangrove habitats, disrupting their ecosystem functioning and biodiversity.
 - The **conversion of mangroves into shrimp farms** and other commercial uses is a significant concern.
 - **Climate Change and Sea Level Rise:** Rising sea levels due to climate change pose a significant threat to mangroves.
 - Climate change also brings about extreme weather events, such as cyclones and storms, which can cause **severe damage to mangrove forests**.
 - **Pollution and Contamination:** Pollution from **agricultural runoff, industrial discharges, and improper waste disposal** contaminate mangrove habitats.
 - **Heavy metals, plastics, and other pollutants** adversely affect the flora and fauna of these ecosystems.
 - **Lack of Integrated Management:** Often, mangroves are managed in isolation, without considering their interconnectedness with adjacent ecosystems like [coral reefs](#) and [seagrass beds](#).
 - Integrated management approaches that consider the **broader coastal ecosystem** are necessary for effective conservation.
- **Government Initiatives Related to Mangrove Conservation:**
- [MISHTI \(Mangrove Initiative for Shoreline Habitats & Tangible Incomes\)](#)
 - [Sustainable Aquaculture In Mangrove Ecosystem \(SAIME\) initiative](#)

Way Forward

- **Drone Monitoring and AI:** Employ drone technology equipped with high-resolution cameras and AI algorithms to monitor mangrove health and detect illegal activities such as **encroachment or illegal logging**.
 - This approach can help in efficient and timely surveillance over vast areas.
- **Mangrove Adoption Program:** Launch a public-driven initiative where individuals, corporates, and institutions can "**adopt**" a **patch of mangroves**.
 - Participants would be responsible for the **maintenance, protection, and restoration of their adopted area**, fostering a sense of ownership and collective responsibility.
- **Mangrove Research and Development:** Invest in research to explore novel applications of mangroves, such as [phytoremediation](#) to **clean polluted water or developing new medicines**

from mangrove plant extracts.

- This could lead to innovative ways to **leverage mangroves' unique properties for sustainable development.**

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. Which one of the following regions of India has a combination of mangrove forest, evergreen forest and deciduous forest? (2015)

- (a) North Coastal Andhra Pradesh
- (b) South-West Bengal
- (c) Southern Saurashtra
- (d) Andaman and Nicobar Islands

Ans: (d)

Mains

Q. Discuss the causes of depletion of mangroves and explain their importance in maintaining coastal ecology. (2019)

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