

Western Australia experienced record Coral Bleaching event

The Coral Bleaching event is marked by longest, largest and most intense marine heatwave across the West Coast.

- **Ningaloo Reef (World Heritage site) on Australia's West coast** has suffered from major coral bleaching in recent years.
- The bleaching is **part of the ongoing fourth mass coral bleaching event** announced by the **NOAA in 2024**.
- Additionally, **The Great Barrier Reef – world's largest coral system stretching over 2,300km on East Coast of Australia** has also experienced its biggest decline in coral in four decades.

About Corals

- Corals are **organisms** that have a **symbiotic relationship with microscopic algae** (zooxanthellae) living in their tissues, which serve as their primary food source and give them color.

Coral Bleaching

- Corals become bleached when they are **stressed by changes in conditions** such as temperature, light, or nutrients.
- **They expel the Symbiotic algae (zooxanthellae) living in their tissues**, causing them to turn **completely white**.
- This also removes their primary food source.

Ideal Conditions for Coral Survival

- **Clean Water:** Essential for coral health, free from polluted runoff that can harm corals or block sunlight needed by their Symbiotic algae.
- **Warm Water:** Most reef-building hard corals prefer water temperatures between **23° and 29° Celsius**.
- **Healthy Wildlife Populations:** Herbivores like parrotfish and sea turtles are vital for grazing on algae.

3 Different Types of Coral Reefs

Coral reefs are diverse underwater ecosystems built by colonies of tiny marine animals called coral polyps. They support vibrant marine life and help protect coastlines from erosion.



Fringing Reef

- Directly attached to shore
- Most common type
- Grows near coastline
- Few lagoons



Barrier Reef

- Separated from land by a lagoon
- Larger than fringing reefs
- Parallel to coastline
- Great Barrier Reef famous example



Atoll Reef

- Ring-shaped reef
- Surrounds a central lagoon
- Forms around sunken volcanic islands
- Found in open oceans

India-Singapore Ministerial Roundtable (ISMR) Held to Strengthen Strategic Partnership

Ministers reviewed progress under six ISMR pillars—**Advanced Manufacturing, Connectivity, Digitalization, Healthcare, Skills Development, and Sustainability**—identified new initiatives, and acknowledged the private sector's key role.

About India-Singapore Relations

- **Diplomatic Ties:** India recognised Singapore's independence in 1965.
 - ⊗ **CECA(Comprehensive Economic Cooperation Agreement)** signed in 2005; upgraded to **Strategic Partnership (2015)** and **Comprehensive Strategic Partnership (2024)**.
 - ⊗ **2025 marks the 60th year of Diplomatic Relations.**
- **Trade & Investment:** Singapore is India's largest ASEAN trade partner and 6th globally (2023–24, 3.2% share).
- **Digital & Fintech:** **UPI–PayNow** cross-border payments and **RuPay** acceptance in Singapore.
- **Multilateral Engagements:** Singapore is a member of International Solar Alliance, Global Biofuel Alliance etc.
- **Defence Exercises:** Agni Warrior (Army) and SIMBEX (Navy).
- **People-to-People Ties:** Indian diaspora is 9% of Singapore's population.
 - ⊗ Tamil is one of the official languages.

Significance for India

- **ASEAN Bridge:** **Strengthens India's trade, connectivity, security, and Counter-Terrorism** links with ASEAN, supporting the **Act East policy** and **Indo-Pacific goals**.
- **Crisis Partnership:** During COVID-19, Singapore provided India with medical aid and oxygen, while India supplied vaccines under the "**Vaccine Maitri Initiative**".
- **Countering China:** Access to **Changi Naval Base** helps India strengthen its presence and balance China's influence in the region.



A Consortium of Four Firms to Build India's First Commercial Earth Observation (EO) Satellite Constellation

Indian National Space Promotion and Authorization Centre (IN-SPACe) selected PixxelSpace India-led consortium of four private firm to build India's first fully indigenous commercial EO.

➤ Other firms include Piersight Space, Satsure Analytics India, and Dhruva Space.

About the Programme

➤ Technology:

- ⊕ 12 Satellites will have all-weather, day-night imaging capacity.
- ⊕ They will be equipped with panchromatic, multispectral, hyperspectral sensors, and Synthetic Aperture Radar (SAR).

➤ PPP model:

- ⊕ **Government Role:** Strategic, technical, and policy support.
- ⊕ **Private Sector:** Own and Operate EO systems (manufacturing, Indian launches, ground infrastructure, and data commercialisation).

➤ **Applications:** Deliver Analysis Ready Data (ARD) and Value-Added Services for Climate Change Monitoring, Disaster Management, Agriculture Planning, serving for high-quality 'Geospatial intelligence' among others.

➤ Deployment Tenure: Four years

About India's private space industry

➤ **Economic Size:** India's space economy is currently worth \$8 billion, with the potential to reach \$100 billion by 2040 through strong private sector involvement.

➤ Rising Private Sector:

- ⊕ **Over 200 space startups** have emerged.
 - ◆ Example, **Vikram-S**, was India's first rocket launched under **Mission Prarambh**.
- ⊕ Industry associations, such as the **Indian Space Association (ISpA)**, play a key role in fostering collaboration.

➤ Government Support

- ⊕ **IN-SPACe:** It was set up to boost private participation in space activities.
- ⊕ **Indian Space Policy 2023:** Provides regulatory clarity and policy stability.
- ⊕ **Liberalisation:** 100% FDI allowed.
- ⊕ **Venture Capital Fund:** A fund of ₹1,000 crore fund has been approved to finance startups.

Significance of India's Private Space Industry



Economic Growth:

Attracts investment and boosts global competitiveness.



Strategic Self-Reliance:

Develops critical tech, ensures data sovereignty, and enhances security.



Productivity enhancement of ISRO:

Allows ISRO to concentrate on advanced and long-term missions.

Parliamentary Committee on External Affairs Report on India's Strategy in the IOR

The report titled 'Evaluation of India's Indian Ocean Strategy (IOR)' was presented in Lok Sabha.

Significance of IOR

➤ Geostrategic Importance:

- ⊕ **India:** With 11,098.81 Kms coastline having around 1,300 islands and 2.4 mn sq. km **Exclusive Economic Zone (EEZ)**.
- ⊕ **Global:** 3rd largest ocean with 35 littoral states having one-third of world's population.

➤ Economic Importance:

- ⊕ **India:** 90% of India's trade & most oil imports pass through IOR.
- ⊕ **Global:** 50% global container traffic, 1/3 bulk cargo, 2/3 oil shipments pass through IOR.

➤ **Ecological:** Warmest of the world's oceans, thus ecologically dynamic and biologically productive space.

Key Challenges to the region

- **Geopolitical:** Growing Chinese presence via port/infrastructure investments (e.g., BRI & "String of Pearls", military base in Djibouti and its strengthening relations with Pakistan).
- **Maritime Security:** Piracy, terrorism, Illegal, Unreported, and Unregulated (IUU) fishing, smuggling, drug trafficking.
- **Infrastructure Gaps:** Limited capacity in small island & coastal states.

Key Recommendations

- **Upgrade SAGAR to MAHASAGAR** with emphasis on sustainability, trade, and mutual security.
- **Deepen Multilateral Engagement:** Leverage Quad, IORA, BIMSTEC for security and economic integration.
- Enhance **Diaspora Engagement and Cultural Diplomacy**.
- **Promote Rules-Based Maritime Order:** Support UNCLOS and ASEAN centrality in Indo-Pacific governance.

Indian Initiatives in the Region

Strategic Initiatives	Maritime Security & Defence	Multilateral Engagements
SAGAR 2015 Security & Growth in the Indian Ocean Region Comprehensive maritime strategy MAHASAGAR 2025 Extends SAGAR framework to the Global South Enhanced regional partnership Indo-Pacific Policy Based on free, open, inclusive, rules-based order - Democratic maritime governance	Joint EEZ Patrols Maldives, Mauritius, Seychelles-Coordinated Anti-piracy Operations IFC-IOR Gurugram Information Fusion Centre with White Shipping Agreements & Red Sea deployments Infrastructure Projects Sagarmala 2.0 , Chabahar Port (Iran), Sittwe Port (Myanmar), Colombo West Terminal (Sri Lanka)	IORA & IPOI Indian Ocean Rim Association & Indo-Pacific Oceans Initiative BIMSTEC & QUAD Ports Conclave initiatives & Quadrilateral maritime security cooperation Naval Symposium Indian Ocean Naval Symposium - Regional maritime dialogue platform

RBI's FREE-AI Vision for Financial Sector

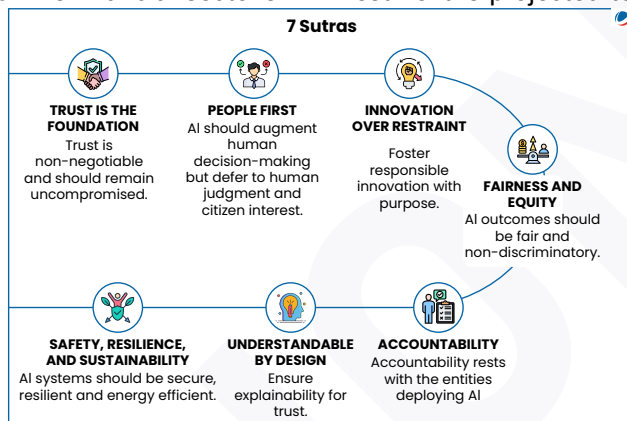
RBI committee unveils **Framework for Responsible and Ethical Enablement of Artificial Intelligence (FREE-AI)** to balance innovation with risk management in financial services.

About FREE-AI Vision

- **Aim:** Ensuring safe, fair and accountable AI adoption in India's financial sector
- **7 Sutras:** Foundational principles for AI adoption (refer to the infographics)
- **Dual Approach:**
 - ⊕ **Fostering Innovation**
 - ◆ Shared infrastructure for **democratized data and compute access**, which may be integrated with the '**AI Kosh**' established under the **IndiaAI Mission**.
 - ◆ **AI Innovation Sandbox** for testing and **Indigenous** financial AI models.
 - ◆ Create **AI policy** for regulatory guidance.
 - ◆ Institutional **Capacity Building** (boards and workforce).
 - ◆ **Relaxed compliance** for low-risk AI solutions to facilitate inclusion and other priorities.
 - ⊕ **Mitigating Risk:**
 - ◆ **Board-approved AI policies** by Regulated Entities
 - ◆ Inclusion of **AI-related aspects in product approval processes**, consumer protection frameworks and audits.
 - ◆ **Strengthened cybersecurity** and incident reporting.
 - ◆ **Robust AI lifecycle governance**.
 - ◆ **Consumer Awareness** when they interact with AI.

Why FREE-AI Vision Matters?

- **AI's Growing Impact:** The financial sector's AI investment is projected to reach:
 - ⊕ **₹8 lakh crore (\$97 billion) by 2027** across banking, insurance, capital markets, and payments.
 - ⊕ **₹1.02 lakh crore (\$12 billion) by 2033 for GenAI alone**, growing at 28-34% annually.
- **Emerging Complex Risks:** AI introduces **data privacy, algorithmic bias, market manipulation, cybersecurity vulnerabilities, and governance failures** that traditional risk frameworks struggle to address.
 - ⊕ These risks could **undermine market integrity, erode consumer trust, and create systemic vulnerabilities** without proper management.



Ministry Of New And Renewable Energy (MNRE) Mandates Local Supply Chains And Data Centres For Wind Turbines

MNRE has **updated its wind turbine approval system**, renaming the Revised List of Models and Manufacturers (RLMM) to the **Approved List of Models and Manufacturers (Wind) or ALMM (Wind)**.

- The RLMM 2018 was a mechanism to ensure quality and reliability of wind turbines installed in the country

Key features of ALMM Wind

- **Domestic Supply Chains:** Mandatory sourcing of key components (blades, towers, gearboxes, generators, special bearings) from approved Indian suppliers.
- **Data Localisation:** All operational data must be stored within India. Operational control centres must also be in India.
- **R&D Centres:** To be set up by manufacturers within a year to design turbines for Indian conditions.
- **Quality Standards:** From Sept 2026, BIS certification required for all components.
- **Exemptions:**
 - ⊕ Already-bid projects or captive/open access projects within 18 months
 - ⊕ New manufacturers/models exempt for 800 MW over 2 years to promote innovation.

About India's Wind Energy Sector

- India currently ranks **4th in the world** for installed wind power capacity.
- Wind contributing **4.69% to total electricity generation**.
- **Installed capacity increased** from ~21 GW in 2014 to **51.3 GW** by June 2025
- **Wind potential** of the country is **1164 GW** at 150 meters above ground level (National Institute of Wind Energy)
- India aims to cater **10% of global wind energy equipment demand by 2030**.

Also in News



Indian Olympic Association (IOA)

IOA has **formally approved India's bid to host the 2030 Commonwealth Games**.

- First held in 1930 in Hamilton, Canada, it is the world's **second-largest multi-sport event**, bringing together athletes from 71 nations and territories.

About IOA

- **Genesis:** Established in 1927 by **Sir Dorabji Tata (Founding President)** and **Dr. A.G. Noehren (Founding Secretary General)**. In the same year, it was officially recognised by the **International Olympic Committee**.
- **Status:** Non-profit organisation under **Societies Registration Act, 1860**.
- **Objective:** To develop, promote, and protect the Olympic Movement in India.
- **Governance:** Managed by a 32-member Executive Council headed by a **President**.



Blue Pinkgill and Shuttlecock Mushrooms

Rare Blue Pinkgill, Shuttlecock Mushrooms were recently spotted in **Telangana forests**.

About species

- **Blue Pinkgill Mushroom:**

- ⊕ **Native to New Zealand.**
- ⊕ Its colour comes from **azulene**, a pigment rare in fungi but common in some flowers and plants, giving it an almost unreal shade.
- ⊕ It was spotted in the Kadamba Reserve Forest and other areas of the Kagaznagar forest division, which is known for its **rich monsoon-driven fungal diversity**.

- **Shuttlecock Mushroom**

- ⊕ Recorded in **Kawal Tiger Reserve**.
- ⊕ This marks the **first confirmed sighting** in the Eastern Ghats, extending its known range beyond the Western Ghats and western India.
- ⊕ Its crisscross lattice structure helps **efficiently release** spores into the air.



Perpetual Tolling

The **Public Accounts Committee** criticized the current perpetual tolling system.

About Perpetual Tolling

- **Origins:** Started with 2008 amendment allowing toll collection even after project costs are recovered formalized in 2023.
- **Current System:**
 - ⊖ Toll rates set in 2008 with annual 3% increase
 - ⊖ After a **Build Operate Toll project's concession ends**, NHA operates toll plazas with **revenue going to Consolidated Fund of India**
- **Proposed Solutions**
 - ⊖ **Technology-driven mechanism** for automatic toll refunds when highways are under maintenance or unfit
 - ⊖ **Independent oversight authority** to justify any toll continuation beyond cost recovery
 - ⊖ **Transparent assessment** of actual operation and maintenance costs



Project Kusha

Post Operation Sindoor, IAF is pressing for rapid progress on Project Kusha.

About Project Kusha or Program Long Range Surface to Air missile (PGLRSAM)

- Approved in 2022 with a budget outlay of 21700 crore rupees.
- It is an indigenous initiative led by **DRDO** to develop a **long-range air defence missile system**.
- **Phase 1-** includes **4 interceptors** variants under developments:
 - ⊖ **M1**(range 150 km), **M2**(250 km), **M3**(350-400 km) and **Naval variant**(200 - 300 km)
- **Phase 2-** aims to develop an even longer range(exceeding 600 km) interceptor missile.



Border Security Force (BSF)

The Ministry of Home Affairs has cleared the first-ever cadre review of the Border Security Force (BSF).

BSF is the **largest border guarding force in the world**.

About BSF

- **Genesis:** Formed in 1965 after Pakistan's attack in Gujarat.
- **Nodal Ministry:** A Central Armed Police Force under the **Ministry of Home Affairs**
- **Deployment:**
 - ⊖ Guards **India's borders with Pakistan & Bangladesh**.
 - ⊖ Some **Left-Wing Extremism (LWE)** affected states.

Roles

- **Peacetime:** Stop cross-border crimes (e.g., smuggling), ensure security in border areas.
- **Wartime:** Hold sectors till the Army arrives, assist in attacks, guard POWs, protect supply lines & rear areas.

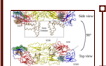


National Green Tribunal (NGT)

Union Environment Ministry issued an **order appointing 2 judicial members and 4 expert members to the NGT**, which is currently functioning below its sanctioned strength.

About NGT (HQ: New Delhi)

- **Origin:** Established under the **NGT Act, 2010** to adjudicate environmental cases.
- **Powers:** Has power of a Civil Court under Code of Civil Procedure, 1908.
 - ⊖ However it is **not bound by the Code of Civil Procedure, 1908** or the Indian Evidence Act, 1872 and is **guided by Principles Of Natural Justice**.
- **Members:** Members shall hold office for 5 years, but shall not be eligible for re-appointment.
- **Eligibility:** **Chairperson:** Judge of the Supreme Court or Chief Justice of a High Court.



Envelope Dimer Epitope (EDE)

Researchers have identified **specific antibodies, known as envelope dimer epitope (EDE)** as the key for understanding dengue immunity.

About EDE

- The EDE is a **special part of the dengue virus that our immune system can recognize** and target with antibodies.
- On the dengue virus surface, **envelope (E) proteins are arranged in pairs (dimers)**.
- The junction area where the **two E proteins meet, forms a unique 3D structure called the Envelope Dimer Epitope (EDE)**.
- Special antibodies called **EDE antibodies can recognize this site and neutralise dengue virus**.



NASA' Orbiting Carbon Observatory (OCO)

The **Trump administration plans to shut down NASA's OCO missions** that track carbon dioxide and monitor plant health, a key data source for scientists, policymakers, and farmers.

About the Missions

- **Launch:** **OCO-2** satellite was launched in 2014 and **OCO-3** in 2019 as an Instrument on the International Space Station.
- **Technology:** Use Hubble-like technology; most sensitive and accurate CO₂ monitoring systems in the world.

Importance

- **Carbon Tracking:** Show where CO₂ is emitted and absorbed globally. They found
 - ⊖ **Amazon rainforest emits more CO₂** than it absorbs.
 - ⊖ **Boreal forests** in Canada, Russia, and melting permafrost areas **absorb more CO₂ than they emit**.
- **Plant Health Monitoring:** Detect photosynthesis "glow" to monitor droughts and predict food shortages.

Place in News



Easter Island (capital: Hanga Roa)

Rising sea levels due to climate change could **submerge coastal areas by 2080, threatening the moai statues and archaeological heritage**.

Political features

- **Location:** It is the **easternmost Polynesian island**, lying west of mainland Chile and east of Pitcairn Island in the **Southeastern Pacific Ocean**
- **Political Status:** **Chilean special territory**

Geographical Features

- **Volcanic:** **Small, triangular volcanic island** formed by three extinct volcanoes.
- **Climate:** Subtropical maritime climate with mild winters and warm summers.
- **Global Recognition:** UNESCO World Heritage Site (Rapa Nui National Park).



AHMEDABAD



BHOPAL



CHANDIGARH



DELHI



JAIPUR



JODHPUR



GUWAHATI



HYDERABAD



LUCKNOW



PRAYAGRAJ



PUNE



RANCHI



SIKAR