MANGROVES: ENVIRONMENT

NEWS: Efforts to restore mangroves can turn the tide on India's coastal security

WHAT'S IN THE NEWS?

India is undertaking major mangrove restoration efforts in states like Tamil Nadu, Gujarat, and Maharashtra to boost coastal resilience, biodiversity, and climate adaptation. These initiatives, supported by schemes like MISHTI and Green India Mission, combat threats from urbanisation, pollution, and climate change.

Mangroves and Coastal Ecosystem Conservation

I. Importance of Mangroves

1. Ecological Significance

- **Unique Habitat**: Mangroves are specialized salt-tolerant forests found in intertidal zones of tropical and subtropical coastal regions.
- **Natural Coastal Buffers**: Act as the first line of defense against extreme weather events like **cyclones, tsunamis, and tidal surges**, absorbing their impact and reducing damage.
- **Biodiversity Hotspots**:
    - Provide **nursery and breeding grounds** for a variety of marine life including fish, prawns, mollusks, and migratory birds.
    - Support endangered species and maintain ecological food chains.
- **Blue Carbon Reservoirs**:
    - Store large amounts of **carbon in biomass and soil**, aiding in **climate change mitigation**.
    - Known for **high carbon sequestration rates** compared to terrestrial forests.

2. Role in Climate Resilience

- **Disaster Risk Reduction**:
    - Example: During the **2004 Indian Ocean tsunami**, areas with dense mangroves experienced **significantly less destruction**.
- **Erosion Control**:
    - The dense root networks **stabilize sediments**, reducing shoreline erosion and **protecting agricultural lands** from salinity intrusion.
- **Adaptation to Sea-Level Rise**: Help buffer coastlines from **rising sea levels** and storm surges, especially in low-lying areas.

3. Livelihood and Cultural Relevance

- **Traditional Dependence**:
    - Vital for **coastal communities** involved in **fishing, crab catching, honey collection**, and firewood gathering.
- **Support to Ecotourism**:
    - Attract tourists and bird watchers, providing **alternate income sources**.
- **Cultural Significance**: Some mangrove areas hold **religious or ancestral significance** to local populations.

II. India's Mangrove Coverage and Threats

1. Current Mangrove Spread

- Total area: **Approximately 4,992 sq. km** (as per ISFR 2023).
- Major states:
    - **West Bengal (Sundarbans)** – ~42% of total mangroves.
    - **Gujarat** – Second-largest contributor (~23.6%).
    - **Odisha, Tamil Nadu, Maharashtra** – Also have substantial mangrove patches.

2. Key Threats to Mangroves

- **Anthropogenic Pressures**:
    - Urban expansion, port development, and tourism infrastructure.
    - Conversion for **shrimp farming and aquaculture**.
- **Pollution**:
    - Plastic waste inflow, untreated sewage, and **industrial effluents** degrading mangrove health.
- **Hydrological Disruptions**:
    - Alteration of **tidal flow patterns** and freshwater inflow due to dams, roads, and embankments.
- **Climate Change**:
    - **Sea-level rise**, shifting salinity gradients, and **temperature stress** impacting species composition and growth.

III. Restoration and Conservation Efforts Across States

1. Tamil Nadu

- **Achievements**:
    - Mangrove cover nearly **doubled** between 2021–2024 (from 4,500 to 9,000 hectares).
- **Flagship Programs**:
    - **Green Tamil Nadu Mission** – Supports mangrove afforestation and wetland restoration.
- **Focus Areas**:
    - **Muthupettai Estuary** and **Kazhipattur** – Community-involved restoration.
- **Methods**:
    - Dredging canals to restore tidal flow.
    - Removal of **invasive species**.
    - Plantation of **native mangrove species** like *Avicennia marina* and *Rhizophora*.

2. Maharashtra (Mumbai-Thane Creek Project)

- **Public–Private Partnership**:
    - Collaboration between **Amazon's Right Now Climate Fund**, **Hasten Regeneration**, and **BMC (Brihanmumbai Municipal Corporation)**.
- **Key Interventions**:
    - Introduction of **trash booms** to block plastic inflow from storm drains.
    - Planting of **3.75 lakh mangrove saplings** across degraded patches.
- **Socio-economic Inclusion**:
    - Providing **employment to women** from local communities through nursery, planting, and maintenance work.

3. Gujarat

- **National Leader** in Mangrove Restoration.
- **Achievements under MISHTI Scheme**:
    - Planted **over 19,000 hectares** of mangroves between 2023–2025.
- **Scientific Approach**:
    - Use of **coastal vulnerability maps** and **GIS-based zonation** for targeted plantation.
- **Share in India's Mangroves**: ~23.6% of total national coverage.

IV. Government Schemes and Policy Support

1. MISHTI Scheme (2023 Onward)

- Full Form: **Mangrove Initiative for Shoreline Habitats and Tangible Incomes**.
- Launched as part of **Union Budget 2023–24**.
- **Implementation**:
    - Funded through **CAMPA (Compensatory Afforestation Fund)** and **MGNREGA**.
    - Focused on afforestation, **restoration of degraded patches**, and **livelihood generation**.

2. Green India Mission

- Component of **National Action Plan on Climate Change (NAPCC)**.
- Focuses on **ecosystem restoration, biodiversity conservation**, and **carbon sequestration** through afforestation.

3. Role of State Forest Departments & NGOs

- **Collaborative Models**:
    - Partnership with local **Panchayats, fishing communities**, and **research institutions** (e.g., MSSRF, NIO).
    - Capacity-building and **community-led mangrove protection committees**.

V. Way Forward – Strategic Recommendations

1. Mainstreaming in Climate Action Plans

- Integrate mangrove conservation and restoration into **State Action Plans on Climate Change (SAPCCs)**.
- Promote **nature-based solutions** (NbS) in coastal protection infrastructure.

2. Community Participation and Ecotourism Promotion

- Provide **incentives and training** to traditional knowledge holders and local youth.
- Develop **eco-trails, bird-watching sites**, and **community-run mangrove nurseries**.

3. Tide-Responsive Restoration

- Design projects based on **local hydrodynamics** – ensuring optimal **salinity, inundation frequency**, and **species suitability**.
- Avoid monoculture and promote **mixed-species planting**.

4. Pollution and Encroachment Control

- Strengthen enforcement of **Coastal Regulation Zone (CRZ) norms**.
- Implement **plastic waste management** near mangrove belts.
- Prevent **real estate encroachment** through geo-tagging and satellite surveillance.

5. Monitoring, Mapping, and Data Analytics

- Use **remote sensing, drones, and GIS platforms** for:
    - Baseline mapping of mangrove cover.
    - Monitoring survival rates and growth.
    - Early detection of degradation hotspots.
- Develop a **central mangrove restoration dashboard** for nationwide coordination.

Source: **https://www.thehindu.com/sci-tech/energy-and-environment/efforts-to-restore-mangroves-can-turn-the-tide-on-indias-coastal-security/article69857555.ece**