BLUE CARBON: ENVIRONMENT

NEWS: *What is blue carbon?*

WHAT'S IN THE NEWS?

Blue carbon ecosystems, including mangroves, seagrasses, and salt marshes, are exceptional carbon sinks that significantly aid in carbon sequestration and ecosystem stability. However, challenges like policy bottlenecks, economic barriers, and corruption hinder their restoration, while innovative strategies and community-driven programs show promise.

1. Importance of Blue Carbon Ecosystems

- **Carbon Sequestration Efficiency**:
  - Mangroves sequester carbon **10 times faster** than mature tropical forests.
  - Coastal wetlands store **3-5 times more carbon per unit area** compared to tropical forests (NOAA).
- **Mangrove Storage Capacity**:
  - Mangroves can store **1,000 tons of carbon per hectare** (Bhavesh Choudhary, 2024).
  - Restoring just 10% of degraded mangroves globally could sequester an additional **1.6 billion tons of CO_2** (PEMSEA).

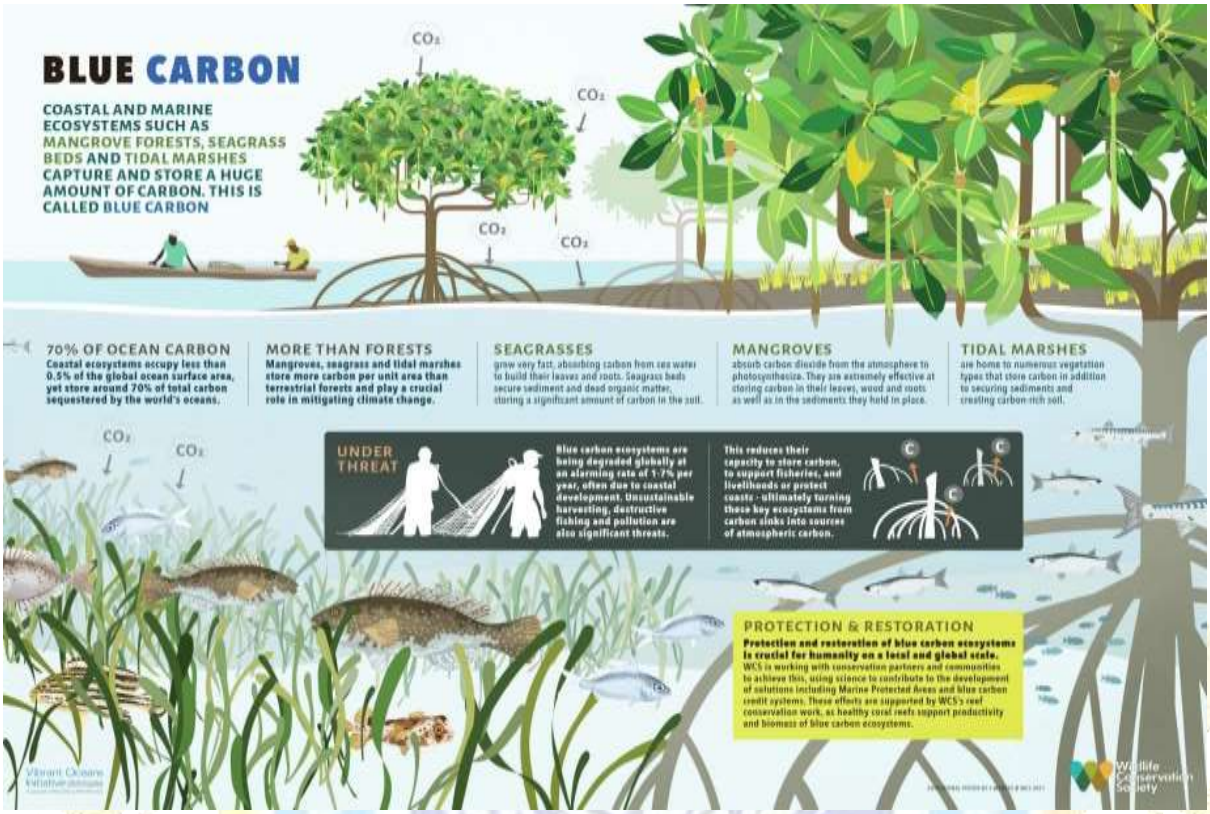
2. Ecosystem Benefits Beyond Carbon Storage

- **Soil and Coastal Protection**:
  - Mangrove roots prevent erosion and stabilize coastal regions.
- **Marine Biodiversity Support**:
  - Mangroves provide critical habitats for marine species, enhancing biodiversity.
- **Local Livelihoods**:
  - Sustainable fisheries and ecotourism are promoted in restored ecosystems (UNEP, 2024).

3. Challenges in Blue Carbon Restoration

- **Deforestation and Habitat Loss**:
  - Myanmar lost **64% of its mangroves** over 35 years due to agricultural expansion, aquaculture, and coastal development.
  - **Shrimp farming alone accounts for 38%** of global mangrove loss.
- **Economic Pressures and Population Growth**:
  - Increasing demand for agricultural land and aquaculture intensifies mangrove destruction.
- **Corruption and Mismanagement**:

- In Bangladesh's Sundarbans, illegal logging and bribery have destabilized conservation efforts (Ahmed, 2024).



4. Limitations of Carbon Credit Systems

- **Complexity and Costs**:
  - Carbon credits tied to blue carbon ecosystems are expensive and involve intricate verification processes.
- **Transparency Concerns**:
  - Projects like Cambodia's REDD+ have faced scrutiny for failing to maintain honest environmental restoration.
  - Lack of transparency damages investor confidence, delaying much-needed climate action.

5. Innovations and Success Stories

- **Australia's Blue Carbon Method**:
  - Integrated into the Emissions Reduction Fund to encourage coastal restoration.
  - Example: South Australia's tidal restoration project issued **16.45 million carbon credits** under the Australian Carbon Credit Unit (ACCU) Scheme (2024).
- **Technological Interventions**:
  - **AI**: Tracks seagrass meadows using satellite imagery for better monitoring.
  - **Blockchain**: Ensures transparency in carbon credit transactions (Mediterranean seagrass restoration, 2024).

- **Community-Driven Initiatives**:
  - Indonesia's MERA (Mangrove Ecosystem Restoration Alliance) restored **262 hectares** of mangroves, boosting sustainable fisheries.
  - Future plans include the restoration of **398,779 hectares** across Jakarta and South Sumatra.

6. Economic Potential of Blue Carbon Restoration

- **Global Market Opportunity**:
  - Blue carbon credit markets could reach **$50 billion by 2030** (McKinsey Sustainability).
- **Economic Returns**:
  - Every $1 invested in blue carbon restoration generates **$6 in economic benefits** (OECD, 2024).
- **India's MISHTI Initiative**:
  - Launched in 2023, it aims to restore **540 sq km of mangroves** across nine states and four Union territories by 2028.
  - Over **250 sq km** of mangroves already restored, enhancing eco-tourism and fisheries safety.
- **Coastal GDP Boost**:
  - Integrated approaches to restoration could increase coastal GDPs by up to **15%** (WEF, 2023).

Colour-Based Classification of Carbon

Scientists classify carbon based on its role, features, and location in the carbon cycle. Here's a simplified breakdown:

1. **Purple Carbon**: Carbon from air or industrial emissions.
2. **Blue Carbon**: Carbon stored in marine plants (e.g., mangroves, seagrasses) and ocean sediments.
3. **Teal Carbon**: Carbon stored in freshwater and wetland ecosystems.
4. **Green Carbon**: Carbon stored in forests and terrestrial plants.
5. **Black Carbon**: Carbon emitted from burning fossil fuels like coal and diesel.
6. **Grey Carbon**: Carbon linked to industrial emissions.
7. **Brown Carbon**: Carbon released from incomplete combustion of organic matter (e.g., wood).
8. **Red Carbon**: Carbon from biological particles on snow and ice, reducing their reflectivity (albedo).

Way Forward

1. **Policy Reforms**: Simplify carbon credit systems, inspired by Australia's Blue Carbon Method.
2. **Technology Integration**: Use AI for ecosystem monitoring and blockchain for transparent carbon credit tracking.

3. **Community Involvement**: Encourage local restoration programs like Indonesia's MERA initiative.
4. **Effective Implementation**: Ensure targeted execution of initiatives like India’s MISHTI scheme for mangrove restoration.
5. **Global Best Practices**: Adopt successful models such as South Australia's Tidal Restoration Project with clear guidelines and strong verification.

Source: https://www.downtoearth.org.in/climate-change/explained-what-is-blue-carbon