Seagrass Conservation

For Prelims: Seagrass, Carbon Sequestration, Greenhouse gas emission, Global warming, Ocean currents, United Nations Environment Programme, Ocean acidification, Gulf of Mannar.

For Mains: Significance of Seagrass and Concerns Related to it.

Source: DTE

Why in News?

A study in ***Nature*** reports that **seagrasses** are declining **at a rate of 1–2% annually,** with nearly **5%** of species endangered due to human activities, highlighting the **need to protect 30%** of seagrass by **2030** to preserve biodiversity.

What are Seagrasses?

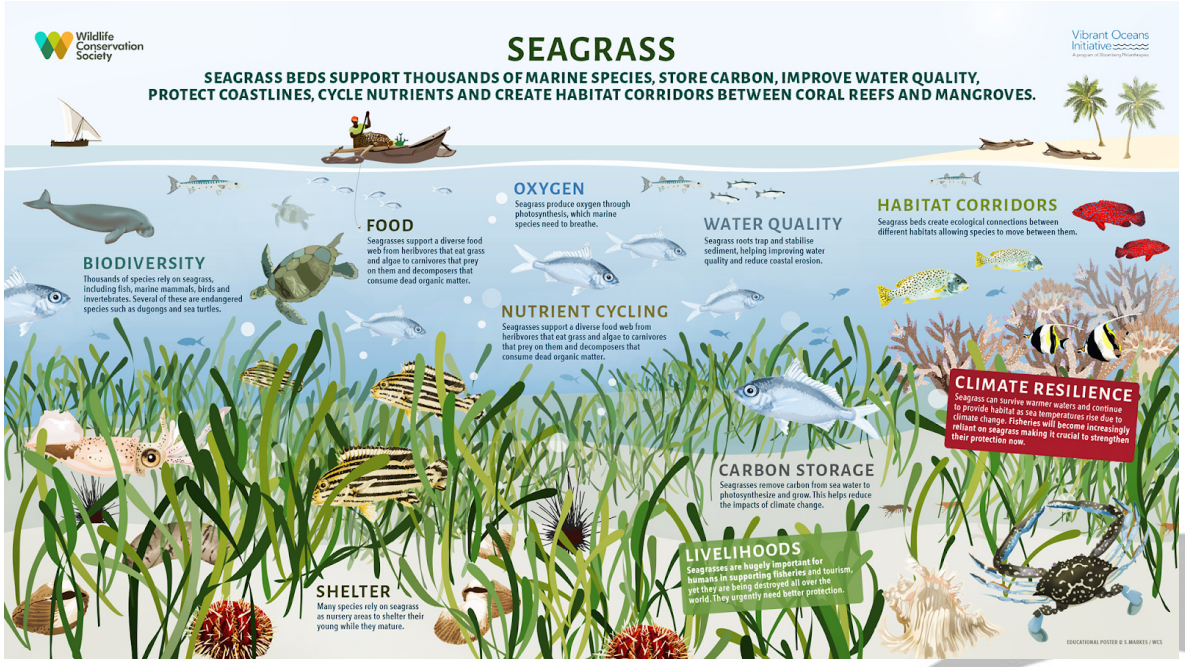
- **About:** Seagrasses are **submerged, flowering marine aquatic plants** that grow in **shallow coastal waters** such as **bays** and **lagoons**.
  - They possess small flowers and strap-like or oval leaves, forming dense underwater meadows.
- **Classification:** Seagrasses belong to the order ***Alismatales*** and are classified into **4 families with around 60 species**.
  - Some of the important seagrasses are **Sea Cow Grass** *(Cymodocea serrulata)*, **Thready Seagrass** *(Cymodocea rotundata)*, **Needle Seagrass** *(Syringodium isoetifolium)*, **Flat-tipped Seagrass** (*Halodule uninervis*), etc.
- **Key Features:**
  - Like terrestrial plants, seagrasses conduct **photosynthesis** and **support marine biodiversity** and **enhance oceanic oxygen levels.**
  - Seagrasses **reproduce both sexually and asexually**.
    - In **sexual reproduction**, submarine **pollination transfers male pollen to female flowers underwater.** Asexually, they **propagate through rhizomes-horizontal underground stems,** that enable regeneration after disturbances like grazing or storms.
- **Threats to Seagrass:**
  - **Pollution:** Industrial, agricultural, and urban waste degrade seagrass meadows.
  - **Coastal Development:** Tourism and infrastructure projects disturb fragile ecosystems.
  - **Climate Change:** Rising temperatures and ocean acidification threaten seagrass survival.
  - **Weak Enforcement:** Despite existing laws, conservation efforts lack strict implementation.

What is the State of Seagrass Conservation?

- **Current Status:** Seagrass covers **0.1% of the ocean floor** but supports marine life, major fisheries, and thrives in **tropical and temperate coastlines.**
- **Seagrasses in India: India's seagrass meadows** span **516.59 sq km**, sequestering **434.9 tonnes of CO_2 per sq km** annually, with major concentrations in the **Gulf of Mannar**, **Palk Bay**, **Andaman & Nicobar, Lakshadweep,** and the **Gulf of Kutch**.
- **Conservation Efforts**:
  - **India's Initiatives**
    - **2011-2020: 14 acres** of seagrass restored in the **Gulf of Mannar & Palk Bay** (85-90% success rate).
    - **Community-led projects** using **bamboo frames & coconut ropes** for transplantation in **Palk Bay**.
  - **Global Efforts:**
    - **23.9% of seagrass areas** fall under **Marine Protected Areas (MPA)**. Successful restoration in **Virginia, USA** (1,700 hectares of Zostera marina).

What is the Significance of Seagrasses?

- **Carbon Sequestration:** Seagrasses **store 11% of oceanic organic carbon** and **absorb 83 million tonnes of atmospheric carbon** annually, **sequestering carbon 35 times faster** than rainforests.
- **Biodiversity Hotspot:** It supports marine species, including **endangered dugongs (sea cow) and green turtles**, and sustains commercially important species like **squids and cuttlefish.**
- **Ecological Importance:** Seagrass meadows support **750 fish species** and **121 threatened marine species** including **endangered dugongs (sea cow), green turtles, squids** and **cuttlefish.**
  - These ecosystems contribute to **20% of global fishery landings**.
- **Coastal Protection:** They **improve water clarity** by **trapping sediments, filter land-based pollutants**, and **prevent coastal erosion** by stabilizing the seabed with their root systems.
- **Livelihoods & Fisheries:** Seagrasses provide **safe breeding grounds for juvenile fish** and **shield marine organisms from strong currents and predators**, supporting ecosystems essential for **fisheries and global food security.**



Way Forward

- **Integration into Policy Framework**: Seagrass conservation should be **incorporated into** India's **National Biodiversity Action Plan**, ensuring **policy support, funding, and sustainable management practices.**
- **Expansion of Marine Protected Areas (MPAs)**: MPAs should be **expanded beyond 2.5% of India's Exclusive Economic Zone (EEZ)** to protect and restore seagrass ecosystems.
- **Recognition in Climate Strategy:** Seagrass should be recognized in **India's Blue Carbon Initiative** to **support climate commitments** and **carbon neutrality goals.**
- **Assessment and Global Cooperation:** Global cooperation is vital as seagrasses **aid climate mitigation through carbon sequestration,** coastal protection, and biodiversity conservation. The **IUCN** should **assess their status for early intervention,** preventing extinction and enhancing conservation efforts.

Drishti Mains Question:

Discuss the ecological significance of seagrass meadows and the challenges they face due to human activities. Suggest measures for their conservation in India.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. What is blue carbon?

(a) Carbon captured by oceans and coastal ecosystems
(b) Carton sequestered in forest biomass and agricultural soils
(c) Carbon contained in petroleum and natural gas
(d) Carbon present in atmosphere

Ans: (a)