Mangroves in India

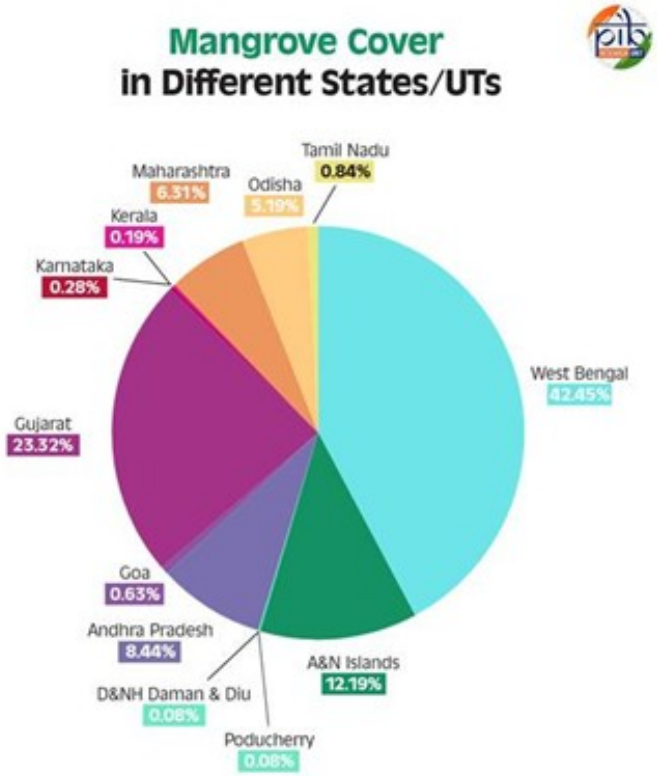
Prelims: *Current events of national and international importance | Ecology & Environment*

Why in news?

Recently, researchers studied how mangrove cells enable the plants to survive in saltwater.

- **Mangrove –** It is a ***salt-tolerant plant*** community found in ***tropical and subtropical*** intertidal regions.
- **Climate requirement –** Mangroves can thrive in high-rainfall areas (1,000–3,000 mm) with temperatures ranging from 26°C to 35°C.
- **Adaptation –** Mangrove species are adapted to survive in waterlogged soils, high salinity, and frequent tidal surges.
- **Ecological importance –** They serve as crucial biodiversity refuges and act as bio-shields against extreme climatic events.
- Additionally, rural populations depend on mangroves for biomass-based livelihoods.
- **Nature's Carbon Vault** – As per ***World Wildlife Fund*** mangroves store ***7.5–10 times more carbon per acre*** than tropical forests.
- Their loss contributes to ***10% of global greenhouse gas emissions*** from deforestation.
- **India State of Forest Report, 2023** –
  - India's total mangrove cover stands at 4,991.68 sq. km, constituting ***0.15%*** of the nation's geographical area.
  - From 2013 to 2023, mangrove cover in the country increased by 363.68 sq. km (7.86%).
  - From 2001 to 2023, mangrove cover increased by 509.68 sq. km (11.4%).
  - **Highest share –** *West Bengal* (***42.45%)*** holds the largest share, followed by Gujarat (23.32%) and Andaman & Nicobar Islands (12.19%).

- **Key Regulatory Measures**
- **Mangroves as ESAs** – Mangroves are classified as Ecologically Sensitive Areas (ESAs) under the Environment (Protection) Act, 1986 by ***Coastal Regulation Zone (CRZ) Notification***, 2019.
- **Buffer Zone Rule –** Activities are restricted ***within a 50-metre buffer zone*** if mangrove cover is more than 1,000 sq. m under the 2019 notification.
- **Replantation Mandate –** If mangroves are damaged by development, compensatory replantation must be done at a ***3:1 ratio***.



- **Additional protection –** Under the Wildlife (Protection) Act, 1972, Indian Forest Act, 1927, and Biological Diversity Act, 2002.

To know more about Mangrove Ecosystem, Click here

Quick Fact

How mangrove's cells helps plants survive in saltwater?

Key Insights
• **Mangroves vs. other plants** – Saltwater would kill most plants, but mangroves thrive due to specialized adaptations.
• **Cell traits identified** – ***Small epidermal pavement*** cells help reduce stress from saline conditions.
• ***Thicker cell walls*** provide mechanical strength against osmotic pressure.
• **Salt management strategies** –
  - Some species exclude salt using a **waxy root layer** that filters it out.
  - Others absorb salt but then **excrete it through leaves** using specialized tissues.
• **Evolutionary resilience –** Mangroves have evolved around ***30 times over 200 million years***, adapting repeatedly to saline environments.

References

1. The Hindu | How mangroves' cells helps plants survive in saltwater
2. PIB | Mangroves as Guardians of Life and Livelihoods

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