



International Day for Conservation of Mangrove Ecosystem

For Prelims: [International Day for Conservation of Mangrove Ecosystem](#), [Mangroves](#), [Indian State Forest Report 2023](#), [Sundarbans](#), [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?

The [International Day for Conservation of Mangrove Ecosystem](#) (26th July) serves as a **crucial reminder** that these **coastal guardians** are vanishing **3-5 times faster** than global forests.

- **UNESCO** and **IUCN** data reveals that **global mangrove cover has halved since 1985**, with **50% of remaining ecosystems now at risk of collapse**.
 - The Tamil Nadu Forest Department held an awareness camp, highlighting mangrove biodiversity and the **Fish Bone Channel Technique** for ecological restoration.

International Day for the Conservation of the Mangrove Ecosystem

- Observed annually on **26th July**, this day aims to raise **awareness** about the significance of **mangrove ecosystems** as **unique, special, and vulnerable ecosystems**, and to promote their **sustainable management, conservation, and use**.
- It was **adopted by UNESCO's General Conference in 2015** to highlight the vital ecological and socio-economic roles mangroves play in **coastal protection, biodiversity support, and climate mitigation**.

Fishbone Technique of Mangrove Restoration

- It is a **mangrove restoration method** for areas with **poor tidal flow**, involving a central **"backbone" channel** and angled **feeder channels** to divert water from creeks.
- Once **salinity and water flow** are suitable, **mangrove seedlings** are planted. It **mimics natural creeks**, enhances **tidal reach**, and supports **natural regeneration** with minimal effort.



What are Mangroves?

- **About: Mangroves** are specialized **coastal ecosystems** consisting of **salt-tolerant (halophytic) trees and shrubs** that flourish in the **intertidal zones** of **tropical and subtropical regions**.
 - They are uniquely adapted to survive in **saline, low-oxygen (anaerobic) environments** with **slow-moving waters** and **accumulated fine sediments**.
 - Common mangrove species include **Red Mangrove, Grey Mangrove, and Rhizophora**, which play a crucial role in **coastal protection, carbon sequestration, and biodiversity conservation**.
- **Mangrove Cover in India:** As per [Indian State of Forest Report \(ISFR\) 2023](#), India's **mangrove cover** is about **4,992 sq. km**, accounting for **0.15% of the country's geographical area**.
 - **West Bengal** has the largest mangrove cover in India, followed by **Gujarat** in second place.

MANGROVES

*Diverse group of salt-tolerant plant communities found in the (tropical/subtropical) coastal intertidal zone *

CHARACTERISTICS

- Survive under hostile environments (high salt, low oxygen)
- Their roots (pneumatophores) absorb oxygen from atmosphere
- Thick succulent leaves to store fresh water

MANGROVE COVER

- Global:** Asia > Africa > North and Central America > S America
- India (ISFR 2021):** West Bengal > Gujarat > A&N Islands > Andhra Pradesh > Maharashtra

Sunderbans - World's largest single patch of Mangrove forests

SIGNIFICANCE

- Stabilise the coastline and reduce soil erosion
- Protection against cyclones
- Improve water quality by absorbing nutrients
- Important carbon sink

THREATS

- Commercialisation of coastal areas
- Emergence of shrimp farms
- Temperature fluctuations (Mangroves can't survive freezing temperatures)

CONSERVATION MEASURES

Global

- Inclusion of Mangroves in Biosphere Reserves and UNESCO Global Geoparks
- Mangroves for the Future Initiative (IUCN & UNDP)
- Mangrove Alliance for Climate (UNFCCC COP27)

India

- National Mangrove Committee (1976)
- Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI) (Union Budget 2023-24)

International
Day for Conservation
of the Mangrove
Ecosystem -
July 26 (UNESCO)

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.

What is the Significance of Mangroves?

- **Carbon Sequestration:** Mangroves store **around 394 tonnes of carbon per hectare**, exceeding most terrestrial forests, due to **anaerobic and saline soils** that slow decomposition.
 - According to **UNESCO**, **1 hectare can store up to 3,754 tonnes of carbon**, equivalent

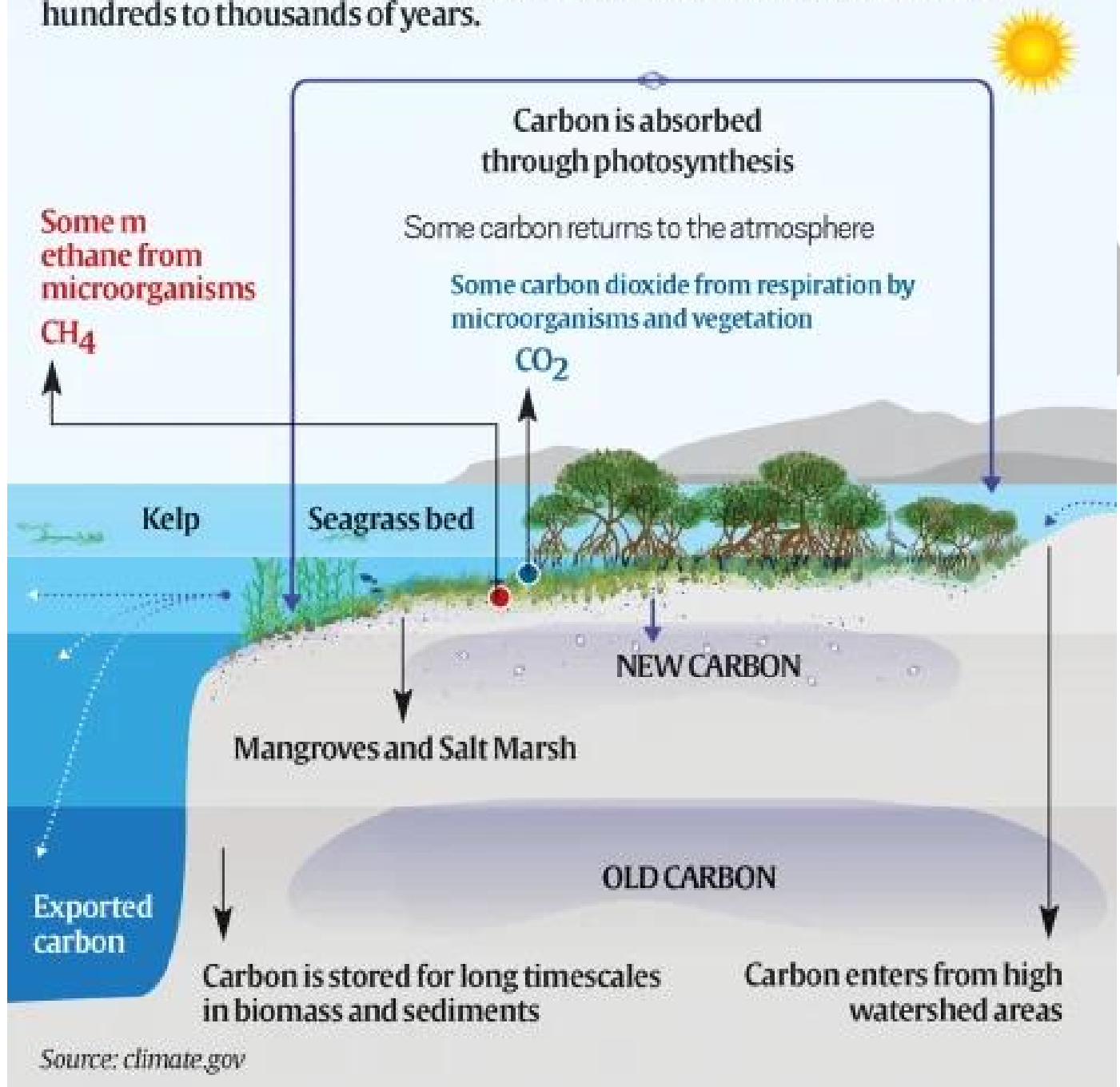
to removing over 2,650 cars annually.

- They uniquely **lock carbon in soil for millennia**, making them critical for **climate change mitigation**.

HOW MANGROVES TRAP CARBON



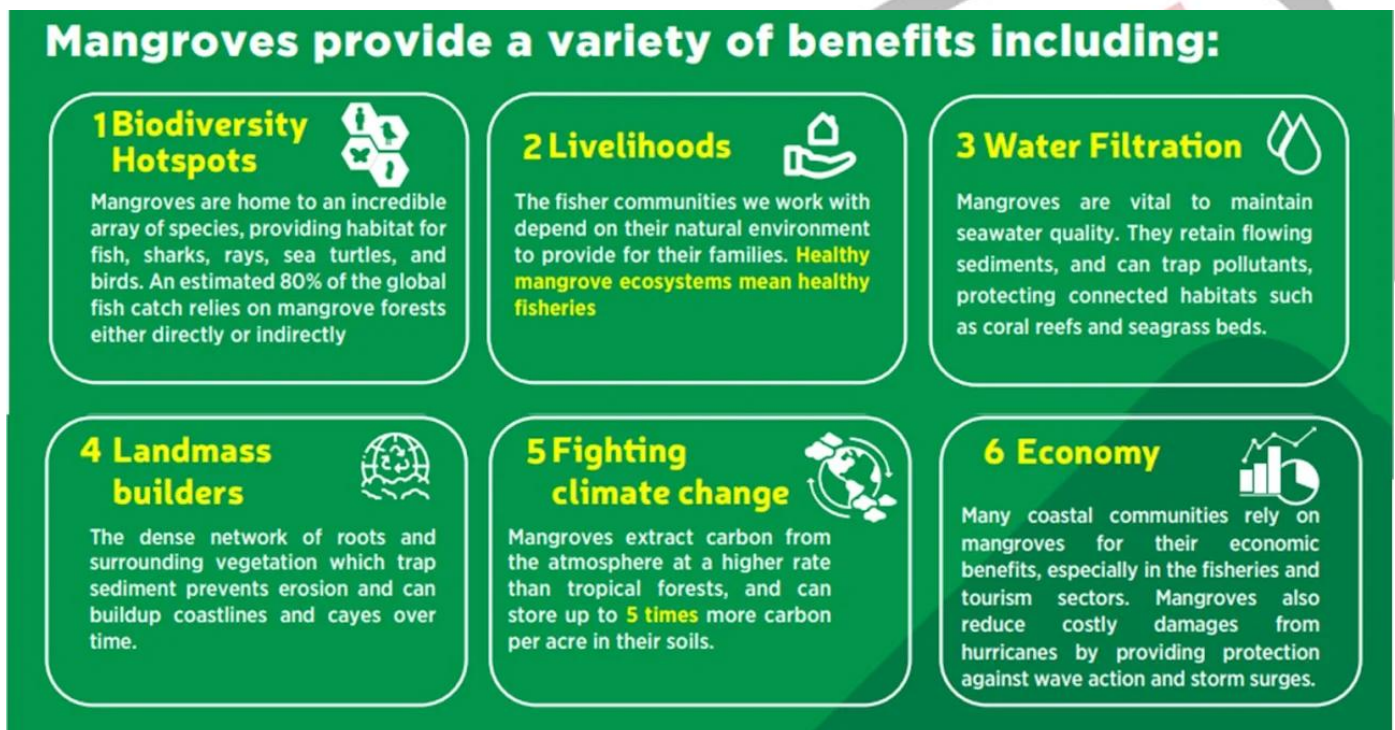
Mangroves are natural carbon sinks. They can capture carbon up to ten times faster than tropical forests, and can store between three and five times more carbon for similar area of natural forests. Much of this carbon is stored below the ground, in the soil, where it can remain trapped for hundreds to thousands of years.



- **Coastal Protection:** Mangroves serve as **natural buffers** against **storm surges, tsunamis,**

and **coastal erosion** acting as "bio-shields".

- Their **dense root systems absorb wave energy and stabilize shorelines**, reducing **wave energy by 5-35%** and **flood depths by 15-20%**, with reductions exceeding **70% during extreme storms** (100-year return period), playing a crucial role in **disaster risk reduction** and **climate resilience** of coastal regions.
- **Biodiversity Hotspots:** Mangroves support diverse **terrestrial and aquatic species** across habitats like **mudflats and aerial roots**.
 - India's mangroves host **5,746 species** (84% animals) across **21 phyla**, the highest globally, including **Bengal tigers, estuarine crocodiles, Indian pythons**, and **260+ bird species**.
 - They serve as **nurseries for marine life** and support **one-third of wild fish landings in Southeast Asia**.
- **Economic Significance, Food Security & Livelihood Support:** Mangroves are vital to **coastal economies**, supporting **fishing, honey collection, boating**, and **non-timber forest produce**.
 - They nurture nearly **800 billion aquatic species annually**, providing **nutrient-rich seafood** (rich in protein, omega-3s, vitamins D & B12, iron, and zinc) and sustaining livelihoods through the **blue economy**.
 - Mangroves also offer **eco-tourism potential** and play a key role in **food security** and **human wellbeing** in coastal regions.



Sundarbans: Ecological Significance, Threats & Conservation Efforts

- The [Sundarbans](#), the **world's largest mangrove forest** in the **Ganges-Brahmaputra-Meghna delta**, holds immense ecological value as a **UNESCO Biosphere Reserve** and [Ramsar site](#).
- It is a **biodiversity hotspot**, home to [Royal Bengal Tiger](#), [Irrawaddy and Ganges dolphins](#), **saltwater crocodiles** and crucial for **coastal protection against cyclones and carbon sequestration**.
- However, it faces **severe threats from climate change** (sea-level rise, [cyclones](#)), **coastal erosion**, and **unsustainable livelihoods**.
- Conservation efforts include **increased government funding** for **mangrove plantations**, **Indo-Bangladesh climate-smart village initiatives**, and **community-led Joint Mangrove Management** for sustainable preservation.

What are the Major Threats to Mangroves?

- **Land Conversion for Agriculture:** According to the "**State of the World's Mangroves 2024**" report, extensive **conversion of mangrove land** for **aquaculture (26%)**, **oil palm plantations**, and **rice cultivation (43%)** is a major driver of loss.
 - **Urbanisation, infrastructure projects**, and **coastal tourism** also lead to large-scale deforestation and fragmentation of mangrove ecosystems.
- **Pollution & Industrial Activities:** **Oil spills**, industrial effluents, and plastic waste degrade water quality and hinder mangrove regeneration.
 - Cases like the **Niger Delta** highlight how oil contamination leads to long-term ecological damage. **Timber extraction** and **charcoal production** also contribute to degradation.
- **Climate Change & Sea-Level Rise:** **Rising sea levels**, increased **frequency of cyclones**, and **coastal erosion** due to climate change pose existential threats. As per the **IUCN Red List of Ecosystems**, climate change threatens **33% of mangrove ecosystems**.
- **Invasive Species & Biodiversity Loss:** Species like *Prosopis juliflora*, found in **Tamil Nadu and Sri Lanka**, disrupt native mangrove habitats by altering **soil salinity**, reducing **freshwater availability**, and preventing natural **regeneration**, thereby threatening local biodiversity.



Key Initiatives Related to Mangroves Conservation

- [Mangrove Alliance for Climate \(MAC\)](#)
- [Mangroves for the Future \(MFF\)](#)
- **MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes)**
- [Sustainable Aquaculture In Mangrove Ecosystem \(SAIME\) initiative](#)
- [Coastal Regulation Zone \(CRZ\) Rules](#)
- [CAMPA Funds & National Coastal Mission](#)
- **Vana Samrakshana Samitis (Andhra Pradesh)**
- **Green Tamil Nadu Mission**

Way Forward

- **Strengthen Legal Framework:** Enforce stricter laws to prevent **deforestation, pollution,** and **unsustainable coastal development.**
- **Community Participation:** Involve local communities through **sustainable livelihoods** and initiatives like **“adopt a mangrove”** for conservation and restoration.
- **Research & Technology:** Promote **phytoremediation, medicinal research,** and use of **drones and AI** for real-time monitoring and protection.
- **Bio-Restoration:** Rehabilitate degraded areas using **bio-restoration** and ensure **species diversity** to build climate resilience.
- **Sustainable Development:** Encourage **eco-friendly coastal infrastructure,** regulate **aquaculture,** and integrate mangroves into **urban planning.**
- **International Collaboration:** Leverage global platforms like the **Ramsar Convention** and **Blue Carbon Initiative** for coordinated conservation efforts.

World Nature Conservation Day (28th July)

- Celebrated **annually, World Nature Conservation Day** underscores the critical need for **environmental protection and biodiversity conservation.**
- It reinforces commitments under **international environmental frameworks** such as the **UNFCCC, CBD,** and **SDGs** (especially Goals 13, 14, and 15).
- The observance complements India’s **LIFE (Lifestyle for Environment) initiative,** advocating sustainable habits like **water conservation, waste reduction, and eco-friendly mobility.**

Drishti Mains Question:

Discuss the ecological and economic significance of mangroves in the Indian context. Propose a comprehensive strategy for their conservation and sustainable utilisation.

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)

