# 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

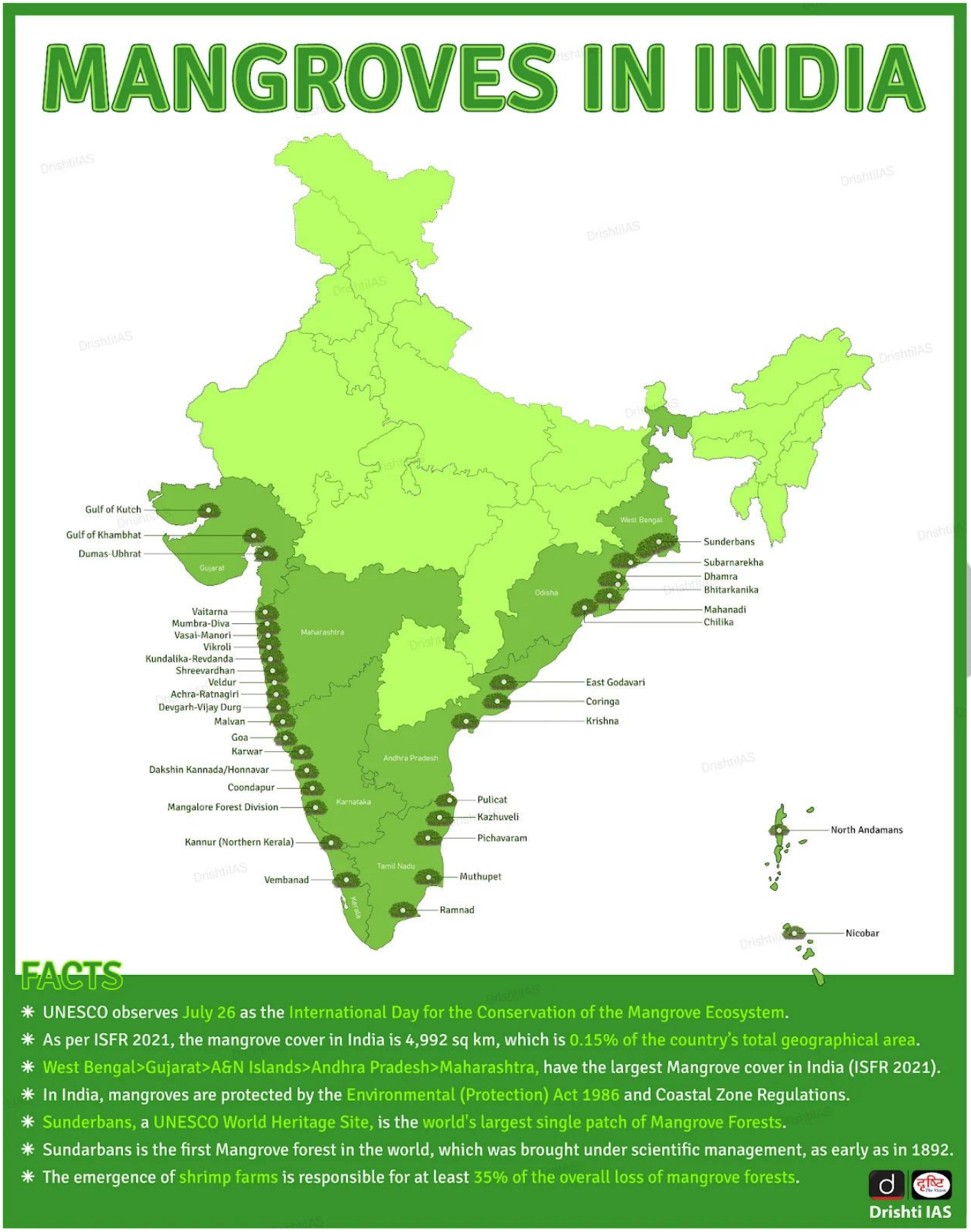
- **Inclusion of Mangroves** in Biosphere Reserves and UNESCO Global Geoparks
- **Mangroves for the Future** Initiative (IUCN & UNDP)
- **Mangrove Alliance** for Climate (UNFCCC COP27)

### 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)*

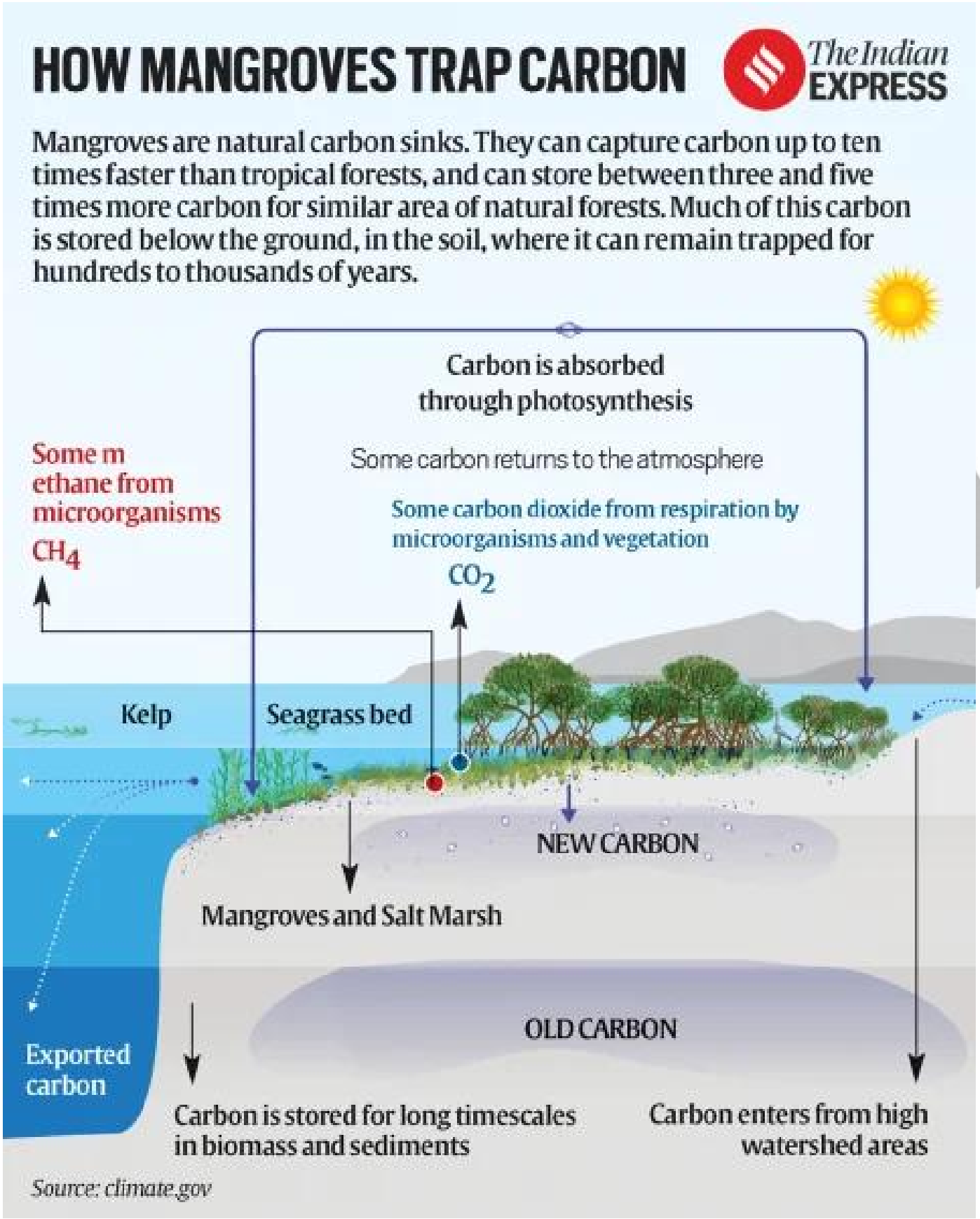
Drishti IAS




## What is the Significance of Mangroves?

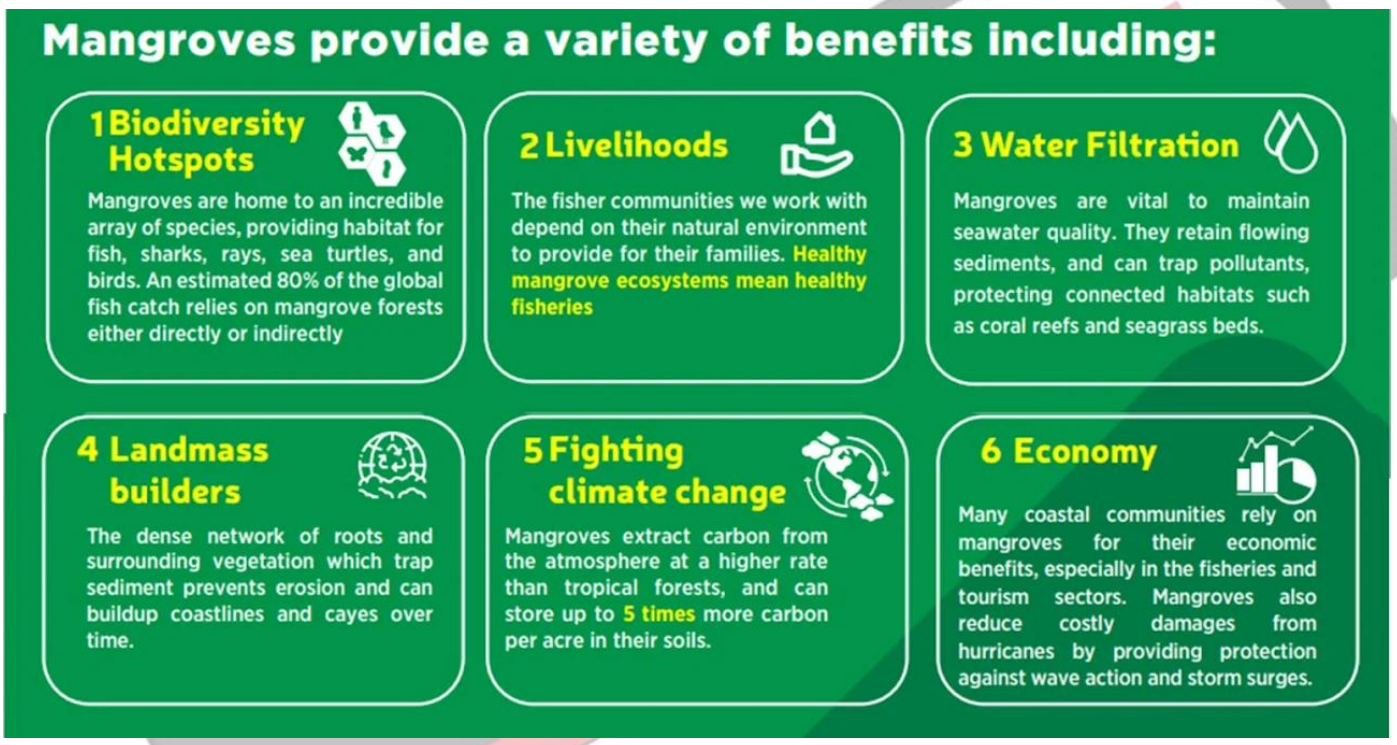
- **Carbon Sequestration:** Mangroves store **around 394 tonnes of carbon per hectare**, exceeding most terrestrial forests, due to **anaerobic and saline soils** that slow decomposition.
    - According to **UNESCO**, **1 hectare can store up to 3,754 tonnes of carbon**, equivalent

to **removing over 2,650 cars annually**.
    - They uniquely **lock carbon in soil for millennia**, making them critical for **climate change mitigation**.




- **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)