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For UPSC | IAS | IPS & State Civil Services Aspirants

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Internal Security

OPERATION SINDOOR –(May 7, 2025)

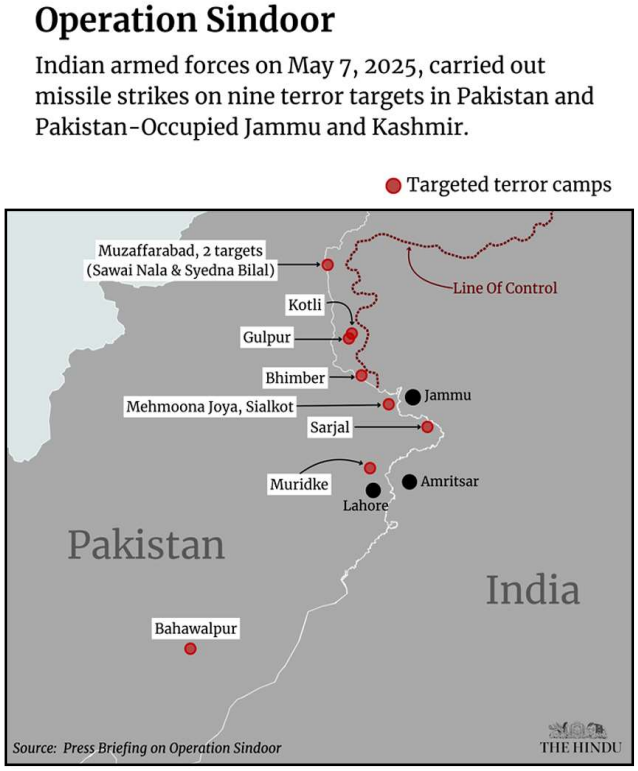
Background

- **Trigger: Pahalgam Terror Attack (April 22, 2025)** – 26 civilians killed, including Indian and foreign tourists.
- **Perpetrator:** Claimed by *The Resistance Front (TRF)* – linked to **Lashkar-e-Taiba (LeT)**.
- **Response: Operation Sindoor**, a precision retaliation by the Indian Armed Forces

1. What is Operation Sindoor ?

Attribute	Details
Date	7th May 2025
Operation Type	Precision **air and missile strikes** from Indian territory
Target Groups	○ **Jaish-e-Mohammed (JeM)** ○ **Lashkar-e-Taiba (LeT)** ○ **Hizbul Mujahideen**
Terror Sites Hit	9 total – 4 in Pakistan and 5 in PoJK Key camps and facilities in **Pakistan-occupied Jammu and Kashmir (PoJK)**.
Key Technologies Used	Rafale jets, **SCALP missiles**, **HAMMER bombs**, **Loitering drones**
Duration	Approx. 23 minutes
Nature of Operation	Focused, non-escalatory, intelligence-driven, civilian-safe

2. Operation Sindoor – Terror Sites Targeted



Location	Function / Affiliation
Markaz Subhan Allah, Bahawalpur	JeM Headquarters
Markaz Taiba, Muridke	LeT Base and Ideological Hub
Mehmoona Joya, Sialkot	Hizbul Mujahideen Training Camp
Markaz Ahle Hadith, Barnala	LeT-linked Religious Indoctrination Centre
Syedna Bilal Camp, Muzaffarabad	JeM Training Centre
Shwawai Nalla Camp, Muzaffarabad	LeT Operational Cell
Makaz Raheel Shahid, Kotli	Hizbul Mujahideen Operations Base
Markaz Abbas, Kotli	JeM Safehouse
Sarjal Facility, Tehra Kalan	IEDs and Weapons Storage Depot

MILITARY ASSETS & TECHNOLOGY USED

SCALP Cruise Missiles

- **Full Form:** *Storm Shadow* (SCALP EG)
- **Type:** Long-range, air-launched cruise missile
- **Origin:** Developed by **MBDA (Europe)**
- **Platform Used:** Deployed from **Rafale fighter jets**
- **Use Case:** Precision strikes on **hardened infrastructure**, like command centers, bunkers
- **Previous Use:** Iraq, Libya, Syria, Ukraine

HAMMER Precision-Guided Bombs

- **Full Form:** *Highly Agile Modular Munition Extended Range*
- **Origin: Safran Electronics & Defense (France)**
- **Type:** Modular air-to-ground missile with **guidance systems**
- **Features:**
  - Laser, GPS, and infrared targeting
  - Effective against **mobile targets and dynamic battlefield scenarios**
- **Platform:** Rafale and other compatible aircraft

Loitering Munitions (Kamikaze Drones)

- **Definition:** UAVs capable of both surveillance and precision attack by "loitering" until a target is found.
- **Advantages:**
  - Real-time intelligence gathering
  - Autonomous strike capability
  - Reduced pilot/operator risk
  - Extended operational range
- **Role in Sindoor:** Deployed over enemy territory to identify and strike key moving targets with **minimal collateral damage**

Significance of Operation Sindoor

1. **Strategic Significance:**
   a. **Precision-based & Non-Escalatory:** No targeting of Pakistani military installations.
   b. **Intelligence-driven:** Sites were selected based on confirmed terrorist links.
   c. **Civilian Safety:** Operations calibrated to **minimize collateral damage**.

2. **Diplomatic Messaging:**
    a. Reinforces India's **zero-tolerance policy** on cross-border terrorism.
    b. Conducted in a manner to **avoid international backlash** or escalation.
    c. Underscores India's right to **retaliate within international law frameworks**.

Key Highlights

Aspect	Details
Operation Style	Launched entirely from within Indian territory
Avoided Targets	Deliberate avoidance of Pakistani military infrastructure
Justification	Assertive response to TRF-sponsored Pahalgam terror attack

List of Key Military Operations of India (Chronological Recap)

Year	Operation	Force	Objective/Location
1948	Operation Polo	Army	Integration of Hyderabad
1961	Operation Vijay	Army	Liberation of Goa, Daman & Diu from Portuguese rule
1971	Operation Trident	Navy	Attack on Karachi Port
1971	Operation Python	Navy	Follow-up to Trident on Karachi
1971	Tangail Airdrop	Air Force	Bangladesh liberation support
1984	Operation Blue Star	Army	Removal of militants from Golden Temple
1987	Operation Pawan	Army	IPKF deployment in Sri Lanka
1988	Operation Cactus	Navy & IAF	Thwarted coup in Maldives
1999	Operation Vijay	Army	Reclaimed Kargil during Kargil War
1999	Operation Safed Sagar	Air Force	Air support in Kargil War
2008	Operation Black Tornado	Army/NSG	Response to 26/11 Mumbai attacks
2015	Myanmar Strike	Army	Anti-insurgency across India-Myanmar border
2019	Operation Bandar	Air Force	Balakot air strike after Pulwama attack
2020	Operation Samudra Setu	Navy	Repatriation during COVID-19
2021	Operation Devi Shakti	Army	Evacuation from Afghanistan
2022	Operation Ganga	All Forces	Ukraine evacuation amid Russia-Ukraine war
2023	Operation Dost	IAF/NDRF	Earthquake rescue in Turkey & Syria
2024	Operation Sindoor	Army/Navy/IAF	Precision strike post-Pahalgam attack in Pakistan & PoJK

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CURRENT EVENTS OF INTERNATIONAL IMPORTANCE

Japan

Context: The Defence Minister recently held a bilateral meeting with Japan's Defence Minister Gen Nakatani in New Delhi.

Key Facts about Japan

- **Capital:** Tokyo, located in east-central Honshu.
- **Official Language:** Japanese.
- **Currency:** Japanese Yen.
- **Form of Government:** Parliamentary government under a constitutional monarchy.
- **Geography:** Island nation in East Asia, situated in the Northwestern Pacific Ocean.

Physical Geography of Japan

- **Archipelago Structure:** Comprises a chain of islands stretching approximately 1,500 miles in a northeast–southwest arc.
- **Main Islands (north to south):** Hokkaido, Honshu, Shikoku, and Kyushu.
- **Maritime Borders:**
  - East: Pacific Ocean.
  - North: Sea of Okhotsk.
  - West: Sea of Japan (East Sea).
  - Southwest: East China Sea.
- **Land Borders:** None (as it is an island nation).

Terrain and Natural Features

- **Landscape:** Over **80% mountainous**, with rugged terrain.
- **Volcanic Activity:** Located on the **Pacific Ring of Fire** – a major zone of earthquakes and active volcanoes.
- **Highest Peak: Mount Fuji** (3,776 m), a stratovolcano and national symbol.
- **Major Mountain Ranges:** Japanese Alps.
- **Major Rivers: Shinano River** (longest), Tone River, Kiso River.

Climate

- **Climatic Zones:** Ranges from **subarctic in the north to humid subtropical in the south**.
- **Frequent Natural Disasters:** Experiences frequent **earthquakes, tsunamis, and volcanic eruptions** due to its location on the Pacific Ring of Fire and high tectonic activity.

Alcatraz Island

Context: The US President recently directed his administration to rebuild and enlarge Alcatraz, the infamous prison that has been shuttered for more than 60 years on a remote California island.

About Alcatraz Island

- **Location:** A rocky island in **San Francisco Bay, off the coast of California, in the United States.**
- **Alternate Name:** Also known as **'The Rock'**.
- **Area:** Occupies an area of 22 acres (9 hectares)

History of Alcatraz Island

- **1849:** Sold to the U.S. government.
- **1854:** Site of the **first lighthouse on the coast of California**.
- **1859:** First permanent army troops stationed there.
- **1861:** Became a **military prison**.
- **1907:** Named the **Pacific Branch of the U.S. Military Prison**.
- **1933:** The army left the island.
- **1934-1963:** Served as a **federal (national) prison**.

- Housed some of the **most dangerous prisoners** in the country.
- Could hold over 330 convicts, though rarely more than 260 at one time.
- Considered the **most inescapable prison in the United States** due to the island's isolation and the strong currents of San Francisco Bay. While a few inmates did escape, their survival of the currents is unlikely.

- **March 1963:** Closed due to the **high cost of maintaining** the prison.
- **1972:** Became part of the newly created **Golden Gate National Recreation Area**.
- **Present Day:** Now **open to the public** and is a **popular tourist destination**

India–New Zealand Free Trade Agreement (FTA)

Context: The first round of negotiations for the India–New Zealand Free Trade Agreement (FTA) recently concluded successfully in New Delhi, highlighting the growing bilateral engagement.

Key Facts about New Zealand

- **Location:** An island country located in the **Southwestern Pacific Ocean**, situated between the Tropic of Capricorn and the Antarctic Circle.
- **Main Islands:** Comprises two major islands—the **North Island (Te Ika-a-Mâui)** and the **South Island (Te Waipounamu)**—separated by the **Cook Strait**, along with over 700 smaller islands. The South Island is the larger of the two.
- **Capital City: Wellington** (located at the southern tip of the North Island). It is the southernmost capital city in the world.
- **Largest City: Auckland** (located on the North Island).
- **Geography and Geology:**

- **Pacific Ring of Fire:** Geologically, New Zealand is part of the **Pacific Ring of Fire**, making it prone to **earthquakes and volcanic activity**. It sits on the collision boundary of the **Pacific and Australian tectonic plates**.
- **Diverse Relief:** Features diverse relief, including:
  - The **Canterbury Plains** (South Island) - vast, flat agricultural plains.
  - A high central plateau in Central Otago (South Island).
  - **Active volcanoes** such as Mount Ruapehu and White Island (North Island).
  - The **Southern Alps** - a major mountain range running along the western side of the South Island.
- **Highest Peak: Mount Cook (Aoraki)**, located in the Southern Alps.
- **Largest Glacier:** The **Tasman Glacier**, located on the South Island.
- **Largest Natural Lake: Lake Taupô**, located in a volcanic caldera on the North Island, contributing to the country's hydroelectric energy and tourism.
- **Coastline:** Extensive coastline of over 15,000 km, leading to a large Exclusive Economic Zone (EEZ).

- **Climate:** Largely temperate, with subtropical conditions in the far north and alpine conditions in the inland South Island.
- **Population:** Relatively sparsely populated. There are significantly more sheep than people.
- **Indigenous People:** The **Mâori** are the indigenous Polynesian people of New Zealand (Aotearoa).
- **Political System:** A **constitutional monarchy** with a **parliamentary democracy** (Westminster system). The King of New Zealand, King Charles III, is the Head of State, represented by the Governor-General.
- **Historical Significance:** New Zealand was the **first country in the world to grant all women the right to vote** in 1893.
- **Economy:** A developed country with a liberalized free-trade economy. The service sector dominates, followed by the industrial sector and agriculture. International tourism is also a significant source of revenue.
- **International Relations:** Strong relationship with Australia, sharing a "Trans-Tasman identity." It is part of various international organizations and forums.

Portugal

Context: Portugal is moving toward another minority government following its recent general election, reflecting growing public discontent with traditional political parties.

Key Facts about Portugal

- **Geographical Location:**
  - The **westernmost country of mainland Europe**.
  - Located on the **west coast of the Iberian Peninsula**.
- **Borders:**
  - Shares its **only land border with Spain** to the north and east.
  - Bounded by the **North Atlantic Ocean** to the south and west.
- **Political System:** A **unitary semi-presidential republic** with a **parliamentary democracy**.
- **Autonomous Regions:** Portugal also administers two autonomous regions, the **Madeira and Azores archipelagos**, both located in the Atlantic Ocean.
- **Capital: Lisbon**, the capital of Portugal, is one of the **oldest cities in Europe**.
- **Historical Significance:** Has historically served as a major **seaport and center of global maritime exploration** during the **Age of Discovery** (15th-17th centuries). This period links Portugal closely to **India's colonial past** via the Portuguese Empire.
- **Climate:** The country experiences a **maritime temperate climate**, characterized by:
  - Cool and rainy conditions in the north.
  - Warmer and drier conditions in the south.
- **Terrain:** The **Tagus River** flows westward and effectively divides Portugal into:
  - **Mountainous northern regions**.
  - **Rolling plains in the south**.
- **Highest Point:** The highest point in Portugal is **Ponta do Pico (Pico Alto)**, which is a volcano located in the Azores archipelago, not on mainland Portugal.

South Korea - A Key Player in East Asia

Context:

South Korea has recently told China that it is **worried about a "No-Sail Zone" that China announced in the Yellow Sea.** This area is sensitive because it's where the Exclusive Economic Zones (EEZs) of both countries meet. This situation shows the ongoing tensions and legal questions in this important sea.

I. Key Facts about South Korea:

- **Location:** South Korea is in **East Asia**. It's on the southern part of the Korean Peninsula.
    - **North:** It shares a land border with **North Korea**. This border is very important.
    - **East:** It's bordered by the **East Sea** (also known as the Sea of Japan).
    - **South:** It faces the **East China Sea**.
    - **West:** It's bordered by the **Yellow Sea**, which is currently a point of dispute.
- **Political Division:** The Korean Peninsula is divided into two countries along the **38th Parallel**. This line is also known as the **Demilitarised Zone (DMZ)**, a heavily guarded area that separates North and South Korea.
- **Capital City: Seoul**, a very large and modern city, is the capital of South Korea. It's a major center for politics, economy, and culture.
- **Major Rivers:**
    - **Han River:** Flows through Seoul.
    - **Nakdong River:** The longest river in South Korea.
- **Major Islands: Jeju Island**, located in the Korea Strait, is the country's largest island. It's a popular tourist spot and is known for its volcanic features.
- **Mountains:** Most of the country is covered by mountains, especially the **Taebaek Mountain range** along the eastern coast.
- **Highest Peak: Mount Halla** (1,950 meters) on Jeju Island. It's an old, inactive volcano.

II. Geopolitical and Legal Importance:

- **Concern over "No-Sail Zone":** South Korea's Foreign Ministry is looking into whether China's declared "No-Sail Zone" is legal under **international maritime law**, especially the **United Nations Convention on the Law of the Sea (UNCLOS)**.
- **Strategic Yellow Sea:** The Yellow Sea is a very important body of water in East Asia.
    - **Borders:** It's bordered by **China and the Korean Peninsula**.
    - **Importance:** It's crucial for **regional security** (military), **fishing**, and **commercial shipping routes** (trade by sea). Many ships carrying goods pass through this area.
- **International Law (UNCLOS):** South Korea is using parts of UNCLOS to challenge China's actions. These parts include:
    - **Article 58:** Talks about the rights of other countries within **Exclusive Economic Zones (EEZs)**, including the freedom to sail ships and fly planes. An EEZ is an area up to 200 nautical miles from a country's coast where it has special rights to explore and use marine resources.
    - **Article 74:** Deals with how to draw lines for EEZs between countries that have overlapping claims.
    - **Article 87:** Guarantees **freedom of the high seas**, which means all countries have the right to navigate and conduct legal activities in international waters.

East China Sea - A Hotbed of Geopolitical Tensions

Context:

Recently, China's **Liaoning aircraft carrier** entered the **East China Sea** near Japan's **Senkaku Islands** for the first time. It conducted aggressive military drills very close to Japanese territory. This event highlights the growing military activities and ongoing territorial disputes in this important sea.

I. About the East China Sea:

- **Location:** It is an arm of the **Western Pacific Ocean**, located in **East Asia**.
- **A "Semi-Closed" Sea:** It's bordered by land and islands, making it somewhat enclosed:
  - To the **North:** The **Yellow Sea**.
  - To the **South:** The **South China Sea** and **Taiwan**.
  - To the **East: Japan's Ryukyu and Kyushu islands**.
  - To the **West:** The **Chinese mainland**.
- **Connections:**
  - It connects with the **Japan Sea (Sea of Japan)** through the **Tsushima Strait**.
  - It connects with the **South China Sea** through the **Taiwan Strait**.
- **"China Sea":** The East China Sea and the South China Sea together are sometimes referred to simply as the "China Sea."
- **Bordering Countries:** The countries that share a border with the East China Sea include:
  - **South Korea**
  - **Japan**
  - **Republic of China (Taiwan)**
  - **People's Republic of China**
- **Depth and Size:**
  - It covers an area of about 290,000 square miles (750,000 sq. km).
  - It is mostly **shallow**, with almost three-fourths of its area being less than 650 feet (200 meters) deep.
- **Rivers:** Two major Chinese rivers, the **Yellow River (Huanghe)** and the **Yangtze River (Changjiang)**, flow into the East China Sea. These rivers bring a lot of fresh water and sediment into the sea.
- **Weather:** The weather in the East China Sea region is mainly influenced by **monsoon winds**.

II. Islands and Disputes:

- **Key Islands:** The sea contains several important islands:
  - **Ryukyu Islands:** These are part of **Japan**.
  - **Diaoyu Islands (China) / Senkaku Islands (Japan):** These small, uninhabited islands are a **major source of territorial dispute between China and Japan**. Both countries claim them.
- **Submerged Reefs:** The northern part of the East China Sea has many submerged reefs (underwater rocks) like Yajiao Rock, Hupijiao Rock, and Socotra Rock.

III. Strategic and Economic Importance:

- **Global Shipping:** The East China Sea is a vital waterway for global trade. In 2023, approximately **35% of all global petroleum and petroleum product shipments** traveled through this sea. This highlights its immense importance for international commerce and energy supply.
- **Rich Resources:** It is believed to have significant **oil and natural gas reserves** beneath its seabed, which contributes to the territorial disputes.
- **Fisheries:** The sea is also rich in marine life, making it important for **fishing industries** of the bordering countries.

- **Military Presence:** Given its strategic location, resource potential, and territorial disputes, there is a **huge presence of military forces** from various countries, especially China, Japan, and the United States (due to its alliances in the region).

India and Egypt Strengthen Strategic Ties Through Collaboration in Skill Development

Key Development

- On **28th April 2025**, India and Egypt held **high-level deliberations** to deepen strategic collaboration in the area of **skill development**.
- The meeting took place at **Kaushal Bhawan, New Delhi**, hosted by the **Ministry of Skill Development and Entrepreneurship (MSDE), Government of India**.

Delegations Involved

- **Indian Delegation**:
  - Led by **Shri Atul Kumar Tiwari**, Secretary, MSDE
- **Egyptian Delegation**:
  - Led by **H.E. Prof. Dr. Ayman Bahaa El Din**, Deputy Minister of Technical Education, Egypt
- **Facilitation**:
  - Enabled through collaboration with **GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit)** – India and Egypt offices

Context & Significance

- This engagement follows the **2023 elevation** of India–Egypt ties to a **Strategic Partnership**.
- Also builds on Egypt awarding **Prime Minister Narendra Modi** its **highest civilian honour**—a testament to the growing importance of bilateral relations.
- Marks a strategic shift towards using **skill development** as a core area of cooperation, aligning with **South-South and triangular development frameworks**.

India's Skill Development Vision

- Under the **Skill India Mission**, India aims to become the **"Skill Capital of the World."**
- Key achievements so far:
  - **400,000+ individuals trained** in cutting-edge domains like:
    - **Artificial Intelligence (AI)**
    - **Robotics**
    - **Big Data**
  - Over **1.3 million entrepreneurs nurtured**
- India showcased:
  - Its **world-class vocational training (TVET) ecosystem**
  - **Global standard Skill India International Centres**
  - Scalable, **affordable skilling models**

Egypt's Skill Development Initiatives

- Highlighted the **EU-supported TVET Egypt Reform Programme**
- Shared experiences on:
  - Establishment of **Sector Skill Councils**
  - National efforts to modernize technical education
- Egypt's skilling approach shows **resonance with India's models**, encouraging greater synergy.

Future Collaboration Avenues

The two sides identified several **promising areas for future cooperation**:

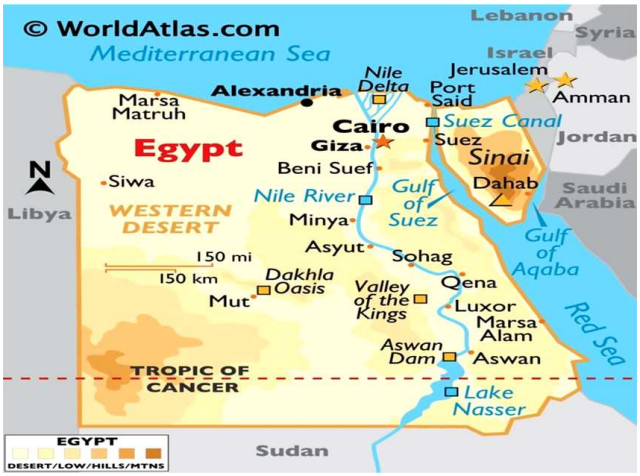
1. **Joint Certification Programmes**
2. **Faculty and Student Exchange Initiatives**
3. **Digital Skilling & Entrepreneurship Projects**

4. **Centres of Excellence** in key sectors:
    - **Information Technology**
    - **Agriculture**
    - **Tourism**
    - **Green Skills / Sustainability**
5. **Standardization of skill qualifications** for **international employability**

Geostrategic and Development Implications

- The partnership is seen as a **model for South-South cooperation** – enabling mutual development among Global South nations.
- Positions India and Egypt as **skill development hubs** in their respective regions.
- Reinforces **India's soft power diplomacy** through **capacity building and human capital development**.

India-Egypt Bilateral Relations :



Historical Background

- **Ancient ties**: India and Egypt have a shared history of relations dating back to ancient times, with Ashoka's edicts referencing ties with Egypt in the **3rd century BCE.**
- **Modern relations**: The relationship gained significant momentum with **Mahatma Gandhi and Saad Zaghloul's common goals for independence.**
- This bond grew further with President Nasser and Prime Minister Nehru in the 1950s, culminating in a **Friendship Treaty** in 1955.

Political Relations

1. **Diplomatic Relations**:
    - **August 18, 1947**: India and Egypt established diplomatic relations at the Ambassadorial level.
    - Founding members of **Non-Aligned Movement (NAM)** in 1961.
2. **High-Level Visits**:
    - **Presidential Visits**:
        * **Hosni Mubarak** (1982, 2008, and 2011 post-revolution).
        * **Mohamed Morsi** (2013).
        * **Abdel Fattah el-Sisi**:

          October 2015: Attended India-Africa Forum Summit.

          2016: State Visit.

          January 2023: Chief Guest at India's 74th Republic Day.

          September 2023: G20 Summit participation.
    - **Prime Ministerial Visits**:
        * **Rajiv Gandhi (1985)**, **P. V. Narasimha Rao (1995)**, **I.K. Gujral (1997)**, **Manmohan Singh (2009)**, **Narendra Modi (2023)**.
        * **PM Modi's 2023 Visit**: Upgraded bilateral ties to **Strategic Partnership**.
3. **Telephonic Conversations**:
    - Regular engagements between **PM Modi** and **President Sisi**, especially during crises like the **Israel-Hamas conflict** in Gaza (October 2023).
4. **Institutional Dialogue**:
    - Various **Joint Working Groups (JWGs)**, such as Cyber Issues, Science & Technology, Defence, and Trade.
    - Regular **Joint Defence Committees (JDC)** and **Foreign Office Consultations (FOC)**.

5. **Guest Country Status at G20**: Egypt was invited as a **Guest Country** during India's **2023 G20 presidency**.

Economic Relations

1. **Trade Overview**:
    - India-Egypt trade has significantly increased, with bilateral trade reaching **USD 7.26 billion** in **2021-22**.
    - Egypt is India's **6th largest trading partner** in Africa.
2. **Export and Import**:
    - **2022-23 Trade**: Exports from India were **USD 4.11 billion**, while imports were **USD 1.95 billion**.
    - Despite a reduction in imports, the overall trade remained strong, despite disruptions like the **Israel-Hamas conflict**.
3. **Investment**:
    - **Indian Investments in Egypt**: Over **55 companies** with investments exceeding **USD 4 billion**.
    - Notable investments include **Tech Mahindra's** Global Delivery Centre, and collaborations in **vaccine production** with **Serum Institute of India**.
4. **Egyptian Investments in India**: Around **USD 37 million**, primarily in sectors like **IT services**, **construction**, and **smart electrometers**.
5. **Trade Facilitating Mechanisms**:
    - **Joint Trade Committee (JTC)**, **Joint Business Council (JBC)**, and **Joint Working Groups (JWGs)** to enhance trade and remove non-tariff barriers.
6. **Noteworthy Business Events**:
    - **Food Africa Cairo 2024** and **India-Africa ICT Expo**: Involvement of Indian companies like **NSIC** and **startups**.

Defence Relations

1. **Bilateral Cooperation**:
    - India and Egypt maintain **cordial defence relations**, which include **high-level visits** and **MoUs** (e.g., **MoU on Defence Cooperation** signed during Rajnath Singh's visit in 2022).
    - **Joint Defence Committees (JDC)** and **defence exercises** are key tools of cooperation.
2. **Defence Exercises**:
    - **'Desert Warrior'**: A joint air exercise held in Cairo (2021).
    - **Tri-service Exercise**: India participated in the **Bright Star-2023** multilateral exercise led by US CENTCOM.
3. **Defence Delegations**: Regular visits by senior military officials, including **Air Force** and **Army** heads.
4. **Strategic Location**: Egypt serves as a key **transit hub** for Indian military aircraft and naval vessels.

Cultural Relations

1. **Historical and Cultural Linkages**:
    - Streets in Cairo named after Indian leaders like **Mahatma Gandhi**, **Jawaharlal Nehru**, and **Dr. Zakir Husain**.
    - Egypt's **Gamal Abdul Nasser Marg** and several busts of **Mahatma Gandhi** in Egypt.
2. **Cultural Outreach**:
    - **Maulana Azad Centre for Indian Culture (MACIC)**: Promotes **Yoga**, **Bollywood**, **classical dance** (Kathak), and **art exhibitions**.
    - **Glimpses of India** painting competition, held annually since 1996.

3. **People-to-People Exchange**:
    - Regular visits by **Indian cultural troupes** and performances of traditional dances like **Kathak** and **Qawwali**.
    - **Yoga**: Celebrated with increasing popularity, including a large **Yoga Day event** in Cairo (June 2024).

Indian Community in Egypt

- **Indian Diaspora**: Approximately **6,000 Indians** in Egypt, predominantly in Cairo, with many involved in **Indian businesses** or **medical professions**.
- **Students**: Over **2,000 Indian students** in Egyptian universities, especially in **medical studies**.

Tourism and Connectivity

- **Tourist Exchange**: In 2023, over **59,000 Indian tourists** visited Egypt, and **15,900 Egyptians** visited India.
- **Flight Connectivity**: Increased air traffic with direct flights from both countries.

Track-2 Diplomacy

- **Dialogue Platforms**: Discussions between think tanks like **India Foundation** and **ECFA**, with a focus on global, regional, and bilateral issues.

Conclusion

India and Egypt share a rich historical and cultural bond, with increasing **political**, **economic**, **defence**, and **cultural** cooperation. The **Strategic Partnership** signed in 2023, along with sustained **high-level visits**, reflects the evolving relationship between these two ancient civilizations. Their engagement across various sectors is poised for growth in the coming years, with further institutional mechanisms and collaborative efforts set to bolster ties in the future.

EDITORIALS

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International Issues

IMF Loan to Pakistan – May 2025 Tranche Approval

1. Background: IMF Disbursement

- On May 9, 2025, the IMF Executive Board approved a disbursement of **$1 billion** (approx. Rs 8,500 crore) to Pakistan.
- The loan is part of the **Extended Fund Facility (EFF)** approved on **September 25, 2024**, amounting to **$7 billion** over **37 months**.
- Total amount disbursed so far: **$2.1 billion**.
- Additionally, the IMF approved a **$1.4 billion** loan under the **Resilience and Sustainability Facility (RSF)** to support Pakistan's climate and disaster resilience efforts.

2. IMF's Extended Fund Facility (EFF) :

Objective:

- To support countries facing **medium-term balance of payments problems** caused by **structural economic weaknesses**.

Key Features:

- It is a **loan**, not a grant or financial aid.
- Offers **longer repayment terms** and **extended engagement** to allow time for structural reforms.
- Targets issues like:
    - Fiscal imbalances
    - Poor infrastructure

- Underdeveloped banking systems
- Weak governance
- Low tax base

Repayment Terms:

- Typically includes a **4.5-year grace period**.
- Repayment period of up to **10 years**.
- Linked to **strict reform conditionalities** and **performance reviews**.

3. IMF's Resilience and Sustainability Facility (RSF)

- Provides **long-term concessional loans** to countries facing structural vulnerabilities.
- Supports reforms to address **BoP risks** from:
  - Climate change
  - Pandemic preparedness
  - Structural shocks
- **Eligibility**:
  - PRGT-eligible low-income countries
  - Vulnerable small states (population < 1.5 million)
  - Middle-income countries with GNI per capita < 10x 2021 IDA threshold
- **Disbursement**:
  - Each reform-linked **measure** must be completed for tranche release.

4. Why Pakistan Qualifies for the EFF

Structural Weaknesses:

- **Economic stagnation**: 2023 GDP was $338 billion, lower than in 2017.
- **High inflation**:
  - 2020: 10.7%
  - 2021: 8.9%
  - 2022: 12.2%
  - 2023: 29.1%
  - 2024: 23.4%
- Significant depreciation of purchasing power from 2019 to 2024.

Other Economic Challenges:

- Persistent **current account and fiscal deficits**.
- **Low savings and investment rates**.
- **High population growth**, with **low female labour force participation**.
- Heavy military expenditure relative to health, education, and infrastructure.
- Weak tax-to-GDP ratio; agriculture and real estate remain largely untaxed.

External Debt Dependency:

- Pakistan has borrowed extensively from:
  - IMF (28 loans in 35 years)
  - China (especially under CPEC)
  - UAE, Saudi Arabia
  - Asian Development Bank
  - Islamic Development Bank
  - Paris Club and other multilateral institutions

5. Why did the IMF Approve the Latest Tranche ?

Economic Reforms and Progress:

- **Reduction in government borrowing**.
- **Inflation control**: dropped to 0.3% in April 2025.
- Improved **foreign exchange reserves**, enabling **interest rate cuts**.
- Execution of FY2025 budget aimed at **fiscal consolidation**.
- **Introduction of Agricultural Income Tax**, a long-pending structural reform.
- Measures to increase **tax revenues** and enhance **public sector efficiency**.

IMF's Official Assessment:

- Noted Pakistan's **progress in stabilizing the economy** despite global challenges.
- Cited **improved policymaking credibility** and increased confidence among investors.
- Highlighted Pakistan's **commitment to macroeconomic discipline and structural adjustments**.

6. India's Response and Abstention

Abstention at IMF Executive Board

- India **abstained** from the vote, which registers dissent under IMF rules (formal "no" vote not permitted).
- Emphasised the need for **adherence to technical and procedural norms**.

India's Key Objections

1. **Prolonged Dependency and Poor Track Record**
    - Pakistan has received IMF assistance **28 times in 35 years**.
    - Four separate programs in the **last five years alone**.
    - Poor record of implementing reforms, leading to repeated bailouts.
2. **Debt Sustainability Concerns**
    - Frequent bailouts without systemic reform raise risks of **debt distress**.
    - Pakistan risks becoming a **"too big to fail"** borrower, increasing the IMF's long-term exposure.
3. **Military Dominance and Economic Mismanagement**
    - Concerns about the **Pakistani military's disproportionate influence** in civilian economic affairs.
    - Alleged **lack of transparency and fiscal discipline**, undermining reform credibility.
4. **Use of Funds and Terrorism**
    - India strongly objected to providing funds to a country involved in **state-sponsored cross-border terrorism**.
    - Warned of **reputational risk** to IMF and violation of **international norms**.

7. Geopolitical and Institutional Context

IMF Governance and Voting

- The **Executive Board** consists of **25 Directors**, representing countries or country groups.
- **Voting power** is based on a country's **economic size (quota)**, not "one country, one vote".
- Decisions are typically made **by consensus**.
- In rare formal votes, members can vote **in favour** or **abstain — no provision to vote against**.

India's Broader Concerns

- Urged that IMF support must be **linked to effective implementation of structural reforms**.
- Suggested increased **monitoring of fund utilisation**, especially in countries with **governance concerns**.
- Emphasised the need to balance **economic objectives** with **security and accountability**.

8. Implications for Pakistan

Positive Outcomes:

- Boosts **short-term liquidity** and **foreign exchange stability**.
- Enhances **credibility** with international donors and credit rating agencies.
- Offers an opportunity to address **long-standing structural problems**.

Associated Risks:

- Potential for **social unrest** due to austerity measures.
- High risk of a **debt spiral** if reforms are reversed or poorly implemented.
- Failure to sustain reforms could harm **Pakistan's creditworthiness**.

India–China Dispute on Germanium Export Restrictions (with Global Context)

1. India is currently engaging with China over **export restrictions on germanium**, a critical mineral essential for high-tech manufacturing.
2. These curbs have exposed India's **strategic dependence on China** and pose significant economic and technological challenges, particularly in sectors like **telecom, semiconductors, and renewable energy**.

What Is Germanium and Why It Matters

Parameter	Details
Type	**Critical mineral** (not a Rare Earth Element)
Atomic Number	32
Appearance	Grey-white, brittle **metalloid**
Key Uses	Fiber optic cables, solar panels, infrared optics, semiconductors
Form Used	**Germanium oxide** – used in the core of preforms for drawing optical fibers
Global Supply	**China produces ~60%** of global germanium
India's Position	**Zero domestic production**, fully reliant on **imports**

Timeline of Key Events

Date / Period	Event
2023	China imposed **export licensing requirements** on germanium and gallium.
Nov 2024	**Full export ban** of germanium, gallium & antimony to the **U.S.** announced by China
Dec 3, 2024	China justified the ban citing **national security**, seen as retaliation to US sanctions
Jan 2025	India raised concerns through its **embassy in Beijing.**
Why is India affected if the Chinese ban is on exports to the U.S.? • Even though the **ban is officially on exports to the U.S.**, **China has tightened overall control** over exports of critical minerals like **germanium, gallium, and antimony** through **licensing regimes** and **strategic restrictions**. • These controls have created a **global supply squeeze**, indirectly affecting **all countries**, including India.	
2024 RTI Reply	Embassy confirmed **germanium** was the only element about which Indian industries raised formal grievances
2024 (India)	India began importing germanium via **UAE**, resulting in **increased costs**

Global Geopolitical Context

Why Did China Ban These Exports?

- Official reason: **National security concerns**
- Real motive: A **retaliatory response** to:
    - Biden administration's sanctions on Chinese chip firms and machinery
    - **President-elect Donald Trump's** threat to impose additional **10% tariffs** on Chinese imports

Minerals Banned by China

1. **Gallium (Atomic no. 31)** – for high-speed semiconductors
2. **Germanium (Atomic no. 32)** – for solar, fiber optics, semiconductors
3. **Antimony (Atomic no. 51)** – for bullets, defence tech

These minerals are vital for **computing, defence, and renewable energy** — the engines of future economic and strategic power.

Past Precedent

- In **2010**, China halted rare earth exports to **Japan** over a dispute.
- Japan responded by **funding alternate sources** like **Lynas Corporation** in Australia.

Impact on Indian Industry

Sector	Impact
Fiber Optics	Germanium oxide essential in preforms → Production costs rising
Semiconductors	Germanium vital in chip-making → import route via UAE adds cost and time
Solar Panels	Disruption in sourcing critical materials → slows green energy goals
Cost Pressure	UAE-based imports (instead of direct Chinese supply) → **higher import costs**

India's Diplomatic Response

- Indian Embassy in **Beijing** took up the issue with **Chinese ministries**
- However, **no public disclosure** of meetings (as per RTI response to *The Hindu*)
- **Only germanium** was listed among concerns from Indian industry
- No formal action yet on gallium or antimony, which also pose risks

Broader India–China Economic Frictions

- **Foxconn Case**:

Strategic Concern	Description
Import Dependence	India is completely dependent on imports for key critical minerals
Single-Supplier Risk	China dominates global supply chains (60–80%) for germanium & gallium
Industrial Impact	India's electronics, telecom & defence sectors are exposed
Geopolitical Exposure	China could weaponize exports amid diplomatic tensions
National Security	Semiconductors, optical fibers, and solar panels are critical to India's future defence, economy & digital infra

Way Forward for India

Area of Action	Recommendation
Diplomatic Diversification	Leverage partnerships with UAE, Australia, Africa, Latin America
Domestic Capability	Invest in **critical mineral exploration & processing**
Critical Minerals Mission	Broaden to include **germanium, gallium, antimony**
Multilateral Forums	Push resource security agenda in **BRICS**, **SCO**, **Quad**, etc.
Private Sector Role	Incentivize Indian firms to invest in overseas mineral assets

Conclusion

The germanium export ban is not just a trade disruption — it is a **geopolitical signal**. It reveals India's vulnerability in critical mineral supply chains and highlights the urgent need for a **strategic minerals policy**, **diplomatic diversification**, and **domestic resilience** to safeguard the future of India's technology and defence sectors.

India Extends $50 Million Help to Maldives

What Happened?

- India has **extended (or "rolled over") a $50 million treasury bill** to the **Maldives**.
- India's rollover of the **$50 million treasury bill** is a strong message that it **supports the Maldives**, even during strained relations.
- It reflects India's long-term view of building a **strong, secure, and balanced partnership** in the Indian Ocean Region.
- A **treasury bill** is a **short-term loan** given by a government to meet urgent financial needs.
- This move gives the Maldives **temporary financial relief**, as the country is facing **high debt and economic troubles**.

Why Is This Important?

- Despite recent **tensions** between India and the Maldives, this step shows that **India still values its relationship** with the island nation.
- The transaction was handled by the **State Bank of India (SBI)**.

India–Maldives Relations: Key Points

Strategic Partnership

- Maldives is an important **maritime neighbor** for India.
- It is central to India's:
  - **'Neighbourhood First' policy**
  - **Vision MAHASAGAR** (Mutual and Holistic Advancement for Security and Growth Across Regions)

Working Together in International Forums

- Both countries are founding members of:
  - **SAARC** (South Asian Association for Regional Cooperation)
  - **South Asia Free Trade Agreement (SAFTA)**

Economic Ties

- **Trade agreement** signed in **1981** for essential goods.
- Bilateral trade reached:
  - **$300 million in 2021**
  - **$500+ million in 2022**
  - **$548 million in 2023**

- India is a **key investor** in Maldives' economy and tourism sector.

Defence & Security

- Since **1988**, India has helped Maldives in **defence cooperation**.
- Focus areas:
  - Training, joint exercises, coastal security.
  - Tackling piracy, terrorism, and drug smuggling.

Tourism & Connectivity

- In **2023**, India was the **largest source of tourists** for Maldives (11.8%).
- The **"Open Skies Agreement"** (2022) improved air connectivity.
- Major project: **Greater Male Connectivity Project (GMCP)**—linking capital Male to nearby islands.

Why Maldives Is Important for India

Location

- Maldives is in the **middle of major sea trade routes** in the Indian Ocean.
- Acts like a **checkpoint** for about:
  - **50% of India's trade**
  - **80% of India's energy imports**

Countering China

- China has invested heavily in Maldives, increasing its influence.
- India wants to **maintain balance** and protect its strategic interests in the region.

Diplomatic Importance

- Strong ties with Maldives help India:
  - To Lead regional forums like **IORA** (Indian Ocean Rim Association)
  - To Play a bigger role in Indian Ocean diplomacy

Challenges in India–Maldives Relations

- **Change in governments** often brings uncertainty in long-term projects.
- **Chinese investments** raise concerns for India (fear of "debt trap diplomacy").
- **Security issues** like piracy, terrorism, and drug trafficking need constant cooperation.
- **Religious extremism** in Maldives is a concern for both countries.
- **Trade imbalance** causes some frustration in Maldives (they import more than they export to India).

The Way Forward

- India has always shown commitment by supporting Maldives in tough times.
- To make the relationship stronger:
  - **Work together on mutual goals**
  - **Continue financial and security cooperation**
  - **Handle challenges together**, including economic and security concerns

Colombia Joins China's Belt and Road Initiative (BRI)

What Happened?

- On **May 14, 2025**, **Colombia officially joined** China's **Belt and Road Initiative (BRI)**.
- This is part of China's ongoing effort to **build closer ties with Latin American countries**.
- The agreement was signed during a meeting in **Beijing** with Colombian President **Gustavo Petro** and Chinese President **Xi Jinping**.

What is the Belt and Road Initiative (BRI)?

- BRI is a **global infrastructure and investment plan** launched by China in 2013.
- BRI aims to connect Asia with Africa and Europe via land and maritime networks with the aim of improving regional integration, increasing trade and stimulating economic growth.
- In return, China gains **economic influence and stronger political ties**.
- **Components:**
    - **Silk Road Economic Belt:** This segment of the BRI is dedicated to improving connectivity, infrastructure, and trade links across Eurasia through a network of overland transportation routes.
    - **Maritime Silk Road:** This component enhances maritime connections and cooperation starting in the **South China Sea, extending to Indo-China, Southeast Asia, and across the Indian Ocean to Africa and Europe.**
- **Key Corridors for Development:**
    - China-Pakistan Economic Corridor (CPEC)
    - New Eurasian Land Bridge Economic Corridor
    - China-Indochina Peninsula Economic Corridor
    - China-Mongolia-Russia Economic Corridor
    - China-Central Asia-West Asia Economic Corridor
    - China-Myanmar Economic Corridor

Why Colombia's Move Is Important

- Colombia's Foreign Ministry called it a **"historic step"** that will bring:
    - More **investment**
    - **Technology partnerships**
    - Support for **sustainable development**
- President Petro said it marks a **new chapter** in Colombia's foreign policy — dealing with the world on **equal and free terms**.

China's Influence in Latin America: Key Points

- China has become the **largest trading partner** for countries like:
    - **Brazil**
    - **Peru**
    - **Chile**
- **About 2/3 of Latin American countries** have already joined the BRI.
- In 2024, China opened **its first Latin American port** in **Chancay, Peru**, showing its **growing influence** in the region.

China–Latin America Forum (CELAC)

- Colombia's announcement came during the **China-CELAC Forum**, a major event for Latin American leaders hosted in Beijing.
- Chinese President Xi Jinping promised:
    - **$9.2 billion in credit** to support development in the region.
    - Cooperation on:
        * **Infrastructure and clean energy**
        * **Counterterrorism**
        * **Combating organized crime**
        * **Scholarships and training programs**

What Other Leaders Said

- **Chile's President Gabriel Boric** agreed with Xi that:
    - The world is facing threats from **unilateralism** (countries acting alone) and **protectionism** (blocking trade).
    - China and Chile should support **free trade** and **global cooperation**.

- **Brazil's President Luiz Inácio Lula da Silva**, also at the event, said:
    - Latin America wants to avoid another **Cold War** between the U.S. and China.
    - The region aims to be a **positive force in global cooperation**.

U.S. – China Tensions in Latin America

- The **U.S. is concerned** about China's growing presence in the region.
- Example: The **Panama Canal** — both countries rely on it heavily for trade.
- The U.S. has questioned Chinese control over ports near the canal, calling it a **security risk**, while China denies this.
- China's state-owned company **CK Hutchison** is planning to **sell 43 ports** (including two at the Panama Canal) to a **U.S.-led group**, and this is under review.

India-Germany Relations & PM Modi–Chancellor Merz Talk (May 2025)

1. Context: High-Level Talk Between India and Germany

- On **May 20, 2025**, **Prime Minister Narendra Modi spoke with newly elected German Chancellor Friedrich Merz**.
- They discussed **bilateral relations, regional and global developments**, and reaffirmed a **joint stance against terrorism**.
- Chancellor Merz is the leader of Germany's **Christian Democratic Union (CDU)** and took office earlier in May 2025.

2. Key Highlights of the Conversation

a. Congratulations & Strategic Partnership

- PM Modi **congratulated Merz on becoming Chancellor**.
- Both leaders **reaffirmed their commitment** to deepening the **India-Germany Strategic Partnership**, which has seen **25 years of robust growth**.

b. Commitment to Fighting Terrorism

- Both sides **"stood united in combating terrorism in all forms"**, as per official statements.
- They reiterated the importance of **coordinated global efforts** to counter terrorism and safeguard democratic values.

c. Areas of Future Cooperation Identified

- The two leaders agreed to **strengthen cooperation in**:
    - **Trade and Investment**
    - **Defence and Security**
    - **Innovation and Technology**

d. Diaspora & People-to-People Ties

- They **acknowledged the positive contribution** of the **Indian diaspora in Germany**, which acts as a cultural and economic bridge.

e. Invitation Extended

- PM Modi **invited Chancellor Merz to visit India**, and both agreed to stay in close touch moving forward.

3. Strategic Significance of India–Germany Relations

- India and Germany have a **Strategic Partnership since 2001**, further elevated through the **Inter-Governmental Consultations (IGC)** mechanism.

- Key pillars include:
    - **Economic partnership**: Germany is India's **largest trading partner in the EU**.
    - **Defence collaboration**
    - **Green energy and climate cooperation**
    - **Education and research**: Large Indian student community in Germany
- Both share **democratic values, rule of law**, and seek a **rules-based international order**.

4. India-Germany Joint Stand Against Terrorism

- **Terrorism remains a common concern:**
    - India faces cross-border terrorism, particularly from Pakistan-based groups.
    - Germany is concerned with **homegrown radicalization and international terrorism**, including from the Middle East and extremist ideologies.
- A joint approach enhances **intelligence sharing, capacity building**, and **multilateral anti-terror cooperation**.

India vs Germany – Electoral and Political Systems

India's Electoral System

- **Type**: **First-Past-the-Post (FPTP)** system.
- **Constituencies**: 543 Lok Sabha seats; one MP elected per constituency.
- **Voting Process**:
    - Conducted by the **Election Commission of India (ECI)**.
    - **Electronic Voting Machines (EVMs)** are used.
    - Voters' fingers are ink-marked to prevent multiple voting.
- **Government Formation**:
    - The **party or coalition with majority (272+ seats)** forms the government.
    - Its leader becomes the **Prime Minister**.

Germany's Electoral System

- **Type**: **Mixed-Member Proportional (MMP)** system.
- **Voting Structure**:
    - **Two Votes**:
        1. **First vote:** For a local candidate (FPTP style) – 299 seats.
        2. **Second vote:** For a party list (proportional) – determines total share in 630-member Bundestag.
- **Threshold**: Parties need at least **5% of the vote** or **3 direct seats** to enter Parliament.
- This system ensures **local representation + proportional fairness**.

India *Vs*. Germany – Constitutional and Governance Structure

Feature	India	Germany
System	**Parliamentary democracy**	**Federal Parliamentary Republic**
Head of Government	**Prime Minister** (executive powers)	**Chancellor** (executive powers)
Head of State	**President** (ceremonial)	**President** (ceremonial)
Federalism	States have powers under the Constitution	**Strong federal structure**; Bundesrat (upper house) represents states
Upper House Powers	Rajya Sabha can delay but not veto major laws	**Bundesrat** can **veto laws** affecting states

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National Human Rights Commission (NHRC)

Context: NHRC recently took suo motu cognizance of a media report concerning the abduction, rape, and murder of a minor girl in Hubballi, Karnataka, and the subsequent death of the accused in a police encounter.

About the National Human Rights Commission (NHRC)

- **Nature of Body: Statutory body**, not a constitutional body.
- **Enabling Act:** Constituted under the **Protection of Human Rights Act, 1993**. (Amended in 2006 and 2019).
- **Establishment Date:** Established on **12th October 1993**.
- **Status:** An **independent institution** committed to protecting and promoting human rights.
- **Definition of Human Rights (as per Section 2(1)(d) of the Act):** Rights relating to life, liberty, equality, and dignity of the individual guaranteed by the Constitution of India or embodied in International Covenants and enforceable by courts in India.

Mandate and Objectives

- **Core Function:** Safeguards rights related to life, liberty, equality, and human dignity, which are guaranteed by the Constitution of India and international human rights treaties.
- **Primary Objectives:**
    - Strengthening institutional frameworks to address human rights issues.
    - Independent investigation of alleged human rights violations.
    - Supporting and enhancing the work of other institutions in promoting human rights.
    - Inquiry into any violation of human rights or negligence in the prevention of such violation by a public servant (suo motu, petition, or court order).
    - Intervening in any ongoing court proceedings involving allegations of human rights violations.
    - Visiting jails and detention places to assess living conditions of inmates and make recommendations.
    - Reviewing constitutional and legal safeguards for human rights protection and suggesting effective implementation measures.
    - Analyzing factors (including acts of terrorism) that inhibit human rights enjoyment and recommending remedial actions.
    - Studying treaties and other international human rights instruments and recommending effective implementation measures.
    - Promoting and undertaking research in the field of human rights.
    - Spreading human rights literacy and awareness among the public.
    - Encouraging efforts of NGOs working in human rights.

Composition and Structure

The NHRC is a **multi-member body** comprising a Chairperson and up to five full-time members, along with seven ex-officio members.

- **Chairperson:** A retired Chief Justice of India or a retired or sitting Supreme Court judge.
- **Full-time Members (up to 5):**
    - One retired or sitting Supreme Court judge.
    - One retired or sitting Chief Justice of a High Court.
    - Three experts in human rights, with **at least one woman** among them.
- **Ex-Officio Members (7):** Chairpersons of the following National Commissions:
    - National Commission for Scheduled Castes (SCs)
    - National Commission for Scheduled Tribes (STs)
    - National Commission for Minorities
    - National Commission for Women
    - National Commission for Backward Classes (BCs)
    - National Commission for Protection of Child Rights
    - Chief Commissioner for Persons with Disabilities

Appointment and Tenure

- **Appointment Authority:** Members are appointed by the **President of India**.
- **Recommendation Committee:** The President appoints members based on the recommendation of a **six-member committee** led by the **Prime Minister**.
    - **Composition of the Committee:**
        * Prime Minister (Chairperson)
        * Speaker of Lok Sabha
        * Deputy Chairman of Rajya Sabha
        * Leaders of the Opposition in both Lok Sabha and Rajya Sabha
        * Union Home Minister
- **Tenure: Three years** or **until the age of 70**, whichever is earlier.
- **Reappointment:** Members are **eligible for reappointment**.
- **Post-Tenure Employment:** Members are **barred from further government employment** post-tenure.
- **Removal:** The Chairperson or any member can be removed by the President under specific circumstances (e.g., proven misbehavior, incapacity, insolvency, engaging in paid employment outside duties, unsound mind, conviction for an offense involving moral turpitude) after an inquiry by the Supreme Court.

Powers and Limitations

- **Powers of a Civil Court:** The NHRC has all the powers of a civil court under the Code of Civil Procedure, 1908, when investigating complaints. It can summon witnesses, require document production, receive evidence, and requisition public records.
- **Investigative Staff:** Has its own investigative staff; can also utilize services of any Central or State government officer/agency for investigation.
- **Advisory Nature:** The recommendations of the NHRC are **advisory** in nature. It has no power to punish violators or award monetary relief directly.
- **Time Limit for Inquiry:** Cannot inquire into any matter after the expiry of **one year** from the date on which the act constituting a violation of human rights is alleged to have been committed.
- **Limited Jurisdiction over Armed Forces:** For human rights violations by armed forces, it can only seek a report from the Central Government and make recommendations. The government must inform the NHRC about actions taken within three months.

Private Member's Bill (PMB)

Context: Vice President and Rajya Sabha Chairman Jagdeep Dhankhar recently emphasized that PMBs are "forward-looking" and a "gold mine" for legislative progress.

About Private Member's Bill (PMB)

- **Definition:** A legislative proposal introduced by **any Member of Parliament (MP) who is not a Minister**, whether elected or nominated.
- **Drafting Responsibility:** The drafting responsibility of a PMB lies **entirely with the MP concerned**, not with any Ministry.
- **Notice Period:** A **notice period of one month** is required under parliamentary rules for introducing a PMB.
- **Significance/Purpose:** PMBs often reflect the ideological stance, personal convictions, or public interest concerns of the MP, especially those in the **Opposition**.

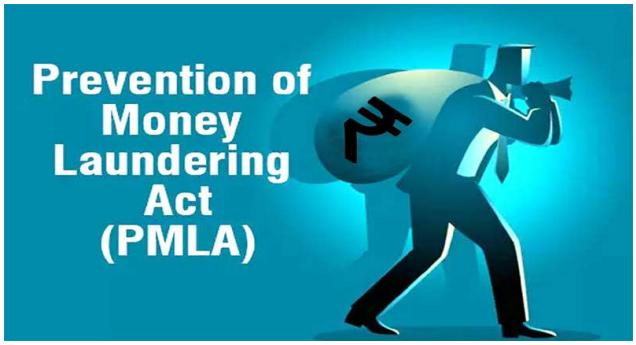
Time Allocation for PMBs in Parliament

- **Lok Sabha:** The **last two-and-a-half hours of business on every Friday** are earmarked for the introduction and discussion of PMBs.
- **Rajya Sabha:** PMBs are taken up **every alternate Friday** for two-and-a-half hours.

Historical Record and Trends

- **Success Rate:** Since Independence, **only 14 PMBs** have ever been passed and received Presidential assent.
- **Last Passed PMB:** The last PMB to become law was in **1970**.
- **Recent Trends (17th & 18th Lok Sabha):**
    - **17th Lok Sabha (2019–2024):**
        - 729 PMBs introduced in Lok Sabha.
        - 705 PMBs introduced in Rajya Sabha.
        - Only 2 PMBs discussed in Lok Sabha.
        - Only 14 PMBs discussed in Rajya Sabha.
    - **18th Lok Sabha (as of 2024 Budget Session):**
        - Only 20 MPs introduced PMBs.
        - Not a single PMB was discussed due to disruptions and prioritization of other business.

Prevention of Money Laundering Act (PMLA)



Context: The Enforcement Directorate (ED) has significantly intensified actions under the PMLA since 2014, reflecting a heightened institutional response to economic offenses in India.

About the Prevention of Money Laundering Act (PMLA), 2002

- **Enactment:** Enacted in **January 2003**.
- **Objectives:**
    - To **prevent and control money laundering**.
    - To **attach and confiscate assets** derived from crime (proceeds of crime).
    - To address related economic offenses in India.
- **Definition of Money Laundering (Section 3):** Any attempt to project criminal proceeds as untainted assets.

- **Amendments:** Has undergone major amendments in **2009 and 2012** to expand its scope and enforcement powers.
- **Recent Enforcement Trend (as of 2024-25):** The ED has initiated 775 new investigations and filed 333 prosecution complaints under PMLA, demonstrating increased legal action.

Enforcement Directorate (ED) Role

- **Chief Enforcement Agency:** ED is the chief enforcement agency under PMLA.
- **Powers:** Empowered to:
    - **Investigate** money laundering offenses.
    - **Attach property** derived from money laundering.
    - **File prosecution complaints** against offenders.
- **Obligations Imposed by PMLA:** Mandates **record maintenance and client identity verification** by banks, financial institutions, and intermediaries (also known as Reporting Entities).

Key Institutions under PMLA

- **Adjudicating Authority:** Responsible for **confirming the attachment of property** by the ED.
- **Appellate Tribunal:** Hears appeals against the orders of the Adjudicating Authority and other authorities under the Act.
- **Special Courts:** Designated **sessions courts** for conducting trials of offenses punishable under PMLA.

International Cooperation

- The Act allows for **international cooperation** through treaties and Memoranda of Understanding (MoUs) with foreign governments for matters related to money laundering and asset recovery.

Focus Areas for 2025 (as mentioned in context)

- **Foreign Exchange Management Act (FEMA) cases** are a key enforcement priority for the ED.
- **Fugitive Economic Offenders Act, 2018:**
    - Applications have been filed against 24 individuals.
    - 14 individuals have been declared **"fugitive economic offenders."**
    - Over **₹ 900 crore worth of assets** have been confiscated under this Act so far. (This Act aims to deter economic offenders from evading the process of law in India by remaining outside the country).

ECINET

Context: The Election Commission of India (ECI) is set to launch ECINET, a single-point digital platform, to streamline electoral services.

About ECINET

- **Developer:** Being developed by the **Election Commission of India (ECI)**.
- **Nature:** A **single-point digital platform**.
- **Purpose:** A new user-friendly digital interface for:
    - Electors (voters)
    - Election officials
    - Political parties
    - Civil society
- **Integration:** Will **integrate and reorient over 40 of ECI's existing mobile and web applications**.
    - It will subsume apps like the Voter Helpline App, Voter Turnout App, cVIGIL, Suvidha 2.0, ESMS, Saksham, and KYC App.

- **User Experience:** Designed with an **aesthetic User Interface (UI)** and a **simplified User Experience (UX)**, providing a singular platform for all electoral-related activities.
- **Benefit for Users:** Aims to alleviate the burden of downloading and navigating multiple apps and remembering different logins.
- **Accessibility:** Will enable users to access relevant electoral data on their desktops or smartphones.

Data Management and Legal Framework

- **Data Entry:** Data on ECINET will be entered **solely by authorized ECI officials**, ensuring accuracy.
- **Data Hierarchy:** In case of any conflict, the **primary data as duly filled in statutory forms will prevail**.
- **Legal Alignment:** The data provided through ECINET will be **strictly aligned within the legal framework** established by:
    - Representation of People Act 1950
    - Representation of People Act 1951
    - Registration of Electoral Rules 1960
    - Conduct of Election Rules 1961
    - Instructions issued by ECI from time to time.

Expected Beneficiaries

- Expected to benefit nearly **100 crore electors**.
- Will also benefit the entire electoral machinery, including:
    - Over 10.5 lakh Booth Level Officers (BLOs)
    - Around 15 lakh Booth Level Agents (BLAs) appointed by Political Parties
    - Nearly 45 lakh Polling Officials
    - 15,597 Assistant Electoral Registration Officers (AEROs)
    - 4,123 Electoral Registration Officers (EROs)
    - 767 District Election Officers (DEOs) across the country.

Competition Commission of India (Determination of Cost of Production) Regulations, 2025

Context: The Competition Commission of India (CCI) recently notified these regulations to effectively assess alleged predatory pricing and deep discounting practices, particularly in the quick commerce and e-commerce sectors.

About Competition Commission of India (Determination of Cost of Production) Regulations, 2025

- **Notifying Authority:** Notified by the **Competition Commission of India (CCI)**.
- **Primary Aim:** To effectively assess alleged **predatory pricing and deep discounting practices** in sectors like **quick commerce and e-commerce**.

What is Predatory Pricing

- **Definition:** Predatory pricing refers to a strategy where a **dominant company deliberately lowers its prices below the cost of production** to drive competitors out of the market.
- **Market Impact:** Once rival firms are weakened or eliminated, the dominant company typically raises prices to recoup its losses and consolidate market control, potentially leading to a monopoly.
- **Legal Prohibition:** This practice is specifically **prohibited under Section 4(2)(a)(ii) of the Competition Act, 2002**, when used to unfairly gain or maintain dominance.

- Section 4 of the Competition Act, 2002, deals with the "Abuse of Dominant Position."
- Section 4(2)(a)(ii) prohibits a dominant enterprise from directly or indirectly imposing unfair or discriminatory prices, including predatory pricing.

Key Features and Changes in the 2025 Regulations

- **Strengthening Oversight:** These regulations implement **updated cost assessment standards** to strengthen oversight of predatory pricing behavior.
- **Modern Benchmarks:** The revised benchmarks are designed to reflect modern economic thinking, judicial rulings, and international best practices in competition law.
- **Definition of "Cost":** According to the latest regulations, the **"cost of a good or service would be assumed to be its average variable cost"**.
  - **Average Variable Cost (AVC):** Calculated as the **total variable cost divided by total output** during a particular period.
  - **Total Variable Cost:** Refers to the total cost (including everything that goes into the production of that good or service) **minus the fixed cost and fixed overheads** attributable to the product.
  - *Note:* While AVC is the primary assumption, the CCI may, in specific cases, consider other cost measures like Average Total Cost, Average Avoidable Cost, or Long-Run Average Incremental Cost, depending on the industry and market conditions.
- **Shift to Case-by-Case Assessment:** One of the key changes is the **shift from sector-specific benchmarks to a flexible, case-by-case assessment model**.
  - This approach is adaptable to various industries, particularly the dynamic **digital economy**.
  - Rather than prescribing uniform metrics, the framework allows the Commission to consider the **unique features and evolving dynamics of digital markets** when evaluating alleged predatory conduct.
- **Repeal of Earlier Regulations:** These new regulations **repeal the 2009 Cost Regulations**, reflecting evolving global practices in competition law.

Right to Know

Context: The Supreme Court of India recently quashed a Delhi High Court order that had directed the Wikimedia Foundation (which hosts Wikipedia) to remove a user-created page and associated discussion, reaffirming the "Right to Know."

Supreme Court's Observations

- **Reaffirmation:** The ruling reaffirmed that the **"Right to Know" is a basic right** under:
  - **Article 19(1)(a)** (Freedom of Speech and Expression)
  - **Article 21** (Right to Life and Personal Liberty)
- **Public Discussion of Courts:** The judgment reinforced that **public discussion and criticism of courts is a legitimate aspect of democracy** and must not be equated with contempt without careful consideration.

Significance of the "Right to Know"

The Right to Know is essential to enable citizens to:

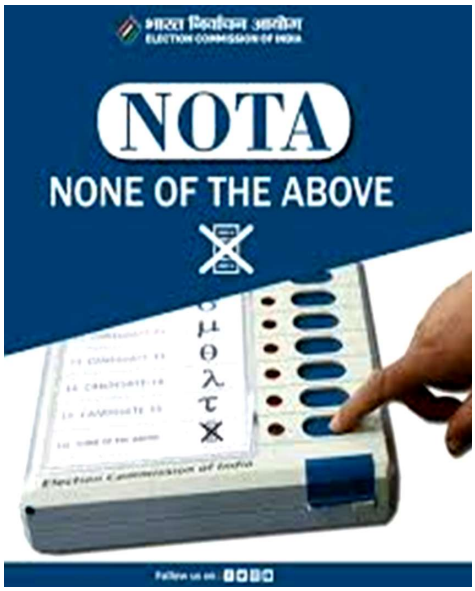
- **Participate in public discourse and democratic processes** effectively.

- **Access justice** effectively.
- **Hold public authorities accountable**.

Constitutional Significance of the Right to Know

1. **Under Article 19(1)(a) – Freedom of Speech and Expression:**
    - This article ensures the **right to express opinions** through speech, writing, and other media.
    - As per the Supreme Court, this includes the **Right to Know** about:
        * Government activities
        * Public decision-making
        * Court proceedings
    - The Court reiterated that **freedom of expression covers the right to receive information**, which is vital for a functioning democracy.
2. **Under Article 21 – Right to Life and Personal Liberty:**
    - The **Right to Know is also implicit in Article 21**, as it enables citizens to:
        * Access justice
        * Participate in governance
        * Live with dignity through informed decision-making
    - The Supreme Court, in the landmark **Menaka Gandhi Case (1978)**, significantly expanded the scope of Article 21 to include a broad range of rights, now including access to truthful public information. Other rights included under Article 21 are:
        * Right to live with dignity
        * Right to livelihood
        * Right to privacy
        * Right to shelter
        * Right to a clean environment
        * Right to information (which subsumes the Right to Know)

NOTA (None of the Above)



Context: The Vidhi Centre for Legal Policy recently filed a Public Interest Litigation (PIL) seeking mandatory inclusion of NOTA in all elections, including constituencies with only one candidate.

About NOTA

- **Definition:** NOTA (None of the Above) is a **voting option that allows voters to officially reject all contesting candidates** in an election while still maintaining the **secrecy of their choice**.
- **Origin:** Introduced as a result of the **2013 Supreme Court judgment in the PUCL vs Union of India case**.
- **Purpose:** Established as a **symbol of voter discontent**, providing an outlet for voters who do not wish to vote for any of the candidates.
- **First Implementation:**
    - First implemented in the **2013 Assembly elections** in Chhattisgarh, Mizoram, Rajasthan, Delhi, and Madhya Pradesh.
    - Later, it was introduced in the **2014 General Elections (Lok Sabha elections)**.

Current Legal Status and Function of NOTA

- **Counting of Votes:** Votes cast under NOTA are **counted**.

- **Validity:** However, they are **treated as invalid votes**. This means they do not count towards the total number of valid votes polled for any candidate.
- **Election Outcome: Even if NOTA receives the highest number of votes, the candidate with the second-highest valid votes is declared elected.**
- **Impact:** Therefore, NOTA **does not impact the election outcome** in terms of who wins.
- **Significance:** It primarily serves as a **tool for democratic expression** and a way for voters to express their dissatisfaction with the available candidates without abstaining from voting entirely.

Election Commission's Position on NOTA

- **Opposition to Mandatory NOTA:** The Election Commission (EC) has **opposed making NOTA mandatory in all elections**, particularly in scenarios with only one candidate.
- **Reasoning (Infrequent Uncontested Elections):** The EC cited that **uncontested elections are infrequent**:
    - Only **6 such cases since 1971** in Lok Sabha elections where candidates won unopposed due to no other candidates.
    - Only **9 cases since 1952** where candidates were elected unopposed (this likely refers to situations where candidates withdrew, leaving only one).
- **Legislative Requirement:** The EC argued that making NOTA compulsory would **require legislative amendments** to the:
    - **Representation of the People Act, 1951** (the main law governing elections in India).
    - **Conduct of Election Rules, 1961** (rules specifying the procedure for elections).

Union Public Service Commission (UPSC)

Context: Recently, Dr. Ajay Kumar, former Defence Secretary, has been appointed as the new Chairman of the Union Public Service Commission (UPSC).

About Union Public Service Commission (UPSC)

- **Nature:** The UPSC is a **constitutional body**.
- **Constitutional Basis:** Established under **Articles 315 to 323 of the Indian Constitution**, located in **Part XIV** dealing with "Services Under the Union and the States."
- **Establishment History:**
    - Initially formed as the Public Service Commission on **October 1, 1926**, under the Government of India Act, 1919 (Lee Commission's recommendation).
    - Acquired **constitutional status** on **January 26, 1950**, with the commencement of the Indian Constitution.
- **Article 315:** Specifically provides for the establishment of a Public Service Commission for the Union and for each State.

Composition and Appointment

- **Composition:** The UPSC comprises a **Chairman and other members**.
- **Number of Members:** The **number of members is determined by the President of India**, though the Constitution does not specify a fixed number.
- **Appointment Authority:** The **Chairman and members are appointed by the President**.

- **Qualification:** At least **half of the members must have held office for at least 10 years** under the Government of India or a State Government.
- **Tenure:** The Chairman and members hold office for a term of **6 years or until they attain the age of 65 years**, whichever is earlier.

Resignation and Removal Provisions

- **Resignation:** A UPSC member or Chairman may **resign by writing to the President of India**.
- **Removal:** They may be **removed by the President on specific grounds mentioned in the Constitution**, which include:
    - Being adjudged an insolvent.
    - Engaging in paid employment outside the duties of his office.
    - Being, in the opinion of the President, unfit to continue in office by reason of infirmity of mind or body.
    - **Misbehavior:** In case of **'misbehavior'**, the President **must refer the matter to the Supreme Court for inquiry**.

      If the Supreme Court, after inquiry, **upholds the charges** and recommends removal, the **President can remove the individual based on its advice**. The Supreme Court's advice in such cases is binding on the President.

Post-Tenure Employment Restrictions

- **UPSC Chairman:** The UPSC Chairman is **not eligible for any further employment** in the Government of India or any State Government (i.e., any office under the central or state government).
- **UPSC Members (excluding Chairman):**
    - May be appointed as **Chairman of the UPSC**.
    - May be appointed as **Chairman of a State Public Service Commission**.
    - However, they are **not eligible for any other office of profit** under the Government of India or any State Government.
- **Reappointment:** The Chairman or any member **cannot be reappointed for a second term** in their respective positions.

Duties and Powers of UPSC

- **Central Recruitment Agency:** The UPSC is India's **central recruitment agency**, primarily responsible for conducting examinations for appointments to **All-India Services, Central Services, and Public Services of the Union**. This includes:
    - **Civil Services Examination (CSE)** (for IAS, IPS, IFS, etc.).
    - **Engineering Services Examination (ESE)**.
    - **Combined Medical Services (CMS)**.
    - National Defence Academy (NDA) and Naval Academy (NA) Examination.
    - Combined Defence Services (CDS) Examination, and others.
- **Advisory Role:** It **advises the President and Governors** (when requested by states for joint recruitment) on matters related to:
    - **Appointments** to civil services and posts.
    - **Transfers and promotions**.
    - **Disciplinary actions** against civil servants.
    - **Framing recruitment rules and procedures** for various services.
- **Consultative Body:** The government is obligated to consult UPSC on various personnel matters, though its advice is generally advisory.

Lok Adalat

Context: The Rajasthan High Court recently took suo motu cognizance of the non-functioning of 16 permanent Lok Adalats across the state, following a news report highlighting this grave issue.

About Lok Adalats

- **Nature:** Lok Adalats (literally, "People's Courts") are **statutory alternative dispute resolution (ADR) forums**.
- **Legal Basis:** Established under the **Legal Services Authorities Act, 1987**.
- **Purpose:** They provide an **accessible, informal, and expeditious mechanism** to settle disputes through **mutual compromise and conciliation**.
- **Scope of Disputes:** Can settle disputes either **pending in courts** or at the **pre-litigation stage**.
- **Statutory Status:** Being constituted under the Legal Services Authorities Act, 1987, they have **legal backing**, and their awards are **enforceable as civil court decrees**.
- **Organizational Levels:** Lok Adalats can be organized at the **district, state, and national levels**.
- **Authority to Organize:** The State/District Legal Services Authority or the Supreme Court/High Court/Taluk Legal Services Committee may organize Lok Adalats at such intervals and places and for exercising such jurisdiction and in such areas as it thinks fit.
- **Nature of Cases Handled:**
    - **Included:** Civil, compoundable criminal, family, property, and pre-litigation disputes.
    - **Excluded:** Non-compoundable criminal cases are excluded.
- **Cost-Effectiveness:** There is **no court fee** for cases referred to Lok Adalats. If a case pending in court is settled through a Lok Adalat, the court fee already paid is refunded.
- **Voluntary and Non-Coercive:** Settlements are based on **mutual agreement** between the parties; no party is compelled to accept a decision.
- **Binding Awards:** Decisions (awards) of Lok Adalats are **final, binding, and equivalent to civil court decrees**.
    - There is **very limited scope for challenge** against such an award (mainly on grounds of fraud or coercion).
    - If parties are not satisfied, though there is no provision for an appeal, they are **free to initiate fresh litigation** by approaching the court of appropriate jurisdiction, in exercise of their right to litigate.

Permanent Lok Adalats (PLAs)

- **Establishment and Purpose:** Permanent Lok Adalats were specifically introduced under the **Legal Services Authorities Act, 1987 (amended in 2002)**, to resolve disputes related to **public utility services (PUS)**.
    - Examples of public utility services include transport, postal, telegraph, electricity supply, water supply, health, etc.
- **Composition:** These are **permanent bodies** comprising a **Chairman** (who is a judicial officer) and **two other members** with adequate experience in public utility services.
- **Jurisdiction:** They have jurisdiction to resolve disputes involving amounts **up to ₹ 1 crore**.
- **Limitations:** They **cannot adjudicate cases involving non-compoundable offences**.
- **Key Difference from Regular Lok Adalats:** PLAs have the power to decide a dispute on its merits *if* the parties fail to reach a settlement, which is a significant difference from traditional Lok Adalats that only facilitate conciliation.

e-Zero FIR Initiative

Context: The Indian Cybercrime Coordination Centre (I4C) has launched the e-Zero FIR initiative, which automatically converts financial cybercrime complaints over ₹ 10 lakh into First Information Reports (FIRs).

What is the e-Zero FIR Initiative?

- **Definition:** The e-Zero FIR initiative is a new mechanism where **financial cybercrime complaints involving fraud above ₹ 10 lakh are automatically converted into FIRs**.
- **Reporting Channels:** This conversion occurs if the complaint is reported via the **1930 helpline** or the **National Cybercrime Reporting Portal (NCRP)**.
- **Pilot Launch:** This system has been launched on a pilot basis in **Delhi** by the **Indian Cybercrime Coordination Centre (I4C)** under the **Ministry of Home Affairs (MHA)**.
- **Objective:** The initiative aims to **speed up investigations** into large-scale cyber frauds and ensure **swift action** against cybercriminals.
- **Rationale:** It addresses the longstanding grievance of victims who face delays in FIR registration and difficulty recovering stolen money due to jurisdictional issues or bureaucratic hurdles.
- **Legal Framework:** The system is aligned with the provisions of **Sections 173(1) and 1(ii) of the newly enacted Bharatiya Nagarik Suraksha Sanhita (BNSS)**.
    - The **e-Crime Police Station of Delhi** has been officially notified for e-FIR registration and case transfer under these legal provisions.

How Does the System Work?

1. **Complaint Filing:** Complaints of financial cybercrime losses **above ₹ 10 lakh**, once filed through the **1930 helpline or the NCRP**, will automatically trigger a Zero FIR.
2. **Zero FIR Generation:** This Zero FIR is generated at the **e-Crime Police Station, Delhi**.
3. **Routing:** The Zero FIR is **immediately routed to the relevant territorial cybercrime police station** based on the complainant's location (i.e., where the crime occurred or where the victim resides/was affected).
4. **Victim Action:** Victims are required to **visit the designated cybercrime police station within 3 days** to get the Zero FIR converted into a regular FIR.

Integration of Key Platforms

The seamless functioning of this process involves the integration of:

- **I4C's National Cybercrime Reporting Portal (NCRP):** The primary platform for citizens to report cybercrimes.
- **Delhi Police's e-FIR System:** The electronic system used by Delhi Police for FIR registration.
- **National Crime Records Bureau's (NCRB) Crime and Criminal Tracking Network & Systems (CCTNS):** A nationwide network that connects police stations and facilitates data sharing and crime tracking.
- **Benefits of Integration:** This interlinking of databases facilitates **real-time processing, auto-routing, and nationwide interoperability** for cybercrime cases, improving efficiency and coordination.

About Zero FIR

- **Concept:** A **Zero FIR can be registered at any police station**, **regardless of the place of the crime** (jurisdiction).
- **Purpose:** It ensures that **jurisdictional issues do not delay investigation** and provides **legal urgency** for prompt action, especially in cases where the crime spans multiple jurisdictions or the exact location of the crime is initially unknown.
- **Origin:** Introduced following the **Justice Verma Committee recommendations** post the **Nirbhaya case (2012)**.
- **Significance:** It reinforces **victim-centric policing** and facilitates quick redressal by ensuring that a complaint is recorded immediately, allowing investigation to begin without delay.

National Investigation Agency (NIA)

Context: The National Investigation Agency (NIA) has recently arrested two individuals, including one alleged militant, in connection with violence in Manipur.

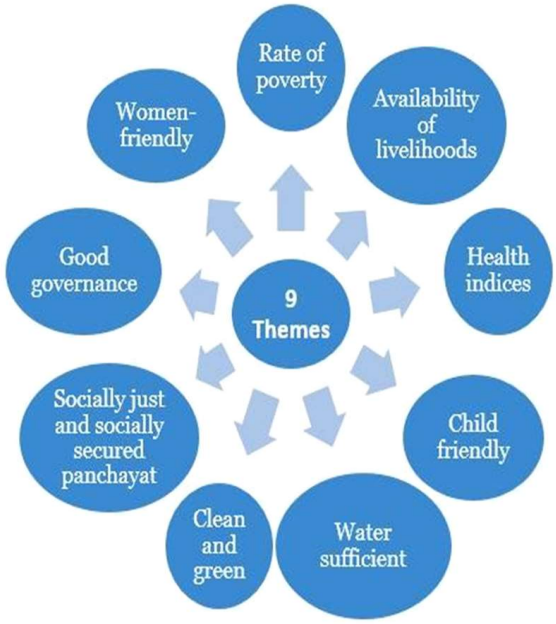
About the National Investigation Agency (NIA)

- **Establishment:** The NIA was established under the **National Investigation Agency Act, 2008**, in the wake of the **26 / 11 Mumbai terror attacks** (2008). The attacks highlighted the need for a dedicated federal agency to combat terrorism.
- **Nature:** It is the **primary counter-terrorism agency of India**.
- **Mandate:** Possesses powers to **investigate and prosecute offences affecting India's sovereignty, security, and integrity**.

Key Features of the NIA

- **Jurisdiction:** The NIA's jurisdiction is broad and extends:
    - **Across India.**
    - To **Indian citizens abroad**.
    - To offences committed on **Indian ships and aircraft** (wherever they may be).
    - To crimes committed **outside India that affect Indian citizens or interests**. This provides the agency with significant reach to address cross-border terrorism.
- **Powers and Mandate:**
    - Can **investigate Scheduled Offences** which are specifically listed in the NIA Act. These include offences under:
        * **Unlawful Activities (Prevention) Act (UAPA)**
        * **Arms Act**
        * **Explosives Act**
        * Atomic Energy Act
        * Suppression of Unlawful Acts Against Safety of Civil Aviation Act
        * SAARC Convention (Suppression of Terrorism) Act
        * Trafficking in Persons (Prevention, Protection and Rehabilitation) Act
        * Cyber terrorism offences
    - Can **initiate investigations on orders from the Central Government** when a Scheduled Offence is suspected or reported.
    - Has the authority to **prosecute cases in Special NIA Courts** established for expeditious trials of scheduled offences.
    - Is empowered to **coordinate with state police forces** during investigations, providing a national approach to counter-terrorism.
    - Can conduct **extraterritorial operations** with international legal cooperation, especially when terror networks extend beyond Indian borders.
- **Headquarters:** Located in **New Delhi**.
- **Zonal Offices:** Has zonal offices in various cities, including **Guwahati and Jammu**, to ensure effective presence and operations across different regions.
- **Leadership:** Headed by a **Director-General (DG)**, who is typically a senior **Indian Police Service (IPS) officer**. The DG is appointed by the Central Government.

Panchayat Advancement Index (PAI) - Measuring Local Progress



Context:

The **Ministry of Panchayati Raj** recently held a two-day national meeting (write-shop) in New Delhi. The meeting was about rolling out **Version 2.0 of the Panchayat Advancement Index (PAI)** for the financial year 2023-24. This shows the government's focus on measuring and improving development at the village level.

I. What is the Panchayat Advancement Index (PAI)?

- **What it is:** The PAI is a tool that looks at many different areas (**multi-domain and multi-sectoral index**) to check the overall development, performance, and progress of Panchayats (village local self-governments).
- **Main Goal:** Its main aim is to measure how well grassroots-level bodies (Panchayats) are doing in achieving the **Localized Sustainable Development Goals (LSDGs)**. By doing this, it helps India reach the larger **Sustainable Development Goals (SDG) 2030 Agenda**.
- **How it Works:** The index looks at various social and economic factors and measurements to understand the well-being and development status of local communities within a Panchayat's area.
- **Purpose:** One key purpose of the PAI is to **find out where Panchayats are lacking in development**. It does this by giving scores across different LSDG themes. This helps Panchayats plan their development activities based on actual facts and needs at the local level.

II. How PAI is Designed (Structure and Indicators):

- **Indicators:** The PAI is built using **435 unique local indicators**.
    1. **Mandatory:** 331 of these indicators are compulsory to report on.
    2. **Optional:** 104 are optional indicators.
    3. **Data Points:** These indicators cover a total of 566 unique data points.
- **Themes:** These indicators are spread across **9 themes of Localization of Sustainable Development Goals (LSDGs)**. These 9 themes cover various aspects of village development, such as:
    1. Poverty Free and Enhanced Livelihoods Panchayat
    2. Healthy Panchayat
    3. Child-Friendly Panchayat
    4. Water Sufficient Panchayat
    5. Clean and Green Panchayat
    6. Self-Sufficient Infrastructure Panchayat
    7. Socially Just and Socially Secure Panchayat
    8. Panchayat with Good Governance
    9. Women-Friendly Panchayat
- **Alignment:** The PAI is also aligned with the **National Indicator Framework (NIF)** of the Ministry of Statistics and Programme Implementation (MoSPI). This ensures that data collected at the local level aligns with national data collection standards.
- **Commitment to SDGs:** The PAI shows India's strong commitment to achieving the global **SDG 2030 Agenda** by encouraging participation and planning from the bottom-up (from villages upwards).

III. Performance Categories and Versions:

- **Performance Grouping:** Based on their scores in the PAI and different thematic areas, Gram Panchayats are grouped into one of five performance categories:
    - **Achiever:** 90 points and above
    - **Front Runner:** 75 to below 90 points
    - **Performer:** 60 to below 75 points
    - **Aspirant:** 40 to below 60 points
    - **Beginners:** Below 40 points
- **PAI Version 1.0 vs. 2.0:**
    - **Version 1.0 (Baseline):** This first version acted as a starting point and collected data from 2.16 lakh (216,000) Gram Panchayats across 29 States/Union Territories.
    - **Version 2.0 (Major Improvement):** Version 2.0 is a big step forward. It has better functions, is more efficient, and is easier to use.
    - **Refinement:** The shift from 1.0 to 2.0 means the framework has been made sharper and more practical. It uses a more focused set of indicators and data points to make it easier to use and more reliable, while still covering all the important themes.

IV. Significance for Local Governance and Development:

- **Empowering Panchayats:** PAI helps Panchayats understand their strengths and weaknesses, allowing them to plan their development efforts better.
- **Data-Driven Planning:** It encourages planning based on real data and evidence, making development more effective.
- **Achieving SDGs:** By localizing the SDGs, PAI helps ensure that global development goals are met even at the village level.
- **Transparency and Accountability:** It introduces a system for regular assessment, which can improve how transparent and accountable Panchayats are for their work.
- **Competitive Spirit:** The performance categories might encourage healthy competition among Panchayats to improve their scores.

Warrant of Arrest - Understanding Lawful Custody

Context:

The Supreme Court recently clarified an important point about arrests. It stated that when someone is arrested using a **warrant**, there's no need to separately tell the person why they are being arrested, because **the warrant itself clearly states the reasons**.

I. What is a Warrant of Arrest?

- **Definition:** A warrant of arrest is a **written order** given by a **judge or magistrate**. It is supported by a sworn statement (affidavit). This order **allows a police officer to arrest and take into custody** a person who is accused of doing something illegal (a specific offense).
- **Police Officer's Duty:** When a police officer uses a warrant to make an arrest, they must:
    - **Tell the person** being arrested the main points of the warrant (what it's about).
    - **Show the person the warrant** if they ask to see it.
    - **Quickly bring the arrested person before the court** without unnecessary delays.

- **What Makes a Warrant Valid (Proper):** For a warrant to be legal and valid, it must:
    - Be **in writing**.
    - Be **signed by the presiding officer of the Court** (the judge or magistrate).
    - Have the **official seal of the Court**.
    - Clearly state the **name and address of the accused person**.
    - Clearly mention the **offense** they are accused of.
    - **If any of these things are missing**, the warrant is not proper, and any arrest made using such a warrant is **illegal**.
- **Two Kinds of Warrants:** Warrants can be of two types:
    - **Bailable Warrant:** This is a court order that includes a condition. It says that if the arrested person provides a bail bond (a promise to appear in court) with enough guarantors (sureties), they can be released from custody. The warrant will also state how many guarantors are needed, the amount of the bond, and the date they need to appear in court.
    - **Non-Bailable Warrant:** In this type of warrant, there is **no instruction for bail** written on the warrant. This means the person arrested under a non-bailable warrant must be brought before the court, and only the court can decide whether to grant them bail.

II. Arrest Without Warrant:

- **General Rule:** A police officer **can arrest a person without a warrant** if they have a strong reason (reasonable suspicion) to believe the person was involved in a **cognizable offense**.
- **Cognizable vs. Non-Cognizable Offenses:**
    - **Cognizable Offenses:** These are **serious crimes** where the police can arrest someone without a warrant and start an investigation without needing a court order. Examples include murder, rape, robbery, theft, and offenses against the state.
    - **Non-Cognizable Offenses:** These are less serious crimes. For these, a police officer **cannot make an arrest without a warrant** issued by a magistrate.
- **Other Situations for Arrest Without Warrant:** There are several other specific situations where a person can be arrested without a warrant:
    - **Probable Cause:** If an officer has strong reason (probable cause) to believe a crime has happened and the person being arrested committed it.
    - **Caught in the Act:** If an officer sees someone committing a crime right then.
    - **Fleeing a Crime Scene:** If a person is running away from a crime scene, and the officer believes they committed the crime.
    - **Escaping from Custody:** If a person has already been legally arrested and is trying to escape, or has already escaped.
    - **Violation of Probation or Parole:** If someone who is on probation (a period of supervision instead of jail) or parole (early release from prison under supervision) breaks the rules of their release.
    - **Violating Court Order or Summons:** If a person does not follow a court order or fails to appear after receiving a summons.
    - **Threat to Public Safety:** If there is an immediate danger to public safety, or if waiting for a warrant would lead to important evidence being destroyed or the suspect escaping.

III. Significance for Legal System and Rights:

- **Protection of Liberty:** The concept of a warrant is fundamental to protecting individual liberty. It ensures that arrests are made based on legal authority and specific accusations, not just arbitrary power.
- **Due Process:** It upholds the principle of due process, ensuring that proper legal procedures are followed during arrests.
- **Clarity from Supreme Court:** The recent Supreme Court ruling provides clarity, stating that the warrant itself fulfills the requirement of informing the arrested person about the grounds of arrest, streamlining the process while safeguarding rights.

EDITORIALS

Crux of The Hindu & Indian Express

Indian Polity & Governance

Demands for a Caste Census

What Just Happened ?

- **On** April 30, 2025, The **Cabinet Committee on Political Affairs (CCPA)**, chaired by **Prime Minister Narendra Modi**, approved the **enumeration of caste data** in the upcoming **Census of India**.
- **Official Statement**:
  - Union Minister **Ashwini Vaishnaw** said: "(The caste census) will strengthen the social and economic structure of our society while the nation continues to progress."

History of the Demand

- **Why the demand:** To identify and quantify **Other Backward Classes (OBCs)** and ensure fair **policy-making, reservations**, and **representation**
- **Major political backers**:
  - RJD (Rashtriya Janata Dal)
  - SP (Samajwadi Party)
  - DMK (Dravida Munnetra Kazhagam)
  - JDU (Janata Dal (United))
  - Several BJP MPs from OBC backgrounds

1. Introduction to Caste Census

What is the Census?

- The **Census of India** is a **decennial population-based survey** that marks the demographic and socio-economic status of India.
- The Census was first conducted in **1872** under British rule, and a complete Census was carried out in **1881**.
- It has been conducted every **10 years since 1951**, under the **Census Act of 1948**.
- The **2021 Census** was delayed due to the **COVID-19 pandemic**, with no official resumption dates yet.

2. What is Caste Census?

A **Caste Census** refers to the process of collecting **caste-based data** as part of the national population enumeration. This data provides insight into:

- Distribution of caste groups.
- Socio-economic status.
- Educational level.
- Employment patterns of different caste groups across India.

History:

- **Pre-Independence (1881-1931)**: Caste enumeration was conducted during the British period, and detailed data on caste was recorded.
- **Post-Independence (1951 onwards)**: The government stopped collecting caste-based data except for **Scheduled Castes (SCs)**, **Scheduled Tribes (STs)**, and religious groups.

- The last caste-related data was published in **1931**.

3. Context of Caste Census in India

Caste in Independent India:

- After India's independence, caste-based classifications were replaced with broader categories such as **SCs, STs, OBCs,** and **General category**.
- **SC** and **ST** data has been collected since 1951, but **OBCs** were excluded from the Census.
- Since **1961**, states were allowed to conduct their own surveys to identify **OBCs**.

Last Published Data:

- **1931 Census**: The last officially released caste data before India's independence.
- **1941 Census**: Caste data was collected but never published due to **World War II**.

4. Caste Surveys Conducted by States

Several states conducted their own surveys for caste data collection:

- **Bihar (2023)**: Conducted its caste survey and published the data under **Chief Minister Nitish Kumar**.
- **Telangana (2024)**: Conducted a **socio-economic, educational, employment, political, and caste survey** under the **Congress government**.
- **Karnataka (2025)**: The **Socio-Economic and Educational Survey**, commissioned in **2015** by **CM Siddaramaiah**, was released in **April 2025**.

These state surveys influenced the national debate on caste census, as they gave states greater control over the inclusion of caste data.

5. Political Developments: Caste Census Demand

Caste Census - Political Implications:

- **Opposition Support**:
    - **Congress** (led by **Rahul Gandhi**) and regional parties like **RJD**, **SP**, **DMK**, and **JDU** have strongly supported caste enumeration as a tool for **social justice**.
- **BJP's Position**:
    - Initially resistant, the **BJP** argued that caste-based politics could divide society.
    - However, the **2024 elections** saw a **shift in the BJP's position**, as caste dynamics began to play a more significant role in electoral politics.

Electoral Impact of the 2024 Lok Sabha Elections:

- The **Congress Party** gained from 52 seats (2019) to 99 seats (2024).
- The **BJP** lost its single-party majority, particularly in **OBC-dominated states** like **Uttar Pradesh**, intensifying the call for caste data collection.

6. Why Is Caste Census Important Now?

Reasons for Demand:

1. **Accurate Representation**: Caste census data will provide updated insights into caste-based socio-economic conditions, addressing issues like **inequality**, **poverty**, and **education**.
2. **Targeted Welfare**: Data will help in designing welfare programs targeted at **OBCs**, **SCs**, and **STs**.
3. **Quota and Sub-Quota Debate**: The data may lead to **sub-categorization** within OBCs, influencing **reservation policies**.

Political Implications:

- **Caste Data and Reservations**: The new data could expand the scope of **reservations**, challenging the **50% cap** imposed by the **Supreme Court** in the **Indra Sawhney case (1992)**.
- **BJP's Strategy**: The caste census may be used by the **BJP** to counter accusations from opposition parties regarding caste-based division and show commitment to **social justice**.

7. SECC – A Precursor to Caste Census

Socio-Economic and Caste Census (SECC) 2011:

- Initiated by the **UPA government**, costing approximately ₹ **4,900 crore**

- While caste data was collected, it was **not released** publicly. It was handed over to the **Ministry of Social Justice** and **NITI Aayog** for analysis, but the **raw caste data** was never made public.

8. Legal and Constitutional Issues

Supreme Court's Cap on Reservations (1992):

- The **Indra Sawhney case** capped reservations at **50%**, a limit that could be challenged by caste census data, especially if significant disparities within **OBCs** are revealed.

Political Consequences:

- The caste census could result in demands for **higher quotas**, leading to **political and legal battles**.

9. Likely Impacts of Caste Census Approval

Positive Outcomes:

- **Improved policy-making** for social justice and targeting of welfare programs.
- Exposure of disparities within **OBC groups**, allowing for **sub-categorization**.
- Political inclusion of historically underrepresented backward castes.

Concerns and Challenges:

- **Political polarization** over caste data.
- **Data verification challenges**, especially due to self-reporting.
- Risk of **social fragmentation** or intensification of **caste-based politics**.
- Potential **demands for higher reservations** by numerically stronger OBC groups.

10. What Happens Next?

Operational Challenges:

- The implementation of caste data collection will involve significant challenges, particularly in ensuring **accurate reporting** and **avoiding misrepresentation**.

Political Weaponization:

- Once released, the data could be used by various political parties to demand **reservations** or **sub-categorization**, potentially leading to more **polarization**.

Supreme Court's Role:

- The **50% reservation cap** will likely become a contentious issue as caste data is used to argue for either the extension or **sub-categorization** of reservations.

Timeline of Events:

1. **2025**: Decision on caste census in the next **decadal Census**.
2. **2026**: Delimitation of constituencies based on updated caste data.
3. **Supreme Court Judgments**: Potential challenges to the **50% reservation cap**.

11. 2021 Position of the Government

- **April 1, 2021**: The **National Commission for Backward Classes (NCBC)** recommended caste enumeration as part of the **Census 2021**.
- **July 20, 2021**: The **government** told Parliament that it had decided not to enumerate caste-wise populations beyond **SCs and STs** in the Census.

12. Caste Census Timeline and Major Political Shifts

2024 Elections & Political Shift:

- **Pre-election (2024)**: Major opposition parties, including **BJP's Bihar wing**, supported caste census.
- **Election Results**:
    - **Congress** increased its seat share from 52 (2019) to 99 (2024).
    - The **BJP** lost its single-party majority and suffered significant losses in key **OBC-dominated states** like **Uttar Pradesh**.
    - This shift put increased pressure on the Union government to reconsider its stance on caste census.

13. Constitutional and Legal Significance

Delimitation:

- **Delimitation** (redrawing of constituencies) is frozen since **1971** and will be taken up after the first Census post-2026.
- **Caste Census** data will impact the reorganization of political constituency boundaries.

Women's Reservation Act (2023):

- Implementation of the **33% reservation for women** in **Parliament and Assemblies** depends on Census and delimitation data.

14. State-level OBC Surveys

Many states, to avoid the legal complexities of caste enumeration at the national level, began conducting **independent caste surveys**, described as "**surveys**" rather than **censuses**.

- The aim is to implement "**quota within quota**" for extremely backward sub-castes.

15. Census 2021: Postponement and Future Plans

Postponement:

- The **2021 Census** was postponed due to the **COVID-19 pandemic**.
- Key components like **House Listing** and **Population Enumeration** were prepared but not carried out.
- **October 2024**: The tenure of **Registrar General of India (RGI)**, **Mritunjay Kumar Narayan**, was extended until **August 2026**.

Next Census:

- The **next Census** is now imminent, pending final schedule.

Conclusion

The **Caste Census** decision, passed in **April 2025**, marks a pivotal moment in India's socio-political landscape. It will have significant implications for **reservation policies**, **political inclusion**, and **social justice programs**. However, it also brings challenges related to **data accuracy**, **political weaponization**, and the future of **reservation caps**.

NCLAT dismissal of the insolvency petition against PepsiCo India:

1. Introduction

- The **National Company Law Appellate Tribunal (NCLAT)** dismissed the insolvency petition filed against **PepsiCo India Holdings** by **SNJ Synthetics**.
- The decision was made because the **Insolvency and Bankruptcy Code (IBC)** cannot be used as a mechanism for **debt recovery**, particularly in cases where the debt is disputed.

2. Case Background

- **Petitioner**: **SNJ Synthetics**, a company that manufactures **PET preforms**.
- **Respondent**: **PepsiCo India Holdings**.
- **Dispute**:
  - SNJ Synthetics had supplied products to PepsiCo under a **supply agreement** and claimed dues amounting to **₹ 1.96 crore** (comprising a **principal** of ₹ 91.63 lakh and **interest** of ₹ 1.05 crore).
  - PepsiCo had already settled the **principal debt** (₹ 91.63 lakh), but SNJ Synthetics continued to claim the **interest** amount of ₹ 1.05 crore.

3. What Happened in Court?

- **NCLT's Initial Ruling (January 2025)**
  - The **National Company Law Tribunal (NCLT)** rejected the petition filed by SNJ Synthetics.

- NCLT ruled that **CIRP (Corporate Insolvency Resolution Process)** could not be initiated because:
    - The **principal debt** of ₹ 91.63 lakh had already been settled.
    - The dispute was only regarding the **interest** (₹ 1.05 crore), which was **disputed**.
- The claim for interest did not meet the required **minimum threshold of ₹ 1 crore** for an insolvency petition to be admissible under **Section 9 of the IBC**.
    - Section 9 of the Insolvency and Bankruptcy Code (IBC) allows operational creditors to initiate the Corporate Insolvency Resolution Process (CIRP) against a corporate debtor.
    - This section specifically addresses the initiation of CIRP by creditors who are owed operational debts, such as for goods or services, rather than financial debts like loans.
- NCLT also noted that the **supply agreement** lacked signatures from both parties, further complicating the claim.

4. NCLAT's Ruling (May 2025)

- **NCLAT upheld NCLT's decision**, dismissing the insolvency petition. The key reasons included:
    1. **IBC is for Corporate Revival, Not Debt Recovery**:
        - The **IBC** is designed to help struggling companies **revive** and resolve **financial distress**, not for **debt recovery**.
        - Invoking IBC for an unresolved **disputed claim** (in this case, interest) was inappropriate.
    2. **Claim for Interest Disputed**:
        - The dispute was about the **interest** portion of the debt, which had not been **paid**.
        - Since the **principal debt was already settled**, the **IBC cannot be used** to recover just a disputed **interest** amount.
    3. **Minimum Debt Threshold**:
        - Under **IBC Section 9**, an insolvency petition can only be initiated if the debt claim is **₹ 1 crore or more** and is **undisputed**.
        - Since the **interest claim** was **below ₹ 1 crore**, the petition was not maintainable.

5. Legal and Financial Implications

- **IBC's Role**:
    - The **IBC** is meant to resolve **financial stress** and **revive** companies rather than resolve **disputed claims** for debts.
    - **Insolvency process (CIRP)** cannot be used to settle disputes over **interest** or other minor financial disagreements.
- **Debt Threshold for IBC**:
    - To initiate insolvency proceedings under **Section 9 of the IBC**, the debt must be at least ₹ 1 crore and **undisputed**.
- **Impact on SNJ Synthetics**:
    - The ruling means that SNJ Synthetics cannot use the IBC route for recovering the **interest** claim from PepsiCo India.

6. Key Details of the Dispute

- **Claim Details**:
    - SNJ Synthetics had claimed a **total of ₹ 1.96 crore**:
        - ₹ 91.63 lakh as **principal amount** (paid off).
        - ₹ 1.05 crore as **interest** (disputed).

- **Settlement of Principal**:
    - On **February 10, 2023**, PepsiCo settled the **principal debt** with a reconciled amount of **₹ 77.73 lakh** (instead of the claimed ₹ 91.63 lakh).
- **Interest Dispute**:
    - The interest amount was calculated based on a rate of **24% per annum**, but it was still disputed and **below the threshold for IBC eligibility**.
- **Contract Issues**:
    - The **supply agreement** dated **October 9, 2018** lacked signatures from both parties, weakening the claim.

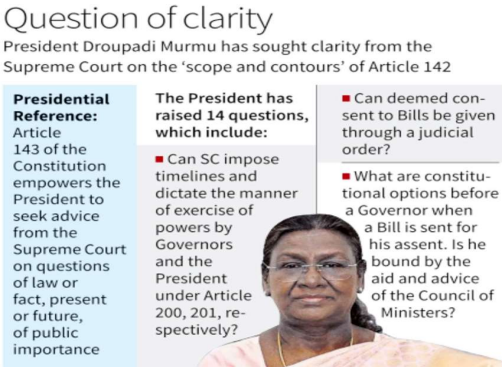
7. Broader Legal Principles

- **Corporate Insolvency Resolution Process (CIRP)**:
    - CIRP aims to help distressed companies **revive** by restructuring debts. It is not a **debt recovery** mechanism.
- **Insolvency and Bankruptcy Code (IBC)**:
    - **IBC** is meant for companies facing **genuine financial distress** and to resolve cases where the company is **unable to pay its debts**.
    - It is **not a substitute for regular debt recovery** procedures.

Conclusion

The **NCLAT** ruling reaffirms that **IBC should not be misused** for **debt recovery** where disputes exist. The focus of **IBC** is to aid companies in **financial distress**, not to handle disputed claims, especially for **interest** or smaller amounts.

Presidential References to the Supreme Court (Article 143)



- President **Droupadi Murmu** has made a **Presidential Reference to the Supreme Court** under **Article 143(1)** of the Constitution, seeking clarity on whether **judicial timelines** can be imposed on the **President and Governors** regarding the **assent or withholding of State Bills**.
- This move comes in the wake of a **Supreme Court verdict (April 8, 2025)** which questioned delays by Governors in assenting to Bills, especially those passed by the Tamil Nadu Legislative Assembly.

What is a Presidential Reference?

- Under **Article 143(1)** of the Indian Constitution, the **President can refer questions of law or fact of public importance** to the **Supreme Court for its advisory opinion**.
- The **opinion is not binding** but carries significant moral and constitutional weight.
- Presidential References are **rare** and used only in **constitutionally sensitive or politically complex matters**.

Current Issue: President Seeks Clarity on State Bills

- The reference addresses whether **the President or Governors can be given court-ordered deadlines** for decision-making on **Bills passed by State legislatures**.
- Tamil Nadu Chief Minister **M. K. Stalin** has **strongly opposed** the move, calling it an infringement on federal autonomy.
- Stalin also announced a plan to engage with other state leaders to consolidate opposition against the reference.

Background :

- In Tamil Nadu's case, originally 12 Bills, mostly dealing with appointments of Vice-Chancellors in State universities, were sent by the State Legislature for consent to the Governor under Article 200 of the Constitution between January 2020 and April 2023.
- The Governor had sat on them indefinitely.

- Ultimately, when the State approached the top court against the Governor's perceived inaction in November 2023, the latter had quickly referred two of the Bills to the President and proceeded to withhold consent on the remaining 10.
- The State Assembly had re-passed the 10 Bills in a Special Session within days, and had sent them to the Governor again for assent.
- The State argued in the apex court that it was following procedure under the first proviso of Article 200.
- The Governor had proceeded to refer all 10 Bills to the President for consideration.
- The President had subsequently assented to one Bill, rejected seven and not considered the remaining two proposed laws.
- Due to the reasons of long period of time taken by the Governor and "scant respect" shown to the past judgments of the Supreme Court, the Bench invoked its inherent powers under Article 142 of the Constitution to declare that 10 Bills have been deemed to have been assented to.
- This was found to be a violation of the **Constitutional principles**.
- The Court said that the Governor's action caused an **unreasonable delay** and was inconsistent with the established **parliamentary conventions**.

The Governor's Constitutional Powers:

- Under **Article 200** of the Constitution, the Governor has 3 options when dealing with a bill passed by the state legislature:
    - **Grant assent** to the bill.
    - **Withhold assent** (reject the bill).
    - **Reserve the bill for the President's consideration** (only in special circumstances).
- However, the Court clarified that there is **no concept of "absolute veto"** or "pocket veto" in the Constitution.
- This means the Governor cannot **indefinitely withhold assent** to a bill once it has been reconsidered by the state legislature.
- The **Governor can only reserve a bill for the President** the first time it is presented, not after the legislature has reconsidered it.

The Court's Use of Article 142:

- The Supreme Court used **Article 142** of the Constitution, which gives the Court the power to make **any order necessary to do complete justice** in a case.
- In this instance, the Court declared that the 10 bills should be considered as having received **assent** due to the **undue delay** caused by the Governor.

Court's Reasoning:

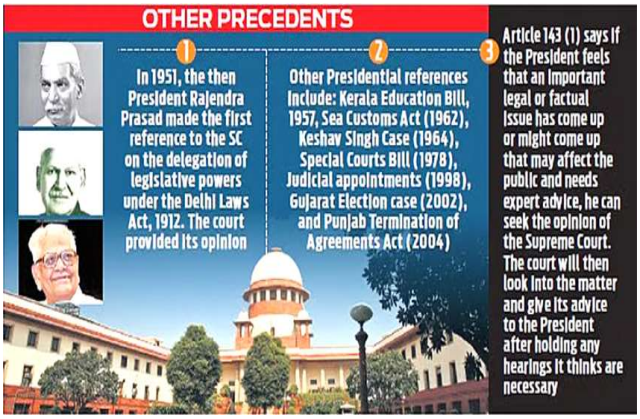
- The **Court stressed** that the Governor must **act with due deference to the conventions of parliamentary democracy**.
- This means the Governor must respect the **will of the people**, as expressed through the legislature and the elected government.
- The Court pointed out that the Governor's actions should align with the **Constitutional oath** they take, which requires them to **preserve, protect, and defend the Constitution** and serve the **well-being of the people**.
- The Governor's duty is not to obstruct the legislative process, but to act as a **facilitator**.
- The **Court also said that the Governor's delay** was not just unreasonable but also **disrespectful** to the legislature and the state's democratic process.

Timeline for Governor's Actions:

- To prevent delays and obstruction in the future, the Court set out clear **guidelines** for Governors to follow when dealing with bills:
    - **For reserving a bill for the President**: The Governor must do so within **3 months** of receiving the bill.
    - **For bills reconsidered by the legislature**: The Governor must grant assent to the bill within **1 month** after receiving it for the second time.

- This ensures that **bills do not remain pending indefinitely** and that the Governor's actions are in line with the democratic framework.

Historical Presidential References (Past 75 Years)



1. Berubari Union Case (1959)

- **Issue:** Whether the Indian government could cede part of **Berubari Union (West Bengal)** to Pakistan under a 1958 agreement.
- **SC Opinion:** Such cession **requires a constitutional amendment** under **Article 368**.
- **Impact:** The ceding was cancelled; Berubari remained part of India.
- **Relevance:** Cited by **J. Jayalalithaa** in 2008 in her petition on **Katchatheevu Island**, arguing that similar cession to **Sri Lanka** in 1974 and 1976 lacked constitutional backing.

2. Cauvery Water Dispute (1991)

- **Referred by:** President **R. Venkataraman**
- **Context:** Karnataka promulgated an ordinance defying the **Cauvery Tribunal's interim order**.
- **SC Verdict:** Ordinance declared **unconstitutional**; violated the **Inter-State River Water Disputes Act** due to its **extra-territorial impact**.
- **Impact:** Strengthened the authority of tribunals and protected downstream states like **Tamil Nadu** and **Puducherry**.

3. Ram Janmabhoomi Reference (1994)

- **Referred by:** President **Shankar Dayal Sharma**
- **Question:** Did a Hindu temple exist beneath the Babri Masjid structure?
- **SC Response: Declined** to answer, as the matter was **religious and political**, not just legal.

4. 2G Spectrum Case (2012)

- **Referred by:** President **Pratibha Patil**
- **Question:** Is **auctioning the only valid method** for allocating natural resources?
- **SC Opinion: Auctions are not mandatory**, and the 2G ruling was **context-specific** to the flawed First-Come-First-Served policy.

5. Uttarakhand President's Rule (2016)

- **Referred by:** President Pranab Mukherjee
- Concerned the validity of imposing President's Rule in the state.
- Showcased how Article 143 can be used in a political crisis involving federal principles and legislative majority.

Significance of Presidential References

Parameter	Significance
Legal Advisory	Provides clarity on constitutional matters without triggering litigation.
Judicial Independence	Respects court's advisory role while maintaining separation of powers.
Political Impact	Used to resolve disputes that could impact national unity, federalism, or institutional balance.
Not Binding	SC's opinion under Article 143 is advisory and not enforceable but is often respected and followed.

Implications of the 2025 Reference

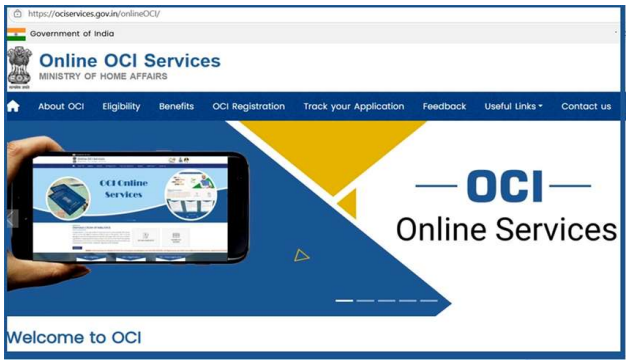
- Could **reshape Governor-State relations**, especially in opposition-ruled states.
- May **curtail excessive delays** in gubernatorial decision-making on Bills.
- Raises **constitutional debate** on **judicial activism vs executive prerogative**.
- Reinforces the **importance of federalism and cooperative governance** in India's democracy.

Conclusion

The current **Presidential Reference on timelines for Bill clearance** revisits the delicate balance between

the **legislature, executive, and judiciary**, and also between the **Centre and States**. While rare, such references historically serve as milestones in interpreting and reinforcing the Constitution. As the Supreme Court deliberates, its opinion—though non-binding—could have **far-reaching political and legal consequences**.

Overseas Citizen of India (OCI) & Revamped OCI Portal



Why in News

- The Union Home Minister and Minister of Cooperation, Shri Amit Shah, launched the revamped Overseas Citizen of India (OCI) Portal in New Delhi on **19th May 2025**.
- The new portal aims to improve user experience for over **5 million OCI cardholders worldwide**, incorporating advanced features, security upgrades, and streamlined application processes.
- This launch aligns with India's ongoing efforts under the leadership of Prime Minister Shri Narendra Modi to offer world-class immigration and digital governance services to the Indian diaspora.

About the OCI Scheme

- Introduced through an **amendment to the Citizenship Act, 1955** in **August 2005**.
- Provides a form of long-term visa and residency for eligible foreign nationals of **Indian origin**.

Eligibility for OCI Card

A foreign national may register as an OCI if they:

- Were a citizen of India on or after **26 January 1950**
- Were eligible to become a citizen of India on that date
- Belonged to a territory that became part of India after **15 August 1947**
- Are the child, grandchild, or great-grandchild of such a citizen
- Are a minor child of such persons or where one/ both parents are Indian citizens
- Are a spouse of Indian citizen/OCI holder (marriage sustained for at least 2 years)

Ineligibility: Citizens or descendants of **Pakistan, Bangladesh**, or any other country notified by the Government of India.

Benefits of OCI

- **Lifelong multiple-entry visa** to India
- **No need to register** with FRRO, regardless of duration of stay
- Parity with NRIs in:
    - Financial, educational, and economic fields
    - Domestic airfares, entry fees at national parks
    - Inter-country adoption procedures
- Can pursue professions like doctors, advocates, and CAs (subject to laws/tests)

Limitations of OCI

OCI is not dual citizenship. OCI cardholders:

- Cannot vote, contest elections, or hold constitutional/government post
- Need special permission for:
    - Journalism, missionary work, mountaineering
    - Visiting **Protected/Restricted Areas (PAP/RAP)**

Revamped OCI Portal – May 2025

Key Functional Features

- Auto-filled application forms
- User dashboards to track application status
- Integrated payment system
- Real-time eligibility guidance

- Image cropping tools and document categorization
- Edit before final submission

Renunciation & Cancellation

Renunciation:

- Voluntary by cardholder (full age/capacity)
- Automatically extends to minor children

Cancellation Grounds:

- Fraud/misrepresentation in application
- Anti-India activity, wartime collaboration with enemies
- Imprisonment e"2 years within 5 years of registration
- Threat to **national security, sovereignty, or foreign relations**

Significance:

- Enhances diaspora engagement
- Reflects e-governance under **Digital India**
- Encourages transparency, accessibility, and efficiency in public services

Waqf (Amendment) Act, 2025

1. Background

- On **May 20, 2025**, the **Supreme Court of India** heard a group of petitions challenging the **Waqf (Amendment) Act, 2025**, which became law on **April 8, 2025**.
- The **petitioners said** the new law is a form of **"slow takeover"** of Waqf properties and hurts the rights of **India's Muslim community**, the largest religious minority.

2. Constitutional Presumption vs. Violation

- The **Supreme Court** noted that a law made by Parliament is usually **assumed to be legal (constitutional)**.
- **Senior Advocate Kapil Sibal**, for the petitioners, said:
  - This assumption can be challenged if there's an **obvious violation of rights**.
  - The court can **temporarily stop** the law if it may cause **serious harm** to people's rights.

3. Main Concerns Raised by Petitioners

a. Violation of Minority Rights

- The law goes against **Article 25** (freedom of religion) and **Article 26** (right to manage religious affairs).
- It allows the **government to take over waqf land** without any compensation, which is normally given in other land acquisition cases.

b. Section 3C – Dispute Clause

- This section allows **any person** to **raise a dispute** over waqf land.
- The dispute is looked into by a **government official** with **no fixed timeline or clear rules**.
- Even a **small dispute** can stop the entire waqf property from being used—for example:
  - Schools
  - Hospitals
  - Burial places
  - Community centres
- During the dispute, the government can also:
  - **Demolish the property**
  - **Give it to third parties**
  - **Declare it as non-waqf**

c. Section 3D – Heritage Sites

- If a waqf property is declared a **protected monument** under:
  - **Ancient Monuments Preservation Act, 1904** or
  - **Archaeological Sites and Remains Act, 1958**, it **loses its waqf status**.
- Petitioners said these laws are meant for **preserving buildings**, not for **removing religious ownership**.
- Many religious places are **both historical and religious**—so both roles can exist together.

d. Non-Muslims in Waqf Boards

- The Act allows **non-Muslims to be part of waqf management bodies**.
- Petitioners said:
  - This **weakens Muslim control** over their own religious endowments.
  - Other religions like **Hindus and Sikhs don't allow outsiders** to manage temples or gurudwaras.

e. Section 3E – Scheduled Tribes (STs)

- This section says that **land owned by STs** (under Fifth or Sixth Schedule of the Constitution) **cannot be declared as waqf property**.
- Petitioners called this **unfair and biased** against Muslims.

f. Section 3(r) – 5-Year Proof of Being Muslim

- This section says a person can only create a waqf if they **prove they have followed Islam for at least 5 years**.
- Lawyers said this is:
  - **Unreasonable**
  - **Intrudes into personal faith**
  - **Violates Article 14** (Right to Equality)
- They asked: *What proves someone is Muslim—prayer? Dress? Abstaining from alcohol?*

4. Effect on Old and Unregistered Waqfs

- Around **50% of the 8 lakh waqf properties** in India are **unregistered**, passed down through **tradition and use**.
- Under the new law, these **unregistered waqfs cannot go to court**.
- These include **centuries-old religious and charity properties** with no formal documents.

5. Constitutional Articles Involved

Article	Meaning	Violation Claimed
Article 14	Right to Equality	Different rules for Muslims, STs
Article 25	Freedom of Religion	Stops religious practices
Article 26	Right to manage religious institutions	Government control of waqf
Article 32	Right to go to court	Unregistered waqfs can't file cases

6. Government's Data on Waqf Properties Disputed

- The government said there was a **116% increase** in waqf properties from 2013 to 2024 using data from the **WAMSI Portal**.
- Petitioners replied:
  - The rise is due to **better registration**, not actual new properties.
  - It should not be used to **justify stronger control** or label it as a misuse.

7. Impact on Secularism

- **Senior Advocate Rajeev Dhavan** said that **religious belief, practices, and property** are all **parts of religious freedom**.
- Taking away these rights can **weaken India's secular system** and harm minority faiths.
- The law may also affect the **Places of Worship Act, 1991**, which protects the status of religious places.

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Indian Society & Social Justice

International Labour Day 2025

Context: Global preparations for celebrating International Labour Day 2025 with government holidays and remembrance events.

About International Labour Day :

- **Date of Observance:** Annually on **May 1st**.
- **Purpose:** To honor the dedication and contributions of workers worldwide.
- **Significance:** A memorial to the struggles and victories of the labor movement.

History & Origins

- **Root Cause:** Demand for an **eight-hour workday.**
- **Originating Event: Chicago, USA, May 1, 1886** – Workers initiated a strike.
- **Key Turning Point:** The **Haymarket Affair (May 4, 1886)** in Haymarket Square, Chicago.
    - Violence erupted when a bomb was thrown at police officers.
    - Resulting gunfire led to several deaths (police officers and civilians).
- **Global Recognition:**
    - Stimulated trade unions and socialist federations across Europe.
    - **Formally approved in 1889 at the Paris meeting of the Second International** to declare May 1 an international day of workers' solidarity.

Global Observance

- **Countries Observing on May 1:** Over **80 countries**, including India, Cuba, and China.
- **Exceptions (US & Canada):**
    - While International Labour Day commemorates events in the United States, **both the US and Canada observe Labour Day on the first Monday of September**, not May 1.

International Labour Day in India

- **First Celebration:** Held in **Chennai (then Madras) in 1923.**
- **Organized by:** The **Labour Kisan Party of Hindustan.**

Typical Observances

- Usually involves parades, union gatherings, and celebrations that emphasize employee rights.

Cashless Treatment of Road Accident Victims Scheme, 2025

Context: The Government of India recently launched a groundbreaking cashless treatment scheme for road accident victims across the country, aiming to ensure swift and hassle-free medical care.

About Cashless Treatment of Road Accident Victims Scheme, 2025

- **Eligibility:** Any individual injured in a **road accident involving a motor vehicle on any public road in India** will be eligible for cashless medical treatment.
- **Treatment Location:** Available at **designated hospitals**.
- **Benefit Cap:** The maximum benefit under the scheme is **capped at Rs 1.5 lakh**.
- **Duration of Validity:** Valid for **up to seven days from the date of the accident**.

- **Non-Designated Hospitals:** Treatment at hospitals not designated under the scheme will be **limited to stabilization measures** as detailed in the scheme's guidelines.

Implementation and Coordination

- **Coordinating Agency:** The **National Health Authority (NHA)** will serve as the central coordinating agency.
    - It will collaborate with the police, hospitals, and respective State Health Agencies to operationalize the scheme effectively.
- **State Nodal Agency:** The **State Road Safety Council in each state and Union Territory** will act as the nodal agency responsible for the scheme's implementation within their jurisdiction.
    - This includes coordinating with the NHA for onboarding designated hospitals, treatment of victims, payment processes to hospitals, and other related matters through a dedicated portal.
- **Monitoring Committee:** A **17-member steering committee headed by the Road Transport Secretary** will monitor the implementation of the scheme.

Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) Scheme

Context: Bihar recently secured the first position in the country for successfully implementing the Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) scheme in the financial year 2024-25.

About Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) Scheme

- **Launch Date:** June 29, 2020.
- **Scheme Type:** A **Centrally Sponsored Scheme** by the **Ministry of Food Processing Industries (MoFPI)**.
- **Core Purpose:** Designed to **address the challenges faced by micro-enterprises** in the unorganized food processing sector and to tap the potential of groups and cooperatives to support their upgradation and formalization.
- **Overall Outlay:** Envisages an outlay of **₹ 10,000 crores** over a period of five years from 2020-21 to 2024-25.

Objectives of the PMFME Scheme

The scheme aims to build the capability of microenterprises to enable:

1. **Increased Access to Credit:** For existing micro food processing entrepreneurs, Farmer Producer Organizations (FPOs), Self-Help Groups (SHGs), and Co-operatives.
2. **Integration with Organized Supply Chain:** By strengthening branding and marketing efforts.
3. **Formalization Support:** Support for the transition of an estimated **200,000 existing enterprises into a formal framework**.
4. **Access to Common Services:** Increased access to facilities like common processing facilities, laboratories, storage, packaging, marketing, and incubation services.
5. **Institutional Strengthening:** Strengthening of institutions, research, and training in the food processing sector.

6. **Professional & Technical Support:** Increased access for enterprises to professional and technical support.
7. **Enhance Competitiveness:** Enhance the competitiveness of existing individual micro-enterprises in the unorganized segment.

Funding Pattern

The expenditure under the scheme is shared between the Central and State Governments with varying ratios:

- **General States: 60:40** ratio between Central and State Governments.
- **Northeastern and Himalayan States: 90:10** ratio.
- **Union Territories (UTs) with Legislature: 60:40** ratio.
- **Other Union Territories: 100%** by the Central Government.

Coverage and Benefits

- **Direct Assistance: 200,000 micro food processing units will be directly assisted** with credit-linked subsidies.
- **Infrastructure Support:** Adequate, supportive common infrastructure and institutional architecture will be supported to accelerate the growth of the sector.
- **Broad Components:** The program has four broad components:
    1. Support to individuals and groups of micro-enterprises.
    2. Branding and Marketing support.
    3. Support for strengthening of institutions.
    4. Setting up a robust project management framework.

Financial Support Details

1. **Support to Individual Micro Units:**
    - **Credit-linked subsidy: @ 35% of the eligible project cost** with a ceiling of ₹ **10 lakh**.
    - **Beneficiary contribution:** Minimum **10%**, with the balance from a bank loan.
    - Includes **on-site skill training & handholding** for DPR (Detailed Project Report) preparation and technical upgradation.
2. **Support to FPOs/SHGs/Cooperatives (Group Category):**
    - **Seed capital: ₹ 40,000 per SHG member** (provided to SHGs) for working capital and small tools.
    - **Credit-linked capital subsidy for common infrastructure: @ 35%**, subject to a maximum of ₹ **3 crore**, for FPOs, SHGs, Cooperatives, and any Government agency for setting up common infrastructure.
    - **Grant for Branding and Marketing:** Up to **50%** for groups of FPOs/SHGs/ Cooperatives or a Special Purpose Vehicle (SPV) of micro food processing enterprises.
    - Includes skill training & handholding support.

Eligible Borrowers

- Farmer Producer Organizations (FPO)
- Self-Help Groups (SHGs)
- Co-operatives
- Existing Micro Food Processing Entrepreneurs
- **New Units:** Whether for individuals or groups, would only be supported for **One District One Product (ODOP)**.

One District One Product (ODOP) Approach

- The scheme adopts the **One District One Product (ODOP) approach** to reap the benefit of scale in terms of procurement of inputs, availing common services, and marketing of products.
- ODOP provides a framework for **value chain development** and alignment of support infrastructure, focusing on a specific product from each district, often perishable agricultural produce or a widely produced food item.

Afrikaners – Africa's White Tribe

Context: Recently, the U.S. Deputy Secretary of State welcomed the first group of Afrikaner refugees to the United States.

Who Are the Afrikaners?

- **Identity:** Afrikaners are a **white ethnic group** native to South Africa.
- **Ethnogenesis:** Their identity was shaped through **ethnogenesis on African soil**, distinguishing them from European settlers who maintained stronger ties to their homelands.
- **Nickname:** Often referred to as **"Africa's White Tribe"** due to their deep-rooted historical presence since the 17th century.

Origin and Historical Presence

- **Beginning:** The Afrikaner community originated in **1652**, when **Jan van Riebeeck**, acting under the **Dutch East India Company (VOC)**, established a **resupply station at the Cape of Good Hope**.
- **Initial Settlers:** Initially settled by **Dutch Protestants**.
- **Ethnic Mix and Evolution:** Over time, the settlers included:
    - **French Huguenots** fleeing persecution after the **Edict of Fontainebleau (1685)**.
    - **Germans**.
    - **Enslaved people** from **India, Indonesia, Madagascar, and East Africa**, who contributed to the early ethnic and cultural mix.

Formation of Afrikaner Identity

- **Unique Identity Development:** A unique Afrikaner identity developed through complex interactions among **Europeans, enslaved people, and the indigenous Khoikhoi communities**.
- **Social Structures:** Marked by:
    - **Paternalistic household systems**.
    - **Strict social hierarchies** (which later underpinned racial segregation policies).
- **Language:** The development of **Afrikaans** as a distinct language, evolving from 17th-century Dutch with influences from indigenous languages and Malay.
- **Cultural Influences:** Afrikaners were significantly influenced by:
    - **Calvinist values** (a conservative form of Protestantism).
    - **Frontier living**, leading to a self-reliant and often isolated existence.
    - A **militant, self-reliant culture**, especially among the **Trekboers** (migrant farmers) who moved inland in the 18th century.
- **Conflicts:** The expansion of the Trekboers often involved **violent conflicts with indigenous communities**, leading to the displacement and subjugation of native populations.

Global Report on Food Crises (GRFC)

Context: The Global Report on Food Crises 2025, released in May 2025, reveals that acute hunger has reached a new record high globally.

About Global Report on Food Crises (GRFC)

- **Nature:** It is an **annual, consensus-based technical report**.
- **Coordination:** Coordinated by the **Food Security Information Network (FSIN)**.
- **Support for:** Produced in support of the **Global Network Against Food Crises (GNAFC)**.
- **Partnership:** Produced through a partnership of key entities, including:
    - **UN agencies** (e.g., FAO - Food and Agriculture Organization, WFP - World Food Programme, UNICEF - United Nations Children's Fund).
    - The **European Union**.
    - Other international organizations and NGOs.
- **Purpose:** The GRFC provides **in-depth analysis of acute food insecurity and malnutrition** at global, regional, and country levels.
    - It identifies **immediate and underlying drivers** of food crises.
    - It guides **humanitarian and development interventions** to address these crises.

Key Findings of the 2025 GRFC

- **Record High Acute Hunger:**
    - In **2024, 295.3 million people in 53 countries faced acute food insecurity**.
    - This is an increase from 281.6 million in 2023.
    - This marks the **sixth consecutive annual increase** and represents the **highest level since reporting began**.
- **Crisis Severity:**
    - Nearly a quarter of the population in the assessed countries suffered from acute hunger.
    - A significant number of people, **1.9 million, faced famine conditions (IPC/CH Phase 5)** – which is more than double the figure from the previous year, indicating a worsening of extreme food insecurity.
- **Humanitarian Funding Crisis:**
    - A concerning trend shows that **humanitarian allocations to food sectors could fall by up to 45% in 2025**.
    - This shortfall threatens life-saving nutrition services for at least **14 million children** and risks disrupting aid in major crisis zones.
- **Impact on Children and Women:**
    - Over **37 million children under five in 26 countries suffered from acute malnutrition in 2024**.
    - More than **10.2 million of these children experienced severe acute malnutrition**, highlighting the severe impact on vulnerable populations.

Jnanpith Award

Context: The President of India recently conferred the 58th Jnanpith Award on Sanskrit scholar Jagadguru Rambhadracharya Ji at a function held at Vigyan Bhavan in New Delhi. (Note: The 58th Jnanpith Award for 2023 was jointly awarded to Jagadguru Rambhadracharya for Sanskrit and Gulzar for Urdu).

About Jnanpith Award

- **Nature:** It is the **highest literary honour of India**.

- **Purpose:** Given to writers for their **outstanding contribution towards Indian literature** through creative writing.
- **Eligible Languages:** Awarded for works in **any of the Indian languages mentioned in Schedule VIII of the Indian Constitution, and English** (English was included from the 49th award, given in 2013).
- **Institution:** Instituted in **1961**.
- **Prize:** The award carries a **cash award (currently ₹ 11 lakh)**, a **citation**, and a **bronze replica of Vagdevi (Saraswati)**, the goddess of learning.
- **Sponsor:** It is sponsored by the cultural organization **Bharatiya Jnanpith**.
- **Bharatiya Jnanpith:**
    - One of the premier literary organizations of India.
    - Established in **1944**.
    - Nurtures literature and culture through various literary endeavors, including awards, publications, fellowships, and research.
- **First Recipient:** The first recipient of the award was **Malayalam poet G. Sankara Kurup**, who received the award in **1965** for his collection of poems *Odakkuzhal*.
- **First Woman Recipient:** Bengali author **Ashapurna Devi** was the first woman to win the prize in **1976**.
- **Criteria Evolution:** Until 1982, the award was given for a specific work; thereafter, it is given for a **writer's overall contribution to literature**.

Eligibility and Selection Rules

- **Nationality and Status:** Only **creative writers who are alive and are Indian citizens** can be proposed for the Award. It is **not awarded posthumously**.
- **Language Eligibility Cycle:** A language which receives the Award in a particular year **is not eligible for consideration for the next two years**. This rule ensures rotation and promotes diversity across languages.
- **One-Time Award:** A writer who receives the Award once **will not be considered again**.
- **Discretion of Selection Board:** The Award **may not be given in a particular year** if the **Jnanpith Award Selection Board** feels that there is no suitable name that comes up to the expected standard of the Award.
- **Selection Process:**
    - Nominations are received from literary experts, critics, universities, and literary associations.
    - **Language Advisory Committees** (three members each, reconstituted every three years) scrutinize nominations for their respective languages and forward recommendations.
    - A final **Selection Board** (7 to 11 eminent figures, also with a three-year tenure renewable for two more terms) comparatively evaluates these recommendations and makes the final decision. The board can consider names beyond submitted proposals.

SPICED Scheme - Enhancing Sustainability and Exports in the Spice Sector

Context: The Spices Board has announced the launch of the "Sustainability in Spice Sector through Progressive, Innovative and Collaborative Interventions for Export Development (SPICED)" scheme for the

financial year 2025-26. This initiative aims to boost the Indian spice industry by focusing on sustainability, innovation, and export promotion.

I. About the SPICED Scheme:

- **Full Name:** Sustainability in Spice Sector through Progressive, Innovative, and Collaborative Interventions for Export Development (SPICED).
- **Implementing Agency:** Spices Board, under the Ministry of Commerce and Industry.
- **Objective:** To enhance sustainability, foster innovation, and promote export development in the Indian spices sector.
- **Key Focus Areas:**
    - Enhancing productivity of small and large cardamom.
    - Improving the quality of post-harvest processes.
    - Encouraging the production and export of value-added, GI-tagged, and organic spices.
    - Enabling compliance with global food safety and phytosanitary standards.
    - Boosting the capacity of stakeholders across the value chain.

II. Key Features and Components:

The SPICED scheme offers financial assistance and support across various components:

1. **Sustainable Production Practices:**
    - Support for replanting and rejuvenation of cardamom plantations.
    - Development of water resources and micro-irrigation.
    - Promotion of organic farming practices.
    - Expansion of Good Agricultural Practices (GAP).
2. **Post-Harvest Infrastructure Development:**
    - Support for the installation of improved post-harvest infrastructure, such as modern dryers, slicers, dehullers, and grading machines, to ensure superior product quality.
3. **Support for Farmers and FPOs:**
    - Financial assistance to farmers and Farmer Producer Organizations (FPOs) to procure essential post-harvest machines such as spice polishers, turmeric boilers, mint distillation units, and threshing machines.
4. **Entrepreneurship and Product Development:**
    - Support for the creation of Spice Incubation Centres.
    - Promotion of entrepreneurship and product development initiatives aimed at enhancing market access and branding for startups and MSMEs.
5. **Capacity Building:**
    - Training and extension services to empower spice farmers, SHGs, and FPOs with the latest technical know-how, best practices, and market intelligence.
6. **Export Promotion:**
    - Assistance in participating in international trade fairs, buyer-seller meets, and other market linkage programs.
    - Eligibility: Exporters with a valid Certificate of Registration as Exporter of Spices (CRES) are eligible.
    - Preference: Given to first-time applicants and Small and Medium Enterprises (SMEs).
7. **Transparency:**
    - Scheme activities will be geo-tagged.
    - Fund availability, status of applications, and a list of beneficiaries will be published on the board's website for better transparency.

III. Significance and Impact:

- **Economic Growth:** The scheme aims to boost the Indian spices sector, a significant contributor to agricultural exports.

- **Farmer Empowerment:** By providing financial and technical support, the scheme empowers spice farmers, leading to increased income and improved livelihoods.
- **Sustainable Practices:** The focus on organic farming, GAP, and efficient water management promotes environmentally sustainable practices.
- **Value Addition:** Encouraging the production and export of value-added spices will fetch higher prices in the international market.
- **Global Competitiveness:** By enabling compliance with international standards and promoting exports, the scheme enhances the competitiveness of Indian spices in the global market.
- **MSME and Startup Support:** The scheme's focus on Spice Incubation Centres and entrepreneurship will encourage innovation and product diversification in the sector.

International Booker Prize 2025 – Banu Mushtaq's Historic Win

Context:

Indian writer, lawyer, and activist **Banu Mushtaq** has achieved a historic milestone by becoming the **first author writing in Kannada** to win the prestigious **International Booker Prize** for her short story collection, *Heart Lamp*. This recognition underscores the growing global appreciation for diverse linguistic literary traditions.

I. About the International Booker Prize:

- **Objective:** The International Booker Prize is an annual award that celebrates the **best works of long-form fiction or collections of short stories** that have been **translated into English** and subsequently **published in the UK and/or Ireland**.
- **Administration:** It is administered by **The Booker Prize Foundation**, an independent charity.
- **Unique Recognition of Translators:** A key feature of the prize is its explicit recognition of the **vital work of translators**. The **£50,000 prize money is divided equally between the author and the translator**. Additionally, shortlisted authors and translators each receive £2,500.
- **Eligibility:**
    - The work must be originally written in a language other than English.
    - It must be translated into English.
    - It must be published in the UK and/or Ireland.
    - Authors and translators of any nationality are eligible.
- **History & Evolution:**
    - **Founded:** Established in **2005**.
    - **Initial Format (2005-2014):** Initially, it was a **biennial award** that recognized an author's entire contribution to world literature, with no requirement for the book to be originally published in a language other than English. This meant authors writing in English could also be considered for their overall body of work.
    - **Shift in Rules (from 2015 onwards):** The rules underwent a significant change in 2015. Since then, it has been awarded **annually** specifically for a **single work of fiction** that was **originally written in another language and subsequently translated into English**. This change sharpened its focus on translated literature.

II. International Booker Prize 2025 Winner:

- **Winning Work:** *Heart Lamp* by **Banu Mushtaq**.
- **Translator:** Translated from **Kannada by Deepa Bhasthi**.

- **Historical Firsts:**
    - It is the **first collection of short stories** to be awarded the International Booker Prize. The prize has predominantly been awarded to novels.
    - It is the **first winning book originally written in Kannada**, marking a significant recognition for Kannada literature on a global stage.
- **Thematic Content of *Heart Lamp*:** The collection spans stories written between 1990 and 2023. It offers a poignant and insightful portrayal of the **struggles faced by Muslim women in southern India**, providing a unique perspective on their lives, challenges, and resilience.

III. Significance for India:

- **Global Recognition of Indian Literature:** Banu Mushtaq's win brings significant global attention to **Kannada literature** and regional Indian languages, highlighting their richness and depth.
- **Role of Translators:** The award underscores the critical role played by translators (like Deepa Bhasthi) in making diverse literary voices accessible to a wider international audience.
- **Cultural Diplomacy:** Such international accolades contribute to India's soft power and cultural diplomacy, showcasing its literary heritage on the world stage.
- **Representation of Social Issues:** *Heart Lamp*'s thematic focus on the struggles of Muslim women in southern India brings important social narratives to an international platform, fostering understanding and dialogue.
- **Inspiration for Indian Authors:** This win can inspire more Indian authors writing in regional languages to pursue translation and international publication.

Conclusion: Banu Mushtaq's win of the International Booker Prize for *Heart Lamp* is a landmark achievement, not just for her and Kannada literature, but for the entire Indian literary landscape. It champions the power of translated fiction to transcend linguistic barriers and bring compelling stories from diverse cultural contexts to a global readership.

Self Reliant India (SRI) Fund Scheme - Empowering MSMEs for Growth

Context:

The **Self Reliant India (SRI) Fund scheme**, a key initiative aimed at boosting Micro, Small, and Medium Enterprises (MSMEs) through equity infusion, has recently announced significant progress, having invested around **₹ 10,979 crore in 577 MSMEs as of March 2025** since its launch. This highlights the government's commitment to strengthening the backbone of the Indian economy.

I. About Self Reliant India (SRI) Fund Scheme:

- **Objective:** The primary goal of the SRI Fund is to **infuse ₹ 50,000 crore as equity funding** into MSMEs that demonstrate the **potential and viability to grow** and eventually graduate into larger enterprises. This initiative is a crucial part of the **"Atmanirbhar Bharat" (Self-Reliant India)** package.
- **Fund Structure (Corpus):** The total corpus of ₹ 50,000 crore is envisaged through a collaborative approach:
    - **Government of India Contribution:** ₹ 10,000 crore (20% of the total).
    - **Private Equity/Venture Capital Funds:** ₹ 40,000 crore (80% of the total), leveraging private sector capital and expertise.
- **Implementation Agency:** The SRI Fund is being implemented by **NSIC Venture Capital Fund Limited (NVCFL)**. NVCFL is a wholly-owned subsidiary of the National Small Industries Corporation (NSIC) and is registered with SEBI as a **Category II Alternative Investment Fund (AIF)**.

II. Unique "Mother-Fund and Daughter-Fund" Structure:

The SRI Fund operates through an innovative **"mother-fund and daughter-fund" structure** for equity or quasi-equity investments:

- **Mother Fund:** The **SRI Fund itself, managed by NVCFL**, acts as the **"mother fund."** It does **not invest directly** into MSMEs.
- **Daughter Funds:** The mother fund (SRI Fund) provides funding support to various **SEBI-registered Category I and Category II Alternative Investment Funds (AIFs)**, which are designated as **"Daughter Funds."** These daughter funds are empanelled with NVCFL.
- **Investment Mechanism:** The daughter funds are responsible for the **onward provision of growth capital to MSMEs** in the form of equity or quasi-equity (a mix of equity and debt).
- **Leverage Requirement:** The Daughter Funds are mandated to invest **at least 5 times the amount of capital contribution received from the SRI Fund** (net of fees and expenses) in MSMEs covered under the Micro, Small & Medium Enterprises Development Act, 2006. This ensures significant private sector participation and multiplies the impact of government funds.

III. Key Objectives of Funding Support:

The growth capital provided through this scheme is aimed at achieving several strategic objectives:

1. **Enhancing Equity Financing:** To increase the availability of equity and equity-like financing for MSMEs, moving beyond traditional debt funding.
2. **Accelerating Growth & Employment:** Supporting faster growth of MSME businesses, which in turn ignites the economy and creates substantial employment opportunities.
3. **Creating National/International Champions:** Identifying and supporting enterprises with the potential to grow beyond the MSME bracket and become significant national or international players.
4. **Promoting Self-Reliance (Atmanirbhar Bharat):** Specifically backing MSMEs that contribute to India's self-reliance by producing critical technologies, goods, and services, reducing import dependence.
5. **Facilitating Listing:** Encouraging and assisting MSMEs in listing on stock exchanges, providing them access to public capital markets.

IV. Impact and Significance:

- **Financial Access:** Addresses the long-standing credit gap and lack of equity funding faced by many MSMEs, especially those with high growth potential but insufficient collateral for traditional loans.
- **Job Creation:** By fostering MSME growth, the scheme directly contributes to employment generation across various sectors and regions.
- **Economic Revival:** Stimulates economic activity by enabling MSMEs to expand, innovate, and contribute more significantly to GDP.
- **Innovation & Competitiveness:** Encourages innovation and technological upgradation within the MSME sector, enhancing their competitiveness both domestically and globally.
- **Regional Development:** Aims to ensure that funding reaches MSMEs across the nation, including those in remote regions, promoting balanced regional development.
- **Transparency:** Geo-tagging of activities and public disclosure of fund availability and beneficiary lists ensure greater transparency and accountability.

PM E-Drive Scheme - Accelerating India's Electric Mobility Transition

Context:

The **PM E-DRIVE (Electric Drive Revolution in Innovative Vehicle Enhancement) scheme** is rapidly gaining momentum, with a recent allocation of **₹ 2,000 crore to set up 72,000 public EV charging stations across India**. This substantial investment underscores the government's commitment to building a robust electric vehicle (EV) ecosystem and addressing key barriers to EV adoption.

I. About PM E-DRIVE Scheme:

- **Nature:** It is a **flagship initiative** of the Government of India, managed by the **Ministry of Heavy Industries**.
- **Launch & Duration:** The scheme was officially launched on **September 29, 2024**, and will be implemented for a period of two years, from **October 1, 2024, to March 31, 2026**.
- **Total Financial Outlay:** The scheme has a significant total financial outlay of **₹ 10,900 crore**.
- **Overarching Goal:** To **accelerate electric mobility** in India through a multi-pronged approach involving demand incentives, charging infrastructure support, and ecosystem development.
- **Key Aims:**
    - **Reduce transport-related carbon emissions:** Directly contributes to India's climate goals and commitment to a cleaner environment.
    - **Improve air quality:** Especially in urban centers, by decreasing pollution from fossil fuel vehicles.
    - **Enhance energy security:** By reducing India's dependency on imported fossil fuels.
    - **Spur investment** in the EV sector and associated supply chains.
    - **Create employment opportunities** along the entire EV value chain.
- **Successor Scheme:** PM E-DRIVE subsumes and builds upon earlier programs like the **Faster Adoption and Manufacturing of Hybrid and Electric Vehicles in India (FAME)** schemes (FAME-I & FAME-II) and the temporary Electric Mobility Promotion Scheme (EMPS-2024).

II. Key Objectives and Scope:

The scheme's objectives are comprehensive, addressing various aspects of EV adoption and infrastructure development:

1. **Promoting EV Adoption (Demand Incentives):**
    - **Support for Purchase:** Provides direct demand incentives to buyers for the purchase of various categories of electric vehicles, including:
        * e-2 Wheelers (e-2Ws)
        * e-3 Wheelers (e-3Ws), including registered e-carts, e-rickshaws, and L5 category vehicles.
        * e-buses (with a significant allocation of ₹ 4,391 crore for 14,028 e-buses for public transport).
        * e-ambulances (with an allocation of ₹ 500 crore).
        * e-trucks (with an allocation of ₹ 500 crore, a new focus area).
    - **Mechanism:** Incentives are provided through **Aadhaar-authenticated e-vouchers**, sent to the buyer's mobile number after EV purchase, ensuring transparency and direct benefit transfer. The incentive amount is an upfront reduction in the purchase price.
    - **Eligibility:** Only EVs with advanced batteries and meeting specified performance criteria, registered as "Motor Vehicle" as per CMVR, are eligible.

2. **Deploying Robust EV Charging Grid:**
    - **Addressing "Range Anxiety":** A major objective is to reduce "range anxiety" (the fear among EV users of running out of charge before reaching a charging station or destination due to limited charging infrastructure).
    - **Seamless Mobility:** Aims to ensure seamless EV mobility across cities and highways by establishing a widespread network of public charging stations.
    - **Target:** A significant allocation of **₹ 2,000 crore** is for establishing **72,000 public EV charging stations** (including 22,100 fast chargers for e-4Ws, 48,400 for e-2Ws/3Ws, and 1,800 for e-buses) by the end of FY 2025-26. These will be strategically located along national highway corridors, metro cities, airports, railway stations, toll plazas, and fuel outlets.
3. **Strengthening EV Manufacturing Ecosystem:** While incentives are for consumers, the scheme indirectly supports local manufacturing of EVs, batteries, and charging equipment under the "Make in India" initiative.
4. **Upgrading Testing Agencies:** Allocates funds (₹ 780 crore) for the upgradation of vehicle testing agencies under MHI with advanced technologies to support green mobility.

III. BHEL as Nodal Agency:

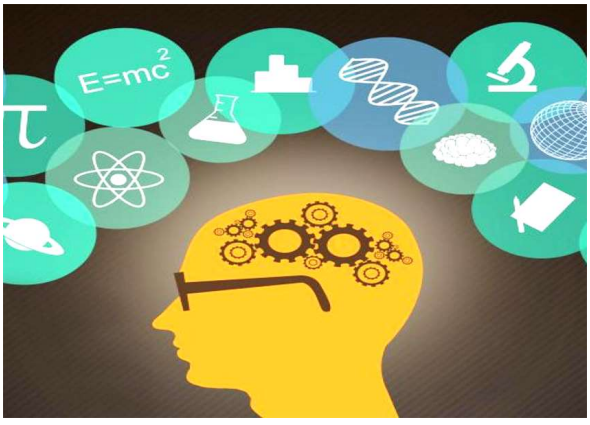
Bharat Heavy Electricals Limited (BHEL), a Public Sector Undertaking (PSU) under the Ministry of Heavy Industries, is being considered as the nodal agency for crucial aspects of the scheme:

- **Demand Aggregation:** For EV charging infrastructure across the country.
- **Unified EV Super App:** Development of a digital "Super App" for EV users across India. This app will be a one-stop solution offering:
    - Real-time charger availability status.
    - Slot booking functionality.
    - Integrated payment options.
    - Progress dashboards for tracking nationwide deployment, ensuring digital ease-of-use for all EV stakeholders.
- **Coordination:** BHEL will also coordinate with state governments and ministries to compile and evaluate proposals for charger installations.

IV. Significance and Impact:

- **Boost to EV Sales:** Direct incentives are expected to significantly lower the upfront cost of EVs, accelerating their adoption.
- **Infrastructure Backbone:** The massive rollout of charging stations will alleviate range anxiety, a major barrier to EV adoption, and create a robust EV-ready ecosystem.
- **Environmental Benefits:** Direct contribution to reducing greenhouse gas emissions and improving urban air quality.
- **Economic Growth:** Creation of green jobs in manufacturing, technology, and maintenance sectors, and overall economic stimulation.
- **Energy Security:** Reduces reliance on imported fossil fuels, contributing to India's energy independence.
- **"Make in India" Push:** Encourages domestic manufacturing of EVs and their components, strengthening the indigenous supply chain.

INSPIRE Scheme - Helping Young Scientists in India



Context:

Recently, there have been some concerns from researchers across India about not getting their **INSPIRE fellowships** (money for their studies) on time. These payments, given by the Department of Science and Technology (DST), have been delayed for many months. This shows how important it is for research money to be given out smoothly.

I. What is the INSPIRE Scheme?

- **Full Name:** INSPIRE stands for **Innovation in Science Pursuit for Inspired Research**. (It's about new ideas in science to inspire research).
- **Main Program:** It's a big, important program from the **Department of Science and Technology (DST)**, which is part of the Ministry of Science and Technology.
- **Started:** It began in **2008**.
- **Main Goal:** To **create more skilled people** in science and technology, and to make India's research stronger.
- **How it Works:** Unlike many other scholarships that need you to pass an exam, INSPIRE picks talented students based on their **good marks** in school and college.

II. What is the INSPIRE Fellowship?

- **Part of INSPIRE:** The INSPIRE Fellowship is a specific part of the bigger INSPIRE scheme. It was started in 2008 to encourage more people to choose careers in **basic sciences research**.
- **Why it's Needed:** The scheme wants to **find and support bright students** and make them interested in science research. It aims to stop them from choosing other jobs that pay more, like in engineering, IT, or finance.
- **How Many Selected:** About **1,000 scholars** are chosen each year. They are picked based on their **academic results** and how good their **research idea (proposal)** is.
- **Who Can Apply (Eligibility):**
    - You must be the **top student (first-rank holder)** in your Master's degree (postgraduate) in science, applied sciences, or engineering.
    - **OR** if you were already an **INSPIRE scholar** before, you need to have at least **70% marks** in your Bachelor's (UG) and Master's (PG) degrees. Also, you should have been in the **top 1%** in your Class XII board exams or done very well in big national exams like IIT-JEE.
- **Selection Process:** A special **committee (screening committee)** reviews each research idea before giving out the fellowship.

III. Key Features and Parts of the INSPIRE Scheme:

- **Managed By:** The **DST** is in charge of running the scheme.
- **Money Spent:** A lot of money has been put into the scheme: ₹ 1,979 crore in the 11th Five-Year Plan and ₹ 2,200 crore in the 12th Five-Year Plan.
- **Focus Area:** The main goal is to create more skilled people in **basic and natural sciences**.
- **Three Main Parts:**
    1. **SEATS (Scheme for Early Attraction of Talent):** This part is for **school students** to make them interested in science early on.
    2. **SHE (Scholarship for Higher Education):** This gives scholarships to **college students (UG and PG)** studying science.
    3. **AORC (Assured Opportunity for Research Careers):** This part helps students pursue careers in research. It includes the **INSPIRE Fellowships** and also awards for young university teachers (Faculty Awards).

IV. Problems and Worries:

- **Fellowship Delays:** The current news highlights a big problem: money for fellowships is often not given out on time. Delays of many months can seriously affect a researcher's work and their personal finances.
- **Effect on Research:** When money is delayed, research work slows down. This might even make smart people decide not to pursue research.

- **Need for Better System:** The delays show that the system for giving out these funds needs to be improved and made faster so that research can happen smoothly.

Dag Hammarskjöld Medal - Honoring UN Peacekeepers

Context:

Recently, two Indian peacekeepers who died while serving under the UN flag last year will be posthumously awarded the **Dag Hammarskjöld Medal** by the United Nations. This happened as the UN commemorated the International Day of UN Peacekeepers on May 29. This highlights the sacrifice of peacekeepers and India's significant contribution to UN peacekeeping missions.

I. About the Dag Hammarskjöld Medal:

- **Highest Honor:** It is the **highest honor** given by the United Nations to peacekeepers.
- **Posthumous Award:** It is a **posthumous award**, meaning it is given to honor those who have **lost their lives** while serving in a UN peacekeeping operation. It is awarded to members of peacekeeping operations who lost their lives during service with a peacekeeping operation under the operational control and authority of the United Nations.
- **Award Ceremony:** Each year on **Peacekeeper's Day (May 29)**, the medal is awarded at a ceremony at United Nations headquarters in New York. It is awarded to any member state that has lost one or more military or police peacekeepers.
- **Named After:** The medal is named after **Dag Hammarskjöld**, the **second Secretary-General of the United Nations**.
- **First Award:** The first medal was presented to Dag Hammarskjöld's family on October 6, 1998.
- **Dag Hammarskjöld:** He was the Secretary-General of the UN from April 10, 1953, until September 18, 1961. He died in a plane crash while on a peace mission in the Congo.
- **Second Award:** The second medal honored Commandant René de Labarrière, a military observer in the United Nations Truce Supervision Organization. He was the first peacekeeper to die in a UN peacekeeping operation, in 1948.

II. Other UN Awards for Peacekeepers:

- **Captain Mbaye Diagne Medal for Exceptional Courage:** This medal is awarded to military, police, civilian UN personnel, and associated personnel who show **exceptional courage** in the face of extreme danger while fulfilling their mission's goals or serving humanity and the UN.
- **UN Military Gender Advocate of the Year Award:** This award, started in 2016, recognizes the dedication and **effort of an individual peacekeeper** in **promoting gender equality** within the UN Security Council Resolution 1325 (which deals with women, peace, and security).

III. India and UN Peacekeeping:

- **Largest Contributor:** Since the 1950s, **India has sent over 290,000 peacekeepers** to more than 50 missions worldwide. This makes India the **largest contributor** to UN peacekeeping efforts.
- **Current Presence:** Today, over **5,000 Indian troops** serve in nine of the eleven active UN peacekeeping missions.
- **Dangerous Regions:** Indian peacekeepers often serve in **dangerous and hostile regions**, committed to upholding global peace and security.
- **Beyond Deployment:** India also actively supports UN missions through **training, capacity building**, and providing **technological support**.

India launches Indian Institute of Creative Technology in Mumbai to empower youth for digital content revolution

Introduction

- The **Government of India** has announced the creation of the **Indian Institute of Creative Technology (IICT)** in **Mumbai**.
- This institute is **modelled after IITs and IIMs** and will serve as a **National Centre of Excellence** focused on the **AVGC-XR** sector:
    - **A**nimation
    - **V**isual Effects
    - **G**aming
    - **C**omics
    - **X**R (Extended Reality)
- It aligns with flagship initiatives like **Digital India**, **Skill India**, and **Startup India**.

Objectives

- To promote **high-quality education**, **innovation**, **research**, and **policy-making** in digital creative technologies.
- To position India as a **global leader** in the **media and entertainment** sector.
- To replicate the **IT success model** in the AVGC-XR sector.
- To empower Indian **youth, creators, and entrepreneurs** with cutting-edge digital skills.

Institutional Details

Location

- **Permanent Campus**: 10 acres in **Film City, Goregaon**, allocated by the **Maharashtra government**.
- **Temporary Campus**: **State-run facility at Bandra-Kurla Complex (BKC)**, Mumbai.

Funding

- **₹ 400 crore** sanctioned by **Prime Minister Narendra Modi** for institute development.

Industry Collaboration

- **Global tech giants** such as **Google**, **Microsoft**, **Meta**, **Apple**, **NVIDIA**, **Adobe**, and **Star India** are partnering with IICT.
- **MoUs** have already been signed with Google, Microsoft, and Meta.
- These partnerships aim to:
    - Develop **industry-relevant curriculum**
    - Set up **research labs and studios**
    - Offer **internships and job placements**
    - Promote **joint R&D** in digital creative fields

Infrastructure and Facilities

The IICT campus will include:

- **Virtual production environments**
- **Immersive studios**
- **Animation and gaming laboratories**
- **Editing suites**
- **Smart classrooms**

Expansion Plans

- A **second phase** will expand the campus infrastructure over the 10-acre Film City plot.
- **Regional centres** will be established across India to ensure wider access to training.

Strategic Significance

- Union Minister **Ashwini Vaishnaw** emphasized that IICT will help India become a **global leader** in the AVGC-XR domain.
- The initiative supports **youth employment**, **digital entrepreneurship**, and India's growing **creative economy**.
- It reflects India's aim to lead the **global content revolution** and strengthen its **soft power** through media and digital arts.

India to Showcase SVAMITVA Scheme at World Bank Land Conference 2025

Context

- India's flagship rural land governance program, **SVAMITVA Scheme**, is being showcased at the **World Bank Land Conference** (May 5–8, 2025), held in **Washington, D.C.**
- The Indian delegation is led by **Secretary, Ministry of Panchayati Raj, Vivek Bharadwaj**, along with officials from MoPR and the **Survey of India**.

About the World Bank Land Conference 2025

- **Theme**: *"Securing Land Tenure and Access for Climate Action: Moving from Awareness to Action"*
- Brings together **global leaders**, **policy experts**, and **development agencies** to:
  - Promote **secure land tenure**
  - Align **land-use management with climate resilience and sustainable development**
- Features **plenary sessions**, **regional workshops**, **innovation expos**, and **knowledge exchanges**

SVAMITVA Scheme – Key Features

- **Full form**: *Survey of Villages and Mapping with Improvised Technology in Village Areas*
- **Launched**: 2020 by the Ministry of Panchayati Raj
- **Objective**: To provide **legal ownership of residential properties** in rural India using **modern geospatial technologies**

Components

- **Drone-based high-resolution mapping** of rural properties
- Use of **CORS (Continuously Operating Reference Stations)** network with **5 cm accuracy**
- Generation of **property cards** (legal ownership documents)
- Integration with **Gram Manchitra** – a geospatial tool for village-level planning

Achievements (as of May 2025)

- **24.4 million property cards** issued
- Coverage: **1.6 lakh villages**
- Mapping completed for **over 100 million property parcels**
- Estimated **USD 1.162 trillion land value** unlocked
- Recognised as a **global good practice in land governance and digital infrastructure**

Global Showcase & Relevance

Plenary Sessions

1. **May 6 (Tuesday)**:
   "Good Practices and Challenges in Land Tenure and Governance Reform"
   - India share experiences on scalable solutions for rural land digitisation and ownership recognition
2. **May 8 (Thursday)**:
   "Establishing the Land Foundation for Climate Action and Disaster Risk Management"
   - SVAMITVA's role in enabling **climate-informed rural planning and disaster resilience**

Gram Manchitra Platform

- A GIS-based platform supporting:
  - Village development plans
  - **Solar site selection**
  - **Infrastructure mapping**
  - **Disaster risk reduction**
  - **Climate-aligned asset creation**

Strategic Importance

- Helps **formalize land ownership** in rural India '! Reduces disputes, enables credit access
- Enables **data-driven rural governance** and **climate adaptation**
- Aligns with global SDG targets related to **sustainable communities**, **resilient infrastructure**, and **inclusive institutions**
- Enhances India's image as a **leader in digital public infrastructure**

EDITORIALS

Crus of The Hindu & Indian Express

Indian Society & Social Justice

Human Development Report (HDR) 2025 : Key Highlights

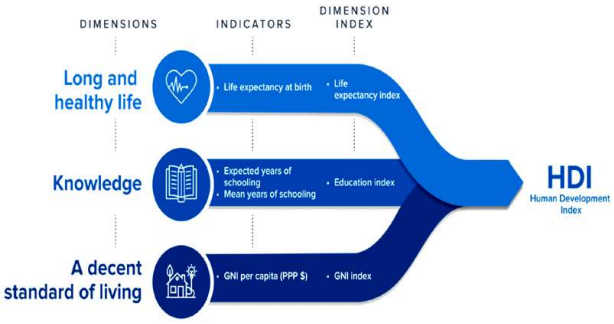
LEADERBOARD

HDI ranking and value (2023)

Rank	Country	HDI value
1	Iceland	0.972
2	Norway	0.970
2	Switzerland	0.970
4	Denmark	0.962
5	Germany	0.959
5	Sweden	0.959
7	Australia	0.958
8	Hong Kong, China (SAR)	0.955
8	Netherlands	0.955
17	United States	0.938
130	India	0.685

HDI: Human Development Index
Source: UNDP Human Development Report 2025

1. **Human Development Report (HDR) is Published by** United Nations Development Programme (UNDP)
2. **Frequency:** Annual
3. **1st introduced: In 1990,** in the first Human Development Report authored by **Mahbub ul Haq and Amartya Sen.**
4. **Purpose:** Evaluates countries based on **Human Development Index (HDI)**, which includes:
    a. **Health** (life expectancy)
    b. **Education** (mean and expected years of schooling)
    c. **Income** (Gross National Income per capita)



Key Messages:

- **This Year's Report Title:** ***"A Matter of Choice: People and Possibilities in the Age of AI"***
- **Stagnation in Human Development:** Progress in human development has stalled in many parts of the world, with inequality becoming a major barrier to further advancements.
- **AI and Human Development:** The integration of **Artificial Intelligence (AI)** in various sectors is both a challenge and an opportunity.
- The report stresses the importance of **human-centered AI governance** to avoid exacerbating inequality.

Global Trends:

- **Global HDI Trend:** The smallest increase in HDI since the report's inception (excluding the pandemic period of 2020-21).
- **Top-ranked Country: Iceland** with an HDI of **0.972**.
- **Bottom-ranked Country: South Sudan** with an HDI of **0.388**.
- **Inequality:** The gap between **high-HDI** and **low-HDI** nations is widening.

AI & Work

- **AI Usage:** 1 in 5 people globally are using AI, with **60% optimistic** about its potential to create jobs, but **50% fear job loss** due to automation.

India's Human Development Status

- **HDI Rank:** India ranks **130th** out of **193** countries with an **HDI value of 0.685**.

Changes in India's HDI Value and Indicators Between 2022 and 2023

Key Data (Human Development Index)	2022	2023
Rank	133	130
HDI value	0.676	0.685
Life Expectancy (years)	71.70	72.00
Expected Years of Schooling (years)	12.96	12.95
Mean Years of Schooling (years)	6.57	6.88
Gross National Income Per Capita ($ 2021 PPP)	8475.68	9046.76

- **Human Development Category:** India is classified as a **medium human development** country, approaching the threshold for **high human development** (HDI e" 0.700).

Key Progress Areas:

1. **Life Expectancy:**
   - **1990:** 58.6 years
   - **2023:** 72 years
   - This improvement is a result of national health programs like:
     * **National Health Mission (NHM)**
     * **Ayushman Bharat**
     * **Janani Suraksha Yojana**
     * **Poshan Abhiyaan**
2. **Education:**
   - **Mean Years of Schooling:**
     * **1990:** 8.2 years
     * **2023:** 13 years
   - Key programs that contributed:
     * **Right to Education Act (2009)**
     * **National Education Policy (2020)**
     * **Samagra Shiksha Abhiyan**
   - **Challenges:** While access to education has improved, **quality** and **learning outcomes** still need significant enhancement.
3. **National Income:**
   - **Gross National Income (GNI) per capita:**
     * **1990:** USD 2,167
     * **2023:** USD 9,046 (in PPP terms)
   - **Poverty Reduction:** Between **2015–16 and 2019–21**, **135 million Indians** escaped multidimensional poverty.
4. **AI and Technological Progress:**
   - India is emerging as a **global AI leader**.
   - **Global AI Index:** India ranks **4th** among 36 evaluated countries.
   - **20% of AI researchers** are now based in India (up from nearly zero in 2019).

Role of AI in Human Development:

- **Economy:** AI can add **₹ 33.8 lakh crore** to India's GDP by **2030**, improving productivity.
- **Healthcare:** AI aids in diagnostics, telemedicine, workflow optimization, and virtual medical training.
- **Education:** AI facilitates personalized learning, AI tutors, and gap analysis.
- **Governance:** AI tools like **MuleHunter.AI** detect fraud in welfare schemes, while the **Bhashini Project** improves multilingual communication in policy outreach.
- **Inclusion:** AI, when designed human-centrically, can bridge service gaps, especially in rural areas.

Challenges Hindering Human Development in India

1. **Inequality:**
   - **30.7% loss in HDI** due to inequality.
   - **Gini coefficient (2023): 0.410** (indicating significant income inequality).
2. **Gender Disparities:**
   - India ranks **102nd** on the **Gender Inequality Index (GII)**.
   - **Female Labor Force Participation (FLFP):** 41.7% (low compared to global standards).
   - Despite some improvements, gender equality remains a major challenge.
3. **Comparison with Neighbors:**
   - India ranks lower than several of its neighbors, including:
     * **China:** Rank 78
     * **Sri Lanka:** Rank 89

        * **Bangladesh:** Rank 130 (same as India)
        * **Nepal:** Rank 145
        * **Pakistan:** Rank 168
    - **BRICS Comparison:**
        * Brazil: Rank 89
        * Russia: Rank 59
        * China: Rank 75
        * South Africa: Rank 110
    - India is lagging behind these countries in terms of HDI.

Policy Recommendations for India

A. Gender Equality:

1. **Strengthen Female Political Representation:**
    - Implement the **106th Constitutional Amendment** for one-third legislative seat reservations.
2. **Encourage Women Entrepreneurship:**
    - Expand access to financial schemes like **PM Mudra Yojana** and **Stand-Up India**.
3. **Skilling and Employment:**
    - Create flexible jobs and provide **crèche facilities** for working mothers.
4. **Legislative Reform:**
    - Strengthen laws against **gender-based violence**, **child marriage**, and **workplace discrimination**.

B. Reducing Inequality:

1. **Inclusive Schemes:**
    - Strengthen programs like **MGNREGA**, **PMEGP**, and **Jan Dhan Yojana**.
2. **Reforms in Land Rights, Health, and Education:**
    - Comprehensive reforms to ensure more equitable access to resources.
3. **Leverage CSR for Equitable Development:**
    - Support **SDG 10** (reduced inequality) and promote **inclusive economic development**.

C. Improving Health & Education:

1. **Increase Investment in Primary Healthcare:**
    - Ensure universal access to nutrition, emphasizing **Poshan Abhiyaan**.
2. **Education System Reform:**
    - Fully implement the **National Education Policy (NEP 2020)** to improve quality and teacher training.

D. Leveraging AI for Inclusive Development:

1. **Support E-health and E-learning:**
    - Utilize AI for healthcare, education, and agriculture advisories for marginalized populations.
2. **Expand Digital and Financial Inclusion:**
    - Initiate schemes like **UPI**, **Jan Dhan**, and **digital literacy programs** to ensure everyone benefits from the digital revolution.

Conclusion

India's **HDI** has shown notable improvements, particularly in **life expectancy**, **education**, and **income**. However, significant challenges remain, especially related to **inequality**, **gender disparities**, and **access to quality education**. Harnessing the potential of **AI** in a human-centered way could greatly contribute to India's future development, but it must be accompanied by robust **policy interventions** to ensure that growth benefits all segments of society equally.

Cabinet Approves National Scheme for ITI Upgradation & National Centres of Excellence for Skilling

Why in the News?

- The Union Cabinet, chaired by **Prime Minister Narendra Modi**, has approved the **National Scheme for Industrial Training Institute (ITI) Upgradation** and the establishment of **five National Centres of Excellence for Skilling (NCOE)**.
- This initiative is a **Centrally Sponsored Scheme** aimed at transforming vocational education in India.

Key Features of the Scheme

- **1. Scheme Overview :**
- The **National Scheme for ITI Upgradation** aims to improve 1,000 **Government ITIs** through a **hub-and-spoke model**, aligning courses with industry demands.
- The **National Centres of Excellence (NCOE)** will be established at five **National Skill Training Institutes (NSTIs)**.
- The scheme will target **20 lakh youth** over the next **five years** through **industry-aligned skills courses**.
- The scheme has been announced in **Budget 2024-25** and **Budget 2025-26** with an **outlay of ₹ 60,000 crore**.
    - **Central Share**: ₹ 30,000 crore
    - **State Share**: ₹ 20,000 crore
    - **Industry Share**: ₹ 10,000 crore
- **Co-financing** will be provided by the **Asian Development Bank (ADB)** and the **World Bank**, covering 50% of the central share equally.

2. Industry-Driven Approach

1. The scheme focuses on upgrading ITIs to **industry-managed, government-owned institutes** in collaboration with State Governments and industries.
2. A **Special Purpose Vehicle (SPV)** model will be adopted for an **outcome-driven** implementation strategy, involving deep industry participation in planning and management.

Objectives of the Scheme

1. **Improved Alignment with Industry Demand**:
    - The scheme will ensure that ITI courses are **industry-relevant**, meeting the specific needs of sectors like **electronics**, **automotive**, and **renewable energy**.
2. **Skilling for Employment**:
    - It aims to provide **employment-ready** workers to industries, including **Micro, Small, and Medium Enterprises (MSMEs)**.
3. **Infrastructure Upgradation**:
    - ITI infrastructure will be revamped to accommodate new-age, capital-intensive trades and to ensure **capacity expansion**.
4. **Enhanced Vocational Training Perception**:
    - The scheme aims to improve the **perception** of vocational training by addressing long-standing challenges in infrastructure, course relevance, and employability.

Components of the Scheme

1. Upgradation of ITIs

1. 1,000 Government ITIs will be upgraded in a hub-and-spoke arrangement.
2. The ITIs will offer revamped trades/courses that are aligned with industry needs.

2. Capacity Augmentation of National Skill Training Institutes (NSTIs)

1. The **five NSTIs**—located in **Bhubaneswar**, **Chennai**, **Hyderabad**, **Kanpur**, and **Ludhiana**—will receive infrastructure upgradation.
2. These institutes will have improved **Training of Trainers (ToT)** facilities.

3. National Centres of Excellence for Skilling

1. **Five National Centres of Excellence for Skilling (NCOEs)** will be set up.

2. The NCOEs will focus on **advanced skills training**, supporting high-growth sectors and ensuring that the workforce is prepared for the **future job market**.

4. Trainer Development

1. **50,000 trainers** will undergo **pre-service and in-service training**.
2. This will ensure that trainers have the required skills to impart industry-aligned knowledge to trainees.

Expected Outcomes

1. **Skilled Workforce for High-Growth Sectors**:
    - The scheme will create a **pipeline of skilled workers** ready for sectors like **electronics**, **automotive**, **renewable energy**, and **more**.
    - It aims to fill **skill gaps** in these high-demand areas.
2. **Strengthening the ITI Ecosystem**:
    - By adopting an **industry-led model**, the scheme aims to revamp the **vocational education ecosystem** in India, making ITIs more attractive and aspirational.
3. **Alignment with PM's Vision of Viksit Bharat**:
    - The scheme aligns with the Prime Minister's vision of a **Viksit Bharat** by fostering a skilled workforce that can drive India's journey toward becoming a **global manufacturing and innovation powerhouse**.
4. **Employment Generation**:
    - **20 lakh youth** will be skilled and prepared for employment through **industry-aligned skilling courses**.

Financial Provisions

1. **Total Outlay**: ₹ 60,000 crore
2. **Central Share**: ₹ 30,000 crore
3. **State Share**: ₹ 20,000 crore
4. **Industry Share**: ₹ 10,000 crore
5. **Co-financing by ADB and World Bank**: Covers 50% of the Central share.

Background

- **Vocational Education's Role in Economic Growth**:
    - Vocational education and training are crucial drivers of economic productivity and growth.
    - As India progresses toward becoming a developed nation by **2047**, this scheme plays a vital role in equipping youth with **relevant skills** to meet the demands of industries.
- **The ITI Network**:
    - Since the **1950s**, ITIs have been the backbone of vocational education in India.
    - The ITI network has expanded by **47%** since 2014, with **14,615 ITIs** catering to **14.40 lakh enrolments**.
    - However, ITIs have suffered from infrastructure deficiencies and a lack of systemic interventions to improve their appeal and course relevance.
- **Current State of ITIs**:
    - While ITIs have made progress, vocational training still lacks the **aspirational value** it should have.
    - The **lack of adequate funding** in the past to upgrade infrastructure and introduce capital-intensive trades has hindered their potential.
- **Need for Scalable, National Programs**:
    - Past schemes to support ITI upgradation have been **incremental** and **limited in scope**.
    - Now, there is a need to scale these efforts through a **nationally scalable program** that re-imagines ITIs and their courses to match **industry requirements**.

Conclusion

The National Scheme for ITI Upgradation and the National Centres of Excellence for Skilling is a game-

changing initiative that will transform India's vocational education landscape.

By aligning ITI courses with industry needs, providing state-of-the-art infrastructure, and upskilling trainers, the scheme aims to develop a highly skilled workforce capable of driving India's economic growth and positioning it as a global manufacturing hub.

NHRC Seeks Action on Plight of Odisha's Dongria Kondh Tribe

Introduction

- The **National Human Rights Commission (NHRC)** has sought an **Action Taken Report (ATR)** from the **Chief Secretary of Odisha** concerning the dire living conditions of the **Dongria Kondh** tribe, a **Particularly Vulnerable Tribal Group (PVTG)**.
- The tribe, which resides in **Kalahandi and Rayagada districts**, faces severe issues such as a lack of basic amenities and **socio-economic deprivation** despite numerous government initiatives.

About Dongria Kondh Tribe

- **Location**: Primarily in the **Niyamgiri Hills** of **Kalahandi** and **Rayagada** districts in Odisha.
- **Tribal Status**: Recognized as a **Particularly Vulnerable Tribal Group (PVTG)**.
- **Population**: Over **10,000 families** (approximately).
- **Main Livelihood**: Agriculture, forest-based activities, and traditional crafts.
- **Challenges**:
    - Precarious living conditions.
    - Lack of basic **infrastructure**: roads, healthcare, potable water, and education.
    - Isolated in **hills and forests**, making access difficult.

NHRC's Involvement

- **Human Rights Petition**:

  Filed by **Radhakanta Tripathy**, a human rights lawyer, against the Odisha government for failing to address issues faced by the Dongria Kondh tribe.
- **NHRC Findings**:
    - The **allegations of human rights violations** are deemed **serious** by the NHRC.
    - The **State Government** has not taken adequate steps despite multiple reminders from the NHRC.
    - The **lack of accountability** in the administration has led to **inefficiency and corruption**.
    - **Reports submitted by local authorities** are seen as **inadequate**, being merely **statistical in nature**, and do not reflect the actual situation on the ground.

Issues Highlighted by NHRC and Petition

Issue	Details
Basic Amenities	No **all-weather roads**, lack of **potable water**, insufficient **healthcare** and **education**
Government Action	The Odisha government has not taken adequate measures despite multiple **interventions** by NHRC
Development Funds	Alleged **misuse of funds** under the guise of development, as **local administration** has not been transparent
Human Rights Violations	Persistent **denial of basic rights** despite the tribe being designated as a PVTG requiring special attention

Background on Odisha's PVTGs

- **Tribal Groups in Odisha**:
    1. 62 tribal groups live in Odisha, 13 of which are officially designated as PVTGs.
    2. According to the 2011 Census, Odisha has 9% of the national tribal population, and tribal settlers constitute 22.85% of the state's population.
- **List of 13 PVTGs in Odisha**:
    1. Birhor
    2. Bonda
    3. Chuktia Bhunjia
    4. Didayi
    5. Juang
    6. Kharia
    7. Dongria Kondh (Focus Group)
    8. Kutia Khond
    9. Lanjia Saora
    10. Lodha
    11. Mankidia
    12. Paudi Bhuyan
    13. Saora
- **Special Status for PVTGs**: Initially termed as **Primitive Tribal Groups (PTGs)**, these tribes were re-designated as **PVTGs** to ensure focused development under **special legislation** due to their vulnerability and **backwardness**.

Challenges Faced by PVTGs in Odisha

Issue	Details
Poverty and Illiteracy	High levels of **poverty** and **illiteracy** among PVTG communities
Isolation	Many tribes live in **remote, inaccessible areas** with **limited connectivity**
Health	Poor **healthcare infrastructure**; high rates of **malnutrition** and **diseases**
Land Rights	**Land alienation** and disputes over **forest rights** and **resources**
Government Schemes	Government initiatives such as **SCA to TSP (Special Central Assistance to Tribal Sub-Plan)** have not achieved desired results in improving living conditions

Historical Government Response & NHRC's Stance

- **State Government's Inaction**: Despite government schemes, **no substantial improvement** has been seen in the living conditions of the Dongria Kondh tribe.
- The Odisha **State Government** has failed to address the real issues and merely submitted **statistical reports** that don't reflect the **actual ground situation**.
- **NHRC's Opinion**: The NHRC has deemed the conditions as a violation of the **human rights** of the tribe.
- The commission finds the situation to be a failure of governance and the **absence of accountability** in the local administration.

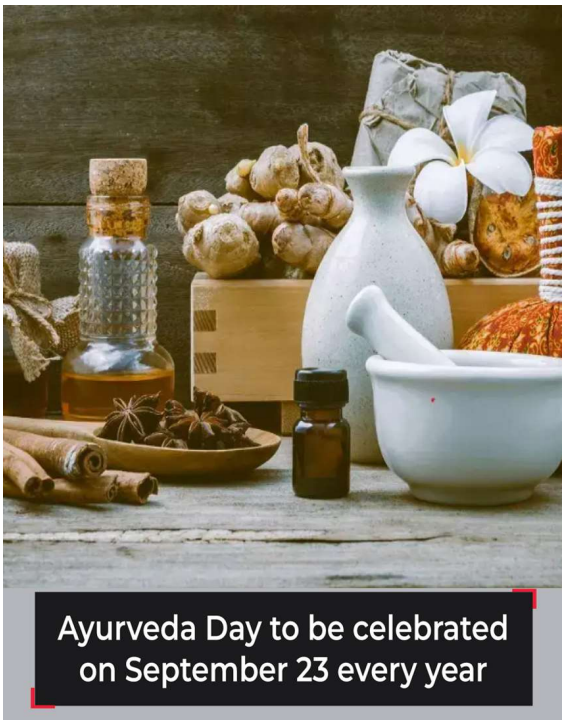
Recommendations & Way Forward

Action Area	Recommendation
Action Taken Report (ATR)	Odisha Chief Secretary must submit a **comprehensive report** on measures taken.
Infrastructure Development	Ensure **all-weather roads**, **clean drinking water**, and **basic healthcare** facilities.
Accountability and Transparency	Initiate **independent verification** of the funds spent on PVTG development.
Special Tribes Protection Scheme	Strengthen **implementation of special schemes** for PVTGs. Enhance the focus on **education and health**.
Monitoring by NHRC	NHRC must **continue monitoring** and ensure the implementation of rights-based frameworks.

Conclusion

The **Dongria Kondh tribe's plight** highlights the **failures of governance** in ensuring the **basic rights** and **socio-economic upliftment** of **Particularly Vulnerable Tribal Groups (PVTGs)** in Odisha. The **NHRC's intervention** and call for an **Action Taken Report (ATR)** signifies the urgency to ensure **accountability, transparency, and sustainable development** in tribal areas. Addressing the **tribal development gap** is essential for **inclusive growth** and **social justice**.

Ayurveda Day Will Now Be Celebrated Every Year on 23rd September



- The **Government of India** has decided that **Ayurveda Day** will now be celebrated every year on a **fixed date – 23rd September**.
- This change was officially announced on **23rd March 2025**.

What Changed?

- Until now, **Ayurveda Day** was celebrated on **Dhanteras**.
- It is a Hindu festival that falls on a different date each year (based on the lunar calendar, usually in **October or November**).
- Because the date kept changing, it was difficult to plan events and programs, especially at the **national and international level**.

Why 23rd September Was Chosen

- A special committee was formed by the **Ministry of Ayush** to find a better, fixed date.
- Out of four options, **23rd September** was selected. This date is important because:
    - It is the **autumn equinox** — a day when **day and night are nearly equal**.
    - This natural balance matches the **Ayurvedic belief** of maintaining **harmony between body, mind, and nature**.

Why This Is Important

- **Ayurveda Day** is meant to promote **Ayurveda as a scientific and natural way of healing and preventing diseases**.
- A fixed date like 23rd September will make it **easier to organize global events** and give Ayurveda **more visibility** across the world.

What the Ministry Is Asking

- The **Ministry of Ayush** is encouraging:
    - Individuals,
    - Healthcare professionals,
    - Schools and colleges,
    - International health partners,
- to **celebrate Ayurveda Day** on **23rd September every year**, starting from 2025.

PM Modi NITI Aayog Meeting

Theme: *Viksit Rajya for Viksit Bharat @ 2047*

Background

- Prime Minister Narendra Modi chaired the 10th Governing Council meeting of NITI Aayog on May 24, 2025.
- The meeting focused on accelerating India's development to achieve the vision of a *Viksit Bharat* (Developed India) by 2047, coinciding with 100 years of Independence.

Key Highlights from PM Modi's Address

- PM Modi emphasized the need to **increase the speed of development** across the country.

- He called for **teamwork between the Centre and states**, stating that no goal is impossible if all work together as *Team India*.
- The vision is to make **every state, city, Nagar Palika, and village developed**.
- This approach will help India to become *Viksit Bharat* even before 2047.
- The goal of *Viksit Bharat* is the aspiration of all 140 crore Indians, requiring inclusive growth at all levels.

Agenda of the Meeting

The Governing Council discussed the following key areas:

1. **ViksitRajya for Viksit Bharat @ 2047** — States were urged to prepare bold, inclusive vision documents aligned with national priorities but rooted in local realities.
2. **Promoting Entrepreneurship, Employment, and Skilling** — Leveraging India's demographic dividend to generate jobs and boost the economy.
3. **Manufacturing and Services Ecosystem** — Focus on creating enabling environments especially in Tier 2 and Tier 3 cities.
4. **MSME and Informal Employment** — Supporting rural non-farm and urban sectors.
5. **Opportunities in Green Economy** — Emphasis on renewable energy and circular economy practices.

State-Level Proposals and Highlights

- **Jammu & Kashmir (CM Omar Abdullah):** Proposed holding PSU and parliamentary meetings in Kashmir to revive tourism and allay public fears after terror attacks. Called for construction of individual bunkers due to cross-border shelling.
- **Haryana (CM Nayab Singh Saini):** Presented Vision Document-2047 aiming to make Haryana a one trillion-dollar economy with 50 lakh new jobs.
- **Uttarakhand (CM Pushkar Singh Dhami):** Called for a national plan to tackle urban drainage issues and inclusion of lift irrigation in PM Krishi Sinchayee Yojana guidelines.
- **Jharkhand (CM Hemant Soren):** Requested amendment to the Coal Bearing Areas Act for land return post-mining and release of Rs 1.40 lakh crore dues from mining companies.
- **Goa (CM Pramod Sawant):** Expressed full commitment to contribute to the *Viksit Bharat* journey as part of Team India.
- **Telangana (CM A. Revanth Reddy):** Proposed forming a national task force headed by the Prime Minister and respective CMs to harness the economic potential of India's six major metros (Mumbai, Delhi, Bengaluru, Kolkata, Chennai, Hyderabad).
- **Arunachal Pradesh (CM Pema Khandu):** Reaffirmed the state's commitment to socio-economic progress and sustainable development aligned with the *Viksit Bharat* vision.
- **Tamil Nadu (CM M K Stalin):** Demanded increase of the state's share in central taxes to 50% and urged for a dedicated urban transformation mission.
- **Andhra Pradesh (CM N Chandrababu Naidu):** Suggested creation of three sub-groups focusing on GDP growth, population management, and artificial intelligence to fast-track the *Viksit Bharat 2047* vision.

Other Important Points

- **NITI Aayog CEO BVR Subrahmanyam** stated that PM Modi focused on agriculture, education, and healthcare in his address.
- The meeting showed **unanimous support for Operation Sindoor**, a campaign aimed at social development.
- PM Modi urged states to **remove bottlenecks to attract investors, encourage manufacturing, and generate jobs**.
- 31 out of 36 states and Union Territories attended the meeting. States like Karnataka, Kerala, West Bengal, Bihar, and Puducherry did not attend.
- Political leaders including Hemant Soren, N Chandrababu Naidu, M K Stalin, and Bhagwant Mann were present and engaged in discussions.

Controversies and Criticism

- **Jairam Ramesh (Congress)** criticized the meeting, questioning the nature of India's development given ongoing concerns over social harmony and institutional autonomy.
- The BJP responded by accusing him of creating unnecessary controversies.
- The Congress described NITI Aayog as an incompetent body and dismissed the meeting as hypocrisy.

About NITI Aayog

Background

- The concept of **planning** has been deeply rooted in India's governance, influenced by the **socialist model of the erstwhile USSR**.
- For nearly six decades, the **Planning Commission** was the main body responsible for India's economic planning, following a **control and command approach**.
- On **January 1, 2015**, the Planning Commission was replaced by **NITI Aayog** (National Institution for Transforming India), emphasizing a **'Bottom-Up' approach**, aiming for **maximum governance with minimum government**.
- NITI Aayog embodies the spirit of **'Cooperative Federalism'** by involving states as equal partners.

Composition

- **Chairperson:** Prime Minister of India
- **Vice-Chairperson:** Appointed by the Prime Minister
- **Governing Council:** Chief Ministers of all states and Lt. Governors of Union Territories
- **Regional Councils:** Address specific regional issues; comprise Chief Ministers and Lt. Governors; chaired by the PM or nominee
- **Ad-hoc Members:** Two ex-officio members from leading research institutions (rotational basis)
- **Ex-Officio Members:** Up to four Union Ministers nominated by the PM
- **Chief Executive Officer (CEO):** Appointed by the PM for a fixed tenure, equivalent to Secretary to Government of India
- **Special Invitees:** Experts nominated by the PM

NITI Aayog Hubs

- **Team India Hub:** Acts as the interface between States and the Centre
- **Knowledge and Innovation Hub:** Builds think-tank capacity for policy and innovation
- The Aayog plans to release three key documents:
    - 3-year Action Agenda
    - 7-year Medium-Term Strategy
    - 15-year Vision Document

Importance

- The **Planning Commission** became obsolete in India's diversified, market-oriented economy.
- India's states vary widely in development stages; a **'one size fits all'** planning approach is no longer suitable.
- NITI Aayog's flexible and cooperative model aims to make India more competitive globally.

Key Objectives

- Foster **cooperative federalism** through continuous engagement with states.
- Develop credible **village-level planning mechanisms** and aggregate upwards.
- Incorporate **national security interests** in economic policies where relevant.
- Address the needs of socially vulnerable groups to ensure inclusive development.
- Facilitate partnerships with **think tanks, research institutions, and policy experts** nationally and internationally.
- Create a **knowledge, innovation, and entrepreneurial ecosystem** through collaboration.
- Provide a platform to resolve **inter-sectoral and inter-departmental issues** to accelerate development.
- Maintain a **state-of-the-art resource center** for governance research and best practices dissemination.

Challenges and Concerns

- NITI Aayog needs to **prioritize objectives** effectively and clarify distinctions among policy, planning, and strategy.
- Requires **greater autonomy and budgetary flexibility**, moving beyond traditional plan/non-plan expenditure to better fund infrastructure.
- Must build **trust and credibility** surpassing that of the erstwhile Planning Commission.

Differences Between NITI Aayog and Planning Commission

Aspect	NITI Aayog	Planning Commission
Nature	Advisory think tank	Extra-constitutional body
Expertise	Broad, diverse membership	Limited expertise
Federalism	States as equal partners	States were spectators
Leadership	CEO appointed by PM	Secretaries appointed by usual process
Planning Approach	Bottom-up approach	Top-down approach
Policy Power	No mandate to impose policies	Imposed policies on states
Fund Allocation	No power to allocate funds	Controlled funds allocation

Major Initiatives by NITI Aayog

- SDG India Index
- Composite Water Management Index
- Atal Innovation Mission
- SATH Project
- Aspirational District Programme
- School Education Quality Index
- District Hospital Index
- Health Index
- Agriculture Marketing and Farmer Friendly Reform Index
- India Innovation Index
- Women Transforming India Awards
- Good Governance Index
- Women Entrepreneurship Platform (WEP)
- Strategy for New India at 75
- Methanol Economy Programme
- **e-AMRIT Portal:** A one-stop platform for information on electric vehicles, developed in collaboration with the UK government, aiming to raise awareness and encourage EV adoption.

Plans to Counter 'Dark Patterns' Used by Online Platforms

Context

- Recently, Union Minister for Consumer Affairs, Food, and Public Distribution, **Prahlad Joshi**, has directed **e-commerce companies to conduct self-audits** to identify and eliminate **Dark Patterns**.
- The initiative follows a significant rise in consumer complaints on the **National Consumer Helpline**.
- A **stakeholder meeting** was convened in Delhi to devise strategies for addressing deceptive and manipulative online design practices.

What are Dark Patterns?

- **Dark Patterns** are deceptive design elements used in **user interfaces (UI)** that mislead or coerce users into taking actions they may not intend, such as making purchases, signing up for subscriptions, or disclosing personal data.
- These practices **compromise consumer autonomy** and violate the principles of **informed consent**.

Objective of the Government Initiative

- Ensure **consumer protection** by regulating manipulative digital practices.
- Promote **transparency** and **fairness** in the digital economy.
- Enforce **compliance with existing consumer protection laws**.

Key Government Actions

1. Self-Audit Directive

- All e-commerce platforms are instructed to **conduct internal audits** to identify and eliminate dark patterns in compliance with guidelines.

2. Stakeholder Engagement

- A multi-stakeholder meeting was held with participation from:
    - Major platforms: **Amazon, Swiggy, Flipkart, Zomato, MakeMyTrip, Meta, WhatsApp, Ola, Apple**
    - Industry associations

- **Voluntary Consumer Organisations (VCOs)**
- **National Law Universities**

3. Formation of a Joint Working Group

- Proposed to:
  - Facilitate industry education on dark patterns
  - Improve consumer redressal mechanisms
  - Aid in policy formation

4. CCPA Enforcement

- The **Central Consumer Protection Authority (CCPA)** has issued notices to firms including:
  - **Uber and Rapido**, for coercing users to tip in advance for faster service.
  - Such actions have been termed **"unfair trade practices"** under the Consumer Protection Act.

5. Guidelines on Dark Patterns

- The **Department of Consumer Affairs** has released **detailed regulatory guidelines**.
- Companies are required to integrate these guidelines into their:
  - **Internal governance mechanisms**
  - **Customer experience policies**

Identified Dark Patterns (13 Types)

1. **False Urgency** – Creating fake deadlines or limited availability.
2. **Basket Sneaking** – Adding items to a user's cart without consent.
3. **Confirm Shaming** – Using guilt-based language to discourage opting out.
4. **Forced Action** – Requiring users to take unrelated actions to proceed.
5. **Nagging** – Persistent pop-ups or reminders for the same task.
6. **Bait and Switch** – Promoting one outcome but delivering another.
7. **Subscription Trap** – Difficult or hidden cancellation options.
8. **Hidden Costs** – Sudden addition of fees at checkout.
9. **Disguised Ads** – Advertising presented as editorial content.
10. **Interface Interference** – UI manipulation to favor certain actions.
11. **SaaS Billing** – Non-transparent billing in software-as-a-service products.
12. **Trick Questions** – Confusing language or misleading choices.
13. **Rogue Malware** – Unauthorized installation of software.

Survey Findings (Source: LocalCircles)

- Based on feedback from **2.3 lakh consumers** across **392 districts**.
- Sectors with highest reported instances of Dark Patterns:
  - **EdTech**
  - **Travel and Airlines**
  - **E-commerce and Quick Commerce**
  - **Online Banking and Payments**
  - **Taxi Apps**
  - **OTT Platforms**

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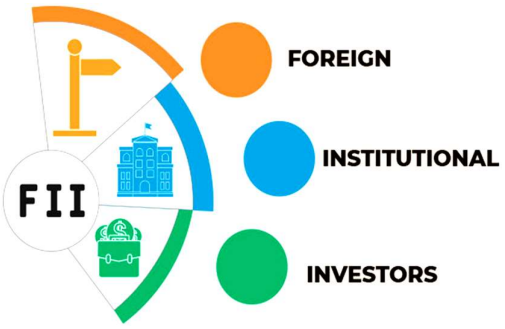
Economics

Foreign Institutional Investors (FIIs)



1. Why in News?

- **FIIs as Net Buyers (April 2025):**
  - Foreign Institutional Investors (FIIs) became net buyers of Indian equities for the first time in four months in April 2025.

- Registered an inflow of **₹ 4,223 crore**.

- **Shift in Investment Trends:**
  - Increased FII participation attributed to the **softening of the U.S. Dollar Index** (from 104–105 to nearly 99–100), which improved the relative strength of the Indian rupee.
  - The **Reserve Bank of India's accommodative stance** and **macro-stability** encouraged investments, particularly in **banking, financial services, and insurance (BFSI)** sectors.
  - FIIs **reduced their exposure to the IT sector** due to concerns about a potential U.S. recession and its impact on tech earnings.

2. About Foreign Institutional Investors (FIIs)

- **Definition and Nature:**
  - FIIs are a subset of **Foreign Portfolio Investors (FPIs)**.
  - Comprise **large institutional investors** such as mutual funds, pension funds, insurance companies, and hedge funds.
- **Investment Approach:**
  - Typically adopt a **strategic and structured investment approach** in foreign financial markets.
  - Offer **long-term capital inflows** to emerging economies like India.
- **Market Impact:**
  - Rapid FII outflows can **destabilise domestic markets**, highlighting the need for regulatory oversight.

3. Regulatory Framework Governing FIIs in India

- **Key Legislations and Bodies:**
  - Regulated by the **Foreign Exchange Management Act (FEMA), 1999**.
  - Governed by **SEBI (Foreign Portfolio Investors) Regulations**.
- **Monitoring:**
  - The **Reserve Bank of India (RBI)** monitors **sectoral investment ceilings** on a daily basis.

4. Investment Ceilings and Eligibility

- **Investment Limits:**
  - FIIs can invest **up to 10%** in any single Indian company.
  - This is subject to a **cumulative FII/NRI/PIO limit of 24%** for the company.
- **Eligible Entities (Expanded Scope):**
  - Eligibility now includes **university funds, charitable endowments, and trusts**.
  - These entities must have a minimum **five-year operational track record**.
- **Permitted Investments:**
  - FIIs are permitted to invest in **unlisted securities**.
  - Allowed to **use their proprietary funds** for investment.

5. Macroeconomic Drivers Influencing FII Activity

- **U.S. Dollar Index:**
  - A **softening of the U.S. Dollar Index** (e.g., decline from 104–105 to 99–100) improves the relative strength of currencies like the Indian rupee, making Indian assets more attractive.
- **Domestic Monetary Policy & Stability:**
  - An **accommodative stance by the Reserve Bank of India (RBI)** and overall **macro-stability** in the domestic economy encourage FII inflows.
  - Sectors like **Banking, Financial Services, and Insurance (BFSI)** often benefit from such positive domestic conditions.
- **Global Economic Outlook:**
  - Concerns about global economic conditions, such as a **potential U.S. recession**, can lead FIIs to adjust their sectoral allocations (e.g., reducing exposure to the IT sector if tech earnings are expected to be impacted).

Solar Energy Corporation of India Ltd. (SECI)

Context: Reliance NU Suntech recently signed a 25-year Power Purchase Agreement with SECI to develop and commission Asia's largest single-location integrated solar and battery energy storage system (BESS) project.

About Solar Energy Corporation of India Ltd. (SECI)

- **Nature:** Leading **Central Public Sector Undertaking (CPSU)**.
- **Mandate:** Dedicated to the development and expansion of **Renewable Energy (RE) capacity** in India.
- **Uniqueness:** It is the **only CPSU dedicated exclusively to the renewable energy sector**.
- **Formation:**
  - Incorporated in **2011** as a **not-for-profit company** (under Sec. 25 of the Companies Act, 1956).
  - Converted to a **commercial company in 2015** (under Sec. 3 of the Companies Act, 2013).
- **Establishment Purpose:** Established to facilitate the implementation of the **National Solar Mission**.
- **Administrative Control:** Functions under the administrative control of the **Ministry of New and Renewable Energy (MNRE)**.
- **Status:** Accorded the status of **Miniratna Category-I CPSU**.

Role and Functions

- **Implementing Agency:** Serves as an implementing agency for the development of **Solar, Wind, and Hybrid Projects**.
- **Contribution to NDCs:** Plays a crucial role in fulfilling India's **Nationally Determined Contributions (NDCs)** for climate change mitigation.
- **Tendering Process:**
  - **Releases tenders** for the selection of Renewable Energy (RE) developers on a pan-India or state-specific basis.
  - The selection of successful bidders is conducted through a **tariff-based competitive e-bidding procedure**.
- **Power Purchase & Sale Agreements:**
  - Enters into a **25-year Power Purchase Agreement (PPA)** with selected bidders for the procurement of power from these projects.
  - Establishes **back-to-back 25-year Power Sale Agreements (PSA)** with DISCOMs/buying entities for the sale of the procured power.
- **Power Trading:**
  - Holds a **Category-I (highest) Power Trading Licensee** for trading power on a pan-India basis.
  - Acts as the **intermediary power procurer** for projects set up through its tenders.
  - Procures power from developers and sells it to buying entities (DISCOMs).
  - A **premier trader of renewable energy power** in the country.
- **Consultancy Services:** Offers **Project Management Consultancy** in the Renewable Energy sector to Public Sector/Government entities, including:
  - Feasibility Studies
  - Bid process Management
  - Construction Monitoring and Management
  - Commissioning, etc.

Impact and Scale

- **Awarded Generation Capacity:** Oversees a massive **65.3 GW of awarded generation capacity**.
- **Breakdown of Capacity:**
  - Over **60% (over 40 GW)** is **solar energy**.
  - **16.3 GW** of **wind energy**.

Insider Trading

Context: The Securities and Exchange Board of India (SEBI) has recently alleged that Pranav Adani, a director of several Adani group companies, shared price-sensitive information, breaching insider trading regulations.

About Insider Trading

- **Definition:** Insider trading involves **buying or selling a publicly traded company's stock (or other securities)** based on **nonpublic, material information** about that company.
- **Material, Nonpublic Information (MNPI)/ Unpublished Price Sensitive Information (UPSI):**
    - Any **undisclosed information** that, if it became generally available, **could substantially impact an investor's decision to buy or sell a security** or is **likely to materially affect the price of the securities**.
    - Examples include financial results, mergers/acquisitions, dividend declarations, changes in capital structure, major expansion plans, or significant litigation outcomes.
- **"Insider" Definition (as per SEBI):** Someone who has **access to price-sensitive information** about a particular company's shares or securities. This can include:
    - Company executives, directors, employees.
    - Promoters and their immediate relatives.
    - Connected persons (individuals or entities in a contractual, fiduciary, or employment relationship that allows them access to UPSI, e.g., auditors, consultants, legal advisors).
    - Family members or friends who might receive tips about MNPI.

Regulation in India

- **Regulating Body:** In India, insider trades are regulated by the **Securities and Exchange Board of India (SEBI)**.
- **Key Regulation:** The **SEBI (Prohibition of Insider Trading) Regulations, 2015**.
    - These regulations aim to prevent unfair trading practices by prohibiting individuals with access to unpublished price-sensitive information (UPSI) from using it for personal gain.
    - They prohibit insiders from communicating, providing, or allowing access to any UPSI, except for legitimate purposes, performance of duties, or discharge of legal obligations.
    - They also prohibit any person from procuring UPSI from an insider, except under similar legitimate conditions.
- **Preventive Measures by SEBI:**
    - Prohibits firms from purchasing their own shares from the secondary market if it could be seen as manipulating the market based on insider knowledge.
    - **System-Driven Disclosures (SDD) framework:** Enables real-time tracking of trading activities by designated persons and their immediate relatives, automatically flagging suspicious trades.
    - **Integrated Market Surveillance System (IMSS):** Uses AI-driven algorithms to identify unusual trading patterns.
    - **Strict Disclosure Norms:** Mandates timely disclosures of trades by insiders.
    - **Enhanced Scrutiny:** Increased action against trades by immediate relatives and connected entities.

- **Prohibition of Unauthorized Sharing of UPSI:** Including on private messaging platforms and social media.
- Requires listed companies to **maintain a structured digital database** of persons with whom UPSI is shared.
- Mandates formulation of a **code of conduct** for preventing insider trading within companies.
- Encourages robust **physical and digital controls** to ensure UPSI confidentiality.
- **Blackout periods:** Companies must establish periods during which insiders are prohibited from trading, especially around earnings announcements.
- **Whistleblower policies:** To encourage reporting of suspicious activities.

- **Penalties for Violation:** SEBI can impose **fines** and **prohibit individuals or entities from trading in the capital market** if found in violation of rules.
  - As per Section 15G of the SEBI Act, 1992, penalties can be substantial (e.g., minimum ₹ 10 lakh, extending up to ₹ 25 crore, or three times the profit made, whichever is higher).
  - Imprisonment for a term which may extend to 10 years, or a fine, or both.

Credit Guarantee Scheme for Startups (CGSS)

Context: The Centre recently notified an expansion of the Credit Guarantee Scheme for Startups (CGSS), making institutional credit more accessible for early-stage businesses.

About Credit Guarantee Scheme for Startups (CGSS)

- **Establishment:** Established by the Government of India in **October 2022** under the Startup India Action Plan.
- **Objective:** To provide **credit guarantees** to loans extended by **Scheduled Commercial Banks, Non-Banking Financial Companies (NBFCs)**, and **SEBI-registered Alternative Investment Funds (AIFs)**.
- **Purpose:** Aims at providing credit guarantees up to a specified limit against loans extended by **Member Institutions (MIs)** to finance **eligible borrowers, viz., Startups**, as defined by the Department for Promotion of Industry and Internal Trade (DPIIT) and amended from time to time.
- **Implementing Agency:** The **National Credit Guarantee Trustee Company Limited (NCGTC)** is the implementing agency of the Scheme.
- **Mechanism:** CGSS does not provide guarantee cover directly to DPIIT-recognized startups. Instead, NCGTC provides guarantee cover to **Member Institutions (MIs)** who, in turn, provide loans to startups. This de-risks the lenders and encourages them to extend credit.
- **Instruments of Assistance:** The assistance can be in various forms, including:
  - Venture debt
  - Working capital
  - Subordinated debt/mezzanine debt
  - Debentures
  - Optionally convertible debt
  - Other fund-based as well as non-fund-based facilities that have crystallized as debt obligations.

- **Types of Guarantee Cover:** The credit guarantee cover under the Scheme is **transaction-based and umbrella-based**.
    - **Transaction-based guarantee cover:** The guarantee is obtained by MIs on a **single eligible borrower basis**. This promotes direct lending by Banks/ NBFCs to eligible startups.
    - **Umbrella-based guarantee cover:** Provides guarantee to **Venture Debt Funds (VDFs)** registered under AIF regulations of SEBI, covering a pool of their investments in startups.

Eligibility Criteria (for Startups)

- Must be a **DPIIT-recognized startup**.
- Should **not be in default** to any lending/ investing institution.
- Should **not be classified as Non-Performing Asset (NPA)** as per RBI guidelines.
- Eligibility must be **certified by the Member Institution** for the purpose of guarantee cover.
- **New units** (whether individual or group) would primarily be supported for **One District One Product (ODOP)**.

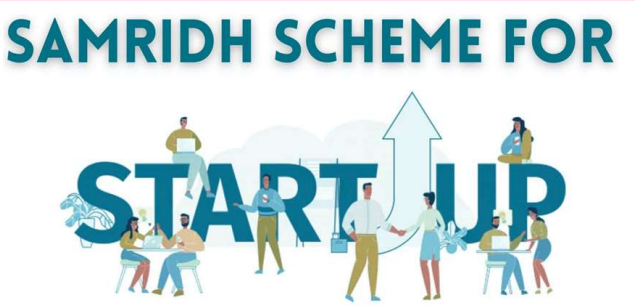
Recent Changes (as of May 2025)

- **Enhanced Guarantee Coverage Limit:** The maximum guarantee limit has been **increased from ₹ 10 crore to ₹ 20 crore** per eligible borrower.
- **Increased Extent of Guarantee:**
    - For loans up to **₹ 10 crore**, the guarantee will now cover **85 percent of the amount in default**.
    - For loans **above ₹ 10 crore** (up to ₹ 20 crore), the coverage will be **75 percent of the amount in default**.
- **Reduced Annual Guarantee Fee (AGF):** The AGF for startups in **27 Champion Sectors** (identified under 'Make in India' to boost manufacturing and service capabilities) has been **reduced to 1 percent per annum from 2 percent per annum**. This aims to make funding more attractive for these strategic sectors.

Significance and Benefits

- **Collateral-Free Funding:** Addresses the significant challenge faced by startups in arranging collateral, enabling them to access debt financing without requiring third-party guarantees or security.
- **Risk Mitigation for Lenders:** By providing a guarantee cover, the scheme reduces the perceived risk for financial institutions, encouraging them to lend to early-stage and innovation-driven startups.
- **Boost to Entrepreneurship:** Fosters a more favorable environment for innovation and entrepreneurship by making credit more accessible.
- **Support for Innovation:** Helps startups secure working capital, term loans, and venture debt, which are crucial for sustaining R&D and product development.
- **Reduced Import Dependency:** Supports domestic manufacturing and innovation, aligning with the 'Aatmanirbhar Bharat' vision.
- **Financial Inclusion:** Catalyzes entrepreneurship by encouraging financial institutions to offer credit despite perceived risks, thereby increasing overall fund flow for startups.
- **Complements Other Schemes:** Complements existing schemes under the Startup India initiative, such as the Fund of Funds for Startups and Startup India Seed Fund Scheme.

SAMRIDH Scheme



Context: Two individuals were recently arrested for allegedly defrauding the Ministry of Electronics and Information Technology (MeitY) of over Rs 3 crore under the pretext of the government-run SAMRIDH scheme for startups.

About SAMRIDH Scheme

- **Full Form: S**tartup **A**ccelerator of **MeitY** for **P**roduct **I**nnovation, **D**evelopment, and **G**rowth (SAMRIDH).
- **Nature:** A flagship programme of the **Ministry of Electronics & IT (MeitY)** for startup acceleration.
- **Policy Framework:** Launched under the **National Policy on Software Products – 2019**.
- **Launch Date:** August 2021.
- **Implementing Agency:** The scheme is being implemented by **MeitY Start-up Hub (MSH)**, a nodal entity under the **Digital India Corporation (DIC)**. MSH acts as a national coordination, facilitation, and monitoring centre for MeitY's startup initiatives.

Objectives of SAMRIDH Scheme

The primary objective is to **support existing and upcoming Accelerators to select and accelerate potential IT-based startups to scale**. The program specifically focuses on accelerating startups by providing:

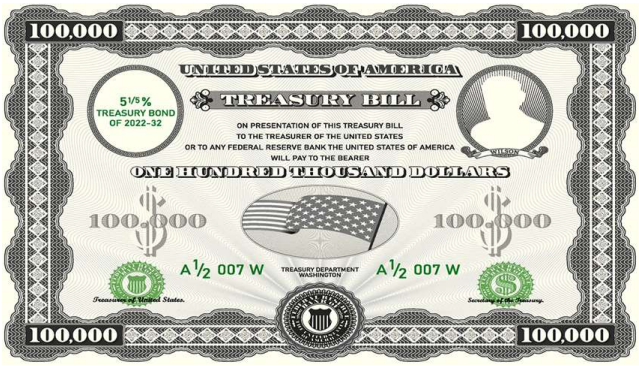
- **Customer Connect:** Facilitating connections with potential customers.
- **Investor Connect:** Connecting startups with investors (Venture Capitalists and Angel Investors).
- **International Market Connect:** Providing opportunities for international expansion.
- **Promote Innovation:** Encourage startups to develop innovative solutions, especially in emerging and deep technologies.
- **Bridge Funding Gap:** Address the gap in accessing growth-stage funding for startups.

Key Features and Support Mechanism

- **Financial Investment:**
    - An investment of **up to Rs 40 lakh** (average of Rs 30 lakh per cohort) is provided to a startup, based on its current valuation and growth stage.
    - This funding is channeled **through selected accelerators**.
    - It facilitates **equal matching investment by the accelerator/ investor**, effectively doubling the funding for the startup.
    - MSH may take **equity** in startups via SAFE (Simple Agreement for Future Equity) or promissory notes to ensure program sustainability.
- **Accelerator Role:**
    - The scheme selects accelerators (government-supported organizations, academic institutions, private sector, early-stage startup funding platforms).
    - These accelerators then select **5-10 startups each** in focused areas.
    - In the first round, 22 Accelerators across 12 states supported 175 startups. The target is to support 300 tech startups over three years.
- **Focused Areas:** Startups are selected in key tech verticals such as:
    - **Health-tech**
    - **Ed-tech**
    - **Agri-tech**
    - **Consumer-tech**
    - **Fin-tech**
    - **Software as a Service (SaaS)**
    - **Sustainability**
    - Also includes AI/ML, IoT, Industry 4.0, Space & Satellite Tech, Clean Tech.
- **Services Provided by Accelerators:** Accelerators provide comprehensive services to startups, including:
    - **Expert diagnostic** for market research and product positioning.
    - **Mentoring** startups through experts based on tech vertical.
    - **Legal Assistance** for all matters: IP, Incorporation, and other compliance matters.
    - **Connected learning** and networking through a shared platform.

- **Co-learning** and weekly meets between founders of all startups in a cohort.
- **Demo Day:** Presentation opportunities with Venture Capitalists (VCs) and angel investors.
- **Assistance to startups in negotiating and closing investment deals** with VCs and angel investors.

Treasury Bills



Context: India recently extended financial support to the Maldives by renewing a USD 50 million Treasury Bill for another year through the State Bank of India (SBI).

About Treasury Bills (T-Bills)

- **Nature:** A **short-term debt instrument** issued by the Indian government.
- **Issuing Authority:** Issued through the **Reserve Bank of India (RBI)**.
- **Purpose for Government:**
  - The primary objective is to **meet the short-term financial requirements of the central government**.
  - RBI also issues such treasury bills under its **open market operations (OMO) strategy** to:
    * Regulate the inflation level in the economy.
    * Influence the spending/ borrowing habits of individuals and entities.
- **Purpose for Investors:** For investors, T-Bills represent one of the **safest investments** with the **highest liquidity** among government securities, as they are sovereign-backed.

Features of Treasury Bills

- **Zero Coupon Securities:** T-Bills are **zero-coupon securities**, meaning they **don't pay interest** periodically.
- **Discount & Redemption:** Instead, they are **issued at a discount** to their face value and **redeemed at the face value (par value) at maturity**.
  - **Example:** A 91-day Treasury bill of ₹ 100/- (face value) might be issued at ₹ 98.
- **Return:** The **return to investors is the difference between the maturity value (face value) and the issue price**.
- **Tenure:** T-Bills are issued in India with specific tenures of:
  - **91 days**
  - **182 days**
  - **364 days**
- **Minimum Investment:** The minimum investment amount is **₹ 25,000 or multiples of this amount**.

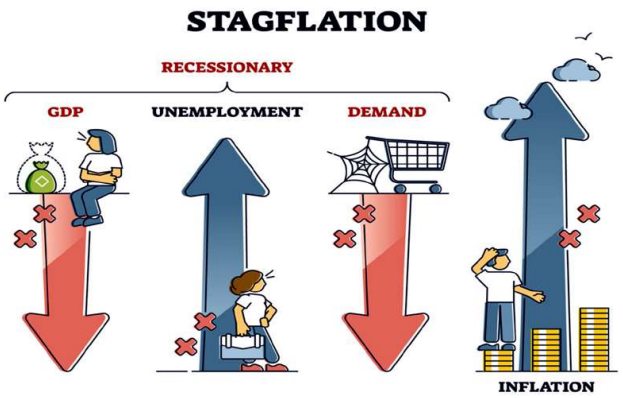
Issue Process

- **Auction Mechanism:** T-bills are issued through an **auction conducted by the RBI** at regular intervals (typically weekly or bi-weekly depending on the tenure).
- **Electronic Platform:** The auctions are held on **RBI's electronic platform called E-Kuber**.

Who Can Buy T-Bills?

- **Broad Eligibility:** T-bills can be purchased by **any entity registered in India**, including:
  - Banks
  - Financial institutions
  - Primary Dealers (PDs)
  - Corporate bodies
  - Institutions
  - Mutual funds
  - State governments
  - Trusts
  - Even **individuals**
- **Markets:** They can be bought in both the **primary market** (through RBI auctions) as well as the **secondary market** (traded on stock exchanges and the over-the-counter market).

Stagflation



Context: In May 2025, concerns over stagflation intensified in the United States, with banks reporting significant unrealized losses from securities investments, indicating potential financial sector stress.

About Stagflation

- **Definition:** Stagflation is a complex economic phenomenon where an economy simultaneously experiences three adverse conditions:
    - **High inflation:** A sustained increase in the general price level of goods and services.
    - **Stagnant or slow economic growth:** A period of little to no increase in the Gross Domestic Product (GDP).
    - **High unemployment:** A significant portion of the workforce is unable to find jobs.
- **Origin of the Term:** The term "stagflation" (a portmanteau of "stagnation" and "inflation") was first used in the **1960s** (by British politician Iain Macleod) and became particularly prominent during the **1970s oil crisis**, when many major economies, including the US and UK, experienced this unusual combination.
- **Policy Dilemma:** Stagflation is particularly challenging for policymakers because the usual economic tools to fight one problem often worsen the other:
    - For example, **raising interest rates** (a common tool to control inflation) may further slow economic growth and increase joblessness.
    - Conversely, **lowering interest rates or increasing government spending** (to stimulate growth and reduce unemployment) can fuel inflation.

Causes of Stagflation

Stagflation can be triggered by a combination of factors, often involving supply-side shocks and policy errors:

- **Supply Shocks:** Sudden and unexpected spikes in the cost of essential resources, such as **oil or food**. This increases production costs for businesses, leading to both higher prices (inflation) and reduced output (slower growth), as seen during the 1970s oil crisis.
- **Policy Errors:** Poorly coordinated fiscal and monetary policies. Examples include:
    - **Excessive government spending** without a corresponding increase in productive capacity.
    - **Delayed interest rate hikes** by central banks, allowing inflation to become entrenched.
    - Policies that restrict growth while simultaneously increasing the money supply.
- **Tariff Increases:** Recent examples like U.S. tariffs can raise input costs for domestic industries, potentially triggering stagflation by increasing consumer prices and reducing overall demand.
- **Structural Issues:** Rigidities in the labor market, lack of investment in infrastructure, or inefficient resource allocation can also contribute to long-term economic stagnation alongside inflationary pressures.

Impact of Stagflation

The simultaneous occurrence of these adverse conditions has severe consequences for an economy:

- **Diminished Purchasing Power:** High inflation erodes the real value of household incomes and savings, reducing consumer purchasing power and consequently lowering overall consumption.

- **Higher Unemployment:** Companies facing higher production costs (due to inflation) and weaker consumer demand (due to stagnant growth) often respond by cutting jobs or slowing hiring, leading to increased unemployment.
- **Reduced Investment:** Economic uncertainty and pessimistic outlook discourage businesses from making new investments, further hampering future economic growth and job creation.
- **Financial Sector Stress:** High interest rates, often deemed necessary to combat inflation, can reduce the value of banks' bond holdings (e.g., fixed-income securities). If depositors lose confidence and withdraw funds, banks may face liquidity crises, as observed with some bank failures (like SVB) in 2023.

Directorate General of Foreign Trade (DGFT)

Context: The Government of India recently updated its import policy for gold and silver to align customs tariffs with trade regulations, a notification issued by the Directorate General of Foreign Trade (DGFT).

About Directorate General of Foreign Trade (DGFT)

- **Status:** The Directorate General of Foreign Trade (DGFT) is an **attached office of the Ministry of Commerce and Industry**.
- **Role:** It is primarily responsible for the **formulation and implementation of India's Foreign Trade Policy (FTP)**, also known as the EXIM (Export-Import) Policy.
- **Headquarters:** Located in **New Delhi**.
- **Structure:** Operates through a network of **24 regional offices** across the country.
- **Evolution:**
    - Before 1991 (pre-liberalization era), DGFT was known as the **Chief Controller of Imports & Exports (CCI&E)**. Its role was primarily regulatory and controlling.
    - Post-liberalisation (after 1991), it was restructured as DGFT to act as a **trade facilitator**, shifting its focus from control to promotion and facilitation of exports and imports.

Key Functions of DGFT

The DGFT performs a wide range of functions to manage and promote India's foreign trade:

- **Policy Implementation:** Implements India's Foreign Trade Policy (FTP) by issuing various **schemes, licenses, and notifications**. These schemes often provide incentives to exporters.
- **Importer Exporter Code (IEC) Issuance:** Issues the **Importer Exporter Code (IEC)**, which is a **10-digit unique code mandatory for all Indian importers and exporters**. No person or entity can engage in import or export without an IEC.
- **Regulation of Transit Goods:** Regulates the transit of goods across Indian borders as per **bilateral treaties** and international agreements.
- **Export Permissions:** Grants permissions for **free export items** listed in **Schedule 2 of the export policy**, ensuring that restricted or prohibited goods are not exported without proper authorization.
- **Standard Input-Output Norms (SION):** Sets **Standard Input-Output Norms (SION)**, which define the quantity of inputs allowed for the export of a specified quantity of output. This helps in determining duty exemption or remission benefits.
- **Regional Trade Promotion:** Facilitates **regional trade promotion**, especially with **neighbouring countries**, fostering economic ties and trade flows.

- **Dispute Resolution:** Handles **quality complaints** of foreign buyers regarding Indian export products and engages in dispute resolution.
- **Trade Data:** Maintains and disseminates **trade statistics** to analyze trends and inform policy decisions.
- **Harmonized System (HS) Codes:** Formulates or adds new codes in the **ITC-HS Codes** (Indian Trade Classification based on the Harmonized System of Coding), which are codes given to export/import products, ensuring alignment with international standards.

Recent Action (Gold and Silver Import Policy)

- The DGFT has recently updated the import policy for gold and silver.
- This involves **aligning customs tariffs with trade regulations** as per recent changes (e.g., Finance Act 2025).
- The updated policy has introduced **stricter restrictions and revised Harmonized System (HS) codes** for importing gold, silver, and platinum.
- For example, import of high-purity gold and silver is now **'Restricted'** and allowed only through **nominated agencies** (notified by RBI/ DGFT) and **qualified jewellers via the India International Bullion Exchange (IIBX)**.
- These measures aim to streamline imports, enhance transparency, prevent misuse of trade agreements (like the India-UAE CEPA for mislabeling gold as platinum alloy), and ensure all precious metal imports pass through formal and traceable channels.

Market Infrastructure Institutions (MIIs)

Context: To further strengthen the governance mechanism at Market Infrastructure Institutions (MIIs), regulator SEBI recently released comprehensive guidelines for internal audit mechanisms at such establishments, along with the prescribed composition of the audit committee.

About Market Infrastructure Institutions (MIIs)

- **Definition:** A Market Infrastructure Institution (MII) is a **financial entity that provides essential infrastructure for running the daily operations in the Stock Market/Capital Markets**. They are the backbone of a robust and well-regulated financial market.
- **Key Entities:** MIIs primarily consist of the following three entities in the stock market:
    - **Stock Exchanges** (including Commodity Exchanges, e.g., NSE, BSE, MCX). These provide a structured and regulated environment for buying and selling securities.
    - **Clearing Houses/Clearing Corporations** (e.g., NSCCL, ICCL). These ensure the smooth and guaranteed settlement of trades, mitigating counterparty risks.
    - **Depository Organizations** (e.g., NSDL, CDSL). These securely hold investors' securities in dematerialized (electronic) form and facilitate their transfer.
- **Role in Economy:** MIIs help to **efficiently trade financial securities**, which in turn helps in the economic growth of the country by facilitating capital formation and allocation.
- **Core Functions:** These entities provide platforms and mechanisms for:
    - Trading
    - Clearing
    - Settlement
    - Record keeping
    - Storage of securities (dematerialization)
- **Systemic Importance:** Any disruption in the operations of these institutions can **adversely impact the functioning of the entire financial system**, leading to systemic risks.

- **Nature:** While MIIs are **separate corporate entities that are in the business to earn a profit** for their services, they are also considered **first-line regulators in the market** and **have to follow strong corporate governance standards** due to their critical role.
- **Regulation:** The **Securities and Exchange Board of India (SEBI)** is the main regulatory body for the capital markets in India. Therefore, **every MII in the stock market has to be registered with SEBI**.
- **Regulatory Focus:** SEBI's regulatory guidelines primarily include responsibilities for **safeguarding the interests of the investors**, ensuring transparency, and maintaining market integrity.

Recent SEBI Guidelines on Internal Audit and Audit Committee

- **Objective:** To further strengthen the governance mechanism and risk management at MIIs.
- **Internal Audit Mechanism:**
    - Every MII is mandated to conduct an **internal audit of all its functions and activities at least once in a financial year**.
    - The audit must be conducted by an **independent audit firm**.
    - The internal auditor will **report exclusively to the Audit Committee**, ensuring independence from the management.
    - The scope of the audit will cover all functions including critical operations, regulatory compliance, risk management, investor grievances, and business development.
    - Observations from the internal auditor are sent to respective Heads of Departments (HoDs) for comments before the final report is submitted to the Audit Committee. Any observations dropped must be justified.
    - The internal auditor must appraise the Audit Committee on critical issues at least twice a year (within 60 days from end of September and March), **in the absence of the management**, to ensure objective discussions.
- **Composition of the Audit Committee:**
    - The Audit Committee of the MII **shall not consist of any Executive Director (including the Managing Director)** of the MII. This ensures greater independence and objectivity in oversight.
    - While Key Management Personnel (KMPs), including the MD, can be invited to attend meetings with the permission of the Chairman of the committee, they **will not have voting rights**.
    - Auditors also have a right to be heard but no voting rights.
    - **Responsibilities of the Audit Committee** include approval of related-party transactions, scrutiny of financial statements, and evaluation of internal financial controls and risk management systems.
- **Implementation:** These new norms typically come into effect after a specified period (e.g., 90 days from circular issuance) to allow MIIs to adapt.

RBI Dividend - Boosting Government Finances

Context: In a significant development for India's public finances, the **Reserve Bank of India (RBI)** has approved the transfer of a record **₹ 2.69 lakh crore surplus to the Union Government as dividend for the financial year 2024-25**. This marks a substantial increase from previous years and provides a crucial fiscal boost to the government.

I. What is a Dividend in Public Finance (RBI Context)?

- **Definition:** In the context of the RBI, a dividend refers to a **portion of the surplus (profits)** generated by the central bank that is transferred to its sole shareholder, the **Government of India**.
- **Nature of Revenue:** RBI dividends constitute a significant source of **non-tax revenue** for the government. Non-tax revenue includes income earned from sources other than direct or indirect taxes, such as fees, fines, profits from public sector undertakings (PSUs), and interest from loans.
- **Legal Basis:** The transfer of dividends from the RBI to the government is governed by the **Reserve Bank of India Act, 1934**. This transfer is subject to approval by the **RBI Central Board**, which evaluates the central bank's financial health and capital requirements.
- **Purpose for Government:** These dividends play a crucial role in **bridging the government's fiscal deficit**. A fiscal deficit is the difference between the government's total expenditure and its total revenue (excluding borrowings). A higher dividend payout provides the government with more fiscal space to fund its expenses or reduce borrowing.
- **Distinction from Private Dividends:** While private corporate dividends typically require shareholder approval based on profit distribution policies, the RBI's transfer is primarily a **policy-based institutional mechanism** guided by its unique role as a central bank.
- **Dividend Yield:** While not directly applicable in the same way as for listed companies, "Dividend Yield" in a corporate context measures the return from dividends relative to the stock price, calculated as: Dividend Yield=(Annual Dividend per Share)/(Current Market Price of Share)

II. How Does RBI Earn a Surplus?

The RBI, as the nation's central bank, is not a profit-making entity in the commercial sense, but it generates surplus income through its various statutory functions and operations:

1. **Open Market Operations (OMOs):** Buying and selling government securities to manage liquidity in the banking system.
2. **Management of Foreign Exchange Reserves:** Investing India's vast foreign exchange reserves (comprising foreign currency assets, gold, and SDRs) in various instruments, primarily safe overseas bonds. Interest earned on these investments is a major income source.
3. **Foreign Exchange Transactions:** Actively participating in the foreign exchange market to manage the Indian Rupee's volatility. Gains arise from buying and selling foreign currencies, especially if the rupee weakens after the RBI sells dollars from its reserves.
4. **Lending to Banks:** Earning interest from commercial banks when they borrow funds from the RBI through mechanisms like the repo rate.
5. **Holding Rupee-Denominated Securities:** Earning interest income from its holdings of government bonds and treasury bills.
6. **Seigniorage (Currency Issuance Profit):** The difference between the face value of currency notes and coins and their cost of production.

III. Why a Higher Surplus in 2024-25?

The significant increase in the RBI's surplus for FY 2024-25 (₹ 2.69 lakh crore, 27% higher than ₹ 2.10 lakh crore in FY 2023-24) is primarily attributed to:

1. **Increased Sale of Foreign Exchange Reserves:** The RBI was an active participant in the foreign exchange market, particularly in January 2025, when it emerged as the **top seller of foreign exchange among Asian central banks**. Selling dollars when the rupee is under pressure or to

manage liquidity generates profits if the exchange rate is favorable to the RBI.

2. **Higher Interest Income:** Robust earnings from its investments, including:
    - **Government Securities:** Increased interest income from its holdings of domestic government bonds.
    - **Foreign Assets:** Improved returns on its overseas investments due to global interest rate movements.
3. **Gains from Forex Transactions:** Favorable movements in exchange rates leading to significant gains from currency trading amid volatility in global markets.

IV. Economic Capital Framework (ECF):

- **Background:** The amount of surplus that the RBI can safely transfer to the government is determined by the **Economic Capital Framework (ECF)**. This framework was first established in August 2019 based on the recommendations of an **Expert Committee led by Dr. Bimal Jalan**.
- **Purpose of ECF:** The ECF guides how much capital the RBI needs to maintain as a buffer to **absorb financial shocks** (like market risks, credit risks, operational risks, and monetary/financial stability risks) while ensuring financial stability. It aims to strike a balance between maintaining a robust balance sheet for the central bank and ensuring consistent surplus transfers to the government.
- **Revised ECF (May 2025):** The transferable surplus for FY 2024-25 was calculated as per the **Revised Economic Capital Framework**, which was approved by the RBI Central Board on **May 15, 2025**. This revision, following a five-year review, confirmed the existing ECF's success and retained its core principles, with some changes to enhance flexibility in maintaining risk buffers (e.g., widening the range for Contingent Risk Buffer to 4.5%-7.5% of the balance sheet size).
- **Contingent Risk Buffer (CRB):** A key component of the ECF, the CRB is a specific risk provisioning set aside by the RBI to handle unforeseen risks. The transfer of surplus to the government is only possible after ensuring that the CRB is maintained within the prescribed range. For FY25, the RBI decided to increase its CRB to 7.5%, indicating a cautious approach despite the high transfer.

V. Implications of Higher Dividend for the Government:

- **Fiscal Space:** The record dividend provides significant **fiscal room** for the Union Government.
- **Fiscal Deficit Reduction:** It can help **reduce the fiscal deficit** as a percentage of GDP, potentially lowering it from the budgeted estimate. Analysts predict a reduction of 20-30 basis points.
- **Meeting Budget Targets:** The higher payout is likely to **exceed the budget estimates** for dividend income from the RBI and other public sector entities, providing a comfortable buffer.
- **Flexibility:** It offers the government **cushion** to absorb potential shortfalls in other revenue streams (like tax or disinvestment receipts) or to manage unanticipated additional expenditures.
- **Bond Market Impact:** A higher dividend can lead to expectations of lower government borrowing, potentially **reducing bond yields** and easing interest rates in the economy.
- **Liquidity in Banking System:** The transfer of funds from RBI to the government's account, and then into the economy via government spending, can also **boost banking liquidity**.

RoDTEP Scheme - Boosting India's Exports

RODTEP SCHEME

Context:

The Government of India recently announced the **restoration of benefits under the Remission of Duties and Taxes on Exported Products (RoDTEP) scheme**. This re-inclusion applies to exports made by holders of **Advance Authorization (AA)**, **Export-Oriented Units (EOUs)**, and units operating in **Special Economic Zones (SEZs)**. This move, effective June 1, 2025, aims to further boost India's export competitiveness.

I. What is the Remission of Duties and Taxes on Exported Products (RoDTEP) Scheme?

- **Introduction:** The RoDTEP scheme was brought in through an amendment to the Foreign Trade Policy 2015-20 and became effective for exports from **January 1, 2021**.
- **Primary Aim:** Its main goal is to **refund various central, state, and local taxes and duties** that are incurred on exported goods but are **not otherwise credited, reimbursed, or refunded** under any other scheme. These are often called "embedded taxes" because they are hidden within the cost of the product.
- **WTO Compliant:** This scheme is designed to be fully **compliant with World Trade Organization (WTO) norms**. This is a key difference from its predecessor (MEIS), which faced challenges at the WTO. RoDTEP follows the global principle that taxes should not be exported.
- **Digital Implementation:** It is implemented via a **comprehensive end-to-end digital platform** (ICEGATE portal) to ensure transparency, efficiency, and quick processing of refunds.
- **Objective:** By removing the burden of these embedded taxes, RoDTEP aims to **reduce the cost of Indian exports**, making them more competitive in international markets and thereby **encouraging exports** from the country.
- **Administering Ministry:** The scheme is administered by the **Department of Revenue, Ministry of Finance**.
- **Replacement of MEIS:** RoDTEP **replaced the Merchandise Export from India Scheme (MEIS)**. This change was made directly in response to the US challenging India's export subsidies under MEIS at the WTO, which ruled against India. RoDTEP was thus framed to ensure India's export support mechanisms are in line with international trade rules.

II. How Tax Reimbursement Under RoDTEP Works:

- **Mechanism:** The scheme provides a way to refund taxes, duties, and levies that are not already refunded under any other mechanism (at central, state, or local levels). These are the taxes incurred by exporters during the **manufacture and distribution of exported products**.
- **Coverage:** This includes not only direct costs but also **prior-stage cumulative indirect taxes** on goods used in the production process.
- **Refund Process:**
    - Rebates are given to eligible exporters as a **percentage of the Freight on Board (FOB) value of exports** (the value of goods when loaded onto the ship/ plane).
    - The refund is issued in the form of **transferable e-scrips**.
    - These e-scrips (electronic certificates with monetary value) are maintained in an **electronic credit ledger by the CBIC (Central Board of Indirect Taxes and Customs)**.
    - **Usage of e-scrips:** These e-scrips can be used by the exporter to **pay Basic Customs Duty on the import of goods**. They can also be **transferred electronically to another party**, providing liquidity to exporters.
    - Exporters must declare their intent to claim RoDTEP when filing the shipping bill.

III. RoDTEP Scheme Eligibility Criteria:

- **Sector Coverage:** It applies to **all sectors involved in the export of goods**, regardless of their turnover.

- **Country of Origin:** The exported goods must have been **manufactured in India**.
- **Exporter Type:** Both **merchant exporters** (traders) and **manufacturer exporters** are eligible.
- **Direct Export:** The goods should have been **directly exported** by the claiming person.
- **Priority Sectors: Labor-intensive sectors** that previously received benefits under the MEIS Scheme are often given priority.
- **Special Categories:**
    - **Special Economic Zone (SEZ) Units**
    - **Export-Oriented Units (EOUs)**
    - **Advance Authorization (AA) holders** (these categories were recently re-included from June 1, 2025).
- **E-commerce Exports:** Goods exported through **e-commerce platforms** are also eligible.
- **Ineligible Products: Re-exported products** (goods imported and then exported without significant value addition) are generally **not eligible** under this scheme. Also, items already benefiting from other duty exemption schemes are typically excluded to avoid double benefits.

IV. Significance of RoDTEP:

- **Enhancing Competitiveness:** By compensating for hidden taxes, RoDTEP makes Indian products more competitive in the global market.
- **WTO Compliance:** Ensures India's export promotion schemes are in line with international trade rules, avoiding disputes.
- **Ease of Doing Business:** The digital platform simplifies the refund process, reducing paperwork and delays for exporters.
- **Support to Exporters:** Provides crucial financial support to exporters, especially MSMEs, helping them manage costs.
- **Boosting "Make in India":** Encourages domestic manufacturing for export by ensuring a level playing field with global competitors.

India Again on US 'Priority Watch List' Over IP Rights Challenges

1. Background: What is the USTR Special 301 Report?

- Published **annually** by the **Office of the U.S. Trade Representative (USTR)**.
- Reviewed **over 100 countries** on how well they **protect and enforce Intellectual Property Rights (IPR)**.
- Divides countries into:
    - **Priority Watch List** – Most serious IP issues.
    - **Watch List** – Moderate concerns.
- The 2025 report places **India on the Priority Watch List**, along with **7 other countries**:
    - **China, Mexico, Russia, Chile, Argentina, Indonesia, Venezuela**

2. Key Findings: Why Is India on the List?

A. Patent System Issues

i. Section 3(d) of Indian Patents Act (1970)

- **Only allows patents for new forms of known substances** if they show **significant improvement in efficacy**.
- Aimed at preventing **"evergreening"** (repeated minor changes to extend patent life).
- **Criticized by pharma companies** (especially U.S. firms) who say it limits innovation.
- **Example:** Novartis's cancer drug *Glivec* was denied a patent in India in 2013 under Section 3(d).

ii. Patent Backlogs & Delays

- **India has over 1.6 lakh (160,000+) pending patent applications** as of late 2024.

- Average time for a patent grant in India: **5-7 years**, vs **2-3 years** in the U.S.

iii. Pre-grant Opposition

- Allows any person to challenge a patent before it's granted.
- Seen as **unpredictable and misused** by competitors.

iv. Excessive Compliance

- Patent holders must:
  - File frequent updates on patent usage.
  - Submit detailed reports on commercial use.
- Adds **cost and complexity**.

B. Copyright and Piracy Issues

i. Section 31D - Compulsory Licensing for Broadcasting

- Allows broadcasters to use copyrighted content **without negotiation**, at a fixed royalty.
- **Leads to confusion** about licensing, discouraging foreign investment in creative industries.

ii. Piracy & Counterfeiting

- India ranked **6th globally in digital piracy losses** in 2024.
- Estimated **revenue loss: $2.8 billion/year** (source: Digital Citizens Alliance).
- Common issues:
  - Illegal streaming and torrent sites.
  - **Signal piracy**: Local cable operators redistribute channels without paying.
  - **Academic piracy**: Photocopying of textbooks, unauthorized reprints.

iii. Weak Enforcement

- Conviction rates for IPR violations remain **below 10%**.
- Penalties are often **not a strong deterrent**.
- **Poor inter-agency coordination** between police, customs, and state authorities.

C. Trade Secret Protection

- **No standalone law** for trade secrets in India.
- Businesses rely on **contracts or civil litigation**.
- Makes India **less attractive** for R&D-heavy sectors like AI, biotech, and pharma.

D. Trademark Challenges

i. High Counterfeiting

- India is **ranked among top 10 countries** for counterfeit products globally (source: OECD-EUIPO 2023 report).
- Major sectors affected: Apparel, electronics, pharmaceuticals.

ii. Trademark Registration Quality

- Cases of **fraudulent or duplicate trademarks** being approved.
- **Trademark pendency in 2024**: ~275,000 applications awaiting examination.

iii. International Treaties

- India has **not joined** the **Singapore Treaty on the Law of Trademarks**, which would improve:
  - Procedural uniformity.
  - Online application systems.
  - Global recognition.

E. Barriers for Foreign Companies

i. Biological Diversity Rules (2024)

- Requires **foreign applicants** to get clearance before filing patents using Indian biological resources.
- Seen as **an extra hurdle** for pharma and biotech companies.

ii. High Tariffs

- **Import duties on IP-intensive products** remain high:
  - ICT products: **10–20%**
  - Pharmaceuticals: **15–25%**
  - Solar equipment: **20–40%**
  - Medical devices: **5–10%**
- These are viewed as **non-tariff barriers** and criticized by the U.S. as **violating WTO commitments**.

3. India's Efforts to Improve IP Protection

A. Policy and Legal Reforms

i. National IPR Policy (2016)

- Aligns with **TRIPS Agreement** (WTO).
- 7 objectives, including:
  - Public awareness
  - Legal reform
  - IP commercialization
  - Human capital development

ii. Patents (Amendment) Rules 2024

- Simplified forms
- Shortened deadlines
- Reduced fees for startups and small entities

B. Support for IP Creators

i. National Intellectual Property Awareness Mission (NIPAM)

- Reached **1.5 million+ people** across **7,000+ institutions** by 2024.
- Focused on **students, startups, MSMEs**.

ii. SIPP (Scheme for Startups Intellectual Property Protection)

- Offers:
  - **Government-borne facilitation fees**
  - Support for filing up to **10 trademarks and 2 patents per startup**

iii. IP Saarthi Chatbot

- AI tool for guiding users on filing patents/ trademarks.
- **Operational 24x7**, multilingual interface.

C. Judicial Strengthening

- **Dedicated IP Divisions in High Courts**:
  - Delhi, Madras, Calcutta, Himachal Pradesh.
  - Faster resolution of IPR cases.
- **Commercial Courts Act (2015)**:
  - Also helps speed up IPR disputes under fast-track mechanisms.

D. Global Cooperation

- India is considering joining:
  - **WIPO Copyright Treaty (WCT)**
  - **WIPO Performances and Phonograms Treaty (WPPT)**
- Participates actively in:
  - **WIPO Assemblies**
  - **Bilateral IPR working groups** with the US, EU, and Japan

4. Why This Matters: Impact of the Watch List

A. Trade & Investment

- May deter U.S. and global companies from:
  - Investing in India
  - Sharing technology
  - Entering IP-heavy sectors (e.g. pharma, electronics)

B. Reputation

- Affects India's image as a global **innovation hub**.
- Seen as **less IP-friendly** than China, Brazil, or South Korea in international rankings.

5. Conclusion

India has made visible efforts, including legal updates, policy changes, and public awareness, **but major gaps remain**: Patent approval delays, Weak IP enforcement, Lack of trade secret law, High piracy and counterfeiting.

Next Steps for India:

- Simplify IP compliance.
- Strengthen enforcement and penalties.
- Pass standalone legislation for trade secrets.
- Improve global trust by ratifying key IP treaties.

WAVES 2025 and India's Creative Economy

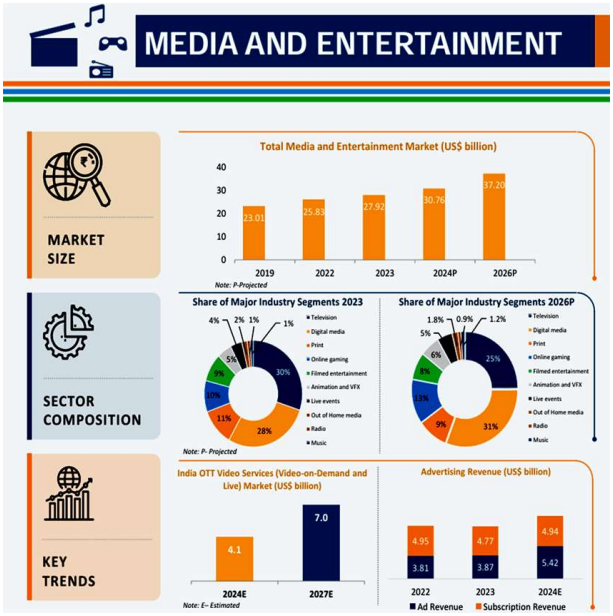
Introduction

- On 1st May 2025, the Prime Minister of India addressed the **World Audio Visual and Entertainment Summit (WAVES 2025)**.
- In his address, he highlighted India's growing role in the global creative economy.
- He emphasized the importance of the **"Orange Economy"**, which refers to sectors driven by culture, creativity, and intellectual property (IP).

About WAVES 2025

- **WAVES 2025** is the **first edition** of the World Audio Visual and Entertainment Summit.
- It was held at the **Jio World Convention Centre** in **Mumbai, Maharashtra**.
- The event was **hosted by the Government of India** and organized by the **Ministry of Information and Broadcasting**.

- The official **tagline** of WAVES 2025 is **"Connecting Creators, Connecting Countries."**
- WAVES 2025 is a global platform to promote **innovation, regulation, and investment** in the **media and entertainment sector**.
- It aims to position **India as a global hub** for **media and entertainment**, **intellectual property creation**, and **technological innovation**.
- The summit showcases India's strength in **content creation**, as well as its innovation in sectors like **broadcasting, films, animation, gaming, digital media, and artificial intelligence**.
- A major feature of the summit is the **WAVES Bazaar**, a global digital marketplace.
- This marketplace is designed to connect **content creators with buyers and investors** from across the world.
- The summit also aims to project India's **cultural heritage and creative capabilities** on the international stage, thereby enhancing India's **soft power**.



What is the Orange Economy?

- The **Orange Economy** is also known as the **Creative Economy**.
- It refers to **economic activities based on culture, creativity, and intellectual property**.
- These activities are knowledge-intensive and include both traditional and digital forms of cultural expression.
- The orange economy includes sectors such as **art, music, cinema, design, fashion, gaming, digital media, advertising, software, animation, comics, and extended reality (XR)**.
- It is recognized globally as a major source of **employment**, **economic growth**, and **inclusive development**.
- It also plays a significant role in achieving the **United Nations Sustainable Development Goals (SDGs)**.
- The **United Nations** declared **2021** as the **International Year of Creative Economy for Sustainable Development**, highlighting its global importance.
- As digital content consumption increases, creative industries are increasingly influencing societies and shaping narratives.

India's Potential in the Orange Economy

- India has a **rich and diverse cultural ecosystem** that supports a thriving creative economy.
- The country has a **2,000-year-old artistic legacy**, including classical texts like **Bharata Muni's Natya Shastra**, which continues to inspire content creators today.
- There is a **growing global demand for Indian content**, including films, music, and web series.
- Much of this content is now available with subtitles and is consumed widely across the world.
- The Prime Minister emphasized the need to move from the slogan **"Make in India"** to **"Create in India, Create for the World."**
- The **Indian media and entertainment (M&E) sector** is currently valued at **$28 billion**.
- It is projected to grow to **$44.2 billion by 2028**.

- The **creator economy** within India is growing at a **compound annual growth rate (CAGR) of 18%**.
- According to a report by **Ernst & Young**, it is expected to rise from **₹ 19 billion in 2023** to **₹ 34 billion by 2026**.
- The creative economy in India contributes **approximately $30 billion to the GDP**.
- It employs around **8% of the country's total workforce**.
- India's **creative exports** exceed **$11 billion annually**.

Government Initiatives to Promote the Creative Economy

- The Government of India has launched several initiatives to support the growth of the creative economy.
- It has announced a **Creative Economy Fund worth $1 billion** to provide financial support to content creators.
- A sum of **₹ 391 crore** has been sanctioned to establish the **Indian Institute of Creative Technology (IICT)**, which will offer specialized training and research in creative fields.
- The government has introduced the **National Creators Award**, which recognizes the contributions of digital content creators in India.
- These awards aim to encourage innovation and excellence in online creativity.
- The **All India Initiative on Creative Economy (AIICE)** was launched by the **Indian Chamber of Commerce**.
- This initiative aims to unlock the potential of India's creative industries through policy support and industry collaboration.
- The Indian government is also working on **intellectual property reforms** and **anti-piracy measures** to protect the rights of creators.
- It is building **global partnerships** to enhance the reach and impact of Indian content worldwide.

India's Soft Power and Cultural Influence

- India's creative talent has played a vital role in enhancing its image globally.
- Renowned figures like **Raj Kapoor, Satyajit Ray, A.R. Rahman, and S.S. Rajamouli** have earned international acclaim.
- Their works have strengthened India's **cultural diplomacy** and expanded its **soft power influence**.
- Events like **WAVES 2025** provide platforms for India to showcase its **artistic diversity, cultural values, and storytelling traditions** to a global audience.

Challenges to the Creative Economy in India

- Despite its potential, India's creative economy faces several challenges.
- There are ongoing concerns related to **misinformation**, **copyright infringement**, **privacy issues**, and **monopolization of markets**.
- Access to digital infrastructure in **rural areas** remains limited, which hampers inclusive participation
- There is also a **lack of formal financing options** for small and independent creators.
- These challenges require policy attention, regulatory reforms, and targeted investments to ensure sustainable growth in the sector.

Conclusion

India's creative economy holds immense potential for economic, cultural, and social development.

With strategic initiatives like **WAVES 2025**, the government is actively working to establish India as a **global hub for intellectual property, cultural exchange, and media innovation**.

The creative economy not only supports economic growth but also strengthens India's global presence through **soft power and cultural diplomacy**.

EDITORIALS

Crux of The Hindu & Indian Express

EConomics

Vizhinjam Port: India's First Dedicated Container Transshipment Port

Inauguration Date: May 2025

Location: Near Thiruvananthapuram, Kerala

Project Cost: ₹ 8,800 crore

1. Introduction

- In May 2025, the Prime Minister of India inaugurated the **Vizhinjam International Deepwater Multipurpose Seaport** in Kerala.
- This is India's **first dedicated container transshipment port** and represents a major milestone in India's maritime infrastructure.
- The port aims to reclaim cargo traffic that currently passes through foreign ports like **Colombo, Singapore, and Dubai**, thereby reducing dependency on external logistics hubs.
- It will also allow India to **directly handle global cargo**, strengthening its maritime sovereignty.

2. Technological and Operational Features

- Vizhinjam is India's **first semi-automated port**, equipped with an **AI-powered Vessel Traffic Management System (VTMS)** developed in collaboration with **IIT Madras**.
- It is designed to serve as a state-of-the-art transshipment hub capable of handling **mega container ships** efficiently and safely.

3. Development and Funding

- The port is developed by **Adani Ports and SEZ Ltd** in partnership with the **Government of Kerala**.
- The Kerala government has contributed **two-thirds of the total cost**, including the funding for a **2.95-kilometre breakwater**, reflecting strong state-centre collaboration.

4. Key Features of Vizhinjam Port

- **Natural Depth:** The port has a natural draft of **nearly 20 metres**, making it suitable for docking large vessels without extensive dredging.
- **Strategic Location:** Vizhinjam is situated just **10 nautical miles from the East-West international shipping route**, providing unparalleled access to global maritime traffic.
- **Connectivity:** The port will be linked via **National Highway 66**, a **new railway line**, and **Kerala's first cloverleaf interchange** to ensure seamless inland transportation.
- **International Integration:** Vizhinjam is part of **MSC's Jade Service**, which connects **Singapore to Europe**, cementing India's role in the international shipping network.

5. Strategic Importance

- Vizhinjam Port will reduce India's **dependence on foreign ports** for transshipment, thus decreasing logistics costs and turnaround times for Indian exporters and importers.

- It will enhance India's **strategic presence** in the **Indian Ocean Region (IOR)** and position the country as a **global maritime hub**.

6. India's Current Port Sector Profile

- **Port Infrastructure**
  - India has **13 Major Ports** governed by the **Major Port Authorities Act, 2021**.
  - Over **200 Minor Ports** are under state governments and governed by the **Indian Ports Act, 1908**, which is outdated and requires reform.
- **Maritime Significance**
  - India is the **16th largest maritime nation** in the world.
  - Indian ports handle **95% of international trade by volume** and around **70% by value**.
  - India's geographical location along key global trade routes gives it high potential to become a transshipment hub.

7. Economic Significance of Ports in India

Ports are vital enablers of trade and contribute significantly to India's GDP by:

- Enabling **fast and cost-effective import-export operations**
- **Boosting export competitiveness** and reducing trade deficits
- Generating large-scale **employment** in logistics, warehousing, and transportation
- **Attracting 100% FDI** under the automatic route for port infrastructure
- Supporting the growth of **Coastal Economic Zones (CEZs)** and **industrial clusters**
- Contributing to government revenues through **customs duties, port charges**, and **service taxes**

8. Recent Achievements in the Port Sector

Capacity Expansion

- Major ports have increased cargo handling capacity to **820 Million Metric Tonnes (MMT)** — a **47% growth since 2014**.
- Overall port capacity has doubled to **1,630 MMT**.
- India aims to reach **10,000 MMT port capacity by 2047**.

Mega Port Projects

- **JNPT** has crossed **10 million TEUs** in container handling.
- **Vadhavan Port** in Maharashtra is under development and will be India's **largest container port**.
- **Galathea Bay Port** in Great Nicobar is planned to be a **major international transshipment hub**.

Operational Efficiency

- India improved to **22nd rank in International Shipments** in the **World Bank's Logistics Performance Index (2023)**.
- Vessel turnaround time has decreased to **0.9 days**.
- Container dwell time has reduced to **3 days**.
- **Nine Indian ports** were listed in the **World Bank's Container Port Performance Index (2023)**.
- **Visakhapatnam Port** was ranked among the **top 20 ports globally**.

9. Key Challenges in the Port Sector

1. Many **minor ports lack modern infrastructure**, deep berths, and mechanisation.
2. Limited deployment of **advanced container handling technologies**.
3. Inadequate planning and insufficient cargo-handling equipment cause delays.
4. **Fragmented governance** due to dual control by central and state governments.
5. The **Indian Ports Act, 1908** is outdated and not aligned with today's trade demands.
6. **Siltation issues**, especially at east coast ports, reduce effective operational depth.
7. Despite digital initiatives, **cargo inspections and clearances** are delayed due to lack of coordination.

10. Government Initiatives and Reforms

Green and Digital Ports

- **Harit Sagar Guidelines** promote sustainable port development.
- **Sagar Setu App** enhances cargo clearance and logistics tracking.
- The **National Logistics Portal (Marine)** digitizes coordination between port stakeholders.

Legislative Reforms

- **Major Port Authorities Act, 2021** ensures autonomy and corporate-style governance.
- **Marine Aids to Navigation Act, 2021** modernizes navigation services.
- **Indian Vessels Act, 2021** harmonizes inland vessel regulation across states.

Strategic Vision Documents

- **Maritime India Vision 2030** aims to develop **mega ports**, transshipment hubs, and modern logistics systems.
- The **Sagarmala Programme** focuses on port-led development, **coastal connectivity**, and logistics cost reduction.

11. Way Forward

1. Replace the **Indian Ports Act, 1908** with a modern legal framework encouraging **private investment**.
2. Modernize **non-major ports** with container scanners and automated handling systems.
3. Introduce **smart port systems** using technologies like **IoT, blockchain, and AI**.
4. Strengthen **last-mile connectivity** through integrated road and rail links.
5. Create a **predictable regulatory environment** to attract global capital and expertise.
6. Ensure **end-to-end digital documentation**, real-time tracking, and automated inspections to reduce inefficiencies.

Conclusion

The commissioning of the **Vizhinjam Port** is a landmark event in India's maritime development journey.

It reflects India's vision of becoming a **self-reliant and globally competitive shipping hub**.

With continued reforms, infrastructure upgrades, and efficient governance, India is poised to become a **leading maritime economy** and a key player in **global supply chains**.

A robust and modern port economy will be vital in achieving the vision of a **$5 trillion economy** and establishing India as a prominent **blue economy**.

India–UK Free Trade Agreement (FTA) – 2025

Announcement

- The India–UK Free Trade Agreement (FTA) was officially concluded on **May 6, 2025**.
- It was jointly announced by Indian Prime Minister **Narendra Modi** and UK Prime Minister **Keir Starmer**.
- The FTA includes a **Double Contribution Convention (DCC)** on social security.

Definition of Free Trade Agreement

- A **Free Trade Agreement (FTA)** is a treaty between two or more countries to reduce or eliminate tariffs and non-tariff barriers on goods and services traded among them.

Objectives of FTAs

- To promote trade by reducing transaction costs.
- To provide better market access for domestic industries.
- To encourage cross-border investments.
- To simplify the movement of professionals.
- To strengthen economic and strategic partnerships.

Scope of the India–UK FTA

- **Goods:** Reduction or elimination of customs duties and quotas.
- **Services:** Eased licensing, improved access for businesses.
- **Investment:** Clear, stable legal frameworks and protections.
- **Intellectual Property Rights (IPR):** Harmonized standards and enforcement.

Key Goals of the India–UK FTA

- To significantly enhance trade and innovation between the two nations.
- To deepen the **India–UK Comprehensive Strategic Partnership**.
- To **double bilateral trade**, currently valued at around **USD 60 billion**, by the year **2030**.

Timeline of Negotiations

Date	Milestone
January 2022	Official FTA talks began after Brexit.
2022–2024	Progress delayed due to UK political changes and elections in both countries.
November 2024	Renewed push during G20 Summit in Rio de Janeiro.
February 2025	Final rounds of negotiation resumed.
May 6, 2025	Agreement officially concluded.

Trade in Goods: Tariff Outcomes

Benefits for India

- **99% of Indian exports** to the UK will face **zero tariffs**.
- This covers nearly the **entire bilateral trade value**.
- The FTA will boost India's labour-intensive exports such as:
    - Textiles and garments.
    - Marine products.
    - Leather and footwear.
    - Gems and jewellery.
    - Toys and sports goods.
    - Engineering goods, auto components, and engines.
    - Organic and specialty chemicals.

Benefits for the UK

- India will reduce tariffs on **90% of UK tariff lines**.
- **85% of these** will become **fully duty-free within 10 years**.
- Major reductions include:
    - **Whisky and Gin:** Tariffs reduced from 150% to 75% initially, and then to 40% by the tenth year.
    - **Automotive imports:** Tariffs will fall from over 100% to 10%, under a quota system.
    - Other UK exports that will benefit include medical devices, cosmetics, aerospace parts, soft drinks, chocolates, biscuits, salmon, and lamb.

Consumer Benefits

- **British consumers** will enjoy lower prices on Indian exports such as seafood, clothing, and footwear.
- **Indian consumers** will see price reductions on UK imports like whisky, medical equipment, and cosmetics.

Services, Investment, and Mobility

Services & Investment Liberalisation

- The FTA includes commitments to ease regulations on:
    - Cross-border services.

- Digital trade and financial services.
- Educational exchanges and collaborations.

- The agreement encourages **greater UK investment** in Indian sectors such as fintech, healthtech, aerospace, and education.

Professional Mobility

- The FTA supports easier movement for:
  - **Contractual service suppliers**.
  - **Business visitors**.
  - **Intra-corporate transferees (ICTs)** and their families.
  - **Independent professionals**, including chefs and yoga instructors.

Double Contribution Convention (DCC)

- This is a **bilateral social security agreement** included in the FTA.
- It prevents **double payments** of social security by Indian professionals working in the UK.
- Indian workers will be **exempt from UK social security contributions for 3 years**.
- Contributions made in India will be **recognized in the UK** for retirement eligibility.
- This measure reduces employment costs for Indian companies operating in the UK.

India's FTA Network (as of May 2025)

Partner(s)	Remarks
Sri Lanka, Bhutan	Early bilateral FTAs in South Asia.
Thailand, Singapore, Malaysia	Part of ASEAN-related bilateral engagements.
South Korea, Japan	CEPA-type agreements.
UAE, Australia, Mauritius	Recently signed FTAs including services.
ASEAN (10 nations)	Multilateral trade agreement.
EFTA (4 nations)	Signed 2024–25, includes investment chapters.

India–UK Economic Relations

Historical Context

Period	Development
Colonial Rule	India governed by the British Crown (1858–1947).
Post-Independence	India joined the Commonwealth in 1950.
Cold War Era	Strategic divergence: India was non-aligned; UK was in NATO.
1990s Reforms	Liberalisation led to better economic and diplomatic ties.
Since 2004	Strategic partnership was established and deepened.

The **Indian diaspora in the UK** exceeds **1.8 million people**, contributing to business and cultural relations.

Trade Statistics (as of August 2024) :

Year	India–UK Total Trade (£ billion)
2021–22	£27.1
2022–23	£36.3 *(34.2% increase)*

- India is the **12th largest trading partner** of the UK.
- India's exports to the UK show a **services trade surplus**.

Investment Flows

Indian Investment in the UK

- In **2023–24**, Indian firms launched **108 new projects**, creating **7,533 jobs**.
- India is the **second-largest source of FDI** in the UK after the US.
- **971 Indian companies** in the UK:
  - Combined revenue: £68.09 billion.
  - Corporate tax paid: £1.17 billion.
  - Employees: 118,430.
- **65,000+ Indian-owned firms**:
  - Revenue: £36.84 billion.
  - Jobs created: 174,000+.

UK Investment in India

- UK is the **6th largest source of FDI** into India.
- **Cumulative FDI inflows:** $35 billion (April 2000–March 2024).
- UK accounts for **~5.17% of total FDI** into India.
- **635 British companies** in India:
    - Combined turnover: ₹ 4,888.4 billion.
    - Employees: 666,992.

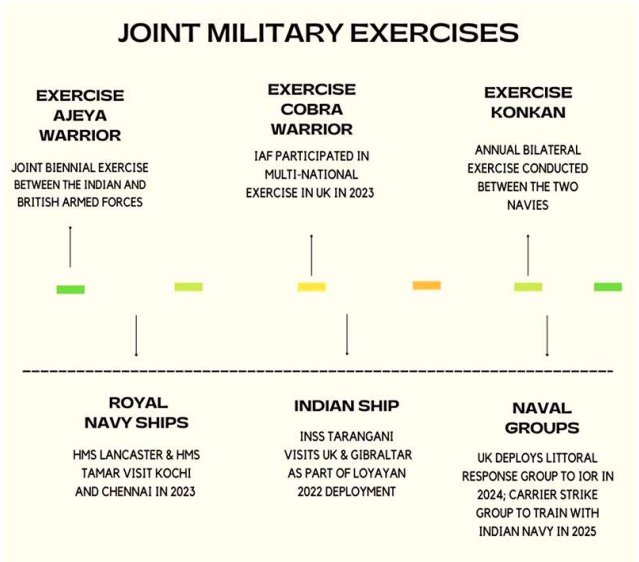
Masala Bonds

- Masala bonds are **INR-denominated bonds** issued abroad by Indian entities.
- They were first issued by **HDFC** in London in **2016**.
- These bonds help raise capital in Indian rupees from global investors.
- **Over £13.41 billion** has been raised by Indian firms through masala, green, and dollar bonds.
- Notable issuers include NTPC, IRFC, and IREDA.
- Masala bonds are listed on the **London Stock Exchange**.

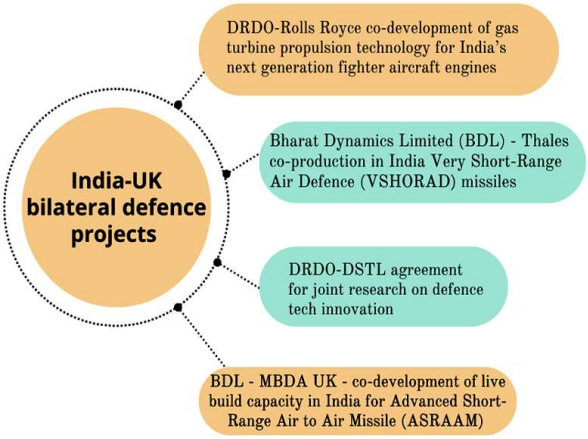
Defence & Strategic Cooperation

- India and the UK regularly conduct **joint military exercises**.
- UK supports **India's Indo-Pacific strategy** and **UNSC reforms**.
- Both collaborate on **AUKUS**, **Commonwealth**, **G20**, and **climate agreements** like the **Glasgow Pact**.
- UK backs India's energy transition goals, including **OSOWOG**.

Key India-UK Joint Military Exercises :



Key India-UK Bilateral Defence Projects



Challenges in India–UK Relations

Issue	Explanation
Russia–Ukraine War	UK criticises Russia; India maintains neutrality.
China and Pakistan ties	UK's balancing approach complicates security trust.
Khalistan Issue	India accuses UK of tolerating separatist elements.
Extradition Delays	No resolution in high-profile cases (e.g., Mallya).
Illegal Migration	Over 100,000 undocumented Indians in the UK.
Colonial Legacy	Issues around partition, cultural artifacts remain.
Defence Procurement	UK slow to adopt India's G2G defence acquisition model.

Jute Corporation of India increases MSP to stop distress sales

भारतीय पटसन निगम लिमिटेड
The Jute Corporation Of India Limited

1. Context of the Announcement

1. On May 14, 2025, the **Jute Corporation of India (JCI)** announced an increase in the **Minimum Support Price (MSP)** for jute to prevent distress sales by farmers.

2. The MSP for **middle-grade jute** has been increased from ₹ 5,335 to ₹ 5,650 per quintal for the **crop year 2025–26**.
3. This new MSP will be applicable from **July 1, 2025**, which marks the start of the new jute crop year.

2. Objective Behind the MSP Hike

- The MSP increase aims to **discourage farmers from selling below the support price**, especially to exploitative middlemen.
- JCI officials urged farmers to be aware of the MSP and avoid distress sales to ensure **sustainability and growth** of the jute sector.
- Prices for **other jute grades** are also expected to rise in **parity** with the hike for the middle-grade category.

3. Awareness and Market Access Initiatives

1. JCI officials noted that **lack of awareness** remains a major barrier for farmers regarding MSPs and the availability of procurement centres.
2. Farmers were encouraged to use the **Paat Mitro mobile application** to find their nearest procurement centre.
3. As of now, there are **110 functioning JCI centres** across India where jute can be sold directly by farmers.

4. Use of Technology in Jute Cultivation

1. The JCI, in collaboration with the **Indian Space Research Organisation (ISRO)**, has been working for 3–4 years to monitor and assess jute cultivation.
2. Satellite-based tools are being used to study **environmental factors, soil health, moisture levels, and production patterns**.
3. A **crop-cutting experiment** has been undertaken to achieve greater accuracy in production estimates.
4. "Active data collection" through **remote sensing technology** is currently underway to support this initiative.

5. Seed Distribution and Production Outlook

1. According to the Jute Commissioner, **over 1,000 tons of jute seeds** have been sold in 2025, compared to 600 tons last year.
2. This sharp rise in seed distribution indicates that **jute production for the upcoming crop year is** expected to be adequate.

6. Procurement Policy and Government Support

1. In the previous year, the **Government of India procured over 5.05 lakh quintals** of jute from farmers.
2. The total procurement was worth **₹ 252.38 crores**, showing substantial government intervention.
3. Officials stated there is **no procurement limit**, and the government is ready to **purchase all jute** offered by farmers if they do not get better rates in the open market.

7. Climate Change and Jute Cultivation

1. Climate change has influenced jute farming practices, leading to **preponed sowing seasons** and impacts from **multiple cyclones**.
2. Despite these challenges, JCI clarified that jute cultivation is resilient and **does not face major climate obstacles**.
3. Jute is considered **eco-friendly**, as each hectare of jute absorbs **15 tons of CO,** and releases **over 10 tons of oxygen**.
4. Jute cultivation also **enhances soil fertility**, benefiting the cultivation of other crops in the same field.

8. Clarification on Market Speculation

1. JCI officials addressed and dismissed **rumours of a jute production shortfall and rising prices**, calling them a **deliberate attempt to manipulate prices**.
2. They assured that **production is on track** and there is no justification for panic or hoarding in the market.

Introduction to Jute

1. **Jute** is one of the most important **natural fibre crops** in India, second only to cotton.

2. It is commonly referred to as the **"Golden Fibre"** due to its golden shine and economic importance.
3. Jute plays a vital role in India's economy as a **cash crop** and a key input for multiple industries.

Climatic and Soil Requirements

1. Jute is classified as a **Kharif crop**, which is sown during the monsoon season.
2. It grows best in **alluvial or loamy soil**, typically found in floodplains and river basins.
3. The ideal **temperature range** for jute cultivation is between **25°C and 35°C**.
4. It requires **heavy rainfall**, typically between **150 cm and 250 cm** annually.
5. The crop also thrives in **humid climatic conditions**, with **relative humidity** ranging from **80% to 90%**.

Jute Production in India and the World

1. India contributes approximately **three-fifths of the global jute production**, making it a leading producer worldwide.
2. **West Bengal** is the dominant jute-producing state, accounting for about **three-fourths of the total production** in India.
3. Other important jute-producing states include **Bihar, Assam, Odisha, and Meghalaya**.

Uses and Economic Significance of Jute

1. Jute is a **valuable cash crop** with applications across various sectors.
2. It is used to manufacture **gunny bags, mats, ropes, yarn, carpets**, and **decorative items**.
3. Due to its biodegradable and recyclable nature, jute is also gaining prominence in **eco-friendly packaging solutions**.

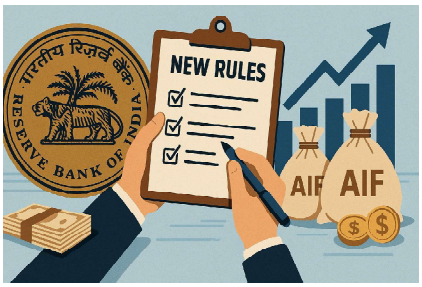
About the National Jute Board (NJB)

1. The **National Jute Board** is a **statutory body** established under the **National Jute Board Act, 2008**.
2. The board functions under the administrative control of the **Ministry of Textiles, Government of India**.
3. The **headquarters** of the National Jute Board is located in **Kolkata, West Bengal**.

Objectives and Functions of the National Jute Board

1. The board aims to **formulate policies and implement programmes** for the holistic development of the jute sector.
2. It works to ensure that **jute producers have access to both domestic and international markets** at **competitive prices**.
3. One of its core missions is to **position India as a global leader in jute manufacturing and innovation**.
4. The board also undertakes **research and development** initiatives to promote **innovative and diversified uses of jute**.

RBI Draft Directions on REs' Investment in AIFs (May 2025)



Why in News

- On **May 19, 2025**, the **Reserve Bank of India (RBI)** issued **revised draft directions** governing investments by **Regulated Entities (REs)** in **Alternative Investment Funds (AIFs)**.
- These directions come in light of concerns around regulatory arbitrage and potential evergreening of loans.
- The RBI, in coordination with SEBI, has proposed new limits and prudential provisions to tighten oversight.
- Comments from stakeholders and the public have been invited until **June 8, 2025**.

Background

- RBI issued the first guidelines on REs' investments in AIFs on **December 19, 2023**, to prevent misuse of such investments for **evergreening stressed assets**.
- **Clarifications** followed via circular dated **March 27, 2024**.
- The 2025 draft directions update and tighten investment norms, keeping in view financial

discipline and SEBI's enhanced due diligence requirements for AIFs.

About Regulated Entities (REs)

- Supervised by **RBI, SEBI, IRDAI**, etc.
- Responsibilities include:
  - Maintaining **financial system stability**
  - Preventing **fraud and money laundering**
  - Enforcing regulatory compliance
- Examples:
  - **Scheduled Commercial Banks**
  - **Non-Banking Financial Companies (NBFCs)**
  - **Insurance Repositories**, etc.

What are Alternative Investment Funds (AIFs)?

- **Privately pooled investment vehicles**, established under the **SEBI (AIF) Regulations, 2012**
- Attract **HNIs and institutional investors**
- Can be formed as:
  - **LLPs**, **trusts**, **companies**, or other legal structures
- Aimed at **non-traditional asset classes**

Categories of AIFs (as per SEBI)

Category	Description	Examples
Category I AIFs	Invest in start-ups, SMEs, infrastructure, socially beneficial sectors	Venture Capital Funds, Angel Funds, Social Venture Funds
Category II AIFs	Do not fall under Cat I or III; **no leverage except operationally**	Private Equity Funds, Debt Funds, Real Estate Funds
Category III AIFs	Use **complex strategies**, may use **leverage** (incl. derivatives)	Hedge Funds, PIPE Funds

- **Category I & II**: Close-ended (Min tenure: 3 years)
- **Category III**: Can be open-ended or close-ended

Key Proposals in the Draft Directions (May 2025) :

Investment Limits

- A **single RE** can invest up to **10%** of the **corpus** of any AIF scheme.
- **Collective investment** by all REs in an AIF scheme capped at **15%**.
- **Investments up to 5%** of corpus per RE are allowed **without any provisioning**.

Provisioning Requirement

- If a RE's investment exceeds **5%** of corpus, and the AIF makes **downstream debt investments** in the RE's **debtor company** (excluding equity and convertible instruments):
  - The RE must make **100% provisioning** for the **proportionate exposure**.

Strategic AIF Exemptions

- Certain AIFs set up for **strategic purposes** may be exempted by RBI in consultation with the **Government of India**.

Implementation

- Revised directions to be **applicable prospectively**.
- Existing commitments/investments to continue under **existing norms**.

Significance of the Move

- Prevents **regulatory circumvention** via AIFs.
- Enhances **transparency** and **risk management** in financial sector investments.
- Reduces the possibility of **evergreening of loans** through indirect channels.
- Aligns with **SEBI's norms** and promotes **fiscal discipline** among REs.

Challenges Ahead

- Balancing financial discipline with AIF sector growth
- Implementation and compliance monitoring by REs
- Managing transitional impact on REs with existing AIF exposure

Continuation of Modified Interest Subvention Scheme (MISS) for FY 2025–26

Context

- On **28 May 2025**, the **Union Cabinet chaired by Prime Minister Narendra Modi** approved the **continuation of the Interest Subvention (IS) component** under the **Modified Interest Subvention Scheme (MISS)** for **FY 2025–26**.

- The decision includes approval for **required fund allocations** and reflects continuity in agricultural credit support policy.

About the Scheme

Modified Interest Subvention Scheme (MISS)

- **Type**: Central Sector Scheme
- **Objective**: To make **short-term agricultural credit affordable** to farmers through interest subvention.
- **Instrument**: **Kisan Credit Card (KCC)**

Features

- **Loan Coverage**: Short-term loans up to **Rs. 3 lakh** for agriculture.
- **Interest Rate**: Subsidized rate of **7%** on KCC loans.
- **Interest Subvention (IS)**:
  - **1.5% interest subvention** provided to **eligible lending institutions**.
  - Applicable to **Public Sector Banks, Private Banks, Regional Rural Banks (RRBs), Cooperative Banks, and NBFC-MFIs**.
- **Prompt Repayment Incentive (PRI)**:
  - Additional **3% interest subvention** for farmers who **repay loans on time**, reducing the **effective interest rate to 4%**.
- **Coverage Extension**:
  - Loans up to **Rs. 2 lakh** for **animal husbandry and fisheries** also eligible under the scheme.

Continuity Clause

- **No structural changes** have been made for FY 2025–26; the scheme continues in its current form.

Rationale Behind Continuation

Credit Support to Farmers

- The scheme ensures **continuous flow of institutional credit**, especially to **small and marginal farmers**.
- Helps in **enhancing agricultural productivity**, reducing dependency on informal credit, and promoting **financial inclusion**.

Economic Considerations

- With current lending cost trends, **MCLR (Marginal Cost of Lending Rate)** and **repo rate movements** indicate that the **1.5% subvention** is crucial to help banks offer loans at affordable rates, especially by **cooperative and rural banks**.

Agricultural Credit Highlights

Growth in Institutional Credit

- **KCC-based disbursement** rose from **Rs. 4.26 lakh crore (2014)** to **Rs. 10.05 lakh crore (by Dec 2024)**.
- **Overall agricultural credit flow** grew from **Rs. 7.3 lakh crore (FY 2013–14)** to **Rs. 25.49 lakh crore (FY 2023–24)**.

Technological Reforms

- Launch of **Kisan Rin Portal (KRP)** in **August 2023**:
  - Promotes **digital governance** in loan disbursal and subvention claim processing.
  - Enhances **transparency and efficiency** in scheme implementation.

KCC Penetration

- Over **7.75 crore KCC accounts** exist nationwide.
- Indicates deep institutional outreach and the importance of continued policy support.

Conclusion :

The Cabinet's decision to continue the Modified Interest Subvention Scheme (MISS) underlines the government's long-term commitment to : **Doubling farmers' income, Ensuring low-cost, accessible institutional credit, Strengthening the rural credit ecosystem.** It also aligns with broader goals of **inclusive growth, rural empowerment, and sustainable agricultural development**

❐❐❐

Science & Technology

S8 Tension

Context: Recent deep sky survey by the Subaru Telescope reported an S8 value consistent with prior lensing estimates.

What is S8?

- **Definition:** A cosmological parameter (Sigma Eight) used to quantify the **"clumpiness" or clustering of matter** in the universe.
- **Scale:** Quantifies clustering on a scale of about **26 million light-years**.
- **Purpose:** Helps determine the amount of matter (both visible and dark) clustered in different cosmic regions.

Background: Evolution of the Universe

- **Beginning:** The universe began with the **Big Bang (~13.8 billion years ago)**, initially being highly uniform.
- **Evidence of Early Universe:** Revealed by the **Cosmic Microwave Background (CMB)**.
- **Formation of Structures:** Small fluctuations in density (1 in 100,000) evolved over time into galaxies, star clusters, and filaments, leading to the **lumpy structure of the present universe**.

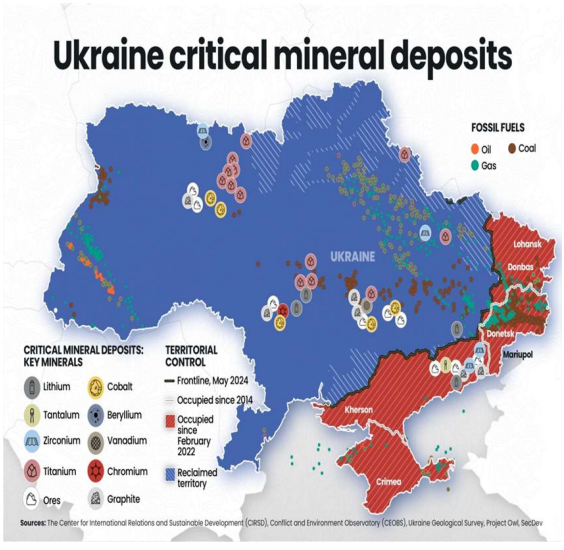
What is the S8 Tension?

- **Definition:** Refers to a **mismatch in the value of S8** as obtained by two different methods:
    1. **CMB measurements:** Yield a **higher value** for S8.
    2. **Cosmic shear/lensing surveys:** Yield a **lower value** for S8.
- **Significance:** This discrepancy **challenges the ΛCDM (Lambda Cold Dark Matter) model**, which is the standard model of cosmology.

Methods of Measurement & Associated Concepts

1. Cosmic Microwave Background (CMB)
    - **Nature:** A **sea of photons (light particles)** present throughout the universe, considered the afterglow or leftover radiation from the Big Bang.
    - **Measurement:** Scientists measure **temperature changes in the CMB** and study its large-scale properties using complex trigonometry.
    - **Expansion Rate Estimation:** Based on CMB studies, cosmologists have estimated the space to be expanding at around **68 kilometres per second per megaparsec ((km/s)/Mpc)**. (An object one megaparsec (3.26 million light-years) away is moving away at 68 km/s).
2. Cosmic Shear & Gravitational Lensing
    - **Cosmic Shear:** Refers to the **distortion in galaxy shapes** caused by **gravitational lensing** due to intervening matter.
    - **Gravitational Lensing:** The bending of light from distant galaxies as it passes through regions of concentrated mass (including dark matter).
    - **Application:** This lensing helps **map dark matter distribution** and provides an **indirect method to calculate S8.**

Ukraine's Critical Minerals



Context: The U.S. and Ukraine recently signed a strategic minerals deal granting preferential U.S. access to Ukrainian mineral projects and establishing a joint investment fund for Ukraine's reconstruction. This highlights the geopolitical importance of Ukraine's mineral wealth.

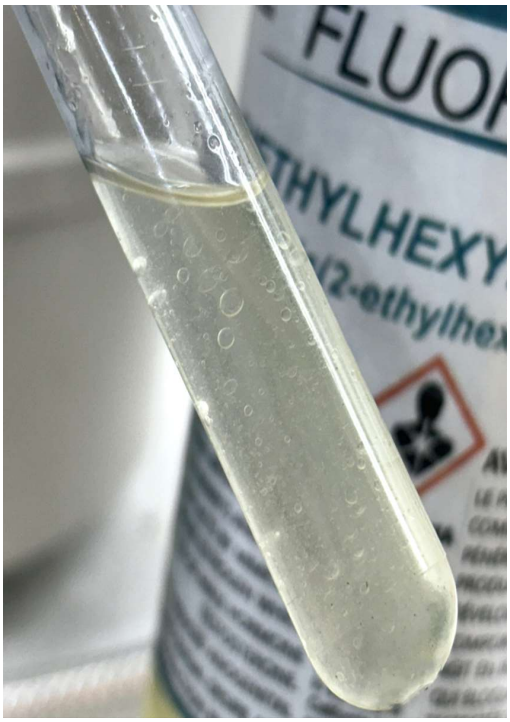
What are Critical Minerals and Rare Earths?

- **Rare Earth Elements (REEs):**
  - A group of **17 chemically similar metals.**
  - **Essential for permanent magnets** used in electric vehicles (EVs), smartphones, missile systems, and wind turbines.
- **Critical Minerals (as per U.S. Geological Survey - USGS):**
  - USGS lists **50 minerals as "critical."**
  - Examples: **Lithium, nickel, cobalt, and rare earths.**
  - **Vital role in:** Defence, aerospace, green energy, and electronics.
  - **Strategic Importance:** Have **no commercially viable substitutes**, making their supply chain strategically important.

Ukraine's Mineral Wealth

- **EU Classification:** Ukraine possesses **22 of the 34 minerals classified as critical by the European Union (EU).**
- **Major Critical Minerals in Ukraine include:**
  - **Rare Earth Elements:** Lanthanum, cerium, neodymium, erbium, yttrium, and scandium.
  - **Other Critical Minerals:** Lithium, nickel, manganese, beryllium, gallium, zirconium, graphite, apatite, fluorite, and titanium.
- **Significant Reserves:**
  - **Graphite:** Reserves account for approximately **20% of global resources.** Crucial for EV batteries and nuclear reactors.
  - **Lithium:** Estimated at **500,000 metric tonnes**, making it one of the largest in Europe. Key areas are in the central, eastern, and southeastern regions.
  - **Titanium:** Concentrated in the northwestern and central regions. Used in the aerospace and defence sectors.
- **Geopolitical Significance:** China dominates global rare earth production, making Ukraine a **strategically attractive alternative supplier** for Western economies.

Di-2-ethylhexyl Phthalate (DEHP)



Context: A recent study in *The Lancet eBioMedicine* found a strong correlation between exposure to Di-2-ethylhexyl phthalate (DEHP) and increased cardiovascular mortality, especially in the 55–64 age group.

About Di-2-ethylhexyl Phthalate (DEHP)

- **Nature:** A **synthetic chemical**.
- **Primary Use:** Primarily used as a **plasticiser**, meaning it is added to plastics to make them more flexible, durable, and resistant to breaking.
- **Physical Properties:** Colourless, oily liquid with little to no odour. Soluble in oils but **not in water**.
- **Key Application:** Widely used in the manufacture of **polyvinyl chloride (PVC) plastics**.

- **Alternate Names:** Also known as **Dioctyl Phthalate (DOP)** and **Bis(2-ethylhexyl) Phthalate (BEHP)**.
- **Prevalence:** Prevalent in numerous everyday items, leading to widespread and continuous human exposure. Examples include:
    - Food packaging materials
    - Medical devices (e.g., IV tubes, blood bags, dialysis tubing)
    - Children's toys
    - Shampoos, lotions
    - Vinyl flooring, wall coverings, shower curtains
    - Adhesives, certain paints, and some auto interiors.

Health Impacts & Concerns

- **Cardiovascular Mortality:**
    - Strong correlation found between DEHP exposure and increased cardiovascular mortality, especially in the 55–64 age group.
    - In 2018, DEHP exposure was linked to around **356,238 global deaths** in this age group, accounting for over **13% of global cardiovascular deaths** in that demographic.
    - **India accounted for the highest number of DEHP-related cardiovascular deaths globally (estimated 103,587 deaths)**, nearly one-third of the global burden, attributed to rapid plastics industry expansion, widespread use, and weaker regulatory controls.
    - Known to cause **inflammation in coronary arteries**, increasing the risk of heart attacks and strokes over time.
- **Other Associated Health Disorders:**
    - Obesity and Type 2 diabetes (metabolic disorders)
    - Hormonal disruptions (endocrine disruption)
    - Infertility (affecting reproductive systems, particularly male reproductive development)
    - Increased risk of certain cancers (classified as a probable human carcinogen by EPA, possibly carcinogenic by IARC).
    - Premature birth and developmental disorders in infants.
    - Liver and kidney damage (in animal studies).
- **Vulnerable Populations:** Foetuses, infants, and individuals undergoing frequent medical procedures using DEHP-containing devices are particularly susceptible.
- **Global Burden:** About 75% of global DEHP-related deaths occurred in regions like Asia, the Middle East, and the Pacific, highlighting a disproportionate burden on developing countries.

Exposure Pathways

- **Leaching:** DEHP is not chemically bound to plastics and can **leach out** into food, water, or the environment, especially under conditions involving heat or contact with fatty foods.
- **Dust & Air:** Gradually released from products into indoor environments, settling on surfaces and accumulating in dust and air.
- **Medical Procedures:** Direct exposure can occur during medical procedures (e.g., blood transfusions, dialysis, feeding tubes) where DEHP-containing devices are used.
- **Diet:** Contaminated food is a significant pathway.

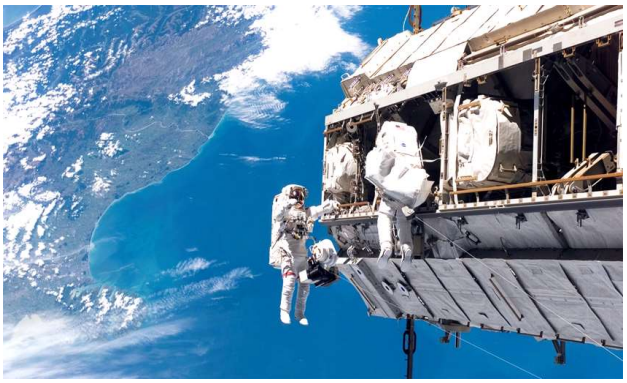
Regulation and Mitigation (General Points)

- Many countries and regions (e.g., EU, US, Canada, Japan, Australia) have introduced regulations to restrict or ban DEHP, especially in sensitive products like children's toys and food contact materials.
- **In India:**
    - The **Food Safety and Standards Authority of India (FSSAI)** amended the Food Safety and Standards (Packaging) Regulations in 2022.

- It now includes a **migration limit for DEHP of d" 1.5 mg/kg** in plastic food contact materials.
- Efforts to regulate DEHP in India started later compared to some Western nations, indicating a need for stronger and more comprehensive policy interventions.

- **Mitigation:** Efforts to reduce exposure include:
  - Avoiding PVC/vinyl plastics where possible.
  - Minimizing exposure to dust.
  - Choosing fresh food over processed and packaged food.
  - Advocating for DEHP-free alternatives in medical settings for vulnerable patients.

Microgravity



Context: Researchers at the Indian Institute of Space Science and Technology (IIST) have developed a 3D computational model showing that microgravity consistently increases human core body temperature, a crucial finding for long-duration space missions.

What is Microgravity?

- **Definition:** A condition of **apparent weightlessness** experienced in space when objects are in **free-fall orbit around Earth**.
- **Presence of Gravity:** Microgravity **does not mean the absence of gravity**. At orbital altitudes (e.g., ~250 miles above Earth), gravity is still present and is approximately **89% as strong as on Earth**.
- **Reason for Weightlessness:** Objects appear to float because they are in **continuous free fall around the Earth**. This state was first explained by **Isaac Newton's orbiting cannonball thought experiment**.
- **Key Concept:** Weightlessness does not imply no gravity; rather, it results from **free-fall motion**, where objects, spacecraft, and astronauts all fall simultaneously.

Physiological Changes in Microgravity

- In a microgravity environment, various physiological changes occur, affecting:
  - Bones (bone density loss)
  - Muscles (muscle atrophy)
  - Blood circulation (fluid shifts, cardiovascular deconditioning)
  - Metabolism
  - Thermoregulation

Thermoregulation in Microgravity

- **Definition:** Thermoregulation is the process by which the **human body maintains a stable core temperature**.
- **Significance in Space:** It is crucial during long-duration space travel, where the microgravity environment significantly alters normal physiological responses.

IIST's Thermoregulation Model

- **Development:** Researchers at IIST developed a **3D computational model** to simulate how heat moves through the human body under microgravity.
- **Factors Incorporated:** The model incorporates various physiological factors to simulate real conditions, including:
  - Sweating
  - Shivering
  - Clothing effects
  - Organ heat production
  - Blood redistribution
- **Key Findings:**
  - Hands and feet become **cooler** in space over time.
  - Head, abdomen, and **core body regions become warmer**.

- During exercise in space, the body temperature **rises faster** than it does on Earth.
- Core body temperature can rise from 36.3°C to **37.8°C in 2.5 months of microgravity exposure.**
- With exercise, the temperature may rise to **nearly 40°C**, a potentially dangerous level (hyperthermia risk).

- **Validation:** The model's accuracy was **validated using past data from astronauts** onboard the Mir Space Station and the International Space Station (ISS), with predicted results matching historical observations.
- **Additional Estimation:** The model also estimates the **Universal Thermal Climate Index (UTCI)**, which reflects how hot or cold it feels outside by factoring in wind, humidity, and solar radiation.

Semaglutide

Context: A recent *New England Journal of Medicine* study reported remarkable results of a weekly dose of semaglutide in treating Metabolic Dysfunction-Associated Steatohepatitis (MASH).

What is Semaglutide?

- **Classification:** Semaglutide is a **GLP-1 receptor agonist**.
- **Original Development:** Originally developed for **Type 2 diabetes management**.
- **Commercial Names:** It is the active ingredient in drugs like:
  - **Ozempic** (primarily for diabetes management, also for cardiovascular risk reduction in T2DM patients)
  - **Wegovy** (approved for chronic weight management)
  - **Rybelsus** (oral formulation for T2DM)
- **Mechanism of Action:** As a GLP-1 receptor agonist, it mimics the action of natural glucagon-like peptide-1. This leads to:
  - Stimulation of glucose-dependent insulin secretion.
  - Suppression of glucagon secretion.
  - Delay in gastric emptying.
  - Reduction in appetite and increase in satiety.
  - Overall improvement in blood glucose control and weight loss.

What is MASH (Metabolic Dysfunction-Associated Steatohepatitis)?

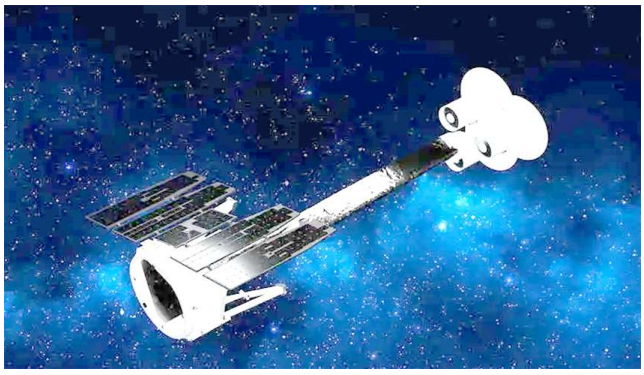
- **Nature:** A **serious form of fatty liver disease**.
- **Characteristics:** Marked by **excessive fat accumulation, inflammation, and fibrosis (scarring)** in the liver.
- **Cause:** Occurs **independently of alcohol use**.
- **Associated Conditions:** Often strongly linked to:
  - **Overnutrition**
  - **Obesity**
  - **Type 2 diabetes**
  - **Metabolic syndrome** (a cluster of conditions like high blood pressure, high blood sugar, excess body fat around the waist, and abnormal cholesterol levels).
- **Progression:** Considered a **progressive liver condition** that can lead to **cirrhosis (severe scarring) or liver failure** if untreated.
- **Former Name:** Previously known as **Nonalcoholic Steatohepatitis (NASH)**. The name was changed to better reflect its metabolic origins.

Why is This Study Important? (Semaglutide for MASH)

- **Unmet Medical Need:** There was previously **no approved drug treatment** specifically for MASH, making this finding highly significant for patients.

- **Dual Benefits:** The study results indicate that semaglutide not only **improves liver histology** (reducing fat, inflammation, and fibrosis in the liver) but also **addresses the root metabolic dysfunctions**, such as:
    - **Insulin resistance**
    - **Inflammation**
- **Therapeutic Hope:** It provides hope for an **additional therapeutic option** for patients who are already vulnerable to:
    - **Cardiovascular complications**
    - **Metabolic complications** (e.g., progression of diabetes)
    - **Renal complications** (kidney issues)
    - Semaglutide has already shown proven benefits in these areas in other patient populations.
- **Comprehensive Approach:** Suggests a comprehensive approach to MASH management by tackling both the liver pathology and underlying metabolic issues.

Imaging X-ray Polarimetry Explorer (IXPE)



Context: NASA's IXPE mission has recently unlocked the mystery of X-ray emission in black hole jets, specifically through observations of the blazar BL Lacertae.

What is IXPE?

- **Full Form:** Imaging X-ray Polarimetry Explorer.
- **Nature:** A **joint mission of NASA and the Italian Space Agency**.
- **Launch Date:** December 9, 2021.
- **Key Capability:** It is the **first satellite capable of measuring the polarisation of X-ray light**.
- **Purpose:** This capability is crucial for understanding **high-energy astrophysical phenomena**, such as black holes, neutron stars, and active galactic nuclei.

What are Blazars and Why BL Lacertae Matters?

- **Blazars:**
    - A type of **active galactic nuclei (AGN)**.
    - Characterized by a **supermassive black hole** that ejects a **relativistic jet** of particles.
    - The distinguishing feature is that this jet is **oriented directly toward Earth**.
- **BL Lacertae (BL Lac):**
    - A **well-known blazar** and among the first discovered.
    - Located in the **Lacerta constellation**.
    - Distinguished by its **high variability** (in brightness and other properties) and **intense electromagnetic emissions**, making it a suitable candidate for polarization studies.

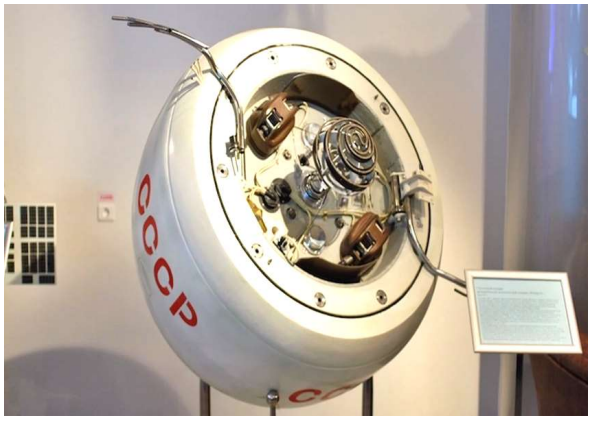
Scientific Discovery by IXPE – Key Findings

- **Mystery Addressed:** The mission aimed to solve the long-standing mystery of **how X-rays are generated in black hole jets**.
- **Competing Theories:** Before IXPE, two main theories existed:
    - **Proton-based models:** Predicted **high X-ray polarization**.
    - **Electron-based models:** Predicted **low X-ray polarization**.
- **IXPE's Observations:**
    - Found that the **X-rays emitted from BL Lac's jets were only weakly polarized (no more than 7.6%)**.
    - Simultaneously, the **optical light was highly polarized (as high as 47.5%)**, which is the highest ever recorded for a blazar.
- **Conclusion:** This clear contrast confirmed that the **X-rays are not generated by protons**, but rather through **electron-photon interactions**.

Compton Scattering

- **Phenomenon Responsible:** The scientific discovery by IXPE confirms that the phenomenon responsible for X-ray generation in blazar jets is **Compton Scattering**.
- **Process:** In Compton Scattering, **high-speed electrons scatter infrared photons**, boosting them to **X-ray energies**.
- **Significance:** This interaction provides a direct link between **relativistic electron activity** and **X-ray generation** in extreme cosmic environments like black hole jets.

Kosmos 482



Context: A part of the Soviet spacecraft Kosmos 482, launched on March 31, 1972, is expected to re-enter Earth's atmosphere around May 10, 2025, after orbiting the planet for over five decades.

What is Kosmos 482?

- **Origin:** A **Soviet-era Venus lander**.
- **Launch Date:** Launched on **March 31, 1972**, as part of the **Venera space programme**.
- **Intended Mission:** It was meant to land on **Venus**.
- **Actual Fate:** A **rocket's upper stage malfunction** left it stranded in **Earth orbit**.
- **Current Status:** After more than 50 years in space, a **500-kg lander module** is expected to make an **uncontrolled re-entry** into Earth's atmosphere around May 10, 2025.

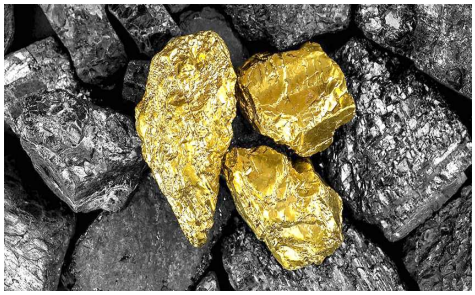
What Went Wrong with Kosmos 482?

- **Cause of Malfunction:** The **upper stage of the launch vehicle shut down prematurely** due to a **timer malfunction**.
- **Consequence:** This prevented the spacecraft from escaping Earth's gravity, sending it into a **low Earth orbit** instead of its intended trajectory to Venus.
- **Module Fate:** The **main spacecraft eventually burned up** in the atmosphere, but the more robust **lander module continued orbiting**.

About the Venera Programme

- **Executor:** A **Soviet interplanetary mission series**.
- **Duration:** Conducted from **1961–1984**.
- **Objective:** Primarily aimed at **exploring Venus**.
- **Achievements:**
  - Launched **28 probes**.
  - **13 probes entered Venus's atmosphere**.
  - **10 probes successfully landed on the surface** of Venus.
- **Venera 8 (Twin of Kosmos 482):**
  - The twin of Kosmos 482, Venera 8, **successfully landed on Venus in 1972**.
  - It transmitted data for **50 minutes** from the Venusian surface.
- **Venus Conditions:** Known for its extreme conditions:
  - Surface temperature: Approximately **462°C**.
  - Pressure: Approximately **92 times Earth's atmospheric pressure**.
- **Lander Design:** Venera landers were specially designed to withstand these harsh conditions, using:
  - **Spherical titanium hulls**
  - **Heat-resistant layers**
  - **Pressure insulation**
  - **Active cooling systems**

Lead-to-Gold Transmutation



Context: CERN's ALICE detector has experimentally confirmed the conversion of lead into gold through a process of nuclear transmutation at the Large Hadron Collider (LHC).

About Chrysopoeia

- **Concept:** The concept of turning **lead into gold**, known as **chrysopoeia**, was a medieval alchemist's dream.
- **Basis of Alchemist's Dream:** Based on the similar density of the two metals.
- **Modern Scientific Understanding:** Modern science clarified that lead and gold are **distinct chemical elements**, and **chemical methods cannot achieve such a transformation** (as it requires changing the number of protons in the nucleus).

Mechanism of Transmutation (at LHC)

- **Process:** Gold nuclei (Au-203) are created when **three protons and two neutrons are ejected** from **lead nuclei (Pb-208)** during **ultra-peripheral collisions** in the LHC.
- **Ultra-peripheral Collisions:** In these collisions, nuclei pass close to each other without directly colliding.
- **Electromagnetic Fields:** These near-miss collisions generate **strong electromagnetic fields** due to the **82 protons** in each lead nucleus moving at **99.999993% of the speed of light**. This extreme speed compresses the field into a short-lived **photon pulse**.
- **Electromagnetic Dissociation:** The process, called **electromagnetic dissociation**, triggers **internal nuclear oscillations** within the lead nucleus, causing the emission of protons and neutrons, thus transforming the element.

Role of ALICE Detector and ZDC

- **ALICE Detector's Function:** The **ALICE detector** (A Large Ion Collider Experiment) utilizes **Zero Degree Calorimeters (ZDCs)**.
- **ZDCs' Role:** ZDCs are used to **identify photon–nucleus interactions** and detect the ejection of:
    - **Zero protons:** Linked to the formation of lead.
    - **One proton:** Linked to the formation of thallium.
    - **Two protons:** Linked to the formation of mercury.
    - **Three protons:** Linked to the formation of **gold**.
- **Significance of Detection:** This is the **first systematic experimental detection of gold creation at the LHC**, attributed to ALICE's high precision in recording both high-energy and rare low-particle collisions.

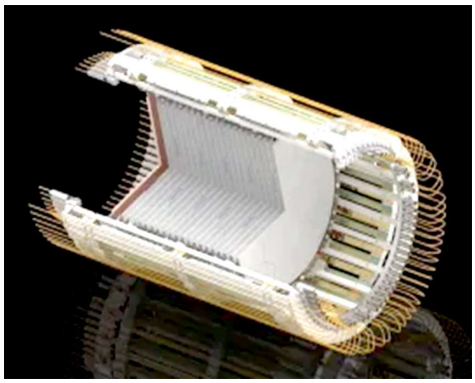
About the Large Hadron Collider (LHC)

- **Nature:** The **world's largest and most powerful particle accelerator**.
- **Builder:** Built by **CERN**.
- **Purpose:** To study **fundamental particles** and test predictions of the **Standard Model of particle physics**.
- **Structure:** Consists of a **27-kilometre circular ring** with superconducting magnets and accelerating structures.
- **Location:** Located on the **Franco-Swiss border near Geneva**.
- **Operation:** Inside the LHC, **two beams of hadrons (usually protons or lead nuclei)** are accelerated to **99.999999% the speed of light** in opposite directions, then made to **collide** at four detector sites: **ALICE, ATLAS, CMS, and LHCb**.

About CERN

- **Full Form:** CERN (European Organisation for Nuclear Research).
- **Establishment:** Established in **1954** as Europe's first joint scientific venture after WWII.
- **Headquarters:** Near **Geneva, Switzerland**.
- **Membership:** Has **23 member states** and **10 associate members**, including **India as an Associate Member**.
- **Mission:** Dedicated to **collaborative high-energy particle physics research** and houses the LHC and its associated detectors.

MADMAX



Context: The MADMAX collaboration has published the first results of its search for dark photons using a prototype detector.

What is MADMAX?

- **Full Form: M**agnetised **D**isk and **M**irror **A**xion e**X**periment.
- **Nature:** A **research initiative** in particle physics/ astrophysics.
- **Primary Goal:** Designed to **detect dark matter candidates**, specifically **axions and dark photons**.
- **Detector Components:** The detector consists of a **stack of dielectric (sapphire) disks** and a **reflective mirror**, forming a resonator system.

What are Dark Photons?

- **Nature: Hypothetical particles** that are similar to ordinary **photons (light particles)** but possess **mass**.
- **Role in Cosmology:** They are proposed components of **galactic dark matter halos**.
- **Conversion Property:** Under specific conditions, dark photons can **convert into ordinary photons**, with the **frequency of conversion depending on the mass of the dark photon**.

How does the MADMAX Detector Work?

- **Core Detection Mechanism:** Involves **boosting the conversion of dark photons to microwave photons**.
- **Resonator's Role:** This boosting is achieved using a **resonator composed of parallel dielectric disks** that significantly **enhance conversion probabilities**.
- **Signal Collection:** A **curved mirror** focuses the resulting **microwave signals** into a **horn antenna**, which is connected to a **microwave receiver** for data acquisition.

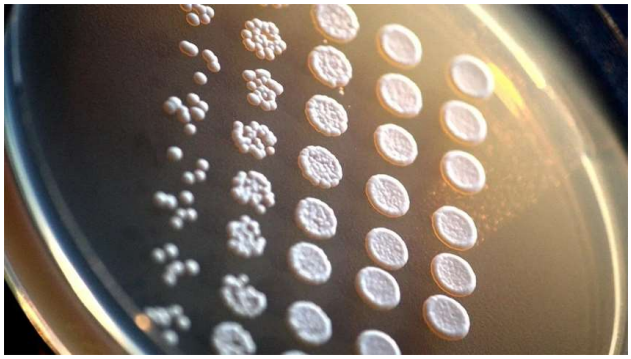
Key Features of the MADMAX Setup

- **Resonator Size:** Uses resonators larger than the wavelength of expected dark photon signals, enabling detection at **higher frequencies (~20 GHz)**.
- **Tunability:** Ability to **tune resonance frequencies by adjusting disk positions**, thereby expanding the range of dark photon masses it can cover.
- **Signal Identification:** Relies on detecting a **narrow peak in Fourier space** that stands out from **thermal noise**, indicating a potential dark photon conversion.

Experimental Findings

- **Initial Results:** The **first prototype run did not detect dark photon signals**. This means dark photons were not found within the specific mass range and sensitivity explored in this initial experiment.
- **Instrument Functionality:** Despite no direct detection, the **instrument functioned successfully**.
- **Sensitivity:** It detected signals with a **sensitivity three orders of magnitude better than prior methods**, demonstrating significant technological advancement.
- **Coverage:** This initial run covered a **previously unexplored range of parameters** in a single experiment, marking progress in the search for dark matter.

RNA Exosomopathies



Context: Researchers at Emory University and the University of Texas Health Science Centre have shown that mutations causing human brain defects also produce similar effects in budding yeast, revealing yeast's potential as a model organism for neurological disorders.

What was Discovered?

- **Key Finding:** Mutations affecting a cellular complex called the **RNA exosome** (which plays a critical role in RNA processing, surveillance, and degradation) produce similar brain defects in both humans and budding yeast (*Saccharomyces cerevisiae*).
- **Implication:** This discovery reveals the potential to use **yeast as a model organism** for studying human neurological disorders, particularly those related to RNA exosome dysfunction.

What are RNA Exosomopathies?

- **Definition:** RNA exosomopathies are disorders caused by **mutations in genes coding for RNA exosome components**.
- **Primary Impact:** These disorders primarily lead to **brain maldevelopment**, affecting structures like the **pons and cerebellum**.
- **Example:** A key example is **Pontocerebellar Hypoplasia Type 1 (PCH1)**, which results in severe motor, cognitive, and, developmental impairments in infants.

Role of the RNA Exosome

- **Nature:** The RNA exosome is a **multi-protein complex** discovered in yeast in 1997.
- **Key Functions:** It is responsible for:
    - **Processing, surveillance, and degradation** of different types of RNA molecules (ensuring quality control and proper function).
    - **Maturation of ribosomal RNA (rRNA)**, which is essential for building ribosomes (the cellular machinery for protein synthesis).
    - **Elimination of faulty messenger RNA (mRNA)** and regulation of **non-coding RNAs (ncRNA)**.

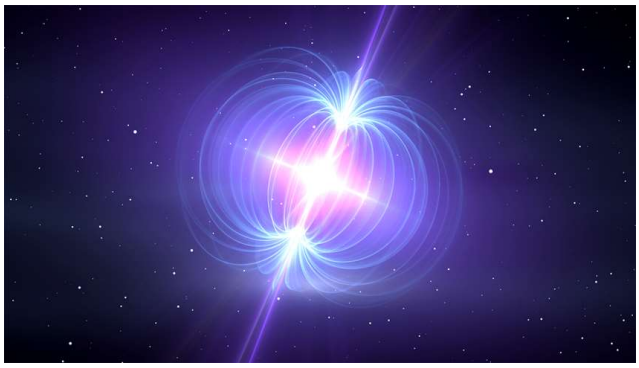
Experimental Findings (Two Studies)

1. **Study 1 (Journal *RNA*):**
    - **Method:** Researchers introduced human disease mutations into corresponding yeast genes.
    - **Results:** Found defects in:
        * RNA surveillance
        * Ribosome production
        * Protein synthesis
    - **Conclusion:** Each mutation had a **distinct molecular signature**, which helps explain the varied clinical symptoms observed in patients.
2. **Study 2 (Journal *G3*): Creation of a Humanized Yeast Model:**
    - **Method:** Scientists replaced segments of yeast RNA exosome with human or mouse genes.
    - **Success Rate:** Of 9 core proteins, **6 were successfully replaced**, with **3 supporting normal yeast growth**.
    - **Validation:** Introduced known brain-defect mutations into this humanized yeast model.
    - **Conclusion:** This proved that the mutations **directly impair RNA exosome function** and are not mediated through indirect processes.

Why Yeast as a Model Organism?

- **Simplicity:** Yeast is a **simple eukaryote**, making it easier to study compared to complex mammalian systems.
- **Genetic Modifiability:** It is **easy to genetically modify and culture** in a laboratory setting.
- **Cost-Effectiveness & Speed:** Offers a **cost-effective and fast method** for:
    - Testing hypotheses about disease mechanisms.
    - Screening potential drug interventions.
- **Rapid Screening:** Using yeast models allows for rapid screening of RNA exosome mutations and their functional consequences, accelerating research into RNA exosomopathies.

Magnetars



Context: Researchers have found observational evidence that magnetar flares can produce heavy elements like gold through r-process nucleosynthesis, challenging the previous understanding that gold primarily forms in neutron star mergers.

What Are Magnetars?

- **Type:** A type of **neutron star**.
- **Defining Characteristic:** Characterized by **exceptionally strong magnetic fields**, estimated to be a thousand times stronger than typical neutron stars (and quadrillions of times stronger than Earth's magnetic field).
- **Energy Emission:** Occasionally, they emit **intense bursts of energy** in the form of **flares**. These flares are often called Soft Gamma Repeaters (SGRs) or Anomalous X-ray Pulsars (AXPs).
- **Recent Discovery Basis:** The discovery was based on data from a **giant flare emitted by a magnetar in 2004**.
    - During this event, **unusual gamma-ray emissions** were recorded almost a day after the initial flare by NASA's **Compton Gamma Ray Observatory**.
    - The **delayed emission** was not consistent with standard flare afterglows. Instead, it displayed **signatures of radioactive decay from neutron-rich isotopes**, strongly suggesting the presence of **r-process nucleosynthesis**.

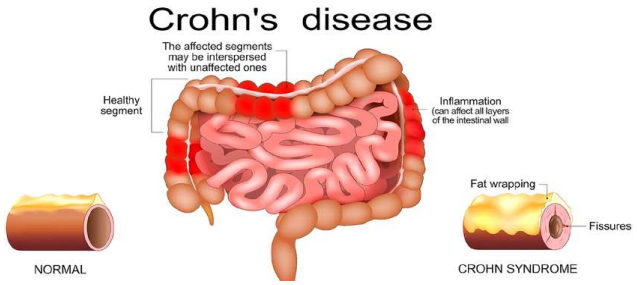
What Is R-Process Nucleosynthesis?

- **Definition:** The **r-process** or **rapid neutron-capture process** is a series of nuclear reactions where atomic nuclei rapidly capture neutrons.
- **Outcome:** This process forms **heavy elements** like **gold, platinum, and uranium**.
- **Required Environment:** It requires **extreme energy environments** and **neutron-rich matter** for these rapid neutron captures to occur before the isotopes decay.
- **Quantity Estimated:** Researchers estimated that approximately **1.9 septillion kg** of r-process material was ejected at nearly light speed during the magnetar flare.
- **Mechanism:** This ejected material likely underwent **rapid neutron capture**, resulting in the synthesis of heavy elements.

Significance of the Discovery

- **Challenging Previous Understanding:** Until this finding, gold was believed to form predominantly in **neutron star mergers**.
- **New Source of Heavy Elements:** This discovery suggests that **magnetars could have contributed to the universe's heavy element inventory** much **earlier than neutron star collisions**.
- **Insights into Chemical Evolution:** Offers crucial insights into the **chemical evolution of galaxies**, indicating multiple potential cosmic factories for the creation of elements heavier than iron.
- **Understanding Stellar Evolution:** Provides a more complete picture of the final stages of massive stars and the diverse phenomena that can arise from them.

Crohn's Disease



Context: A former SpaceX employee is suing the company, alleging wrongful termination due to frequent bathroom use caused by a chronic medical condition, likely Crohn's Disease.

About Crohn's Disease

- **Nature:** It is a **chronic inflammatory bowel disease (IBD)**.
- **Effect:** Causes swelling and irritation (inflammation) of the tissues in the **digestive tract**.
- **Affected Areas:**
    - The inflammation can affect **different areas of the digestive tract in different people**.
    - It **most commonly affects the end of the small intestine (ileum) and the beginning of the large intestine (colon)**.
    - The inflammation often **spreads into the deeper layers of the bowel wall**.
- **Severity:** Crohn's disease can be both **painful and debilitating**. In some cases, it may lead to **serious or life-threatening complications**.

Symptoms

- Symptoms of Crohn's disease vary from person to person.
- Common symptoms may include:
    - **Diarrhea**
    - **Cramping and pain in the abdomen**
    - **Weight loss**
    - Other potential symptoms (though not mentioned in the text) can include fever, fatigue, blood in stool, and reduced appetite.

Treatment

- **Cure:** There is **no known cure** for Crohn's disease.
- **Management:** However, **therapies can greatly reduce its symptoms** and, in many cases, bring about long-term remission and healing of the inflammation.
- **Quality of Life:** With appropriate treatment, many people with Crohn's disease can function well and lead productive lives.

Asteroid YR4

Context: On April 2, 2025, NASA announced that asteroid 2024 YR4 has a 3.8% probability of colliding with the Moon on December 22, 2032.

What is Asteroid YR4?

- **Classification:** It is a **Near-Earth Asteroid (NEA)**.
- **Discovery:** Discovered in **December 2024** using the **ATLAS telescope in Chile**.
- **Orbital Characteristic:** Its orbit brings it within 1.3 times the Earth-Sun distance, which is the definition for a **Near-Earth Object (NEO)**.
- **Initial Alert:** Initially, YR4 triggered the **highest-ever NASA asteroid impact alert in February 2025**.
- **Size Estimation:** New infrared data from the **James Webb Space Telescope** estimates its size at **~65 metres**, comparable to a 10-storey building.
- **Hazard Classification:** This size is **below the 140-meter threshold** for classification as a "**Potentially Hazardous Asteroid (PHA)**", though it's still significant.
- **Earth Impact Risk:** Earlier, YR4 had a 3.1% chance of hitting Earth, but the **latest trajectory analysis shows a negligible risk to Earth**. The current concern is its potential impact with the Moon.

What are Asteroids?

- **Nature:** Also known as **minor planets**, they are **rocky remnants from the early solar system**.
- **Origin:** Dating back **4.6 billion years**, they are essentially leftover building blocks from the formation of planets.
- **Shape:** They typically exhibit **irregular shapes**, though a few are nearly spherical.
- **Companions:** Some host **small companion moons** or even exist as **binary or triple systems**.

Classification of Asteroids

1. **Main Asteroid Belt:**
    - **Location:** Located primarily **between Mars and Jupiter**.
    - **Composition:** This is where the majority of known asteroids are found.
2. **Trojans:**
    - **Orbit:** These asteroids **share an orbit with a planet**.
    - **Stability:** They remain stable due to the **Lagrange Points (L4 and L5)**. At these points, the gravitational forces from the Sun and the planet effectively balance, creating stable regions where objects can reside.
    - **Examples:** Most well-known are Jupiter Trojans, but Mars and Neptune also have Trojans.
3. **Near-Earth Asteroids (NEAs):**
    - **Definition:** These are asteroids whose **orbits pass close to Earth's orbit**.
    - **Sub-classification:** Those that actually **cross Earth's orbital path** are known as **Earth-crossers**.
    - **Significance:** NEAs are of particular interest for planetary defense due to their proximity to Earth.

Microbial Phosphorus Gatekeeping

Context: A recent study published in *Nature Geoscience* examined the role of soil microbes in phosphorus cycling over 700,000 years in the Cooloola coastal dune system, Queensland, Australia.

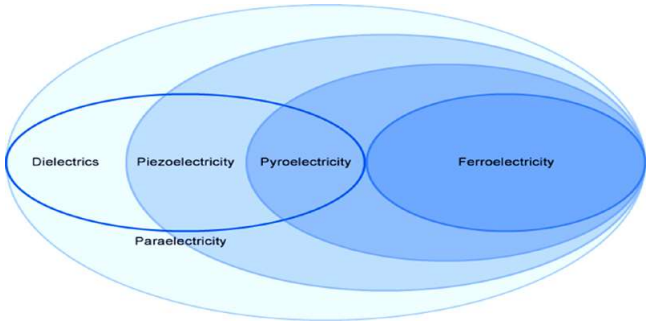
Importance of Phosphorus in Ecosystems

- **Essential Macronutrient:** Phosphorus (P) is an **essential macronutrient** required by all life forms.
- **Crucial Functions:** It is crucial for:
    - **Energy metabolism** (e.g., ATP production).
    - **Cell membrane synthesis** (phospholipids).
    - **Photosynthesis and genetic functions** (DNA/RNA).
- **Limiting Nutrient:** In **ancient and weathered soils**, such as those found in Australia, phosphorus levels decline significantly over time due to mineral weathering. This makes it the **primary limiting nutrient** in many terrestrial ecosystems, restricting growth and productivity.

Key Findings of the Study

- **"Phosphorus Gatekeepers":** The study discovered that **soil microbes—especially fungi and bacteria—act as 'phosphorus gatekeepers'** by regulating how phosphorus is accessed and cycled in the soil.
- **Microbial Adaptive Mechanisms to P Scarcity:** Microbes use several adaptive mechanisms to survive phosphorus scarcity:
    - **Replacing membrane phospholipids** with **non-phosphorus lipids** (e.g., glycolipids or betaine lipids) to conserve phosphorus.
    - **Accumulating microbial lipids (fats)** that reduce the overall cellular need for phosphorus.
    - **Optimizing phosphorus use efficiency** in their metabolism, allowing them to function with less P.
- **Influence on Plant P Availability:** This **microbial gatekeeping strongly influences how phosphorus becomes available to plants**, creating a dynamic **balance of competition and facilitation**:
    - **Competition:** Microbes and plants directly **compete for phosphorus** in the soil.
    - **Facilitation:** In the long run, microbes aid plants by **recycling phosphorus** from organic matter and making it more accessible (e.g., through mineralization or solubilization of insoluble P forms).

Ferroelectricity



Context: Researchers at Oak Ridge National Laboratory (ORNL) have developed a breakthrough technique to visualize the dynamics of domain walls in ferroelectric materials with unprecedented detail.

Fundamentals of Ferroelectricity

- **Definition:** Ferroelectricity is a property of certain **non-conducting crystals or dielectrics** that exhibit **spontaneous electric polarization**.
- **Mechanism:** In such materials, the centers of positive and negative charges spontaneously separate, making one side of the crystal positive and the other negative.
- **Reversibility:** This spontaneous electric polarization can be **reversed by applying an appropriate external electric field**.
- **Nomenclature Origin:** The term "ferroelectric" is derived from **ferromagnetism**.
    - Similar to how magnetic domains align spontaneously in ferromagnetic materials, in ferroelectrics, **electric dipoles align spontaneously in distinct regions called domains**.
- **Examples:** Common examples of ferroelectric materials include **barium titanate (BaTiOƒ)** and **Rochelle salt**.
- **Ferroelectric Domains:** These are clusters where electric dipoles are aligned in a uniform direction. These domains can be reoriented by strong external electric fields.
- **Ferroelectric Hysteresis:** The delay in response when domains reorient to an applied electric field is termed **ferroelectric hysteresis**, analogous to ferromagnetic hysteresis. This property is crucial for memory applications.
- **Curie Temperature:** Ferroelectricity vanishes above a critical temperature called the **Curie Temperature**. Beyond this temperature, thermal agitation is strong enough to disrupt the spontaneous alignment of electric dipoles, and the material loses its ferroelectric properties.

Domain Walls in Ferroelectrics

- **Definition:** Domain walls are the **boundaries between differently polarized regions** (domains) in a ferroelectric material.
- **Unique Properties:** These walls often exhibit **electrical or magnetic properties different from the surrounding bulk domains**.
    - Some domain walls may become **electrically conductive** even when the bulk of the material is non-conductive.
    - They can also become **magnetically active** even if the domain itself is nonmagnetic.
- **Potential Applications:** These unique properties make domain walls potential candidates for **nanoelectronic components** for:
    - **Memory storage**
    - **Sensing applications**
    - **Signal processing**
    - Especially valuable for **low-power devices** due to the localized and controllable nature of their properties.

New Visualization Technique by ORNL

- **Technique Name:** Called **Scanning Oscillator Piezoresponse Force Microscopy (SO-PFM)**.
- **Advantage:** This method is capable of detecting both **slow and abrupt movements of domain walls** under **rapidly fluctuating electric fields**.
- **Improvement over Traditional Methods:** Traditional methods offered only static snapshots (like a "before and after" picture), missing the crucial **intermediate dynamics** of domain wall movement.
- **Outcome:** The new method creates **dynamic visualizations**, which helps researchers understand precisely how domain walls **evolve** and how much **energy is required to move them**.

- **Instrumentation:** It uses **precision-timed control electronics** integrated with **atomic force microscopy (AFM)** to monitor real-time changes, a capability not previously possible.

Geotubing Technology

Context: A recent study on the offshore breakwater system using geotube technology along the Poonthura coastal stretch in Kerala found remarkable transformations in the coastal landscape behind the breakwater.

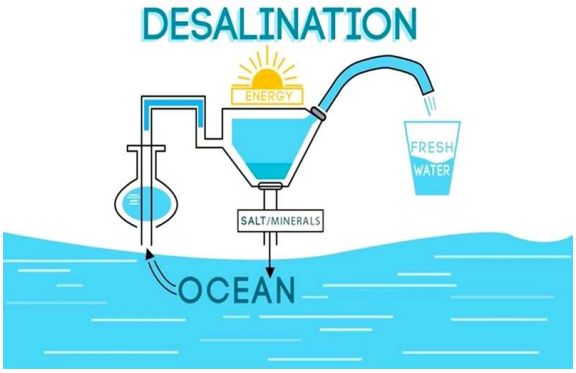
About Geotubing

- **Definition:** Geotubes are **large, permeable fabric tubes filled with dredged materials** (like sand or sediment) or other hydraulically filled materials.
- **Material:** They are constructed from **high-strength, permeable materials, typically polypropylene woven geotextile**, ensuring durability and resistance to environmental factors (e.g., UV radiation, chemicals, biological degradation).
- **Functionality:**
    - The geotextile fabric allows **water to escape** while **retaining the solid particles**, making them effective for:
        * **Dewatering purposes** (separating water from solids).
        * **Retaining soil from erosion**.

Applications and Benefits of Geotubes

- **Coastal Protection (Seawalls & Breakwaters):**
    - Geotubes are primarily used for **seawalls and coastal protection**, creating a synthetic barrier along shorelines and beaches to help **control erosion**.
    - Often referred to as **breakwater tubes**, these barriers act as the **first line of defense against waves and tidal action**.
    - As waves crash, they hit the geotube seawall, limiting their erosive exposure to the beaches and dunes behind them.
    - They minimize the eroding impact of waves and help **retain sand/shorelines** for canals, bays, and other coastal areas.
- **Flexibility & Adaptability:**
    - Geotubes can be installed in **various sizes and shapes** to fit specific project requirements and site conditions.
    - They are adaptable to different site conditions, including **contaminated sites, waterfronts, and inland waterways**.
- **Environmental Advantages (often over traditional methods):**
    - Can use **locally available dredged material** as fill, reducing transportation costs and the need for external materials.
    - Potentially **less impactful on marine life** compared to hard structures like concrete walls, as they are softer and can integrate better with the environment.
    - Can be a **cost-effective solution** for large-scale projects.
    - Allows for natural beach nourishment processes behind the structure in some cases.

Desalination Technology



Context: The Defence Research & Development Organisation (DRDO) has developed an indigenous high-pressure nanoporous multilayered polymeric membrane for seawater desalination.

Purpose and Strategic Importance (DRDO's Development)

- **Executing Agency:** The project was executed by **Defence Materials Stores Research & Development Establishment (DMSRDE), Kanpur**.
- **Initiative:** Developed under the **Aatmanirbhar Bharat** initiative, emphasizing self-reliance.
- **Operational Needs:** The membrane was specifically designed to meet the operational needs of the **Indian Coast Guard (ICG)**.
- **Key Challenge Addressed:** Particularly to withstand **chloride ion-induced instability** often encountered in saline water.
- **Application:** The technology is intended for use in **Offshore Patrol Vessels (OPVs)** of the Coast Guard, providing **self-reliant onboard freshwater capability**, crucial for long-duration maritime operations.

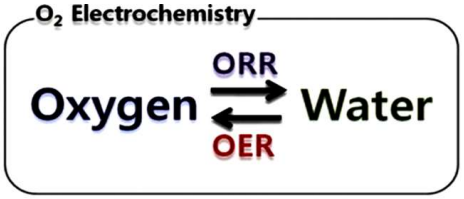
About Desalination Technology

- **Definition:** Desalination is the **removal of dissolved salts and minerals from saline or brackish water** to make it fit for human use (drinking, agriculture, industrial processes).
- **Purpose of Plant:** A desalination plant converts seawater into freshwater by removing salts to meet drinking or industrial quality standards.
- **Primary Technologies Globally:**
    1. **Reverse Osmosis (RO):** A **pressure-driven membrane-based filtration** method. It is the most widely used and energy-efficient method for large-scale desalination today.
    2. **Thermal Desalination:** An **evaporation-condensation method** that uses heat to evaporate saline water, leaving salts behind, and then condenses the pure water vapor. Examples include Multi-Stage Flash (MSF) and Multi-Effect Distillation (MED).

Working of Reverse Osmosis (RO) Desalination

- **Osmosis (Natural Process):** Refers to the natural movement of water from an area of **low solute concentration to high solute concentration** through a semi-permeable membrane. This process seeks to equalize solute concentrations on both sides.
- **Reverse Osmosis (Mechanism):**
    - In reverse osmosis, **external pressure is applied** to the high-solute (saline) side of the membrane.
    - This pressure **pushes water from the high-solute side to a low-solute (freshwater) side**, effectively working **against the natural osmotic gradient**.
    - **Membrane Action:** Microscopic pores in the RO membrane allow **water molecules to pass while blocking salts and other impurities**, which are typically larger than water molecules.
- **Water Quality Improvement:** Seawater typically has a **TDS (Total Dissolved Solids) of ~35,000 ppm**. RO technology is capable of bringing this down significantly to **200–500 ppm**, making the water potable (safe for drinking).

Oxygen Electrocatalysis



Oxygen-water cycle showing an electrochemical redox reaction in molecular oxygen in electrochemical energy technologies.

Context: Researchers from the Centre for Nano and Soft Matter Sciences (CeNS), an autonomous institute under the Department of Science and Technology (DST), have developed a novel iron-doped catalyst aimed at improving oxygen-related electrocatalytic reactions.

About Oxygen Electrocatalysis

- **Definition:** Oxygen electrocatalysis refers to electrochemical reactions involving oxygen that are facilitated by catalysts.

- **Importance:** It is a fundamental process in various **clean energy technologies**, including:
    - **Water splitting for hydrogen production:** A key step in producing green hydrogen as a fuel.
    - **Generation of clean fuels:** Facilitates reactions for sustainable fuel synthesis.
    - **Synthesis of hydrogen peroxide (H_2O_2):** An important chemical with various industrial applications.
- **Challenges:** These technologies currently face major challenges such as:
    - **Slow reaction kinetics:** Reactions occur too slowly.
    - **High energy consumption:** Requires significant energy input.
    - **High material costs:** Due to reliance on expensive **precious metals like platinum (Pt) and ruthenium (Ru)** as catalysts.

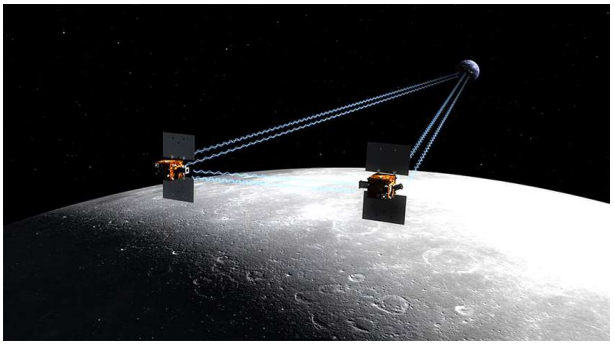
Catalyst Composition and Functionality (CeNS Development)

- **Novel Catalyst:** Researchers developed a **novel iron-doped catalyst**.
- **Variants:** After incorporating selenium (Se), two main catalyst variants were created:
    - $NixFe_1$—xSe_2—NC
    - Ni_3—$xFexSe_4$ –NC
- **Most Efficient Variant:** The most efficient variant, **$NixFe_1$—xSe_2–NC@400**, showed **outstanding bifunctional catalytic performance** for:
    - **Oxygen Evolution Reaction (OER):** The production of oxygen gas (anode reaction in water splitting).
        * Exhibited **lower overpotential** (less energy needed to drive the reaction) and **high durability (over 70 hours)**, surpassing conventional ruthenium-based catalysts.
    - **Oxygen Reduction Reaction (ORR):** The conversion of oxygen into useful chemicals like hydrogen peroxide (cathode reaction in fuel cells or H_2O_2 production).
        * Outperformed **platinum-based catalysts** in terms of **reaction speed, efficiency, and stability** for H_2O_2 production.

Innovation in Catalyst Design

- **Low-Cost & Efficient:** The CeNS team developed a **low-cost and efficient catalyst** using **nickel selenide enhanced with iron (Fe)** doping.
    - This significantly improves performance while **reducing reliance on expensive precious metals**.
- **Synthesis Method:** The catalyst was synthesized starting from a **metal-organic framework (MOF)**.
    - MOFs are known for their **high porosity** and **catalytic potential**.
    - However, traditional MOFs are limited by **poor electrical conductivity**.
- **Role of Iron (Fe) Doping: Iron (Fe) doping** was used to **modify the MOF's electronic structure**. This modification:
    - Enhanced its **catalytic activity**.
    - Created **more active sites**.
    - Improved **reaction intermediate binding**, leading to better catalytic performance.
- **Enhanced Electrical Conductivity:** The MOF was further converted into a **carbon-rich material using pyrolysis** (a high-temperature thermal decomposition process in the absence of oxygen). This step significantly **enhanced the material's electrical conductivity**, which is crucial for electrocatalysis.

GRAIL Mission



Context: NASA's GRAIL mission recently unveiled significant differences between the Moon's nearside and farside, attributing them to tidal deformation and varied volcanic activity.

About GRAIL Mission

- **Full Form:** GRAIL stands for **Gravity Recovery and Interior Laboratory**.
- **Agency:** It is a **NASA lunar mission**.
- **Launch:** Launched in **2011**.
- **Composition:** Consisted of **two robotic spacecraft, named Ebb and Flow**, which orbited the Moon in tandem.
- **Primary Goal:** To **measure variations in the Moon's gravitational field**, providing critical insights into its internal structure and geological history. The mission generated the **most detailed gravitational map of the lunar surface to date**.
- **Methodology:** The mission achieved its goal by **precisely measuring the distance between the two spacecraft** as they orbited the Moon.
    - Even tiny changes in this distance, caused by variations in the Moon's gravitational pull (due to underlying mass concentrations or deficiencies), provided data about the Moon's interior composition, crust thickness, and subsurface anomalies.
    - This approach was similar to that used by NASA's GRACE mission for Earth.

Key Discoveries and Findings

- **Lunar Crust:** GRAIL discovered that the Moon's crust was **more porous and not as thick as previously supposed** (average thickness between 34 and 43 kilometers, about 10-20 km thinner than previous estimates).
- **"Dikes":** It also discovered **long linear features called "dikes"** (vertical bodies of solidified magma in the subsurface). These dikes were evidence of the Moon's expansion by a few kilometers early in its history.
- **Nearside vs. Farside Differences (Recent Findings):** GRAIL data has been crucial in explaining the significant differences between the Moon's nearside and farside, attributing them to:

1. **Tidal Deformation and Gravitational Asymmetry:**
    * The lunar nearside **flexes slightly more than the farside** during its elliptical orbit around Earth. This phenomenon is known as **tidal deformation**.
    * This difference in flexibility is primarily driven by **Earth's gravitational pull**, which exerts a greater influence on the side facing our planet, indicating an asymmetrical internal structure (especially in the mantle).
2. **Volcanic Activity and Heat Distribution:**
    * The Moon's **nearside was once significantly more volcanically active than the farside**, leading to the formation of vast plains of basaltic rock known as "mare" (dark regions visible from Earth). The farside is largely rugged and cratered.
    * This concentrated volcanic activity on the nearside also led to the concentration of **heat-producing, radioactive elements like thorium and titanium in the nearside mantle**.
    * This resulted in a **significant temperature difference** (nearside mantle being ~100-200°C hotter) between the two hemispheres, creating a long-term thermal imbalance that has shaped the Moon's geology over billions of years.

3. **Crustal Thickness and Surface Composition:**
    * The GRAIL data revealed that the **nearside crust is significantly thinner than the farside crust**.
    * This thinner crust allowed magma from the Moon's interior to more easily reach the surface in the past, leading to extensive lava flows and the formation of the maria on the nearside. The thicker farside crust inhibited such widespread volcanism.

Significance of GRAIL Mission

- **Fundamental Understanding:** Deepened our understanding of the Moon's internal structure, composition, and geological evolution.
- **Planetary Formation:** Provides insights into the formation and evolution of other terrestrial planets and moons in our solar system, as the techniques used can be applied elsewhere (e.g., Saturn's Enceladus, Jupiter's Ganymede).
- **Future Lunar Missions:** The enhanced gravity map is critical for developing precise lunar Positioning, Navigation, and Timing (PNT) systems, which are essential for the success of future lunar exploration missions, including selecting safer and more reliable landing sites.

A-to-I mRNA Editing in Animals

Context: Researchers from China recently reported that it's hard to make sense of the widespread persistence of A-to-I mRNA editing in animals.

Concept and Mechanism of A-to-I mRNA Editing

- **Central Dogma Overview:**
    - **DNA** acts as a recipe book for building proteins, using 20 different amino acids.
    - Each recipe (i.e., a gene) is first **transcribed into messenger RNA (mRNA)**.
    - The mRNA is then read by **ribosomes** to assemble proteins.
    - mRNA is composed of four nucleotide bases: A (adenosine), U (uracil), G (guanine), and C (cytosine).
- **A-to-I Editing Process:**
    - In **A-to-I mRNA editing**, the **adenosine (A) base in mRNA is enzymatically converted into inosine (I)**.
    - This conversion is carried out by a specific family of proteins called **ADARs (Adenosine Deaminase Acting on RNA)**.
- **Impact on Protein Synthesis:**
    - Crucially, the **ribosome reads inosine (I) as guanine (G)** during protein synthesis.
    - This effectively **alters the protein's amino acid sequence post-transcriptionally**, meaning the change occurs at the RNA level, **without any change in the original DNA sequence**.

Functional Impact of A-to-I Editing

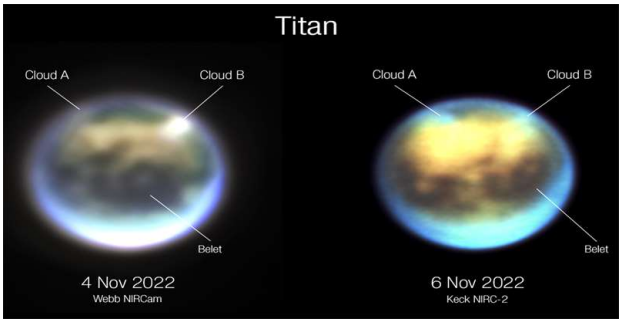
- **Protein Diversification:** A-to-I editing can **change the codon identity** (a sequence of three nucleotides that codes for an amino acid), thereby producing a **different amino acid** in the resulting protein. This can lead to:
    - **Functional protein diversification**: Creating multiple protein isoforms from a single gene.
    - **Alteration in protein stability or activity**: Modifying how the protein functions or how long it lasts.

- **Major Risk: Misreading Stop Codons:**
    - A significant risk associated with A-to-I editing is the potential to **misread stop codons**.
    - For example, a stop codon like UAG or UGA (which signal the ribosome to stop protein synthesis) may be edited to UGG.
    - UGG codes for the amino acid **tryptophan**.
    - This editing error allows the ribosome to **continue protein synthesis** past the intended stop point, potentially creating **abnormally long or malfunctioning proteins**. This highlights the need for precise regulation of this editing process.

Discovery of PSC Genes (Example from *F. graminearum*)

- **Identification:** Researchers identified **71 genes in *F. graminearum*** (a type of fungus) that contain **premature stop codons (UAG) in their unedited mRNA**.
- **Naming:** These genes were termed **PSC (premature stop codon-containing) genes**.
- **Importance of Editing in PSC Genes:** Deleting these PSC genes had:
    - **No impact during asexual growth**, suggesting the edited proteins are not critical in this phase.
    - But caused **significant disruption during sexual development**, proving the **essentiality of A-to-I editing** in these specific life stages for proper protein function and organismal development. This suggests that A-to-I editing is not just random but plays a crucial, controlled role.

NASA–Webb–Keck Observation of Titan



Context: In November 2022 and July 2023, NASA scientists observed Saturn's largest moon, Titan, using both the James Webb Space Telescope (JWST) and the Keck Observatory.

About Titan

- **Largest Moon of Saturn:** Titan is the **largest moon of Saturn**.
- **Second-Largest Moon in Solar System:** It is the **second-largest moon in the solar system**, surpassed only by Jupiter's Ganymede.
- **Unique Characteristics:** It is the **only known moon with a thick atmosphere** and **surface liquid bodies**, including lakes and seas of methane and ethane.
- **Earth-like Weather:** Titan exhibits **Earth-like weather patterns**, including clouds, rainfall, and seasonal variations, though based on a methane/ethane cycle rather than a water cycle.

Key Findings from Joint Observations

- **Cloud Presence and Convection:** These observations revealed the presence of **clouds in the mid- and high northern latitudes** of Titan. Crucially, these clouds were observed to **rise to higher altitudes over time**, indicating **convection-driven weather patterns** (similar to how thunderclouds form on Earth).
- **First Confirmed Evidence:** This marks the **first-ever confirmed evidence of convective cloud activity in Titan's northern hemisphere**. This is significant because most of Titan's hydrocarbon seas (like Kraken Mare and Ligeia Mare) are located in the northern hemisphere.

- **Insights into Methane Cycle:** The findings offer fresh insights into **Titan's active methane cycle**, which is analogous in complexity to **Earth's hydrological (water) cycle**, but with **methane and ethane instead of water**. This cycle involves evaporation, cloud formation, precipitation (methane rain), and accumulation in surface lakes/seas.
- **Astrobiological Significance:** Understanding Titan's weather helps scientists better comprehend **prebiotic chemistry** (the chemical processes that may have led to the origin of life) and **climate dynamics** on icy moons with thick atmospheres, making Titan a key object for astrobiological interest. The detection of methyl radicals (CH3) by Webb also provides insight into Titan's complex organic chemistry.

About Keck Observatory

- **Location:** The W. M. Keck Observatory is located near the summit of **Mauna Kea, a dormant volcano in Hawaii**, at an altitude of **4,200 meters**. This high elevation provides excellent atmospheric conditions for astronomical observations, minimizing atmospheric distortion.
- **Telescope System:** The observatory consists of **two 10-meter telescopes**, **Keck I** (operational since 1992) and **Keck II** (since 1996), making it the **largest optical/infrared telescope system in the world**.
- **Mirror Design:** Each telescope has a **10-meter primary mirror composed of 36 hexagonal segments** made of zero-expansion glass ceramic, which ensures thermal stability and precision imaging.
- **Adaptive Optics:** These segments are adjusted in real-time by **computer-controlled actuators** to maintain the mirror's hyperboloid shape, enabling ultra-precise focus and light collection. Keck was pioneering in using adaptive optics and laser guide stars to correct for atmospheric turbulence.
- **Technological Breakthrough:** A technique called **stressed mirror polishing** was used to shape the asymmetric off-axis segments, a breakthrough innovation in modern telescope engineering.

Role of James Webb Space Telescope (JWST)

- **Infrared Astronomy:** JWST is a premier **infrared space observatory**, designed to detect light from the earliest stars and galaxies, and to study the atmospheres of exoplanets and objects within our solar system, like Titan.
- **Capabilities for Titan:** Its high-resolution and high-sensitivity instruments, particularly in the infrared, allow it to penetrate Titan's thick, hazy atmosphere to study its clouds, atmospheric composition, and surface features.
- **Complementary Observations:** The combined observations from JWST (space-based, broader infrared coverage, high sensitivity) and Keck (ground-based, excellent angular resolution at certain infrared wavelengths, adaptive optics) provide a more comprehensive and detailed understanding of Titan's dynamic atmosphere and surface. They allow probing different depths of the atmosphere and monitoring changes over time.

First Observation of Liquid Carbon's Atomic Structure

Context:

In a significant scientific breakthrough, an international team of scientists has for the first time observed the **atomic structure of liquid carbon**. This feat was achieved using the powerful **DIPOLE 100-X**

laser and ultrashort X-ray pulses from the **European XFEL (X-ray Free Electron Laser) in Germany**. This fundamental research has implications for planetary science, astrophysics, and high-temperature material science.

I. what is Liquid Carbon:

- **Definition:** Liquid carbon refers to carbon in a liquid state. This is an **unstable and transient phase** under normal terrestrial conditions.
- **Normal States of Carbon:** Under standard temperature and pressure, carbon typically exists in:
    - **Solid forms:** Such as graphite (allotropes with sp2 bonding) and diamond (allotropes with sp3 bonding).
    - **Gaseous form:** Primarily as carbon dioxide (CO,) when oxidized, but not as elemental gaseous carbon under normal conditions.
- **Significance of Study:** Studying liquid carbon is crucial for understanding:
    - **Planetary Core Compositions:** Especially for carbon-rich exoplanets, where carbon might exist in liquid form under immense pressures and temperatures.
    - **High-Energy Astrophysical Processes:** Such as those occurring in stellar interiors or planetary formation.
    - **High-Temperature Material Behavior:** Relevant for laser-material interactions (e.g., in advanced manufacturing) and nuclear science (e.g., fusion reactors).

II. Why Liquid Carbon Is Difficult to Study:

The extreme conditions required for its formation make liquid carbon incredibly challenging to observe in a laboratory setting:

- **No Normal Melting Point:** Carbon does not melt under normal atmospheric pressure. Instead, it directly transitions from solid to gas (a process called **sublimation**) at very high temperatures. This makes a conventional liquid phase virtually impossible to achieve under ambient conditions.
- **Extreme Conditions:** Liquid carbon only forms under:
    - **Extremely High Temperatures:** Approximately ~4500°C (or even higher).
    - **Very High Pressures:** Far exceeding atmospheric pressure.
- **Container Limitations:** These extreme conditions are so severe that no conventional container material can withstand them, preventing sustained observation.
- **Transient Existence:** Due to these limitations, liquid carbon can only be created as a **transient phase**, existing for nanoseconds (billionths of a second) before reverting to other states. This necessitates ultrafast measurement techniques.

III. Experimental Technique and Innovation:

The breakthrough was achieved through a sophisticated experimental setup combining high-power lasers and X-ray technology:

- **Laser-Driven Compression:** The **DIPOLE 100-X laser** was used to generate powerful **compression waves** that propagated through a solid carbon sample. This rapid compression and heating briefly converted the carbon into its liquid state.
- **Ultrafast X-ray Probing:** During the fleeting moment (nanoseconds) when the carbon was liquid, the **European XFEL (X-ray Free Electron Laser)** emitted an **ultrashort X-ray pulse**.
    - This X-ray pulse was used to **irradiate (shine on)** the liquid carbon sample.
    - As the X-rays interacted with the atoms, they **diffracted** (bent and scattered) in specific patterns.
- **Diffraction Pattern Analysis:** The **resulting diffraction pattern** was captured and analyzed. This pattern is unique to the atomic arrangement of a substance, thereby revealing the **atomic structure of liquid carbon**.
- **"Movie" of Transition:** By conducting multiple iterations of the experiment with precisely controlled delays between the laser

compression and X-ray pulse, scientists were able to create a **step-by-step "movie"** of the solid-to-liquid phase transition in real-time.

IV. Major Findings of the Study:

The experiment yielded crucial insights, confirming theoretical predictions and providing new data:

- **Water-like Structure:** The most significant finding is that liquid carbon exhibits a **water-like structure**. This means each carbon atom tends to have approximately **four nearest atomic neighbours**, similar to how water molecules arrange themselves.
- **Resemblance to Solid Diamond:** This four-nearest-neighbour arrangement in liquid carbon remarkably resembles the bonding structure found in **solid diamond**, which is known for its strong tetrahedral bonds. This suggests a persistence of some diamond-like ordering even in the liquid state.
- **Confirmation of Theoretical Simulations:** The experimental observations **confirmed earlier theoretical simulations** and predictions about the behavior of carbon under extreme conditions.
- **Precise Melting Point Determination:** The study provided critical data to **precisely determine the melting point of carbon under high pressure**, resolving previous uncertainties.

V. Significance & Applications:

- **Fundamental Science:** Advances our understanding of the fundamental phase behavior of one of the most essential elements, carbon, under extreme conditions.
- **Planetary Science:** Crucial for modeling the **interiors of carbon-rich planets and exoplanets**, which are believed to have liquid carbon layers or cores. This could inform theories of planetary formation and evolution.
- **Astrophysics:** Contributes to understanding matter under extreme conditions found in stellar interiors, supernovae, or impact events.
- **Nuclear Fusion Technology:** Carbon-based materials are often used in fusion reactors (e.g., as plasma-facing components). Understanding liquid carbon behavior under high-energy conditions is vital for designing more robust and efficient fusion devices.
- **High-Pressure Physics:** Expands the knowledge base for materials science under extreme pressures and temperatures, relevant for designing new superhard materials.
- **Technological Advancement:** Highlights the capabilities of advanced research facilities like the European XFEL and high-power lasers in probing extreme states of matter.

Conclusion: The first direct observation of liquid carbon's atomic structure marks a significant milestone in high-pressure physics and materials science. This discovery not only validates theoretical models but also provides invaluable empirical data that will refine our understanding of planetary interiors, astrophysical phenomena, and the behavior of materials in extreme environments, ultimately impacting fields from space exploration to clean energy.

Tiangong Space Station - China's Orbital Laboratory

Context:

Chinese scientists have recently announced the discovery of a new species of bacteria, named **Niallia tiangongensis**, on board the **Tiangong Space Station**. This discovery highlights the unique microbiological environment of space stations and their role as orbital laboratories.

I. About the Tiangong Space Station:

- **Name & Meaning:** "Tiangong" translates to **'Sky Palace'**, signifying its purpose as an advanced orbital outpost.

- **Ownership & Operation:** It is a **Chinese-owned and operated** permanently crewed space station.
- **Orbit:** Located in **Low Earth Orbit (LEO)**, a common altitude for most human spaceflight missions and satellites.
- **China's Space Program:** Tiangong represents the **third and final step** of China's ambitious **Manned Space Program**, building on the experience gained from its precursor missions.
- **Launch History:**
    - The **first module** of the space station, Tianhe, was launched in **April 2021**.
    - This followed two precursor experimental space laboratories: **Tiangong-1** (launched 2011) and **Tiangong-2** (launched 2016).

II. Structure and Modules:

The Tiangong Space Station consists of a modular design:

- **Core Module:**
    - **Tianhe (天和 - "Harmony of the Heavens"):** This is the central living and control hub. It connects and provides power and life support to the other modules.
- **Science Modules:**
    - **Wentian (问天 - "Quest for the Heavens"):** Primarily focuses on life sciences and biotechnology experiments. It also serves as a backup control module and includes an airlock for spacewalks.
    - **Mengtian (梦天 - "Dreaming of the Heavens"):** Dedicated to microgravity science, fluid physics, and material science experiments. It also features an airlock for deploying external payloads.
- **Planned Module:**
    - **Xuntian (巡天 - "Surveying the Heavens"):** A co-orbiting **space telescope module** planned to fly independently but dock with Tiangong for maintenance and refueling. It is designed to have a field of view 300 times larger than that of the Hubble Space Telescope.

III. Comparison with the International Space Station (ISS):

- **Size & Mass:** Tiangong is **significantly smaller and lighter** than the ISS.
    - **Modules:** Tiangong has three core modules (plus the planned Xuntian), compared to the ISS's 16 modules.
    - **Mass:** Tiangong is approximately **20% as massive** as the ISS, which weighs about 400 tons (450 metric tons).
- **Crew Capacity:**
    - **Long-term:** Can accommodate up to **three astronauts** for typical six-month stays.
    - **Crew Handover:** Can support **six astronauts** at a time during crew changeovers.

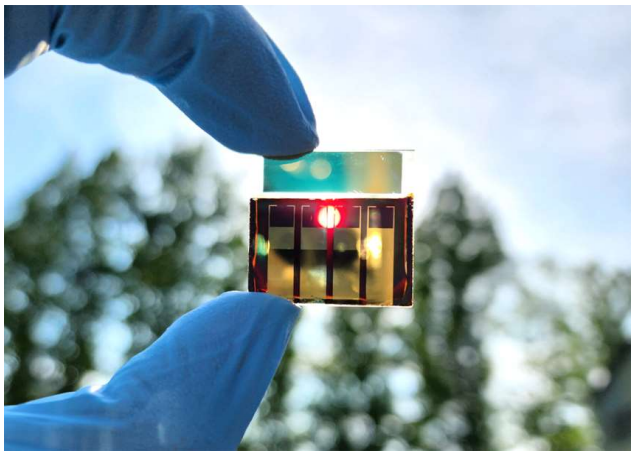
IV. Aims and Scientific Capabilities:

The Tiangong Space Station serves as a robust **in-orbit laboratory** with diverse capabilities for scientific research:

- **Primary Aims:**
    - To build a **long-term, reliable space station** in orbit.
    - To guarantee the **long-term health and safety** of stationed astronauts.
    - To provide advanced conditions for **scientific and technological experiments in space**.
- **Experimentation Facilities:**
    - Features **23 enclosed experiment racks**, each designed for specific research areas.

- **Key Fields of Experimentation:**
    - Space life sciences and biotechnology.
    - Microgravity fluid physics and combustion studies.
    - Material science in space (e.g., crystal growth).
    - Fundamental physics in microgravity environments.
- **External Experiment Platforms:** The station also provides **platforms for exposed and unpressurized external experiments**, allowing for studies directly in the harsh space environment (e.g., material degradation, astronomical observations).

Semi-Transparent Perovskite Solar Cell - A New Era for Solar Power



Context:

Researchers at **IIT Bombay** have recently achieved a significant breakthrough by developing a **semi-transparent perovskite solar cell (PSC)**. This innovation could greatly boost the efficiency of solar energy conversion, making solar power more accessible and affordable.

I. What is a Semi-Transparent Perovskite Solar Cell?

- **Layered Design:** This new type of solar cell is made by placing a thin, semi-transparent **perovskite layer on top of a traditional silicon-based solar cell**. This creates a "tandem" (stacked) structure.
- **"4-Terminal (4T) Tandem Structure":** This means the two layers (perovskite and silicon) work somewhat independently and have separate electrical connections, allowing them to capture different parts of the sunlight spectrum more efficiently.
- **Materials Used:**
    - **Bottom Layer:** Uses well-known **silicon technology**, which is commonly used in most solar panels today.
    - **Top Layer:** Features a specially developed **halide perovskite semiconductor** (made in India). This material is excellent at absorbing light and turning it into electricity.
- **High Efficiency:** This combined cell design has shown a power conversion efficiency of around **30%**. This is a big improvement compared to the approximately 20% efficiency of many standard silicon solar cells used today.
- **Why Halide Perovskite?** Halide perovskite is one of the best light-absorbing materials known today. Besides being very good at turning light into electricity, it is **affordable** because the materials needed can be produced locally in India.

II. Understanding Perovskite Solar Cells (PSCs):

- **Photovoltaic (PV) Technology:** PSCs are a type of PV technology. PV cells are devices that directly convert sunlight into electricity.
- **Perovskite Crystals:** These cells use special crystal structures called perovskites. These crystals get their name from a natural mineral called **calcium titanium oxide (CaTiOƒ)**, which has a similar structure.
- **Tunable Properties:** The special structure of perovskite materials allows scientists to change their properties (like how they absorb light or conduct electricity) to make them work best for solar cells.
- **Chemical Formula:** The basic chemical formula for a perovskite compound is **ABXƒ** , where 'A' and 'B' are positively charged atoms (cations), and 'X' is a negatively charged atom (anion).

This simple structure allows for a lot of flexibility in choosing the specific materials.

- **Advantages:**
    - **High Efficiency:** They can achieve very high power conversion efficiencies, competing with or even surpassing traditional silicon cells.
    - **Lower Cost:** They can be made at a lower cost than traditional silicon PVs because they use abundant materials and simpler manufacturing processes (often at lower temperatures).
    - **Semi-Transparency:** As seen in the IIT Bombay development, they can be made semi-transparent, opening up new uses.
- **Challenges:**
    - **Shorter Lifespan & Stability:** A major issue is their relatively shorter lifespan and stability problems. They can degrade faster when exposed to moisture, heat, and UV light compared to silicon cells, which typically last 25-30 years. (However, IIT Bombay's research suggests improved durability to around 10 years for their tandem cells).
    - **Lead Content:** Many efficient perovskites contain lead, which raises environmental concerns. Researchers are working on lead-free alternatives.

III. Significance of IIT Bombay's Breakthrough:

- **Boosting Efficiency:** Achieving 30% efficiency is a significant step towards more powerful solar panels.
- **Cost Reduction:** Higher efficiency often means less area is needed to generate the same amount of power, which can lead to **lower overall costs for solar power**. The goal is to bring down solar electricity costs to as low as ₹ 1 per kilowatt-hour (kWh).
- **Reduced Import Dependence:** Developing indigenous perovskite technology reduces India's reliance on imported solar components.
- **Versatile Applications:** The semi-transparent nature of these cells opens up new possibilities, such as:
    - **Building-Integrated Photovoltaics (BIPV):** Using them as solar windows or facades in buildings.
    - **Vehicle-Integrated Photovoltaics (VIPV):** Integrating them into vehicles.
- **Green Hydrogen Production:** High-efficiency tandem cells are vital for splitting water into hydrogen (a clean fuel) using sunlight, supporting India's green hydrogen goals.
- **Commercialization:** This technology is being scaled up by a startup from IIT Bombay, with a goal to produce commercial-sized solutions by December 2027.

EDITORIALS

Crux of The Hindu & Indian Express

Science & Technology

National Supercomputing Mission (NSM)

NSM NATIONAL SUPERCOMPUTING MISSION

Introduction

- The National Supercomputing Mission (NSM) was launched in **2015** by the **Government of India**.
- The mission aims to **develop indigenous high-performance computing (HPC) capabilities**.
- It supports **research and development**, **innovation**, and **self-reliance** in supercomputing technologies.
- It provides **supercomputing infrastructure** to **academic institutions**, **R&D labs**, **industries**, and **government organizations**.

- Access to these systems is provided through the **National Knowledge Network (NKN)**, which connects academic and R&D institutions over a high-speed network.
- The mission also includes **training and human resource development (HRD)** in HPC and AI.

Objectives of NSM

1. To deploy high-performance computing systems across the country.
2. To achieve **self-reliance (Atmanirbharta)** in supercomputing hardware and software.
3. To promote **research and development in critical areas** like drug discovery, climate modeling, etc.
4. To enable **start-ups and MSMEs** to use HPC resources for innovation.
5. To **develop skilled human resources** in HPC and AI.
6. To build a **globally competitive supercomputing ecosystem**.

Implementing Structure

- **Steering Agencies:**
  - Department of Science and Technology (DST)
  - Ministry of Electronics and Information Technology (MeitY)
- **Implementing Agencies:**
  - Centre for Development of Advanced Computing (C-DAC), Pune
  - Indian Institute of Science (IISc), Bengaluru

Phased Development of Infrastructure

Phase	Key Focus
Phase I	Install initial supercomputers with components assembled in India. Build foundational infrastructure.
Phase II	Focus on **indigenous manufacturing** and development of a **local software stack**. Increase **Indian value addition to 40%**.
Phase III	Achieve **complete indigenization** of supercomputing systems including design, development, and manufacturing of components. Install high-capacity systems and a national-level HPC facility.

Achievements (as of March 2025)

- Total Supercomputers Installed: **34**
- Total Compute Capacity: **35 Petaflops**
- **Utilization Rate:** Over **85%** (Many systems exceed **95%** usage)
- **Research Supported:**
  - 10,000+ researchers
  - 1,700+ PhD scholars
  - 200+ institutions and R&D labs
  - 1 crore+ compute jobs executed
  - 1,500+ research papers published
- **Training & HRD:**
  - **22,000+ individuals trained** in HPC and AI
  - **5 HPC Training Centers**: Pune, Kharagpur, Chennai, Palakkad, Goa
- **Start-up & MSME Participation:** HPC resources used to drive innovation and R&D projects.

Major Supercomputers Deployed

Supercomputer	Institution / Location	Specs / Significance
Param Shivay	IIT-BHU, Varanasi	First indigenously built supercomputer under NSM, inaugurated in 2019
Param Pravega	IISc, Bengaluru	Installed in 2022 with **3.3 petaflops** capacity; largest academic supercomputer in India
PARAM Rudra (3 systems)	Pune, Delhi, Kolkata	Inaugurated in 2024 for advanced research in **physics, cosmology, and earth sciences**
Upcoming PARAM Rudra	C-DAC Bangalore	Will feature **20 Petaflops** performance and **Trinetra-B** (200 Gbps) interconnect

Indigenous Technologies Developed

1. Rudra Servers

- India's **first indigenously designed and manufactured** high-performance computing servers.
- Built by C-DAC for PARAM Rudra systems.
- Equivalent to globally available HPC-class servers.

2. Trinetra High-Speed Network

- Indigenous communication fabric developed under NSM for inter-node communication.
- **Trinetra-POC**: Proof of Concept to validate architecture.
- **Trinetra-A**: **100 Gbps** interconnect, deployed in PARAM Rudra at C-DAC Pune.
- **Trinetra-B**: **200 Gbps** interconnect, to be deployed in PARAM Rudra at C-DAC Bangalore.

AIRAWAT – AI Computing Infrastructure

- **Objective:** Provide a **common AI research platform** for academia, industry, and start-ups.
- **PoC Configuration: 200 Petaflops (mixed precision)** AI compute capacity.
- **Scalability:** Up to **790 AI Petaflops** peak compute capacity.
- **Ranked 75th** in the **TOP500 Global Supercomputing List (ISC 2023, Germany)**.
- Supports all **Technology Innovation Hubs**, research institutions, and scientific communities.

Application Areas of NSM

- **Drug Discovery**
- **Disaster Management**
- **Energy Security**
- **Climate Modeling**
- **Astronomical and Cosmological Research**
- **Fluid Dynamics**
- **Material Science**
- **Computational Chemistry**

Inclusion and Access

- NSM provides supercomputing access to institutions in **Tier-II and Tier-III cities**.
- Ensures **equitable opportunity** for scientific research across India.
- Facilitates **high-impact research** in resource-constrained institutions.

Support from India Semiconductor Mission (ISM)

- ISM helps NSM by focusing on the **domestic production** of semiconductors.
- Supercomputers require **processors, memory chips, and accelerators**, which were previously imported.
- ISM aims to make these components **locally available**, **cheaper**, and **more efficient**.
- This supports **customized supercomputers** for Indian needs.
- It moves India closer to full **Atmanirbharta in supercomputing**.

Budget and Funding

- **Total Funds Allocated/Utilized: ₹ 1,874 crore**
- This includes funding for:
  - HPC infrastructure
  - R&D in applied scientific areas
  - Application development
  - Human Resource Development
  - Mission Management
- In **2024–25**, an **additional 45 Petaflops** compute power is planned using indigenous servers and technologies.

Significance of NSM

- Boosts **scientific computing** and **technology innovation** in India.
- Supports **Make in India** and **Digital India** initiatives.
- Bridges the **digital divide** in research infrastructure.
- Positions India as a **global leader in supercomputing and AI**.
- Enables solving of **multi-disciplinary grand challenge problems**.

Phthalates in Plastics Linked to 13% of Global Heart Disease Deaths in 2018

Background

- Recently, A **global study** has found a **significant correlation** between daily exposure to **phthalates**, especially **di-2-ethylhexyl phthalate (DEHP)**, and **cardiovascular-related deaths**.
- The study was published in the **journal *eBioMedicine***.
- Conducted by researchers from **New York University (NYU) School of Medicine**.

What Are Phthalates?

- **Phthalates** are synthetic chemicals used to **increase the flexibility and durability** of plastic products.
- **DEHP (Di-2-ethylhexyl phthalate)** is one of the most widely used phthalates.
- Common products that contain DEHP:
    - Food storage containers
    - Toys
    - Medical devices
    - Packaging materials
    - Plastic household items

Health Impact of Phthalates

- Phthalates can **leach into food, air, and water** and **enter the human body**, mainly through ingestion or inhalation.
- Once inside, they break down into **metabolites** detectable in **urine samples**.
- **Health conditions linked to DEHP exposure:**
    - Cardiovascular diseases (heart attacks, strokes)
    - Obesity
    - Hormonal disruption
    - Infertility
    - Certain types of cancer
- **Mechanism:** Phthalates are believed to cause **arterial inflammation**, increasing long-term risk of cardiovascular events.

Key Findings from the Study

- **Global Deaths (2018)**:
    - Estimated **356,238 deaths** globally from DEHP exposure.
    - Equivalent to **13.497% of all cardiovascular deaths** among individuals aged **55–64**.
- **Geographic Distribution**:
    - **India**: Highest death toll at **103,587**
    - **China**: Second highest
    - **Indonesia**: Third highest
    - About **75% of deaths** occurred in:
        * **South Asia**
        * **East Asia & the Pacific**
        * **Middle East**
- The study covered **200 countries and territories**.
- Data sources included:
    - **Environmental health data**
    - **Population health surveys**
    - **Urine sample biomarkers** for DEHP exposure

Global Trends and Inequities

- **South and East Asian countries** bear the heaviest burden due to:
    - **Rapid industrialization**
    - **High plastic consumption**
    - **Inefficient waste management**
    - **Limited regulatory control on plastic additives**
- India, with a **rapidly growing plastic industry**, is particularly vulnerable to **environmental phthalate exposure**.

Policy Relevance

- The findings add urgency to global efforts such as:
    - **United Nations Global Plastics Treaty**
        * First-ever **legally binding treaty** aimed at reducing **plastic pollution**
        * Negotiations currently ongoing

- Study findings can inform:
    - International treaties
    - National health policies
    - Public awareness campaigns
    - Industrial regulation on plastic manufacturing

Conclusion

This study is one of the most comprehensive attempts to **quantify the health cost** of plastic-related chemical exposure. It provides **scientific backing** for stricter controls on **phthalates** and underscores the **urgent need for international cooperation**. For countries like India, it emphasizes the **dual challenge** of managing plastic pollution and reducing environmental health risks.

ICAR to Launch Two Genome-Edited Rice Varieties

Introduction

- The **Indian Council of Agricultural Research (ICAR)** has announced the development of **two genome-edited rice varieties**.
- It is a **first-of-its-kind achievement** in Indian agriculture using **cutting-edge genome editing technology**.
- The varieties will be formally unveiled on **May 4, 2025**, in **New Delhi** by the **Union Agriculture Minister**, **Shivraj Singh Chouhan**.

What is Genome Editing?

- **Genome editing** is a precision biotechnology method that allows scientists to alter specific parts of a plant's DNA.
- Unlike genetically modified organisms (GMOs), genome-edited crops do not involve foreign gene insertion, making them **more acceptable under regulatory frameworks** in several countries.
- This method can lead to **faster, more targeted improvements** in crop traits such as yield, tolerance, and climate adaptability.

Details of the Two Rice Varieties

1. DRR Dhan 100 Kamala

- **Base Variety**: Developed from **Samba Mahsuri**, a popular high-yielding green rice.
- **Yield Improvement**: Produces **25% higher yield** than the original, i.e., **approximately eight tonnes more per hectare**.
- **Maturity Advantage**: Can be harvested **15–20 days earlier** than Samba Mahsuri.
- **Grain Output**: Each panicle produces **450–500 more grains** than the original crop.
- **Environmental Benefits**:
    - **Climate-resilient** and **temperature tolerant**.
    - Uses **water and minerals more efficiently**.
    - Suitable for **direct seeding method**, reducing water usage.

2. Pusa DST Rice 1

- **Base Variety**: Developed from **Maruteru 1010 (MTU1010)**, widely cultivated across India.
- **Stress Tolerance**:
    - Exhibits **tolerance to salinity stress** and can thrive in degraded soils.
- **Yield Performance**:
    - **9.66% more yield** under average salinity conditions.
    - **14.66% more yield** under alkaline soil conditions.
    - **30.36% more yield** under high salinity stress.
- Designed to support cultivation in **coastal and salt-affected areas** of India.

Significance and Impact

- **Agricultural Innovation**: Marks India's entry into **genome-edited crop development**, potentially boosting self-reliance in agri-tech.

- **Food Security**: Improved yield and stress tolerance enhance **food production**, especially under **climate stress conditions**.
- **Farmer Empowerment**: Faster maturing and higher-yielding varieties reduce costs and improve incomes.
- **Environmental Sustainability**: Efficient use of **water and soil nutrients**, as well as adaptability to direct seeding, supports **sustainable farming**.

Spain's Blackout Highlights Renewables' Grid Challenge

1. Introduction
   - A massive power outage occurred in **Spain and Portugal in April 2025, the cause of which is still under investigation.**
   - The blackout has highlighted the challenges posed by renewable energy sources, such as solar and wind, on electricity grids.
   - Critics argue that these sources strain the grid's stability due to their intermittent nature.
2. Grid Stability and Balancing Demand and Supply
   - Electricity grids must balance demand and supply at all times. This balance is maintained by monitoring the **frequency** of the electricity, which is set at 50 Hz in Europe and 60 Hz in the United States.
   - **Inertia**: Traditional power plants (coal, gas, nuclear, hydroelectric) provide stability by using **spinning turbines**, which generate **inertia**—the resistance to changes in the grid frequency.
   - **Problem with Renewables**: Solar and wind power, unlike traditional energy sources, use **electronic systems** to feed power into the grid, which do not provide the necessary inertia for grid stability.
   - This makes it harder to maintain balance in the grid.
3. Role of Conventional Power Plants
   - Conventional power plants are crucial in stabilising the system as they use **rotating turbines** to provide inertia.
   - These plants help maintain grid stability when there are sudden spikes in demand or plant failures.
   - **Hydroelectric and Nuclear Power**: As countries move away from fossil fuels, **hydroelectric** and **nuclear** power plants become even more critical for stabilising the grid, due to their ability to generate inertia.
4. Solutions for Maintaining Grid Stability
   - To compensate for the lack of inertia from renewables, various technical solutions are available:
     - **Flywheels**: These systems store energy in large, rotating wheels, which can provide electricity to the grid when needed.
     - Britain is using flywheels as part of its transition away from coal.
     - **Energy Storage Solutions**: Technologies such as **gravity storage**, **cryogenic liquid air**, **compressed air**, and **concentrated solar power** can help store energy and maintain grid stability.
5. The Issue of Intermittency
   - Renewable energy sources like wind and solar are intermittent and depend on natural conditions.
     - **Example**: Before the blackout on April 28, 2025, **solar and wind power** accounted for 70% of Spain's electricity output.

- However, when wind and solar generation drops, backup power sources, such as thermal power plants, nuclear reactors, or hydroelectricity, must step in quickly.
- **Storage Solutions**: As renewable power is intermittent, **energy storage** becomes crucial to smooth out fluctuations.
- **Pumped storage hydropower** and large stationary batteries are two widely used storage methods.

6. Growing Need for Energy Storage

- To meet the global goal of tripling renewable energy capacity by **2030**, energy storage capacity will need to increase **sixfold**.
- Batteries will play a dominant role, contributing to 90% of the storage solution, according to the **International Energy Agency (IEA)**.
- Battery storage systems, often in the form of **large containers** similar to shipping containers, are increasingly deployed alongside solar and wind farms.
- **Shifting Demand**: Another strategy is to **shift electricity consumption** to times when renewable energy supply is high (e.g., charging electric vehicles during the day when solar energy is abundant).

7. Transmission Network Challenges

- **Transmission Failures**: Blackouts are usually caused by **transmission network failures** rather than generation issues.
- The need to modernise and strengthen the power grid is urgent as energy demand grows, especially from **data centres** and industrial sectors.
- **Investment in Infrastructure**: Countries must invest tens of billions of euros to upgrade **aging power lines** to ensure they can carry increased demand and integrate renewable energy efficiently.
- **Interconnection Between Grids**: Cross-border connections between national grids play a crucial role in stabilising the system.
- For example, during the blackout in Spain, **France** provided electricity to help restore power.
- By **2028**, the **interconnection capacity** between Spain and France is expected to increase from **2.8 to 5.0 gigawatts**, reducing Spain's electrical isolation and enhancing stability.

8. Conclusion

The challenges of integrating renewable energy into power grids highlight the need for substantial investments in **energy storage** solutions and grid **modernisation**. The transition to renewable energy requires overcoming technological and infrastructural hurdles, such as managing intermittency and increasing grid flexibility, to ensure a stable, reliable, and sustainable energy future.

12th Global Space Exploration Conference (GLEX 2025)

Dates: 7th – 9th May 2025

Venue: Yashobhoomi, New Delhi, India

Conference Theme : "Reaching New Worlds: A Space Exploration Renaissance

Inaugurated by: Dr. Jitendra Singh, Union Minister of State (Independent Charge) for:

- Science & Technology
- Earth Science
- Department of Space
- Department of Atomic Energy

- PMO, Personnel, Public Grievances and Pension **PM Modi** Addressed the conference via videoconferencing on 7th May

Key Organisers

- **Main Organiser:** International Aeronautical Federation (IAF)
- **Host:** Indian Space Research Organisation (ISRO)
- **Co-host:** Astronautical Society of India (ASI)

Significance and Highlights

- A landmark event reinforcing **India's growing global space leadership**
- **Largest-ever participation in GLEX history**
    - **1800+ delegates** from 36 countries
    - **1275 abstracts** submitted from 57 countries
        - **822 from India** (64%)
        - **453 international** (36%)
        - **562 student abstracts**, showing strong youth engagement

Key Participants & Speakers

- **Dr. Jitendra Singh** – India
- **Josef Aschbacher** – ESA (Europe)
- **Kazuyoshi Kawasaki** – JAXA (Japan)
- **V. Narayanan** – Chairman, ISRO
- **Jill Smyth** – USA
- **Wu Weiren** – China
- **Salem Al Marri** – UAE

Technical & Public Engagements

- **10 parallel technical sessions**
- Covering **15 thematic areas**
- **240+ interactive presentations**
- **Astronaut Outreach Programme** featuring nearly **10 astronauts**, including:
    - Hazzaa AlMansoori (UAE)
    - Alper Gezeravci (Türkiye)
    - Michael López-Alegría (USA/Spain)
    - Angad Pratap (India)
    - Rakesh Sharma (India's first astronaut)

Space Exhibition Highlights

- Inaugurated by **Dr. Jitendra Singh**
- Features **22 leading organizations**, including:
    - Indian space startups
    - Global space agencies & firms
    - ISRO and industry leaders

About the Global Space Exploration Conference (GLEX)

- First held in **2010, Beijing, China**
- Previous edition: **2023, Oslo, Norway**
- A flagship initiative of the **IAF**
- Aims to:
    - Promote dialogue & collaboration in space
    - Share challenges, lessons & visions
    - Foster international cooperation

About the International Aeronautical Federation (IAF)

- **Established:** 1951
- **Headquarters:** Paris, France
- **Membership:** 563 organizations from 81 countries
- Includes: space agencies, companies, research institutions, universities
- **Mission:** To advance global space exploration and cooperation

National Technology Day 2025: India's Nuclear Capability and Strategic Posture

Why in the News?

- India celebrates **National Technology Day** on **May 11** each year to commemorate the **Pokhran-II nuclear tests** conducted in 1998.
- This day highlights India's major achievements in **science and technology**, especially its

emergence as a **nuclear-capable nation** with strategic autonomy.

- It also emphasizes India's growing role as a **global leader in technological innovation**.

Significance of National Technology Day

- The Government of India designated **May 11 as National Technology Day** in **1999**.
- This decision was taken by **Prime Minister Atal Bihari Vajpayee**, following the successful nuclear tests at Pokhran in 1998.
- The day also marks two other technological achievements that occurred on May 11, 1998:
    - The successful test flight of the **indigenous aircraft Hansa**.
    - The successful **test firing of the Trishul missile**.
- Prime Minister Vajpayee added the slogan **"Jai Vigyan" (Hail Science)** to the earlier national slogan, **"Jai Jawan, Jai Kisan"**, thereby recognizing the importance of scientific progress.

India's Nuclear Journey: A Historical Overview

Initial Stance Post-Independence

1. At the time of independence, India's leaders were generally opposed to nuclear weapons.
2. The memory of the atomic bombings of **Hiroshima and Nagasaki in 1945** had left a lasting impression.
3. **Mahatma Gandhi** condemned nuclear weapons as morally unacceptable.
4. **Prime Minister Jawaharlal Nehru** was sceptical about nuclear armament but did not completely shut the door on future possibilities.

Security Threats and Shift in Nuclear Policy

1. India's defeat in the **1962 war with China** and China's successful nuclear test at **Lop Nor in 1964** increased India's security concerns.
2. In 1965, during the war with Pakistan, China openly supported Pakistan, further heightening the perceived threat.
3. By the late 1960s and 1970s, Pakistan had begun efforts to acquire nuclear weapons with **China's active assistance**.
4. India thus faced the strategic challenge of **two nuclear-capable neighbours**, compelling it to pursue nuclear self-sufficiency.

Key Personalities: Homi Jehangir Bhabha

1. **Homi Jehangir Bhabha** is known as the **father of India's nuclear programme**.
2. He established the **Tata Institute of Fundamental Research (TIFR)** in 1945 with support from the Tata group.
3. He convinced Prime Minister Nehru about the potential of nuclear energy for India's development.
4. In **1954**, the Government created the **Department of Atomic Energy (DAE)**, with Bhabha as its first director.

India's Nuclear Tests :

Pokhran-I (1974): Operation Smiling Buddha

1. India conducted its first nuclear test on **May 18, 1974**, under **Prime Minister Indira Gandhi**.
2. The test was carried out at the Pokhran test range in Rajasthan.
3. It was codenamed **"Operation Smiling Buddha"** and officially termed a **peaceful nuclear explosion**.
4. Despite this claim, the test was met with **widespread international condemnation**.
5. Countries like the United States and Canada imposed **strict sanctions** on India.
6. These sanctions significantly slowed down India's nuclear development for several years.

Pokhran-II (1998): Operation Shakti

1. The nuclear programme slowed down during the **Emergency (1975–77)** and due to opposition from Prime Minister **Morarji Desai**.
2. In **1998**, the **NDA government** under **Prime Minister Atal Bihari Vajpayee** came to power.
3. One of its promises was to formally induct nuclear weapons into India's defence policy.

4. In March 1998, Pakistan tested the **Ghauri missile** with Chinese assistance.
5. In response, India conducted a series of **five nuclear tests** under **Operation Shakti** in May 1998.
6. The tests were conducted on **May 11 and May 13**, 1998.
7. Unlike in 1974, this time the government openly declared **India as a nuclear weapons state**.
8. The international backlash was milder compared to 1974, reflecting India's growing geopolitical and economic stature.
9. Despite limited sanctions, India succeeded in asserting its **strategic sovereignty**.

India's Nuclear Doctrine

1. On **January 4, 2003**, the **Cabinet Committee on Security (CCS)** released a summary of India's official **nuclear doctrine**.

Key Features:

1. India adheres to a policy of **"No First Use" (NFU)**.
    - Nuclear weapons will be used only in **retaliation** to a nuclear attack.
2. India's nuclear retaliation will be **massive** and intended to cause **unacceptable damage**.
3. India reserves the right to use nuclear weapons in response to a **biological or chemical weapons attack**.
4. The decision to use nuclear weapons can be taken only by the **civilian leadership**.
    - The **Nuclear Command Authority (NCA)** is chaired by the **Prime Minister**.
5. India will not use nuclear weapons against **non-nuclear weapon states**.
6. India maintains a **voluntary moratorium on further nuclear testing**.
7. India supports **global nuclear disarmament** in a manner that is **verifiable and non-discriminatory**.

India and the Non-Proliferation Treaty (NPT)

1. India is **not a signatory** to the **Non-Proliferation Treaty (NPT)**, which came into force in **1968**.
2. The NPT recognises only five nuclear weapons states: **the USA, Russia, the UK, France, and China**.
    - These are countries that tested nuclear weapons before **January 1, 1967**.
3. India considers the treaty to be **discriminatory** because it permanently divides the world into nuclear and non-nuclear states.
4. India supports **non-proliferation** but insists on a **more equitable international framework**.

India's Current Nuclear Status

1. India is currently among **9 countries** with a publicly known and declared nuclear weapons.
2. They are:
    - Russia
    - United States
    - China
    - France
    - United Kingdom
    - Pakistan
    - India
    - Israel
    - North Korea
3. Its nuclear posture is based on **credible minimum deterrence**, **no first use**, and **civilian oversight**.
4. India remains committed to the peaceful use of nuclear technology and supports global nuclear disarmament.

India's Technological Achievements

1. India secured the **39th rank** in the **Global Innovation Index 2024**.
2. It also achieved the **6th position** in global **Intellectual Property (IP) filings**, as per the **WIPO report**.

3. The **Network Readiness Index (NRI) 2024** marked India's rise to **49th place**, up from **79th in 2019**, showcasing advancements in **ICT infrastructure** and **digital transformation**.
4. India has emerged as the **third-largest startup ecosystem** globally, fostering entrepreneurship and technological advancement.

India's Agricultural Achievements

1. **Green Revolution (1960s–1970s)**: Introduction of high-yielding varieties (HYVs) of wheat and rice.
2. **White Revolution (1970s)**: India became the **world's largest milk producer**, ending milk imports

India's Indigenous Defence Technology Achievements

1. **INS Kalvari (1967)**: India's first indigenous naval submarine, marking the beginning of 'Made-in-India' defence capabilities.
2. **Agni Series**: Long-range ballistic missiles for strategic deterrence.
3. **Prithvi Series**: Surface-to-surface tactical missiles.
4. **BrahMos**: Co-developed with Russia, **world's fastest supersonic cruise missile**.
5. **Tejas (LCA)**: India's first indigenously developed supersonic fighter jet.
6. **INS Arihant**: India's first ballistic missile nuclear submarine.
7. **INS Vikrant (2022)**: India's first indigenous aircraft carrier, a major naval milestone.

India's Indigenous Space Technology Achievements

1. **Chandrayaan-1 (2008)**: India's first lunar mission, becoming the 4th country to send a probe to the Moon and discovering water molecules on the lunar surface.
2. **Mars Orbiter Mission (Mangalyaan, 2013)**: India became the first nation to reach Mars on its **first attempt**.
3. **104 Satellites in One Launch (2017)**: Set a world record for the most satellites deployed in a single mission.
4. **Chandrayaan-3 (2023)**: Achieved a **soft landing** near the Moon's south pole, a **global first**.
5. **Aditya-L1 (2023)**: India's first solar mission studying the Sun's outer layers.
6. **Gaganyaan (2027)**: India's first crewed spaceflight mission.
7. **Shukrayaan (2028)**: Venus orbiter mission aimed at exploring the planet's dense atmosphere.

Digital Infrastructure Achievements

1. **Aadhaar**: World's largest biometric ID system
2. **UPI (Unified Payments Interface)**: Revolutionised digital payments and fintech.
3. India leads the world in **real-time digital transactions**.

Government Initiatives to Boost Technology Advancements

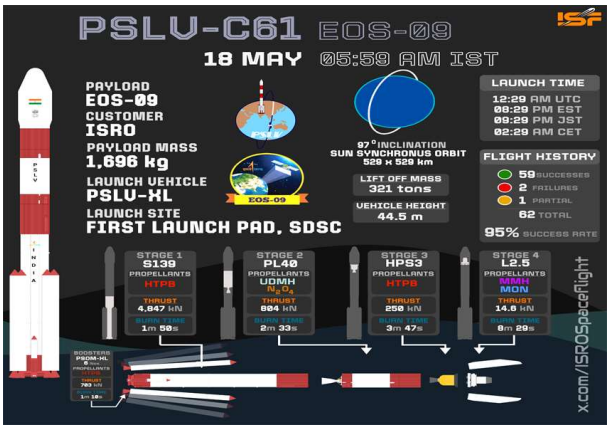
- **Make in India (2014)**: Promotes domestic manufacturing in high-tech sectors like defence, electronics, and semiconductors.
- **Atal Innovation Mission (AIM)**: Promotes innovation through **Atal Tinkering Labs (ATLs)** in schools and **Atal Incubation Centres (AICs)** for startups.
- **NM-ICPS**: National Mission on Interdisciplinary Cyber-Physical Systems promotes AI, robotics, IoT, and quantum technologies via **Technology Innovation Hubs (TIHs)**.
- **Technology Development Board (TDB)**: Funds the commercialisation of indigenous technologies.
- **National Supercomputing Mission (NSM)**: Deploys a network of high-performance supercomputers across India.

- **National Quantum Mission (NQM)**: ₹ 6003.65 crore investment to advance quantum computing, sensing, and communication.
    - 152 researchers from 43 institutions across 17 states and 2 UTs are participating.
- **IN-SPACe and NSIL**: Encourage private sector participation in space tech.
- **Defence Acquisition Procedure (DAP)** and **iDEX**: Foster innovation by startups and MSMEs in defence.
- **INSPIRE Program (DST)**: Provides scholarships and internships to promote science careers among students.

Budgetary Support

1. Budgetary allocations for **Gross Expenditure on R&D (GERD)** have more than doubled.
2. **DST and DBT budgets** have increased by over **100%**.
3. The **space sector budget** has nearly **tripled**, driven by privatisation and global partnerships.

PSLV (Polar Satellite Launch Vehicle) C61 Mission in its XL configuration to launch the EOS-09 satellite



Context:

- On **May 18, 2025**, ISRO attempted the **PSLV-C61** mission in its **XL configuration** to launch the **EOS-09 satellite** into **Sun-Synchronous Polar Orbit (SSPO)**.
- However, due to a **malfunction in the 3rd stage**, the mission ended in failure.
- The issue was a drop in **chamber pressure in the third-stage motor casing**, as confirmed by ISRO Chairman V. Narayanan. ISRO plans to reassess and retry the launch in the future.

What is PSLV?

- **PSLV** stands for **Polar Satellite Launch Vehicle**.
- It is an **indigenously developed**, **expendable**, **four-stage rocket** system used by **ISRO**.
- Known as the **"Workhorse of ISRO"** due to its high success rate and versatility.

Background & Legacy

- First successful flight: **October 1994**
- Notable missions:
    - **Chandrayaan-1** (Moon, 2008)
    - **Mars Orbiter Mission (Mangalyaan)** (2013)
    - **Aditya-L1** (Sun, 2023)
    - **Astrosat** (India's first space observatory)

Applications

- Launches **remote sensing**, **meteorological**, **navigation**, **communication**, and **scientific research satellites**.
- Capable of deploying multiple satellites in different orbits in a single mission.

Technical Specifications of PSLV

Feature	Details
Stages	4 (Solid-Liquid-Solid-Liquid)
Lift-off Mass (XL variant)	Up to 320 tonnes
Payload to SSPO (600 km)	~1,750 kg
Payload to Sub-GTO	~1,425 kg
Total Height	~44 meters
Launch Site	**Satish Dhawan Space Centre**, Sriharikota

PSLV Stage-wise Description

Stage	Type	Propulsion	Description
PS1	Solid	HTPB	Boosts lift-off; can be augmented with 6 strap-on boosters (in XL config)
PS2	Liquid	Vikas engine (UDMH + N2O4)	Offers sustained propulsion after atmospheric exit
PS3	Solid	HTPB	High-thrust phase for further ascent
PS4	Liquid	Twin engines (MMH + MON)	Responsible for satellite injection; restartable for multi-orbit deployments

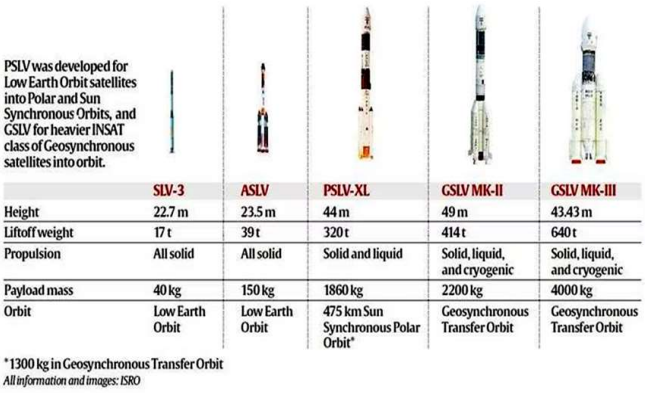
PSLV Orbital Experimental Module (POEM)

- Uses the **PS4 stage** (normally discarded) as an in-orbit experiment platform.
- Equipped with solar panels, battery, and attitude control system.
- Example: **POEM-3** (launched with **XPoSat** on PSLV-C58)

PSLV Variants and Configurations

Variant	Description	Strap-on Boosters	Payload to SSPO
PSLV-CA (Core Alone)	No strap-ons; used for lighter payloads	None	~1,019 kg
PSLV-G	Standard with 6 boosters	6	~1,600+ kg
PSLV-XL	Extended; high capacity	6 (XL type)	~1,750 kg
PSLV-DL	Dual booster config	2	~1,200–1,300 kg
PSLV-QL	Quick launch, 4 boosters	4	~1,523 kg

PSLV vs GSLV – Key Differences

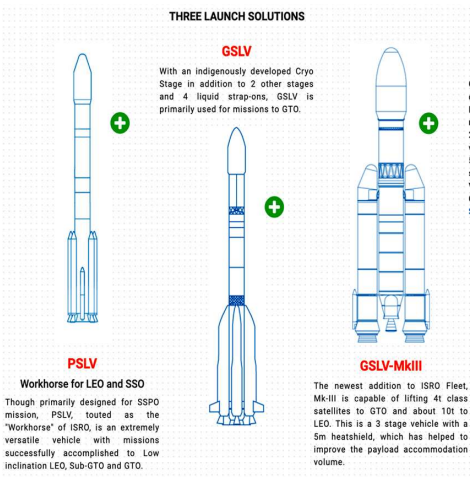

PSLV was developed for Low Earth Orbit satellites into Polar and Sun Synchronous Orbits, and GSLV for heavier INSAT class of Geosynchronous satellites into orbit.

	SLV-3	ASLV	PSLV-XL	GSLV MK-II	GSLV MK-III
Height	22.7 m	23.5 m	44 m	49 m	43.43 m
Liftoff weight	17 t	39 t	320 t	414 t	640 t
Propulsion	All solid	All solid	Solid and liquid	Solid, liquid, and cryogenic	Solid, liquid, and cryogenic
Payload mass	40 kg	150 kg	1860 kg	2200 kg	4000 kg
Orbit	Low Earth Orbit	Low Earth Orbit	475 km Sun Synchronous Polar Orbit*	Geosynchronous Transfer Orbit	Geosynchronous Transfer Orbit

*1300 kg in Geosynchronous Transfer Orbit

All information and images: ISRO

Feature	PSLV	GSLV
Stages	4	3
Fuel	Solid & Liquid mix	Liquid + Cryogenic
Lift-off Mass	~320 tonnes	~420 tonnes
Main Use	Earth Observation / SSPO	Communication / GTO
Payload Capacity	~1.75 tonnes (SSPO)	~2.25 tonnes (GTO)
Variants	CA, G, XL, DL, QL	Mk I, Mk II, Mk III



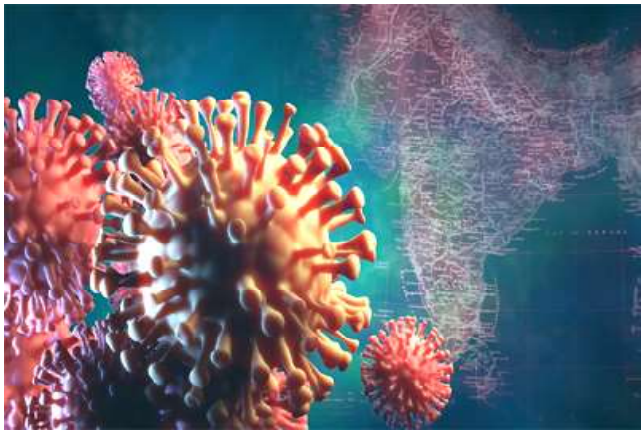
Current Relevance & Implications

- **C61 Failure** marks a rare setback in PSLV's otherwise consistent record.
- Reinforces the complexity of multi-stage launches.
- ISRO's response to failure reflects institutional **resilience and commitment to improvement**.
- Upcoming reattempts of EOS-09 will be closely watched to assess **confidence in PSLV's reliability**.

Conclusion

The **PSLV** remains a cornerstone of India's space program, thanks to its **reliability**, **cost-effectiveness**, and **adaptability**. Despite occasional failures like **PSLV-C61**, it continues to symbolize **India's growing capabilities in space technology** and serves both **domestic** and **international** launch missions.

Emergence of New COVID-19 Variants Detected in India



Background

- **In May 2025, India detected new COVID-19 variants through the Indian SARS-CoV-2 Genomics Consortium (INSACOG).**
- It monitors the genetic evolution of the virus in the country.
- INSACOG was established in December 2020 by the Government of India as a multi-institutional consortium to track SARS-CoV-2 variants using genomic sequencing.

New Variants Detected

- One case of the **NB.1.8.1** variant was identified in Tamil Nadu in April 2025.
- Four cases of the **LF.7** variant were reported in Gujarat in May 2025.

Global Classification by WHO

- The World Health Organization (WHO) classifies both NB.1.8.1 and LF.7 as **Variants Under Monitoring (VUM)**.
- These variants are **not** categorized as Variants of Concern (VOC) or Variants of Interest (VOI).
- NB.1.8.1 and LF.7 are linked to a rise in COVID-19 cases in China and parts of Asia.

Prevalent Variants in India

- The most common variant in India remains **JN.1**, accounting for 53% of samples tested.
- The **BA.2** variant constitutes 26% of samples.
- Other Omicron sub lineages make up 20% of cases.

Virological Features and Risk Assessment

- WHO's preliminary risk assessment considers NB.1.8.1 to pose a **low public health risk globally**.
- However, mutations in the NB.1.8.1 spike protein (A435S, V445H, T478I) suggest increased transmissibility and better immune evasion than previous variants.

Current COVID-19 Situation in India (May 2025)

- As of May 19, 2025, there were **257 active COVID-19 cases** reported nationwide.
- Localized increases in cases have been observed in several regions:
    - Delhi reported 23 new cases.
    - Andhra Pradesh reported 4 new cases.
    - Telangana confirmed 1 case.
    - Bengaluru reported a positive case in a nine-month-old child.
    - Kerala reported 273 cases in the month of May alone.

Government and Expert Response

- A meeting was recently held, chaired by the Director General of Health Services, to review the evolving COVID-19 situation.
- Experts from the National Centre for Disease Control (NCDC), Indian Council of Medical Research (ICMR), and other key health institutions participated.
- The government continues close monitoring of new variants through genomic surveillance and emphasizes preparedness to control any surge.

About Indian SARS-CoV-2 Genomics Consortium (INSACOG)

- Established: December 2020 by the Union Ministry of Health and Department of Biotechnology (DBT), in collaboration with the Council for Scientific & Industrial Research (CSIR) and ICMR.
- Structure: Consortium of **54 laboratories** across India conducting genomic sequencing, coordinated by the NCDC, Delhi.
- Mandate:
    - Initially focused on variants among international passengers.
    - Evolved to **early detection of emerging variants within India**.
- Objectives:
    - Early detection of genomic variants with public health implications via sentinel surveillance.
    - Identification of variants linked to unusual events such as vaccine breakthroughs, superspreader events, and high mortality zones.
    - Correlation of genomic data with epidemiological trends.
    - Recommend public health actions based on combined genomic and epidemiological analyses.
- Impact:
    - Helps to understand superspreader events and outbreaks.
    - Strengthens public health interventions to break transmission chains.

Tamil Nadu Space Sector Policy

Context:

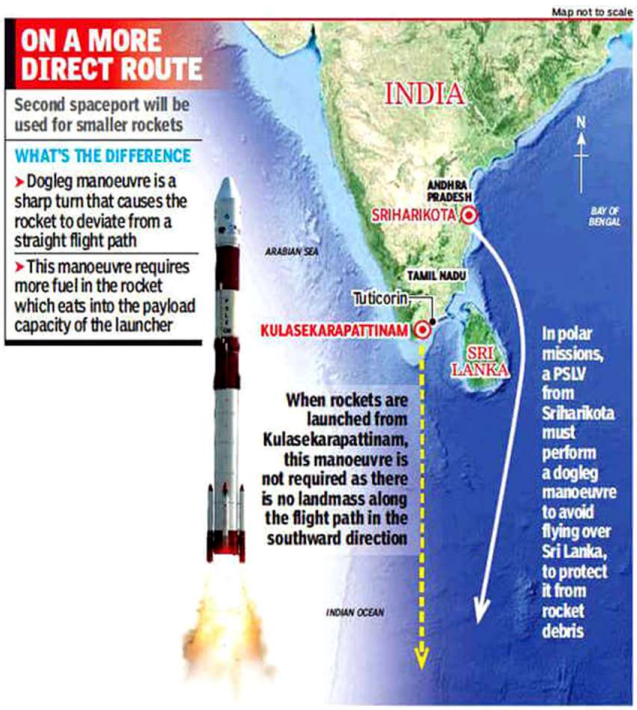
- On April 17, 2025, the Tamil Nadu Cabinet, led by Chief Minister M.K. Stalin, approved the **Space Industrial Policy**.
- **This makes Tamil Nadu the 3rd state, after Karnataka and Gujarat**, to create a state-specific plan to encourage growth and attract money in the space sector.
- This sector includes making satellites, launching rockets, and providing satellite services.
- In 2023, the Union government also released the **Indian Space Policy 2023** to guide the overall space ecosystem.

How is Tamil Nadu Placed in the Space Sector?

Tamil Nadu has several strengths that make it a good location for space-related activities:

- **ISRO Facilities:** The **Indian Space Research Organisation (ISRO)** has an **ISRO Propulsion Complex (IRPC)** in Mahendragiri, Tirunelveli district.
- This complex handles and tests engines for launch vehicles, including **earth storable propellant engines** and **cryogenic engines**.
- It also does research and development (**R&D**) and technology development.

- **2nd Spaceport:** ISRO is building India's 2nd spaceport at **Kulasekarapattinam in Thoothukudi**.



- This important project aims to boost India's space abilities and make satellite launches easier.
- **Space Startups:** The state is home to various **space startups** that are working on new ideas in areas like **launch vehicles**, **reusable launch vehicles**, **in-space refuelling**, **in-space manufacturing**, and combining data from multiple satellites.
- **Academic Support:** The **National Institute of Technology (NIT), Tiruchi**, hosts the southern region's **Space Technology Incubation Centre (STIC)**.
- This center plays a key role in carrying out development projects for ISRO.
- **Vendor Base:** Tamil Nadu has a strong network of over **250 vendors** that supply parts and services to ISRO.

What Prompted the Policy?

- **IN-SPACe Suggestion:** The **Indian National Space Promotion and Authorisation Centre (IN-SPACe)**, a body created by the Department of Space to promote and oversee **Non-Government Entities (NGEs)** in the sector, suggested that the State government create such a policy.
- **Previous Policy:** Even though the State government released the **Aerospace and Defence (A&D) Industrial Policy** three years ago, it had already marked space as a top priority area.
- **Partnerships:** The **Tamil Nadu Industrial Development Corporation (TIDCO)** has signed an agreement (**Memorandum of Understanding**) with **IN-SPACe**.
- This agreement aims to help startups and established companies start manufacturing activities, services, design and R&D, strategic electronics manufacturing, and production of space-grade components.

What Does the Policy Aim to Achieve?

The policy has clear goals for the next 5 years:

- **Investment Target:** It aims to attract **₹ 10,000 crore in investments**.
- **Job Creation:** It is expected to create direct and indirect jobs for nearly **10,000 people** in the same period.
- **Leveraging Strengths:** The policy was prepared by considering the state's strengths in **electronics**, **precision manufacturing**, and related fields.
- **Improving Governance:** It aims to integrate space technologies into Tamil Nadu's governance to improve the quality of life for citizens. Space technologies have many uses in government departments such as **disaster management, fisheries, agriculture, transport, revenue, health, and municipal administration**.
- **Incentives and Support:**
    - **Payroll Subsidy:** The State government will provide a payroll subsidy for companies involved in **R&D** or those setting up **global capability centres** in the space sector.

- **Space Bays:** The government will mark certain regions as **Space Bays**. These areas will offer special incentive packages to firms that plan to invest below ₹ 300 crore.
- **Industrial Housing Incentive:** Developers of **space industrial parks** will be eligible for an industrial housing incentive of 10% on the cost of building homes within the park over 10 years, up to a maximum of ₹ 10 crore.
- **Green Initiatives Subsidy:** Companies that undertake green and sustainable projects will be eligible for a 25% subsidy on the capital cost for such initiatives, up to a maximum of ₹ 5 crore.

India's Space Programme: Historical Developments and Recent Evolution

India's **space programme**, spanning over 5 decades, is known for its practical approach, aiming to help the common person. The **Indian Space Research Organisation (ISRO)** has been leading this, **growing into one of the world's 6th largest space agencies.**

I. Genesis and Growth of ISRO:

- **Early Focus:** From the start, the program focused on practical uses to meet societal needs.
- **Missions & Ambitions: ISRO's** current path includes big missions to the Moon and Sun, plans for advanced space telescopes, and future manned missions.
- **Collaborative Ecosystem: ISRO** builds partnerships with both **public sector undertakings (PSUs)** like **Hindustan Aeronautics Limited (HAL)** and private firms such as **Godrej Aerospace** for making space parts.
- **Commercial Arm: Antrix Corporation** (established in 1992) was created to sell **ISRO's** products and services in the international market.
- **Global Standing: ISRO** today operates many **Geostationary Earth Orbit (GEO)** communication satellites and **Low Earth Orbit (LEO) remote sensing satellites**, making its position as a global leader strong.

II. The Booming Private Space Sector:

The last few years have seen a big rise in India's private space sector, working alongside **ISRO's** efforts.

- **Emergence of Start-ups:** Over 200 **start-ups** have appeared since the early 2010s, focusing on different areas like satellite design, manufacturing, and launch services.
- **Key Private Players and Achievements:**
  - **Dhruva Space:** Specializes in custom satellite design and **ground station solutions**.
  - **Skyroot Aerospace:** A pioneer in private launch vehicles. In 2022, they launched **Vikram-S**, the first Indian private rocket.
  - **Agnikul Cosmos:** Focuses on new mobile launchpads and **propulsion systems**. In 2024, they launched the world's first rocket with a fully **3D-printed engine** from its private launch pad.
  - **Manastu Space:** Develops green technology for **propulsion** and **satellite services**.

III. Regulatory Framework and Enabling Policies:

The government has actively created a helpful regulatory environment to encourage private sector involvement.

- **IN-SPACe (Indian National Space Promotion and Authorization Centre):**
  - **Establishment:** An independent agency under the **Department of Space**, set up in 2020.
  - **Mandate:** Helps and regulates private sector involvement in space activities.

- **Support Initiatives:** Signed about 45 **MoUs** with **Non-Government Entities (NGEs)** and put into action schemes like the **Seed Fund Scheme** and **Technology Transfer initiatives**.

- **Anusandhan National Research Foundation:**
  - **Aim:** To improve public-private partnerships in scientific research.
  - **Budget:** Expected budget of ₹ 50,000 crore over five years, mostly from non-government funding.
- **National Geospatial Policy (2021):**
  - **Objective:** Makes it easier for the private sector to access **geospatial data**.
- **Indian Space Policy (2023):**
  - **Key Provision:** Allows private companies to operate satellites and launch vehicles, greatly increasing their participation in the market.
- **FDI Policy Amendments:**
  - **Liberalization:** The Indian government has made its **Foreign Direct Investment (FDI)** policy in the space sector much easier.
  - **Current Limits:**
    * Up to 74% **FDI** for satellite manufacturing and operation (automatic route).
    * Up to 49% **FDI** for launch vehicles, spaceports, and related systems (automatic route).
    * 100% **FDI** for manufacturing components and systems/sub-systems for satellites, ground, and user segments (automatic route).
  - **Beyond Limits:** Investment beyond these limits is allowed through the government route.
- **NewSpace India Limited (NSIL):**
  - **Establishment:** Established in 2019.
  - **Role:** Boosts local production and supports Indian customers by selling **ISRO technologies**.

IV. Recent Developments and Future Outlook:

- **Venture Capital Fund Proposal:**
  - **Proposal: IN-SPACe** has suggested a **₹ 1000 crore Venture Capital Fund** to boost India's **space economy**.
  - **Current & Target Valuation:** India's space economy is currently valued at $8.4 billion, with a target to reach $44 billion by 2033.
  - **Deployment:** The fund will be used over five years, starting with ₹ 150 crore in FY 2025-26, then ₹ 250 crore each year for the next three years, and ₹ 100 crore in 2029-30.
  - **Structure:** Will operate as an **Alternative Investment Fund (AIF)** under **SEBI regulations**.
  - **Impact:** Aims to provide early-stage money to **startups**, helping them grow, invest in **R&D**, hire more people, and attract more private investment, thereby increasing jobs across the entire **space supply chain** (upstream, midstream, downstream).
- INSPACe Funding Program for Startups
  - On March 14, 2023, **INSPACe** introduced this funding program for **space startups** with great ideas but needing initial support.
  - This program is started together with **ISRO's National Remote Sensing Centre (NRSC)** to support companies using space technology.

- **Key Features:**
    - **Financial Help:** Up to 1 crore Rupees in different stages, including a possible 40% advance.
    - **Guidance and Training:** Help from experienced professionals and special training to improve skills and understand the space industry.
    - **Networking:** Making connections with big companies and potential partners for better understanding and market entry.
- **Main Focus Areas:**
    - **INSPACe** has chosen specific areas where **space technology** can be really helpful. These are:
    - **City Development:** Using **satellite data** for better city planning, watching over infrastructure, and managing resources.
    - **Disaster Management:** Improving warning systems for disasters, tracking them as they happen, and helping in quick and effective responses.
- **Why Support these Startups?**
    - Supporting these **startups** is important for:
    - **Competing Globally:** Aiming to compete with big companies like **SpaceX and Blue Origin.**
    - **Growing India's Space Economy:** Increasing India's part in the global space market.
    - **Reducing Dependency on Imports:** Relying less on foreign parts for **space technology**.
    - **Supporting ISRO:** Letting **ISRO** focus more on research and big space missions.
    - **Improving Lives:** Using **space technology** for better farming, **disaster management**, and communication.
    - **Increasing Global Influence:** Strengthening India's position in the world and as a counter to China.
- **Beyond Funding: Creating a Supportive Environment**
    - **Tax Benefits:** No **GST** on satellite launches.
    - **Atal Innovation Mission:** Programs for young people and new **space tech** companies.
    - **Mentorship Network:** Guidance from retired **ISRO** professionals.

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Ecology & Environment

Vembanad Lake

1. Why in News?

- **Vembanad Lake Rejuvenation Project:**
  - A comprehensive five-year plan (₹ 188.25 crore) submitted to the Kerala Chief Minister.
  - Led by Alappuzha District Administration.
  - Draws inspiration from the **Namami Gange Programme**.
  - Possible revisions based on ongoing studies by the **Centre for Water Resources Development and Management (CWRDM)**.
  - **Eight subcommittees** formed for coordination across sectors: agriculture, fisheries, water resources, biodiversity, sanitation, and disaster management.
- **Alarming Shrinkage & Degradation:**
  - Significant reduction in surface area: **27% reduction between 1917 and 1990**.
  - Primary causes: **land reclamation, sedimentation, and encroachment**.
- **Recent Conservation Efforts:**
  - Cleaning drives removed **28.72 tonnes of plastic waste** and large quantities of water hyacinth.

2. About Vembanad Lake

- **Geographical Features:**
  - **Longest lake in India** and the **largest in Kerala**.
  - Length: Approximately **96.5 km**.
  - Area: Around **2,033 square kilometres**.
  - Spans three Kerala districts: **Alappuzha, Kottayam, and Ernakulam**.
  - **Local Names:** Vembanad Kayal, Vembanad Kol, Punnamada Lake (in Kuttanad), and Kochi Lake (in Kochi).
- **Hydrology:**
  - Fed by **six major rivers**: Meenachil, Achankovil, Pamba, and Manimala are notable.
  - Has an outlet into the **Arabian Sea** on the western side.
- **Islands:**
  - Encompasses important islands like **Pathiramanal, Perumbalam, and Pallippuram**.
- **Ecological Significance:**
  - Part of the **Vembanad-Kol Wetland**.
  - Designated as a **Ramsar site in 2002** due to its international ecological importance.
  - Hosts the **Kumarakom Bird Sanctuary** on its eastern shore.
- **Socio-cultural and Economic Importance:**
  - Prominent part of Kerala's **backwater tourism circuit**.
  - Hosts the famous **Nehru Trophy Snake Boat Race (Vallam Kali)** annually in August in its Punnamada segment.

3. Major Threats and Challenges

- **Shrinkage and Encroachment:**
  - Significant loss of surface area over the last century.
  - Land reclamation for agriculture and construction.
- **Pollution:**
  - **Plastic waste:** Large quantities found.
  - **Water hyacinth:** Proliferation affecting water quality and navigation.
  - **Sedimentation:** Reducing the depth and water holding capacity of the lake.
  - Untreated sewage and industrial effluents from surrounding areas.
- **Ecological Degradation:**
  - Loss of biodiversity.
  - Impact on fisheries due to pollution and habitat destruction.

- **Unsustainable Human Activities:**
    - Over-extraction of resources.
    - Unregulated tourism activities.

4. Conservation Measures and Management

- **Vembanad Lake Rejuvenation Project:**
    - Aims for comprehensive restoration.
    - Multi-sectoral approach with dedicated subcommittees.
    - Focus on long-term sustainability.
- **Role of Institutions:**
    - **Centre for Water Resources Development and Management (CWRDM):** Conducting studies to inform restoration efforts.
    - District Administration leading the project.
- **Community Participation and Cleaning Drives:**
    - Efforts to remove plastic waste and water hyacinth.
- **Need for Integrated Water Resource Management:**
    - Addressing sources of pollution.
    - Sustainable land-use planning in the catchment area.
    - Protecting biodiversity and restoring ecological balance.

Natural Hydrogen

1. Why in News?

- **Formal Exploration Initiatives Launched (Recent Development as of May 2025):**
    - The **American Association of Petroleum Geologists (AAPG)** and the **United States Geological Survey (USGS)** have recently started formal hydrogen exploration initiatives. This signals growing interest and recognition of natural hydrogen's potential.

2. What is Natural Hydrogen?

- **Fuel of the Future:**
    - Hydrogen is widely considered a key fuel for the future due to its potential to **decarbonise the global economy** and significantly reduce **greenhouse gas emissions**.
- **Definition:**
    - Natural hydrogen, also known as **white hydrogen**, refers to **naturally occurring molecular hydrogen** found within the Earth's crust.
    - This distinguishes it from industrially produced hydrogen (e.g., grey, blue, or green hydrogen).

3. How is Natural Hydrogen Formed?

- Natural hydrogen is generated through various **geological processes**, primarily:
    - **Serpentinisation:** A chemical reaction between **water and iron-rich rocks** (ultramafic rocks).
    - **Radiolysis:** The breakdown of **water molecules by radioactive decay** in rocks.
    - **Decomposition of organic matter:** Occurs in deep geological formations.

4. Why is Natural Hydrogen Important?

- **Clean Energy Source:**
    - If harvested sustainably, natural hydrogen can **significantly reduce carbon emissions**.
- **Cost-Effective Alternative:**
    - It can provide a **low-cost and low-emission alternative** to conventional hydrogen sources:

        * **Grey hydrogen** (produced from natural gas, involves CO2 emissions).
        * **Green hydrogen** (produced using renewable electricity and electrolysis, currently more expensive).
    - The estimated **cost of natural hydrogen extraction** may fall to around **$1/kg or less**, which is potentially lower than current green hydrogen production costs.
- **Geological Association:**
    - Natural hydrogen deposits are typically associated with:
        * Tectonically active regions.
        * Ultramafic and basaltic rocks.
        * Ophiolite complexes.
        * Hydrothermal systems.

5. Potential Regions for Natural Hydrogen in India

- Based on geological settings, potential-rich regions in India for natural hydrogen exploration include:
    - **Cratonic belts:** For example, Dharwar Craton, Singhbhum Craton.
    - **Sedimentary basins:** For example, Vindhyan Basin, Cuddapah Basin, Gondwana Basins, Chhattisgarh Basin.
    - **Ophiolitic zones:** Found in the Andaman Islands and the Himalayas.
    - **Basement rock fracture zones.**
    - Areas with **hot springs.**

Palamu Tiger Reserve

Context: Jaigir, a village inside Palamu Tiger Reserve (PTR), has become the first village to be entirely relocated outside the core area, a result of years of efforts by Jharkhand forest officials.

About Palamu Tiger Reserve (PTR)

- **Location:**
    - Western part of the **Chotanagpur plateau**.
    - Spread across two districts: **Latehar and Garhwa** in **Jharkhand**.
- **Part of:** Forms a part of the **Betla National Park**.
- **Area:**
    - Total area: 1,014 sq.km.
    - Core area: 414 sq.km.
    - Buffer area: 600 sq.km.
- **Historical Significance:**
    - **One of the first 9 tiger reserves** created in the country at the inception of **'Project Tiger'**.
    - **First reserve in the world** where a **tiger census was carried out as a pugmark count**, as early as 1932 under the supervision of J.W. Nicholson.

Geography and Hydrology

- **Terrain:** Undulating with valleys, hills, and plains.
- **Rivers:**
    - Three rivers flow through the valleys: **North Koyal, Auranga, and Burha.**
    - **Burha is the only perennial river.**
- **Climate:** The area is **drought-prone**.
- **Geology:** Consists of **gneiss**, and includes **granite and limestone**.
- **Mineral Rich:** Very rich in minerals like **Bauxite and Coal**.

Flora (Vegetation)

- **Forest Types:** Comprises **moist deciduous and dry deciduous forests**.
- **Major Components: Sal and bamboo** are the major components.

- **Distribution:**
    - Western part: Dry deciduous forests.
    - Other parts: Moist mixed deciduous nature.
    - Good distribution of **bamboo thatches** throughout.
- **Medicinal Plants:** The recent herbarium prepared by the Tiger Reserve authorities records a good number of medicinal plants.

Fauna (Key Species)

- **Keystone and Principal Species:**
    - Tiger
    - Asiatic Elephant
    - Leopard
    - Grey wolf
    - Wild dog
    - Gaur
    - Sloth bear
    - Four-horned antelope

Pangolin

Context: A recent report by the Wildlife Justice Commission (WJC) indicates a sharp decline in global trafficking of pangolin scales since 2020, attributed to COVID-19 disruptions, sustained law enforcement, and evolving smuggling tactics.

About Pangolins

- **Species:** There are **8 species of pangolins** globally:
    - **4 in Africa:** Black-bellied, White-bellied, Giant Ground, Temminck's Ground.
    - **4 in Asia:** Indian, Chinese, Sunda, Philippine pangolins.

Physical and Behavioural Traits

- **Habitat:** Live in **tropical forests, grasslands, and agricultural areas**, often found close to human settlements.
    - The **Indian pangolin** is common across India, Nepal, Sri Lanka, and Bangladesh.
- **Diet and Ecosystem Role:**
    - Feed primarily on **ants and termites**.
    - Contribute to **pest control and soil aeration**, making them crucial for ecosystem balance.
- **Unique Feature:** Known for their distinctive scales, which are made of keratin (similar to human fingernails). They curl into a ball when threatened.

Threats

- **Illegal Trade:** Heavily targeted for **illegal trade in Asia**.
    - Their **scales are used in traditional medicine**.
    - Their **meat is considered a delicacy**.
- **Habitat Loss:** Worsened their decline due to deforestation and human encroachment.

Conservation Status

- **IUCN Red List:**
    - **Indian pangolin:** Listed as **Endangered**.
    - **Chinese pangolin:** Listed as **Critically Endangered**.
    - The other six species are also listed as Endangered or Critically Endangered.
- **India's Wildlife (Protection) Act, 1972:** Both the **Indian pangolin and Chinese pangolin are protected under Schedule I**, providing them the highest level of legal protection against hunting and trade.
- **CITES: All 8 species are listed in CITES Appendix I**, which **prohibits international commercial trade** in pangolins and their parts.

Kendu Leaf

Why in the News?

- Tribal communities in Koraput district, Odisha (specifically 8 Gram Sabhas in Baipariguda block), have harvested a significant amount of kendu leaves (over 4 lakh bundles) in the 2025 season.
- They are seeking to **independently manage and sell kendu leaves** under the provisions of the **Forest Rights Act (FRA), 2006**, challenging the state's traditional control over its trade.

What is Kendu Leaf?

- **Common Names:** Also known as **"Green Gold of Odisha"** in Odisha, and **Tendu Leaf** in other parts of India.
- **Category:** One of the most vital **non-wood forest products (NWFPs)**.
- **Nationalisation:** It is a **nationalised forest product**, similar to Bamboo and Sal seed, meaning its collection and trade are regulated by the government.
- **Primary Use:** Primarily used to **roll tobacco into bidis** (local cigarettes).
- **Other Value:** Also holds **medicinal value**.
- **Key Producer States (in order):**
    1. Madhya Pradesh (MP)
    2. Chhattisgarh
    3. **Odisha** (third-largest producer)
    4. Jharkhand
    5. Andhra Pradesh
    6. Maharashtra
    7. Gujarat

Tribal Rights Under Forest Rights Act (FRA), 2006

- **Recognition of Rights:** The FRA, 2006, recognizes the rights of forest-dwelling communities to **collect, use, and sell Minor Forest Produce (MFP)** like kendu leaves.
- **2012 Amendment to FRA:** This amendment significantly empowered communities by enabling them to:
    - **Process, store, transport, and sell MFP** without paying royalties or seeking permission.
- **Transit Permits:**
    - Under FRA, Transit Permits for MFP must be issued by the **Community Forest Rights Management Committee (CFRMC)**, **not by forest officials**.
    - The provisions of the FRA hold **legal supremacy** and cannot be overridden by State laws like the Odisha Kendu Leaf (Control of Trade) Act.

Yangtze Finless Porpoise

Why in the News?

- Chinese scientists have utilized classical Chinese poetry to reconstruct the **historical distribution** of the Yangtze finless porpoise.
- This study demonstrates the **scientific use of ancient literary records** to track **biodiversity trends over 1,000+ years**, spanning from the Tang Dynasty (618–907 CE) to the modern People's Republic of China.

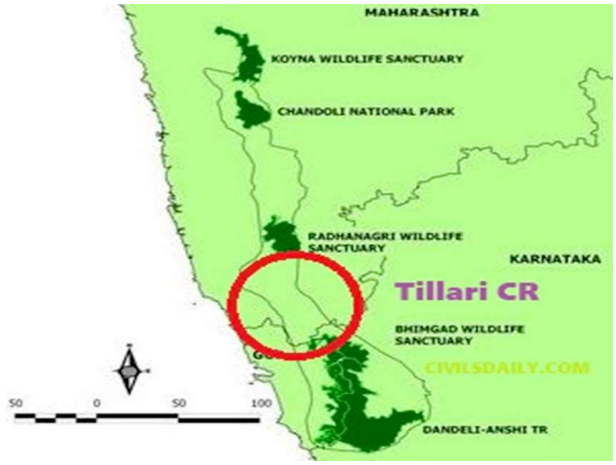
About the Yangtze Finless Porpoise

- **Habitat:** Found **exclusively in the Yangtze River**, which is Asia's longest river.
- **Uniqueness:** It is the **only known freshwater porpoise species in the world**.
- **Unique Traits:** Known for a **"mischievous smile"** and **intelligence similar to gorillas**.
- **Ecological Role:** Considered a **key indicator species**, reflecting the overall health of its freshwater ecosystem.
- **Physical & Behavioural Traits:** Small-bodied, slow-moving, and non-migratory.

Conservation Status

- **IUCN Red List:** Listed as **Critically Endangered**.
- **Estimated Population:** Only **1,000–1,800 individuals** (a very low number indicating high vulnerability).
- **Extinction Risk:** High, with parallels often drawn to the **Baiji dolphin**, which was declared **functionally extinct in 2006**. The Baiji's extinction marked the first human-driven extinction of a dolphin species, serving as a stark warning for the Yangtze finless porpoise.

Bhimgad Wildlife Sanctuary



Context: Public trespassing into the ecologically sensitive Bhimgad Wildlife Sanctuary (BWS) in Khanapur taluk continues unchecked, raising serious concerns among conservationists.

About Bhimgad Wildlife Sanctuary (BWS)

- **Location:** Spans over the **Western Ghats** in the **Belgaum district of Karnataka, India**.
- **Declaration:** Declared as a wildlife sanctuary in **December 2011**.
- **Naming:** Named after the **Bhimgad Fort**, which was constructed and commanded by Chhatrapati Shivaji Maharaj in the 17th century as a defense against Portuguese troops.
- **Geographical Connectivity/Boundaries:** Shares its boundary with:
  - North of **Dandeli Wildlife Sanctuary**.
  - North-west of the **Bhagwan Mahaveer Sanctuary and Mollem National Park** (Goa).
  - North of **Netravali Wildlife Sanctuary** (Goa).
  - East of **Mhadei Wildlife Sanctuary** (Goa).
- **Topography:** Characterized by its diverse topography, encompassing hills, valleys, and plateaus.

Hydrology

- **Headwaters:** Forms the headwaters of a number of rivers like **Tillari, Malaprabha, and Mhadei**, and several perennial streams.

Key Species & Unique Features

- **Barapede Caves:** Known for the **Barapede caves**, which are the **only known breeding area** of the **Wroughton's Free-tailed Bat**, a threatened species on the verge of extinction.
- **King Cobra Breeding Grounds:** Unique feature is the presence of large, isolated rock formations that serve as ideal **breeding grounds for the King Cobra**, the world's longest venomous snake.

Flora (Vegetation)

- **Dominant Vegetation:** Comprises **tropical and subtropical moist broadleaf forests**.
- **Tree Species:** Forests are dominated by towering trees like **Malabar teak, rosewood**, and various species of dipterocarps.
- **Medicinal Plants:** Hosts a number of **medicinal plants**.

Fauna

- **Endangered Species:** Provides habitat for several endangered species, such as:
  - **Indian sloth bear**
  - **Indian pangolin**
  - **Elusive black panther**
- **Other Notable Residents:**
  - Malabar giant squirrel
  - Gaur (Indian bison)
  - Sambar deer
  - A plethora of bird species, including the Malabar trogon and the great Indian hornbill.

Snow Leopard

Context: A group of tourists had a rare encounter with a snow leopard in Himachal Pradesh's Spiti Valley, highlighting the elusive nature of this predator.

About Snow Leopard

- **Type:** A medium-sized **big cat**.
- **Scientific Name:** *Panthera uncia*.
- **Habitat:** Resides in the **rugged terrains of Central and South Asia**.
- **Population Estimate:** Despite a range of over 2 million sq.km., scientists estimate only between **3,920 and 6,390 snow leopards are left in the wild**.
- **Nickname:** Very rarely seen by humans, it is known as the **'ghost of the mountains'**.

Snow Leopard Distribution

- **Geographic Range:** Inhabits the mountains of **central Asia and the Indian subcontinent**.
- **Elevation:** Ranges from about **1,800 metres (6,000 feet) in winter to about 5,500 metres (18,000 feet) in summer**.
- **Countries:** Found in **12 countries**, including China, Bhutan, Nepal, India, Pakistan, Russia, and Mongolia.
- **In India:** Largely found in the high-altitude cold, arid, and rugged terrains of **Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh**.

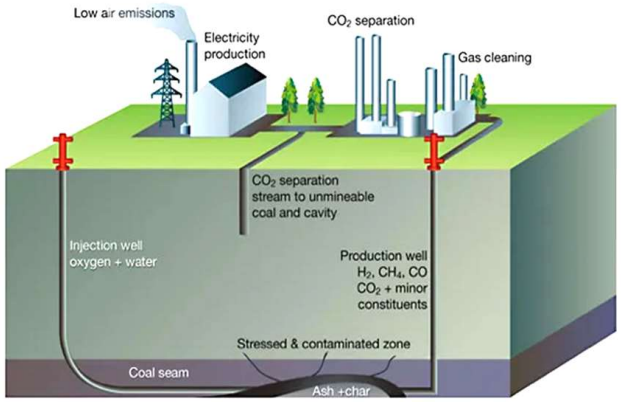
Snow Leopard Features

- **Camouflage:** Pale grey fur with dark rosettes, serving as camouflage against rocky terrains.
- **Fur Adaptation:**
  - **Dense and insulating undercoat** for warmth.
  - Outer layer of fur (about 2 cm long) protects it from harsh winds.
- **Size:** Reaches a length of about 7 feet (2.1 meters), with almost half of that length being the tail.
- **Tail Function:** The tail helps provide **balance** when climbing in mountainous terrain and offers **warmth** when the cat sleeps.
- **Weight & Height:**
  - Stands about 2 feet (0.6 meter) high at the shoulder.
  - Weighs 60–120 pounds (27–54 kilograms).
  - Males are typically larger than females.
- **Social Behaviour:** Solitary and lives alone, except when mating or raising offspring.

Snow Leopard Conservation Status

- **IUCN Red List: Vulnerable**.
- **CITES: Appendix I** (prohibits international commercial trade).
- **Wildlife (Protection) Act 1972 (India): Schedule I** (highest level of protection, prohibits hunting and trade).

Coal Gasification



Context: The Ministry of Coal recently signed agreements under Category II of the Coal Gasification Financial Incentive Scheme, aiming to accelerate coal gasification in India.

What is Coal Gasification?

- **Definition:** Coal gasification is a **thermo-chemical process** that converts coal into **syngas** (synthesis gas).
- **Syngas Composition:** Syngas is a mixture primarily composed of **carbon monoxide (CO), hydrogen (H,), carbon dioxide (CO,), methane (CH„), and water vapour (H, O)**.
- **Process:** Coal is reacted at **high temperatures (1000–1400°C)** with a **controlled amount of oxygen (or air) and steam**, resulting in the production of syngas.
- **Key Principle:** It involves partial oxidation of coal, meaning it's not complete combustion, which allows for the creation of useful gaseous products.

Process of Coal Gasification

1. **Preparation:** Coal is finely crushed to increase its surface area, which aids in efficient reaction.
2. **Gasification Reactor:** The powdered coal is fed into a specialized reactor (gasifier) along with a limited amount of oxygen/air and steam.
3. **Chemical Reactions:** Within the reactor, under high temperature and pressure, the coal undergoes partial oxidation and other reactions, breaking down into the components of syngas.
4. **Gas Cleaning:** Impurities like tar, sulfur compounds (e.g., hydrogen sulfide), and particulate matter (dust) are removed from the raw syngas, leading to cleaner fuel.
5. **Further Processing (Optional):** Syngas can be further processed to produce specific chemicals like hydrogen, methanol, or synthetic natural gas (SNG). Carbon capture and storage (CCS) can also be integrated at this stage.

Ex-situ vs. In-situ Gasification

Aspect	Ex-situ Gasification	In-situ Gasification (Underground Coal Gasification - UCG)
Location	Above ground in **controlled gasifiers/reactors**.	**Underground**, within the coal seams themselves.
Process	Coal is **mined and then gasified** in surface reactors.	Oxygen and steam are **injected directly into the coal seam** to generate syngas underground.
Application	Suitable for **shallow coal reserves**.	Ideal for **deep or unmineable coal seams** where conventional mining is uneconomical or difficult.
Efficiency	More energy is used in mining and handling the coal.	More **energy-efficient** for deeper deposits as it avoids the need for extensive mining.
Environmental	Easier to control emissions and capture CO_2 at the surface.	Potential for groundwater contamination and harder to control reactions.

About the Coal Gasification Financial Incentive Scheme

- **Launch Date:** January 24, 2024.
- **Total Outlay:** ₹ 8,500 crore.
- **Target:** To achieve **100 million tonnes (MT) of coal gasification by 2030**.
- **Aim:** To **efficiently utilize India's domestic coal reserves** for sustainable industrial development.

- **Participation:** Promotes **both public and private sector participation** for setting up coal gasification infrastructure.
- **Alignment with National Goals:** Aligned with India's broader goals of:
    - **Clean coal transition**
    - **Enhancing energy security**
    - **Reduction of import dependency** (for chemicals, fertilizers, etc.)

Significance and Benefits of Coal Gasification for India

- **Cleaner Energy Source:** Produces a cleaner gaseous fuel compared to direct coal burning, reducing pollutants like sulfur dioxide (SO,), nitrogen oxides (NO"), and particulate matter.
- **Versatile End Products:** Syngas is a versatile feedstock for producing:
    - **Hydrogen** (for fuel cells, refining, etc.)
    - **Methanol** (a chemical building block)
    - **Ammonia** (for fertilizers)
    - **Synthetic Natural Gas (SNG)**
    - **Liquid fuels** (via Fischer-Tropsch process)
    - **Electricity** (in integrated gasification combined cycle - IGCC plants, which are more efficient)
- **Energy Security:** Utilizes India's vast domestic coal reserves, reducing reliance on imported oil and natural gas.
- **Carbon Capture Potential:** Allows for easier and more efficient **carbon capture and storage (CCS)** compared to conventional coal combustion, helping to mitigate greenhouse gas emissions.
- **Economic Value:** Transforms lower-value coal into higher-value products, potentially boosting economic growth and creating employment.
- **Reduced Import Bill:** Production of various chemicals and fuels domestically can significantly reduce India's import bill.

United Nations Forum on Forests (UNFF20)

Context: India actively participated in the 20th Session of the United Nations Forum on Forests (UNFF20), held at the United Nations Headquarters in New York.

About the United Nations Forum on Forests (UNFF)

- **Establishment:** Established in **2000 by the UN Economic and Social Council (ECOSOC)**.
- **Mandate:** To promote **sustainable forest management and conservation worldwide**.
- **Sessions:** Holds **annual sessions at the UN Headquarters**, alternating between:
    - **Technical discussions** (odd years)
    - **Policy-level dialogues** (even years)
- **Membership:** Has **universal membership**, including all **UN Member States and specialized forest-related agencies**.
- **India's Role:** India is a **founding member of the UNFF** and continues to play a proactive role in shaping global forest-related policy.
- **UN Strategic Plan for Forests (UNSPF):** The 19th UNFF Session Declaration aimed to secure high-level political commitment to forest protection, with actionable steps to achieve the goals of the **UN Strategic Plan for Forests (UNSPF) 2017–2030**.
    - The UNSPF is a global framework for actions to sustainably manage all types of forests and trees outside forests, and halt deforestation and forest degradation.
    - It includes six Global Forest Goals and 26 associated targets.

India at United Nations Forum on Forests (UNFF20)

The Indian delegation highlighted the country's achievements in forest conservation and sustainable forest management, reaffirming its commitment to the **Voluntary National Contributions (VNCs)** under the UNSPF 2017–2030.

Key Achievements & Initiatives Highlighted by India:

1. **Forest and Tree Cover:** Reported a **steady increase in forest and tree cover**, which now stands at **25.17% of its geographical area**, as per the latest **India State of Forest Report 2023**.
2. **Aravalli Green Wall Project:** Mentioned for **land restoration**, aiming to create a green buffer around the Aravalli mountain range to combat desertification.
3. **Mangrove Cover:** Highlighted a **7.86% increase in mangrove cover** over the past decade.
4. **Green India Mission:** Afforestation of **over 1.55 lakh hectares** under this mission, which is part of India's National Action Plan on Climate Change (NAPCC) focusing on increasing forest/ tree cover, improving forest quality, and enhancing ecosystem services.
5. **Ek Ped Maa Ke Naam (Plant4Mother) Campaign:** Mentioned the planting of **1.4 billion seedlings** under this initiative. This campaign was launched by the Prime Minister on World Environment Day 2024 to encourage tree planting as a tribute to mothers and Mother Earth.
6. **International Big Cat Alliance (IBCA):** A major highlight was India's invitation to all UN Member States to join the IBCA.
    - **Nature:** A **global platform initiated by India**.
    - **Objective:** To protect the **seven big cat species** (Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar, and Puma).
    - **Approach:** Through collaborative research, knowledge exchange, and capacity-building.
    - **Launch:** Launched by PM Modi in April 2023.
7. **Ecosystem Services Quantification:** India shared studies focused on **quantifying ecosystem services** like:
    - Carbon sequestration
    - Water provisioning
    - Biodiversity conservation
    - These studies utilized tools such as the **System of Environmental-Economic Accounting (SEEA)** and the **Millennium Ecosystem Assessment (MEA)**.
        * **SEEA:** An internationally agreed statistical standard for environmental-economic accounting.
        * **MEA:** A major assessment of the human impact on the environment, called for by the UN Secretary-General in 2000, which popularized the term "ecosystem services."

Anamalai Tiger Reserve

Context: The pre-monsoon (summer) estimation of tigers and other animals recently started in the Pollachi and Tiruppur divisions of the Anamalai Tiger Reserve (ATR).

About Anamalai Tiger Reserve (ATR)

- **Location:** Situated at an altitude of 1400 m in the **Anamalai Hills of Pollachi and Coimbatore District of Tamil Nadu**.

- **Geographical Position:** Located on the **southern side of the South Western Ghat landscape**.
- **Area:** Covers 1,479.87 sq. km., including 958.59 sq.km. of core area.
- **Connectivity/Surroundings:**
    - Bounded by **Parambikulam Tiger Reserve** on the East (Kerala).
    - Shares borders with **Chinnar Wildlife Sanctuary** and **Eravikulam National Park** on the South Western side (Kerala).
    - Also surrounded by Nenmara, Vazhachal, Malayattur, and Marayur reserved forests of Kerala.
- **UNESCO World Heritage Site:** The **Kariyan shola, Grass hills, and Manjampatti** areas within Anamalai Tiger Reserve have been identified as a **world heritage site by UNESCO**.
- **Indigenous Communities:** Home to several indigenous tribal communities such as the **Kadars, Muduvars, Malasars, Malai malasars, Eravalars, and Pulayars**.

Vegetation and Flora

- **Vegetation Types:** Ranges from **wet evergreen forests and semi-evergreen forests to moist deciduous and dry deciduous forests**.
- **Unique Forest Types:** Some parts of the reserve boundary also include the **shola forests** (montane evergreen forests) in the Anamalai Hills and rarer **Montane Grasslands, Savannahs, and Marshy Grasslands**.
- **Floral Diversity:**
    - Around **2500 species of angiosperms** are found, including several species of Balsam, Crotalaria, Orchids, and Kurinchi.
    - The reserve is rich in **wild relatives of cultivated species** like mango, jackfruit, wild plantain, ginger (*Zingiber officinale*), turmeric, and pepper (*Piper longum*), cardamom, etc., highlighting its importance as a gene pool.

Fauna

- **Key Wild Animals:** The important wild animals found in the reserve include:
    - **Tiger**
    - **Asiatic elephant**
    - Sambar
    - Spotted deer
    - Barking deer
    - Jackal
    - Leopard
    - Jungle cat
    - Other prominent Western Ghats species like Indian Gaur, Dhole (Indian wild dog), and various primate species are also found here.

International Maritime Organisation (IMO)

Context: The 83rd session of the Marine Environment Protection Committee (MEPC-83) under the International Maritime Organisation (IMO) recently adopted a landmark decision on shipping emissions.

About the International Maritime Organisation (IMO)

- **Nature:** A **specialized agency of the United Nations (UN)**.
- **Responsibility:** Responsible for the **safety and security of international shipping** and the **prevention of marine and atmospheric pollution by ships**.
- **Contribution to SDGs:** Contributes directly to **UN Sustainable Development Goal (SDG) 14**, which focuses on the conservation and sustainable use of oceans and marine resources.

- **Role in Regulation:** The IMO **formulates regulations** on shipping safety, maritime security, and environmental protection, but **does not enforce them directly**. Once a member state adopts a regulation, it becomes part of that country's domestic law.
- **Other Functions:** The organization also deals with **legal matters** such as liability, compensation, and facilitation of maritime traffic.
- **Establishment History:**
    - Initially established as the **Inter-Governmental Maritime Consultative Organisation (IMCO) in 1948**.
    - Became a **UN specialized agency in 1959**.
    - Was **renamed IMO in 1982**.
- **Membership & Headquarters:** The IMO has **174 member states** and is **headquartered in London**.

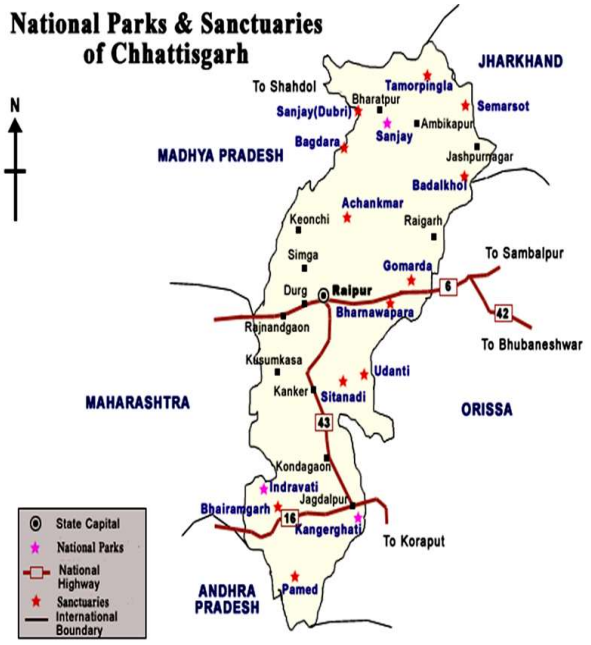
Organizational Structure of IMO :

- **Assembly:** The **supreme governing body**, comprising all member states.
    - Meets every **two years** to approve the work programme, budget, and elect members to the Council.
- **Council:** Acts as the **Executive Organ**, overseeing IMO's work in between Assembly sessions.
- **Committees:** The IMO has **five major Committees**, which are responsible for policy development and regulation formulation.
    - One of these is the **Marine Environment Protection Committee (MEPC)**, which focuses on preventing and controlling marine pollution from ships.
- **Funding:** Sourced through **mandatory contributions by member states**, and also from voluntary donations and commercial revenue.

About the MARPOL Convention :

- **Full Name:** The **International Convention for the Prevention of Pollution from Ships (MARPOL)**.
- **Purpose:** The **primary international treaty** to prevent **pollution of the marine environment from ships** due to operational or accidental causes.
- **Adoption:** Adopted in **1973** under the IMO.
- **Protocol of 1978:** Supplemented by the **Protocol of 1978**, which was introduced following major tanker accidents in the mid-1970s, making it the combined "MARPOL 73/78".
- **Annexes:** MARPOL currently consists of **six technical Annexes**, each targeting various sources of ship-related pollution:
    - **Annex I:** Regulations for the prevention of **oil pollution** (e.g., spills and bilge water discharge).
    - **Annex II:** Regulations for the control of pollution by **noxious liquid substances in bulk** (e.g., chemical tankers).
    - **Annex III:** Regulations for the prevention of pollution by **harmful substances carried by sea in packaged form** (e.g., dangerous goods).
    - **Annex IV:** Regulations for the prevention of pollution by **sewage discharge from ships**.
    - **Annex V:** Regulations for the prevention of pollution by **garbage disposal at sea**.
    - **Annex VI:** Regulations for the prevention of **air pollution from ships** (e.g., sulfur oxides, nitrogen oxides, greenhouse gas emissions).
- **India's Status: India is a signatory to MARPOL** and adheres to its annexes through domestic regulations.

Udanti Sitanadi Tiger Reserve



Context: Recent camera trap images from Chhattisgarh's Udanti Sitanadi Tiger Reserve (USTR) have captured a promising resurgence in wildlife activity, showing extensive use of the forest by carnivores, herbivores, and omnivores alike.

About Udanti Sitanadi Tiger Reserve (USTR)

- **Location:** It is located in the **Gariaband and Dhamtari Districts of Chhattisgarh**.
- **Formation:** It was established by joining the regions previously represented by the **Sitanadi Wildlife Sanctuary and Udanti Wildlife Sanctuary**.
- **Drainage System:** The drainage system of the reserve consists of the **Mahanadi River** as the main river, along with its tributaries: **Udanti, Sitanadi, Indravan, and Pairi Rivers**.
- **Strategic Importance (Corridor):** The reserve's location is strategic as it connects with the Kanker and North Kondagaon forest divisions, forming a **contiguous forest corridor to Indravati Tiger Reserve in the Bastar region**. This connectivity is vital for wildlife movement and genetic flow.
- **Total Area:** 1872 sq.km.
- **Topography:** There are 19 named mountains in the reserve. **Deo Dongri is the highest point**, and the most prominent mountain is Atânga Dongar.

Flora and Fauna

- **Flora (Forest Types):** The predominant forest types in USTR are classified as "Tropical Peninsular Sal Forest and Southern Tropical Dry Deciduous Mixed Forest" (as per Champion & Seth, 1968 classification). The ground is typically covered with a dense growth of grass, plants, bushes, and saplings.
- **Fauna (Key Species):**
    - **Wild Buffalo:** Along with the Indravati Tiger Reserve, the Udanti Sitanadi Tiger Reserve is an important refuge for the **last few herds of the highly endangered Wild Buffalo** (or Asiatic Wild Water Buffalo), which is a critically important species for conservation.
    - **Tiger:** The reserve is a significant habitat for the **tiger**, which is the flagship species for its designation.
    - **Other Endangered/Rare Species:** Apart from the tiger and wild buffalo, other endangered and rare species found in the reserve include:
        * **Indian Wolf**
        * **Leopard**
        * **Sloth Bear**
        * **Mouse Deer**
    - The recent camera trap images confirm the presence and extensive use of the forest by a wide range of carnivores, herbivores, and omnivores, indicating a healthy ecosystem.

EDITORIALS

Crux of The Hindu & Indian Express

Ecology & Environment

PBAT Plastic - A Sustainable Alternative


PBAT plastic

Context: The Kamalpur Nagar Panchayat in Tripura has recently adopted **compostable bags made from PBAT** as a sustainable alternative to single-use plastics (SUPs), highlighting a growing national focus on eco-friendly solutions.

I. What is PBAT Plastic?

- **Definition:** PBAT (Polybutylene Adipate Terephthalate) is a **biodegradable and compostable thermoplastic polymer**. It serves as an **eco-friendly substitute** for conventional, non-biodegradable plastics.
- **Composition:** It is a **copolymer** synthesized from three main monomers:
    - Adipic acid
    - 1,4-butanediol
    - Terephthalic acid
- **Processing:** A significant advantage of PBAT is that it can be processed using **conventional plastic manufacturing methods**, making its adoption relatively straightforward for existing industries.
- **Blends:** PBAT is frequently **blended with other biopolymers** (e.g., PLA, starch) to enhance its mechanical strength, flexibility, and barrier properties, tailoring it for specific applications.

II. Key Properties of PBAT:

Understanding these properties is crucial for evaluating its environmental efficacy and practical applications:

1. **100% Compostable:** This is its most defining feature. PBAT breaks down completely into **water, carbon dioxide (CO,), and biomass** under industrial composting conditions. This process typically occurs within **180 days**, aligning with international composting standards.
2. **Flexibility and Toughness:** Unlike some other bioplastics, PBAT exhibits high flexibility and toughness, making it particularly suitable for film applications such as:
    - Bags (carry bags, garbage bags)
    - Agricultural films (mulch films)
    - Various types of packaging
3. **Moisture Resistance:** It offers good resistance to moisture, making it practical for packaging various goods.
4. **Chemically Inert:** PBAT is chemically stable, preventing unwanted reactions with packaged contents.
5. **Good Barrier Properties:** It can effectively prevent the passage of gases (like oxygen) and moisture, crucial for preserving food and other sensitive products.

III. PBAT vs. PLA (Polylactic Acid): A Comparative Analysis

This comparison is vital as PLA is another prominent bioplastic often discussed alongside PBAT.

Feature	PBAT (Polybutylene Adipate Terephthalate)	PLA (Polylactic Acid)
Composition	Copolymer of adipate, 1,4-butanediol, and terephthalate (petrochemical and bio-based components)	Polymer derived from **lactic acid**, typically sourced from renewable plant sugars (corn starch, sugarcane, cassava)
Flexibility	Highly **flexible and tough**	Generally **rigid and brittle** (unless modified)
Applications	Ideal for **flexible films, bags, packaging, agricultural films**	Suited for rigid products like **cutlery, rigid packaging, 3D printing filaments, electronics casings**
Degradation Rate	**Faster** degradation under industrial composting conditions (180 days)	**Slower** degradation; requires specific industrial composting conditions, can be more challenging
Cost	Generally **lower than PLA**, but **higher than conventional fossil-based plastics**	Generally **higher than PBAT** and conventional plastics
Transparency	Often opaque or translucent	Can be highly transparent

IV. Environmental Significance & Way Forward:

- **Addressing Single-Use Plastic (SUP) Menace:** The adoption of PBAT bags directly tackles the environmental challenges posed by non-biodegradable SUPs, which contribute significantly to plastic pollution in landfills and oceans.
- **Compostability:** Its 100% compostable nature means that, when properly managed in industrial composting facilities, PBAT products can return organic matter to the soil, contributing to a circular economy.
- **Reduced Carbon Footprint:** While its production still involves some petrochemical components, ongoing research aims to increase bio-based content. Its degradation products (water, CO, , biomass) are less harmful than persistent microplastics.
- **Challenges:**
    - **Industrial Composting Infrastructure:** Effective utilization of PBAT's compostable nature requires robust industrial composting facilities, which are not universally available in India. Improper disposal can still lead to litter, though it will eventually degrade faster than conventional plastics.
    - **Cost:** While cheaper than PLA, PBAT is still more expensive than traditional plastics, which can hinder widespread adoption, especially in price-sensitive markets.
    - **Public Awareness & Segregation:** Consumer awareness about proper disposal (segregating compostable plastics from non-compostable ones) is crucial for the success of such initiatives.
- **Government Initiatives (UPSC Relevance):** The move by Kamalpur Nagar Panchayat aligns with the broader Indian government's push for a "Swachh Bharat" and reducing plastic pollution. Policies like the Plastic Waste Management Rules encourage alternatives and proper waste management.

Conclusion: PBAT plastic offers a promising, genuinely compostable alternative to conventional single-use plastics, particularly for flexible applications. Its widespread adoption, supported by adequate composting infrastructure and public awareness, can significantly contribute to India's environmental sustainability goals and combat plastic pollution.

International Day for Biological Diversity (IDB)

Context:

The **International Day for Biological Diversity (IDB)** is commemorated annually on **May 22** to raise global awareness and remind the international community of the urgent need to protect and conserve biodiversity.

I. About International Day for Biological Diversity (IDB):

- **Date:** Celebrated annually on **May 22**.
- **Objective:** To increase global understanding and awareness of biodiversity issues.
- **Significance:** It serves as a crucial platform to highlight the importance of biodiversity for human well-being, ecological balance, and sustainable development.

II. International Day for Biological Diversity 2025 Theme:

- **Theme for 2025: "Harmony with nature and sustainable development."**
- **Linkage to SDGs:** This theme explicitly highlights the connection between the campaign for nature and the **Sustainable Development Goals (SDGs)** of the 2030 Agenda for Sustainable Development.

- **Focus for 2025:** The IDB 2025 aims to draw the world's attention to the crucial linkages between:
    - The **2030 Agenda and its SDGs**.
    - The goals and targets of the **Kunming-Montreal Global Biodiversity Framework (KMGBF)**.
    - This emphasis underscores the belief that these two universal agendas (sustainable development and biodiversity conservation) must advance together as they support the recently adopted "Pact for the Future."

III. History of International Day for Biological Diversity:

- **Proclamation:** The **United Nations** proclaimed May 22 as the IDB.
- **Initial Designation (1993):** When first established by the **Second Committee of the UN General Assembly in late 1993**, **December 29** was initially designated as IDB. This date marked the entry into force of the **Convention on Biological Diversity (CBD)**.
- **Change in Date (2000):** In **December 2000**, the UN General Assembly adopted **May 22** as the new date for IDB.
    - **Reason for Change:** The primary reason was the difficulty for many countries to plan and carry out suitable celebrations on December 29 due to the number of holidays coinciding around that time of year (e.g., Christmas, New Year).
    - **New Commemoration:** May 22 was chosen to commemorate the **adoption of the text of the Convention on Biological Diversity (CBD) on May 22, 1992**, by the **Nairobi Final Act of the Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity**.

IV. Key Concepts and Connections:

- **Biodiversity:** The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.
- **Convention on Biological Diversity (CBD):**
    - An international legally binding treaty adopted in 1992.
    - It has three main objectives: the conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.
    - India is a party to the CBD.
- **Kunming-Montreal Global Biodiversity Framework (KMGBF):**
    - Adopted at the UN Biodiversity Conference (COP15) in Montreal in December 2022.
    - It is a landmark agreement that sets ambitious goals and targets to halt and reverse biodiversity loss by 2030 ("30 by 30" target, aiming to protect 30% of land and sea).
    - It is seen as a "Paris Agreement for Nature."
- **Sustainable Development Goals (SDGs):** A collection of 17 interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all." Many SDGs (e.g., SDG 14: Life Below Water, SDG 15: Life on Land) directly relate to biodiversity.
- **Pact for the Future:** An initiative by the UN aiming to strengthen global governance for current and future generations, emphasizing multilateralism and collective action on global challenges.

Green Hydrogen Certification Scheme (GHCI) and Carbon Credit Trading Scheme (CCTS)

Scheme Under: National Green Hydrogen Mission (NGHM)

Nodal Ministry: Ministry of New and Renewable Energy (MNRE)

Certifying Authority: Bureau of Energy Efficiency (BEE)

1. Introduction

- On April 29, 2025, the Government of India officially notified the **Green Hydrogen Certification Scheme of India (GHCI)** to boost the adoption and export of green hydrogen and to provide clarity for emission reduction claims under the **Carbon Credit Trading Scheme (CCTS)**.
- The scheme was launched by **Union Minister of New and Renewable Energy, Pralhad Joshi**, and aligns with the National Green Hydrogen Mission's objective to make India a global hub for green hydrogen production and exports.

2. Objective and Need for Certification

- The GHCI aims to create a credible framework for the **measurement, monitoring, reporting, on-site verification, and certification** of green hydrogen.
- According to the Minister, the certification is necessary to prevent **greenwashing** and to ensure that hydrogen produced in India genuinely qualifies as "green."
- He emphasized that certified hydrogen would carry a **mark of quality and credibility**, thereby increasing its global acceptance and making it **export-ready**.

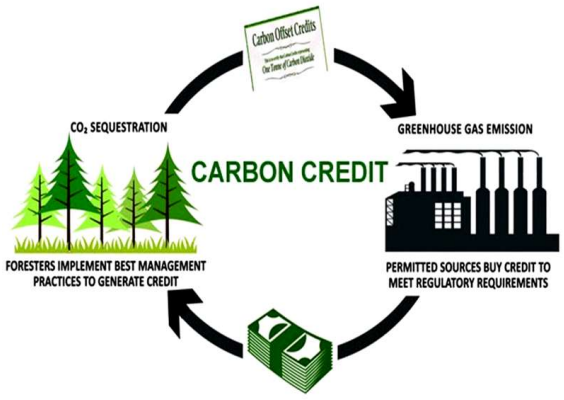
3. Basis of Certification

- The certification is based on a **green hydrogen standard introduced by MNRE in 2023**, which caps emissions at **2 kg of CO, equivalent per kg of hydrogen produced**.
- The certification applies exclusively to hydrogen produced via:
  - **Electrolysis of water using renewable energy**, and
  - **Conversion of biomass**
- Hydrogen produced through fossil fuel-based methods is excluded from the certification.

4. Scope of Certification

- The certification applies only to the **production process of green hydrogen**, including stages up to:
  - **Compression**, and
  - **Purification for transport**
- Processes such as **transport and storage** outside the plant, **conversion into hydrogen carriers** (e.g., ammonia), **reconversions**, and **end-use applications** are **not included** in the certification scope.
- Two types of certifications are available:
  - **Concept Certificate (Voluntary)** – Issued during the project planning phase.
  - **Facility Level Certificate (Mandatory)** – Required for operational green hydrogen production units.
- The certification is **non-transferable** and **non-tradable**, and it **cannot be used** directly for claiming **emission reduction credits**.

5. Carbon Credit Trading Scheme (CCTS)



- On **April 27, 2025**, the **Bureau of Energy Efficiency (BEE)** also notified rules for claiming carbon credits under the **CCTS** for industries using green hydrogen.
- These rules introduce a formal mechanism to **calculate carbon offsets** for green hydrogen produced via electrolysis, supporting industries in **transitioning from fossil fuels**.
- Currently, the CCTS applies to sectors such as:
    - Aluminium
    - Chlor-alkali
    - Pulp and paper
    - Cement
- While these sectors have limited green hydrogen use cases, the new offset methodology provides a roadmap for future inclusion of **hard-to-abate sectors** like **steel**, **refineries**, and **shipping**.
- Although GHCI itself is **not a mitigation tool**, it can support **claims for carbon credits** under the CCTS if the project meets the relevant emission reduction standards.

6. Export Opportunities and Bilateral Agreements

- At the launch, the Minister highlighted India's progress in the international green hydrogen market, stating that India had signed an agreement with **Japan** to supply **over 4 lakh tonnes of green hydrogen derivatives**, including **green ammonia**.
- This agreement is expected to strengthen India's position in the global green hydrogen export market.
- The government has identified **Kandla**, **Paradip**, and **Tuticorin**—which have **international ports**—as strategic **green hydrogen export hubs**.

7. Challenges: High Cost of Production

- Despite the certification framework and export potential, the **high cost of green hydrogen production** remains a key challenge.
- In March 2025, the **Parliament's Standing Committee on Energy** pointed out that green hydrogen production is not yet economically viable on a large scale.
- To address this, the Committee recommended the development of **green hydrogen hubs** in regions with abundant:
    - **Renewable energy**,
    - **Water resources**, and
    - **Proximity to industrial demand centres**
- The Minister noted that green hydrogen is expected to follow the same cost-reduction path as solar energy, which dropped from **₹ 12/ unit in 2012-13 to ₹ 2/unit** in recent years, driven by **scale, skill, and speed**.

8. Water Usage and Sustainability Concerns

- Producing one kilogram of green hydrogen through electrolysis requires approximately **10 litres of treated water**.
- The **CCTS offset guidelines** place strict limits on water usage, capping project water consumption at **no more than 5% of locally available drinking water** to avoid displacing other essential uses.
- To address water concerns, the **MNRE** has proposed using:
    - **Desalinated seawater**, and
    - **Treated wastewater**
- These alternatives are expected to have **only a marginal impact** on hydrogen production costs.
- The mission also supports **R&D in technologies** that allow direct use of **seawater or wastewater** without extensive treatment, to improve sustainability.

About the National Green Hydrogen Mission (NGHM)

- The **National Green Hydrogen Mission (NGHM)** was launched by the Government of India in **2023**.
- The mission aims to make India a **global hub for the production, usage, and export of green hydrogen and its derivatives**.

Key Targets and Components

- The mission has set a target to produce **5 million metric tonnes (MMT) of green hydrogen per year by 2030**.
- **Key components** of the NGHM include:
    - **Strategic Interventions for Green Hydrogen Transition (SIGHT) Programme**
    - Development of **Green Hydrogen Hubs** across the country

Strategic Focus Areas

- **Creation of demand** through domestic usage and promotion of exports
- **Addressing supply-side constraints**, including technology, infrastructure, and finance
- Establishing a robust **certification framework** such as GHCI to verify the quality and environmental integrity of green hydrogen

9. Conclusion

The official launch of the **Green Hydrogen Certification Scheme** and the introduction of **carbon offset rules under the CCTS** mark an important step in India's transition to a green hydrogen economy.

While the certification will enhance transparency and export credibility, the carbon offset mechanism will support industrial decarbonization.

Challenges such as **high production costs** and **water usage** remain, but with strategic planning, policy support, and innovation, green hydrogen can play a critical role in **India's clean energy future** and **climate goals**.

Methane Emissions from Energy Sector in 2024 – IEA Global Methane Tracker 2025

Why in News

- The International Energy Agency's (IEA) *Global Methane Tracker 2025* reported that methane emissions from the energy sector remained **stubbornly high in 2024**, despite the availability of cost-effective abatement technologies.
- The report highlights the urgency of global action to reduce methane emissions, particularly from fossil fuel operations.

What is Methane

- **Methane (CH_4)** is a potent greenhouse gas, responsible for approximately **30% of the rise in global temperatures** since the Industrial Revolution.
- Atmospheric methane concentration is now **2.5 times higher** than pre-industrial levels.
- Methane emissions are increasing faster than other greenhouse gases.

Key Statistics (2024)

- **Total methane emissions from energy sector**: ~145 million tonnes (Mt)
    - **Oil and gas operations**: >80 Mt
        - Oil: ~45 Mt
        - Natural gas: ~35 Mt
        - Abandoned oil/gas wells: ~3 Mt
    - **Coal sector**: >40 Mt
        - Abandoned coal mines: >4 Mt
        - End-use coal equipment: ~1 Mt
    - **Bioenergy**: ~20 Mt
        - Traditional bioenergy (wood, dung, agricultural waste): 18 Mt
        - Modern bioenergy: 2 Mt

Sector-Wise Emission Contribution

- Three major sectors for methane emissions: **Agriculture, Energy, Waste**
- **Energy sector** (oil, gas, coal, bioenergy): >35% of human-caused methane emissions

Top Methane Emitting Countries (Fossil Fuel Sector)

1. China
2. United States
3. Russia
4. Iran
5. Turkmenistan
6. India
7. Venezuela
8. Indonesia

Major Concerns Highlighted

- Methane emissions from fossil fuels remain high despite **technological feasibility** of reduction.
- Abandoned oil, gas wells, and coal mines are the **4th-largest** source of fossil methane globally.
- **Underreporting**: IEA's estimates are **80% higher** than national reports to the UNFCCC.

Available Mitigation Technologies

- **70% of fossil fuel methane emissions** can be reduced with existing technologies.
    - Oil and gas sector alone can cut **75%** emissions through:
        * Plugging leaky wells
        * Upgrading equipment
        * Capturing and flaring methane
- **Coal sector**:
    - Emissions can be halved through methane recovery and oxidation where recovery is not viable
- **Bioenergy sector**:
    - Shift to clean cooking and modern heating
    - Proper handling of biogas and biomethane to avoid leaks

Climate Impact

- Methane mitigation in the fossil fuel sector could prevent a **0.1°C rise in global temperatures by 2050**

Status of Global Action

- **Global Methane Pledge (GMP)** – 2021
    - Target: Cut methane emissions by **30% from 2020 levels by 2030**
    - Over 50% of global methane emissions covered
    - Major non-signatories: China, India, Russia, Iran, Algeria, Venezuela
- **Oil and Gas Decarbonization Charter** – 2023
    - Industry-level initiative with 50 major companies
- Limited implementation:
    - Fewer than half of pledges backed by detailed policies
    - Few countries have shown verifiable reductions

Methane in Nationally Determined Contributions (NDCs)

- Only **30 NDCs** refer to methane emissions from energy
- Only **9** have set **quantitative targets**
- Next round of NDCs (for 2035) may include stronger methane components
    - Countries like Brazil, Canada, UAE, UK have already included such measures

Financing and Industry Responsibility

- Estimated funding needed:
    - Oil and gas sector: **$175 billion**
    - Coal sector: **$85 billion**
- Low- and middle-income countries: **$60 billion financing gap**
- IEA: Abatement costs would account for **<2% of annual fossil fuel industry profits**

Way Forward

1. Strengthen methane monitoring, reporting, and verification systems
2. Plug and monitor abandoned oil wells and coal mines
3. Expand access to clean cooking and heating alternatives

4. Include concrete methane targets in national climate plans (NDCs)
5. Enhance accountability for fossil fuel companies
6. Foster international collaboration and funding mechanisms

Tsarap Chu Conservation Reserve – India's Largest Conservation Reserve

1. Context

- In **May 2025**, the **Himachal Pradesh government** officially **notified Tsarap Chu Conservation Reserve** under **Section 36A(1)** of the **Wildlife (Protection) Act, 1972**.
- It is now the **largest conservation reserve in India**, highlighting a significant step in **biodiversity protection** in the **high-altitude Spiti Valley**.
- The reserve strengthens India's conservation efforts in **cold desert and trans-Himalayan ecosystems**.

2. Location and Geography

- Situated in **Lahaul and Spiti district**, Himachal Pradesh, within the **Spiti Valley**, a **cold desert region**
- Located at the **confluence of the Unam River and Charap Nala**, making it a vital **catchment area**.
- Serves as a **wildlife corridor** between:
    - **Kibber Wildlife Sanctuary** (East)
    - **Chandratal Wildlife Sanctuary** (West)

Boundaries:

- **North**: Borders **Ladakh UT**
- **East**: Adjoins **Kibber Sanctuary**, stretching to **Malang Nala** and **Lungar Lungpa**
- **South**: Bounded by **Kabjima Nala**
- **West**: Near **Chandratal Sanctuary**

Altitude Range: 3,000 – 5,000 metres

- Harsh climate, rocky terrain, sub-zero temperatures
- Geographically fragile, yet rich in biodiversity

3. Biodiversity and Key Species

Flagship Species:

- **Snow Leopard (Panthera uncia)**
    - Known as the **"ghost of the mountains"**
    - Apex predator of the region
    - Indicator of ecological health in high-altitude zones

Other Mammals:

- Tibetan Wolf
- Bharal (Blue Sheep)
- Himalayan Ibex
- Kiang (Tibetan Wild Ass)
- Tibetan Argali – A globally threatened wild sheep species

Important Birds (Avifauna):

- **Rose Finch**
- **Tibetan Raven**
- **Yellow-billed Chough**

These species reflect the **adaptation to cold desert ecosystems**, making Tsarap Chu **ecologically unique** and crucial for **wildlife conservation**.

4. Legal Status: Conservation Reserve

- **Category under Wildlife (Protection) Act, 1972 – Section 36A**
- Created on **government-owned land** outside existing **national parks** or **wildlife sanctuaries**
- Aim: To **protect landscapes and habitats** while allowing for **wildlife movement** through **ecological corridors**

Key Features of Conservation Reserves:

- Managed through **community participation** (Panchayats, local stakeholders)

- Balance between **conservation** and **sustainable local use**
- Supports **buffer zone development** for larger protected areas

Other Conservation Reserves in Himachal Pradesh:

1. **Darlaghat Conservation Reserve**
2. **Naina Devi Conservation Reserve**
3. **Potter Hill Conservation Reserve**
4. **Shilli Conservation Reserve**

Tsarap Chu becomes the **fifth** and **largest** among them.

5. National and Global Importance

National Significance:

- Supports India's biodiversity commitments under:
  - **Convention on Biological Diversity (CBD)**
  - Specifically the **"30 by 30" Target** – Protect **30% of land and marine areas** by **2030**
- Helps conserve **rare ecosystems**, strengthen **climate resilience**, and ensure **species protection**

Global Conservation Alignment:

- The **Himalayas and Trans-Himalayas** are global conservation priority landscapes
- Supported by organisations like:
  - **World Wide Fund for Nature (WWF)**
  - **Snow Leopard Trust**
- Helps protect **climate-sensitive mountain ecosystems** and iconic species like the **snow leopard**

Conclusion

Tsarap Chu Conservation Reserve is a **landmark initiative** in India's environmental policy. It not only expands the country's **protected area network** but also showcases how **community-led, legally supported conservation** can protect **critical and remote ecosystems**. It sets an example for future **landscape-level conservation efforts**, particularly in **climate-vulnerable zones** like the Himalayas.

Operation Olivia & Olive Ridley Turtle Conservation

1. What is Operation Olivia?

- **Operation Olivia** is an **annual mission conducted by the Indian Coast Guard (ICG)**.
- It is aimed at **protecting Olive Ridley turtles** during their nesting season along the **eastern coast of India**, especially in Odisha.
- The operation is **carried out every year from November to May**, covering the entire breeding and nesting period of these turtles.

2. Why is it Called 'Operation Olivia'?

- The operation is named after the **Olive Ridley turtle**, a species of sea turtle found in warm waters, including the **Bay of Bengal**.
- These turtles are known for their **mass nesting behavior (Arribada)** and are **vulnerable**, facing several threats due to human activity.

3. Geographical Focus of Operation Olivia

- Operation Olivia mainly covers coastal areas of:
  - **Odisha** (especially **Gahirmatha Beach** and **Rushikulya River Mouth**)
  - Parts of **West Bengal** and **Andhra Pradesh**
- **Gahirmatha Beach** is the **world's largest rookery (nesting site)** for Olive Ridley turtles.
- The **Rushikulya River mouth** has also emerged as a key site in recent years for mass nesting.

4. 2025 Update – Major Achievement

- In **February 2025**, a **record-breaking 6.98 lakh (698,000) Olive Ridley turtles** were protected during their nesting at **Rushikulya River mouth** in Odisha.
- This was made possible through the Indian Coast Guard's continuous monitoring and protection activities under Operation Olivia.

5. Key Activities Conducted Under Operation Olivia

a. Marine and Aerial Surveillance

- Since its inception, Operation Olivia has conducted:
  - **5,387 surface patrol sorties**
  - **1,768 aerial surveillance missions**
- These operations help monitor illegal fishing, track turtle movements, and ensure no human disturbance in nesting zones.

b. Detention of Illegal Vessels

- A total of **366 boats involved in illegal fishing** were **detained** during the operation period.
- These boats were violating fishing regulations in protected zones, posing a threat to turtle safety.

c. Community Engagement & Conservation Education

- The ICG works closely with **local fishing communities** to ensure:
  - Use of **Turtle Excluder Devices (TEDs)** in fishing nets to reduce accidental turtle deaths.
  - Awareness drives and educational programs to promote turtle conservation.
  - Partnerships with **NGOs** via formal **Memorandums of Understanding (MoUs)** to promote sustainable fishing and biodiversity protection.

6. Why Olive Ridley Turtles Need Protection?

- Olive Ridley turtles are listed as **Vulnerable** under the **IUCN Red List**.
- India legally protects them under:
  - **Schedule I** of the **Wildlife Protection Act, 1972** (provides highest protection).
  - They are also covered under international conventions like:
    - **CITES** (Convention on International Trade in Endangered Species)
    - **CMS** (Convention on Migratory Species
    - **IOSEA Marine Turtle MoU**, to which India is a signatory.
- Threats faced by the species include:
  - **Illegal fishing and trawling during nesting season**
  - **Net entanglement**
  - **Pollution and habitat degradation**
  - **Disturbance by coastal development and tourism**

7. Ecological Significance of Olive Ridley Turtles

- Olive Ridley turtles help maintain **marine ecological balance** by:
  - Controlling **jellyfish populations**
  - Promoting **healthy seagrass beds**, which are important carbon sinks
- Their eggs also serve as nutrients for coastal ecosystems.

8. Mass Nesting – Arribada Phenomenon

- Olive Ridley turtles display a unique nesting behavior called **Arribada**, where **thousands of females come ashore simultaneously** to lay eggs.
- Odisha is one of the very few places in the world where this phenomenon occurs, making it globally significant.

About Olive Ridley Turtle

- **Scientific Name**: *Chelonia mydas*
- **Physical Features**:
  - **Size**: They can grow up to **120 cm in length** & weight between **136159 kg**.

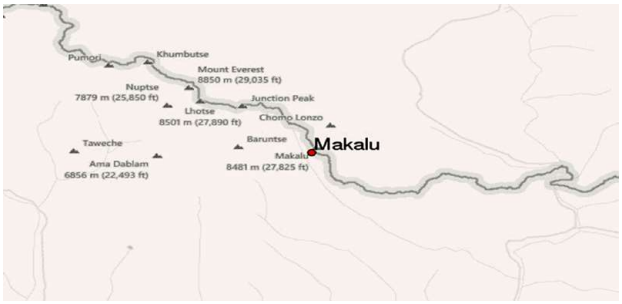
- **Shell**: They have Smooth carapace (upper shell) with color variations like **black, grey, green, brown, and yellow**. And their plastron (bottom shell) is **yellowish white**.
- **Head**: they have a Comparatively small head.
- **Beak**: They have modified "beaks" instead of teeth suited to their herbivorous diet.
- **Vision**: they have Good underwater vision, but nearsighted out of water.
- **Hearing**: Eardrums covered by skin, hearing best at low frequencies.

- **Diet**:
  - **Herbivorous**: they mostly feed on **seagrasses & algae**.
  - This gives their fat a greenish hue but not the shell. This unique diet differentiates them from other sea turtles.
- **Lifespan**: they are Estimated to live for **6070 years**.
- **Distribution**:
  - They are Found in tropical and subtropical waters globally.
  - They make Nest along the coastlines of over **80 countries**.
  - **Largest nesting populations**: Found in **Costa Rica** and **Australia**.
  - **Migration**: Green sea turtles migrate long distances between **feeding grounds** and **nesting sites**, with recorded migrations exceeding **2,600 km**
- **Conservation Status**:
  - Classified as **'Endangered'** on the **IUCN Red List** due to threats like habitat loss, poaching, and climate change impacts.

❐❐❐

Geography

Mt. Makalu



Context: The Indo Tibetan Border Police (ITBP) recently announced their successful scaling of Mt. Makalu.

About Mt. Makalu

- **Height:** Fifth highest mountain in the world, standing at **8,485 meters (27,838 ft)** above sea level.
- **Location:** Located in the **Mahalangur range of the Nepal Himalayas** on the border between **Nepal and Tibet (China)**.
- **Proximity to Everest:** Lies 14 miles (23 km) southeast of Mount Everest.
- **Protected Area:** The mountain lies within the **Makalu Barun National Park**.
- **Distinctive Shape:** Known for its perfect **pyramid shape with four sharp ridges**.
- **Subsidiary Peaks: Makalu I and Makalu II** are two notable subsidiary peaks lying 3 km north-northwest of the main summit.
- **Barun Valley:** A natural wonder at the base of Mt. Makalu, known for:
  - Stunning elevated waterfalls falling inside deep gorges.
  - Diverse species of flora and fauna.
  - Rich cultures of ethnic communities like Sherpa and Kirat.

Climbing Difficulty

- **Hard Eight-Thousander:** Considered one of the **harder eight-thousanders** (mountains over 8,000 meters) and one of the most difficult mountains in the world to climb.

- **Challenges:** Notorious for its **steep pitches and knife-edged ridges**, making it very open to the elements.
- **Technical Ascent:** The final ascent of the summit pyramid involves **technical rock climbing**.

First Ascent

- **Date:** First summited on **15 May 1955**.
- **Expedition:** By a **French team** including Lionel Terray and Jean Couzy, led by Jean Franco.
- **Historical Context:** This ascent occurred two years after the first ascent of Mount Everest.

The Arabian Desert and Green Arabia Hypothesis

Context: A recent study published in *Nature* presents evidence of recurring humid periods in the Arabian Desert, currently the largest expanse of dunes on Earth, supporting the "Green Arabia Hypothesis."

Geography of the Arabian Desert

- **Size:** Spans around **900,000 square miles**, making it the **second-largest desert in the world** (after the Sahara).
- **Location:** Located across **Saudi Arabia, UAE, Yemen, and Oman**, and stretches into **Iraq, Jordan, Qatar, and Kuwait**.
- **Main Sub-deserts:** Composed of three main deserts:
    - **Rub'al-Khali (Empty Quarter):** The largest dune desert.
    - **Ad-Dhana Desert:** Central corridor.
    - **An-Nafud Desert:** Northern zone.

Climatic Features :

- **Aridity:** The region is **hyper-arid**, with **less than 33 mm of annual rainfall**.
- **Temperature Extremes:** Extreme temperature variations: above **50°C during the day**, dropping sharply at night.
- **Wind Phenomena:** Frequent **sandstorms**, including seasonal **Shamals** (northwesterly winds) and whirlwinds called **Dust Devils**, which reduce visibility and affect human movement.

Flora and Fauna :

- **Plant Life:** Scarce but includes **Date palms, adenium (desert rose), acacia, ghaf trees, salt-bush, and juniper.**
- **Animal Species:**
    - **Large Mammals:** Arabian oryx, camels, and gazelles.
    - **Predators:** Striped hyenas, Arabian wolves, and caracals (now rare).
    - **Reptiles:** Dhub lizards, horned vipers, and cobras.
    - **Birds:** Falcons, vultures, and doves.
    - **Insects:** Scarab beetles, ants, and wasps.

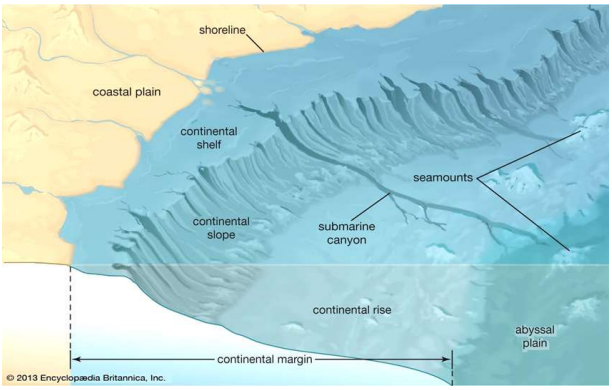
Green Arabia Hypothesis & Key Discoveries

The Green Arabia Hypothesis posits that the Arabian Peninsula experienced multiple periods of increased rainfall and lush vegetation in the past. Recent discoveries provide strong evidence for this:

- **Speleothems (Stalagmites & Stalactites):**
    - Found deep within caves in the Arabian Peninsula.
    - These mineral deposits form **only with consistent rainfall, vegetation, and soil.**
    - Their existence points to **multiple "green phases"** in the region over the **last 8 million years.**

- **Dating Techniques:**
    - **Uranium dating:** Used to accurately determine the **age of speleothem formations**, providing one of the **oldest continuous climate records** for Arabia.
    - **Oxygen isotope analysis:** Helped estimate **past rainfall levels** and **periods of humidity**, confirming that Arabia was not always a desert.
- **Archaeological Evidence:**
    - In the **Baynunah Formation (UAE)**, fossils dating back **7 million years** show the presence of:
        * **Hippos**
        * **Elephants**
        * **Giraffes**
        * **Primates**
    - These fossils indicate that **Green Arabia served as a migratory route for animals and hominids** (including early humans) out of Africa.

Axial Seamount



Context: Scientists are currently on high alert while observing the Axial Seamount volcano, which is set to erupt for the first time in a decade.

About Axial Seamount

- **Type:** An **underwater volcano**.
- **Location:** Approximately **300 miles off the coast of Oregon, United States**, in the **Pacific Ocean**.
- **Volcano Type:** A **shield volcano** with a summit marked by a large caldera.
- **Depth:** Rises to a depth of **1400 meters below sea level**.
- **Formation:** Formed by a **hot spot** – an area in the Earth's mantle where hot plumes of molten material rise into the crust.
- **Tectonic Setting:** Located on the **Juan de Fuca Ridge**, which is the boundary between the **Pacific and Juan de Fuca tectonic plates**.

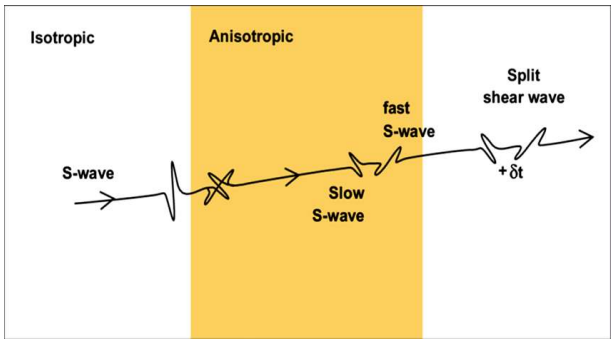
Ecological Significance & Activity

- **Hydrothermal Vents:** Home to **hydrothermal vents**, which are underwater hot springs where seawater is heated by magma and ejected in mineral-rich plumes.
- **Unique Ecosystems:** These vents support **diverse marine life**, including:
    - Microbes that use volcanic gases for energy (chemosynthesis).
    - Giant tubeworms
    - Spider crabs
    - Clams
    - Fish
    - Octopuses
- **Activity Level:** It is the **most active submarine volcano in the northeast Pacific**.
- **Known Eruptions:** Has had known eruptions in **1998, 2011, and 2015**.
- **Risk to Land:** Axial Seamount's eruptions are **not dangerous to people on land**.
- **Scientific Value:** They offer valuable opportunities for scientific observation of underwater volcanic processes.

Research & Monitoring

- **Ocean Observatories Initiative (OOI):** Axial Seamount is part of the Ocean Observatories Initiative (OOI).
- **NeMO Observatory:** Hosts the **world's first underwater volcanic observatory called NeMO** (New Millennium Observatory). This continuous monitoring provides critical data for understanding submarine volcanism.

Shear-Wave Splitting



Context: Scientists at the University of Oxford have proposed a new method for monitoring volcanic eruptions using shear-wave splitting at Mount Ontake, Japan.

What is Shear-Wave Splitting?

- **Definition:** It is a phenomenon where **seismic shear waves** (S-waves) travel at **different speeds** based on their **polarisation**. This typically occurs when the waves pass through materials with **aligned cracks or fractures** in rocks.
- **Mechanism in Volcanic Monitoring:**
    - As magma and volcanic fluids move underground, they alter stress conditions in the surrounding rocks.
    - This causes existing cracks or fractures to **open or close**, or new ones to form with preferred orientations.
    - These changes in crack alignment and stress **affect the speed and direction of shear-waves**, which seismologists can monitor.
- **Predictive Potential:** The **degree of shear-wave splitting increases when internal pressure builds up** within the volcano, offering a potential early-warning signal for impending eruptions.

About Mount Ontake

- **Type:** An **active stratovolcano**.
- **Location:** Located in **Honshû Island, Central Japan**, near Tokyo.
- **Ranking:** It is Japan's **second-highest volcano**.
- **Tectonic Setting:** Part of the **Pacific Ring of Fire**, a major zone of seismic and volcanic activity.
- **2014 Eruption:**
    - Experienced a **deadly phreatic (steam-driven) eruption in 2014**.
    - This eruption occurred **without significant conventional seismic warning**, leading to over 60 deaths, mostly hikers.
- **Phreatic Eruptions:**
    - Are **hydrothermal explosions** caused by **steam pressure**.
    - **Do not involve new magma** reaching the surface.
    - Are traditionally **hard to predict** with conventional monitoring methods due to their rapid onset and lack of magmatic signals. The application of shear-wave splitting aims to address this challenge.

Persian Gulf *Vs.* Arabian Gulf

Context: President Donald Trump's plan to officially rename the 'Persian Gulf' as the 'Arabian Gulf' during a visit to Saudi Arabia sparked renewed discussion on the long-standing naming dispute.

Historical Context and Naming Dispute

- **"Persian Gulf" Usage:** The term **'Persian Gulf' has been used consistently since the 16th century**, widely recognized in historical records, international treaties, and cartographic references.

- **"Arabian Gulf" Preference:** Arab states, particularly **Saudi Arabia and the UAE, prefer the term 'Arabian Gulf'**, using it in their national maps and documents.
- **Iran's Stance:** In 2012, **Iran threatened to sue Google** for not labelling the water body on its maps, asserting its historical naming rights and viewing the term 'Arabian Gulf' as an affront to its sovereignty and history.
- **International Recognition:** The **International Hydrographic Organisation (IHO) still recognizes the water body as the Persian Gulf**. Although countries can use alternative names domestically, they cannot impose unilateral changes in global nomenclature.

Geographical Features of the Persian Gulf

- **Type:** A **marginal sea of the Indian Ocean**, located in **Western Asia**.
- **Geopolitical Chokepoint:** It is a **vital geopolitical chokepoint**.
- **Connection to Arabian Sea:** Connected to the Arabian Sea via the **Strait of Hormuz**, which is one of the **world's most strategic maritime passages for global oil shipments**.
- **Dimensions:**
  - Spans approximately **251,000 km²**.
  - Average depth of **50 meters**.
  - Maximum depth of **90 meters**.
- **Coastline:** The coastline stretches approximately **5,117 km**, with **Iran having the longest stretch (~1,536 km)**.
- **Bounded By:**
  - **North:** Iran
  - **Southwest:** Saudi Arabia, Qatar, UAE
  - **Northwest:** Iraq, Kuwait, Bahrain
- **Important Islands:**
  - **Qeshm Island (Iran):** The **largest island in the Persian Gulf**, with an area of ~1,491 km²—about 2.5 times the size of Bahrain.
  - **Bahrain:** A sovereign archipelago state, comprising over 50 islands, and a significant US naval base location.

Strategic and Economic Importance

- **Global Energy Security:** The Persian Gulf is **central to global energy security**, with approximately **30% of the world's oil exports passing through the Strait of Hormuz**.
- **Naval Deployment:** It is a **theatre of naval deployment** for countries like the USA, Iran, and Gulf states, often reflecting power projection and regional dominance.
- **Island Value:** Islands like Qeshm (Iran) and Bahrain (a sovereign state) hold **strategic military and economic value** due to their location and potential for control over maritime routes.
- **Hydrocarbon Reserves:** The region surrounding the Persian Gulf holds the **world's largest proven oil and gas reserves**, making it critically important for the global economy.

Piprahwa Gems

Context: Buddhist scholars and monks globally have expressed concerns over the auction of ancient Piprahwa Gems, which they believe are imbued with the presence of the Buddha.

About Piprahwa Gems

- **Definition:** The term "Piprahwa Gems" refers to a **cache of jewels discovered interred in a stupa (burial monument)** in Piprahwa.
- **Location:** Piprahwa is located in **present-day Uttar Pradesh**, India.

- **Significance (Religious):**
    - According to an inscription carved into one of the reliquaries (containers for relics), the stupa contained the **remains of the Buddha himself**.
    - The gems were believed to have been **combined with some of the cremated remains of the Buddha**, who died around 480 BC.
    - Widely considered by Buddhist traditions to be imbued with the presence of the Buddha.
- **Excavation:**
    - Excavated in **1898** by **William Claxton Peppe**, a British colonial engineer, after excavating part of his estate.
    - The site was the **first credible find of the Buddha's relics in modern times**.

Discovery, Distribution, and Legal Aspect

- **British Claim:** The **British Crown claimed Peppé's find under the 1878 Indian Treasure Trove Act**.
- **Relics' Destination:** The **bone and ash fragments (Buddha's relics)** were **gifted by the British to King Chulalongkorn of Siam (now Thailand)**.
- **Composition of Gems:** The Piprahwa gems include various materials, either worked into pendants, beads, and other ornaments, or in their natural form, such as:
    - Amethysts
    - Garnets
    - Rock crystals
    - Gold
    - Coral
    - Pearls
    - Shells
- **Distribution of Gems:**
    - Most of the 1,800 gems went to **what is now the Indian Museum in Kolkata**.
    - However, **Peppe was permitted to retain about a fifth** of them, some of which were described as "duplicates" by British colonial administrators at the time. These retained gems are likely the subject of the current auction controversy.

Great Nicobar Island

Context: The Andaman and Nicobar Administration recently invited financial bids to conduct a social impact assessment for land acquisition needed to build a new arterial road under the much-debated Great Nicobar Holistic Development Project.

About Great Nicobar Island

- **Location:** It is the **southernmost island of the Nicobar Islands** archipelago, located in the Bay of Bengal.
- **Separation:** It is **separated from the Andaman Islands by the Ten Degree Channel**.
- **Area:** Covers an area of **1044 sq. km.**
- **Demography & Land Use:** Remains **sparsely populated**, with **dense tropical rainforests covering more than 85% of its area**.
- **Coastline:** Its coastline features over **100 kilometers of untouched beaches**, renowned for their stunning **coral reefs and crystal-clear waters**.
- **Indira Point:** It is also home to **Indira Point, India's southernmost point**, located at its southern tip. This point is less than 150 km from Indonesia (specifically, Sumatra).
- **Highest Peak: Mount Thullier**, which is about 2,105 ft (642 m) high, is the highest peak on the island.
- **Major Rivers: Galathea, Alexandra, and Dagmar** are the major rivers.
- **Major Tribes:** The major tribes residing in Great Nicobar Island are the **Shompens** and the **Nicobarese**.
- **Protected Area:** It is home to the **Great Nicobar Biosphere Reserve**, a UNESCO-designated site, highlighting its ecological significance.

Biodiversity of Great Nicobar Island

- **Flora:**
    - Houses **650 species of angiosperms, ferns, gymnosperms, bryophytes, and lichens**, among others.
    - The tract is rich in plant diversity and fosters a number of **rare and endemic species**, including:
        * *Cyathea albosetacea* (tree fern)
        * *Phalaenopsis speciosa* (orchid)
- **Fauna:**
    - The region also harbours a large number of **endemic and endangered species of fauna**.
    - To date, **11 species of mammals, 32 species of birds, 7 species of reptiles, and 4 species of amphibians** have been found to be endemic to the island.
    - Of these, the well-known **Crab-eating Macaque, Nicobar Tree Shrew, Dugong, Nicobar Megapode, Serpent Eagle, saltwater crocodile, marine turtles, and Reticulated Python** are endemic and/or endangered.

Coral Reefs

Context: Scientists at the University of California San Diego recently developed SNAP-X, a bio-ink that enhances coral larvae settlement by 20x, offering a breakthrough for reef restoration amid climate threats.

About Coral Reefs

- **Definition:** Coral reefs are complex **marine ecosystems** built by groups of tiny animals called **coral polyps**. These polyps secrete **calcium carbonate** (limestone) to form their hard exoskeletons, which accumulate over time to create large reef structures.
- **Habitat:** These vibrant habitats flourish in **warm, clear, and shallow waters of tropical regions**.
- **Examples:**
    - Globally famous: The **Great Barrier Reef** in Australia.
    - In India: **Gulf of Mannar** and **Lakshadweep Islands**.
- **Benefits (Ecosystem Services):** Coral reefs offer crucial benefits, such as:
    - **Providing food** (habitat for diverse marine life, including fish).
    - **Shielding coastlines** from storms, waves, and erosion.
    - **Supporting local economies** through tourism (snorkeling, diving) and fishing.
    - High biodiversity, making them "rainforests of the sea."

Types of Coral Reefs

Based on their formation and proximity to land, coral reefs are generally classified into three main types:

1. **Fringing Reefs:**
    - Found **close to shorelines**, directly adjacent to the landmass.
    - Separated from the land by relatively **shallow lagoons** (or sometimes none at all).
    - They are the **most common type** of coral reef.
2. **Barrier Reefs:**
    - Located **farther offshore** from the coastline.
    - Separated from the land by **deeper, wider lagoons** compared to fringing reefs.
    - The **Great Barrier Reef in Australia** is the largest and most famous example.

3. **Atolls:**
    - **Ring-shaped reefs** that completely encircle a central lagoon.
    - Often formed on **sinking volcanic islands**, where the coral continues to grow upwards as the island subsides.
    - Common in the **Indian and Pacific Oceans** (e.g., Lakshadweep in India, Maldives).

Conditions Required for Coral Reef Formation

Coral polyps have specific environmental requirements to thrive and build reefs:

- **Stable, Warm Water:**
    - Temperatures typically around **20°C to 28°C**.
    - Primarily found in tropical and subtropical regions, generally **between 30°N and 30°S latitude**.
    - They are sensitive to both excessively cold and excessively warm waters (leading to coral bleaching).
- **Shallow Depths:**
    - Usually thrive in depths up to **55 meters (about 180 feet)**.
    - This shallow depth is crucial to allow **sufficient sunlight penetration** for the symbiotic algae (zooxanthellae) living within the coral polyps to perform **photosynthesis**, which provides significant energy to the corals.
- **Clear, Low-Nutrient Saltwater:**
    - **Clear water** is essential for light penetration.
    - **Low nutrient (oligotrophic) saltwater** is preferred, as high nutrient levels can lead to algal blooms that smother corals and compete for light.
- **Minimal Pollution:** Corals are **highly sensitive to chemical and sediment pollution**. Sediment runoff can block sunlight and smother polyps, while pollutants can directly harm them.
- **Abundant Plankton:** While zooxanthellae provide most of their energy, coral polyps are also filter feeders that rely on **abundant plankton** in the water as a food source, captured by their tentacles.

Canary Islands

Context: Thousands of people recently protested against mass tourism in Spain's Canary Islands.

About Canary Islands

- **Geographical Location:**
    - An **archipelago** located off the **northwest coast of Africa**.
    - Situated in the **Macaronesia region of the North Atlantic Ocean**.
    - Approximately **100 km from Morocco** and southwest of mainland Spain.
- **Political Status:** Even though they are geographically closer to Africa than Europe, the Canary Islands are an **autonomous community of Spain**.
- **Significance in Macaronesia:** It is **Macaronesia's largest and most populated archipelago**. (Macaronesia is a collection of four archipelagos in the North Atlantic Ocean: the Azores, Madeira, Canary Islands, and Cape Verde).
- **Major Islands:** Some of the largest and most well-known islands in the archipelago are **Lanzarote, Fuerteventura, Gran Canaria, and Tenerife**.

- **Capital: Santa Cruz de Tenerife** (co-capital with Las Palmas de Gran Canaria, though only Santa Cruz is mentioned in the text).
- **Area:** 7,447 sq.km.

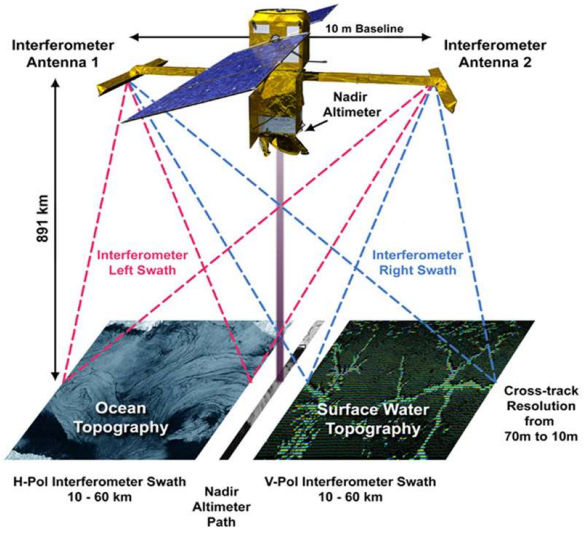
Geology and Climate

- **Formation:** The Canary Islands were **formed by volcanic eruptions** millions of years ago, indicating their volcanic origin.
- **Highest Point: Teide Peak on Tenerife** rises to 12,198 feet (3,718 meters), making it the **highest point on Spanish soil** (including mainland Spain). Teide is a dormant volcano and a UNESCO World Heritage site.
- **Climate:** The Canary Islands have a **subtropical climate**. Temperatures are generally warm and show little seasonal variation throughout the year, making them an attractive tourist destination.

Tourism and Importance

- **Tourist Destination:** The islands' location in the Atlantic Ocean and their proximity to four continents (Africa, Europe, and the Americas) make them an **extremely popular tourist destination**, attracting millions of visitors annually. This popularity, however, is leading to concerns about the impact of mass tourism.
- **Economic Significance:** Tourism is the primary driver of the Canary Islands' economy.

SWOT Satellite - Revolutionary Flood Wave Measurement



Context:

In a significant scientific advancement, researchers from **NASA** and **Virginia Tech** have successfully used data from the **SWOT satellite** to measure, for the first time, the **speed and height of flood waves on U.S. rivers**. This breakthrough marks a new era in global water monitoring and flood prediction.

I. About the SWOT Satellite:

- **Full Form:** SWOT stands for **Surface Water and Ocean Topography**.
- **Launch & Mission:** It was launched in **December 2022**. SWOT is a collaborative mission between:
    - **NASA** (National Aeronautics and Space Administration - USA)
    - **CNES** (Centre National d'Études Spatiales - French Space Agency)
    - Contributions from the Canadian Space Agency (CSA) and the UK Space Agency also exist.
- **Primary Objective:** To conduct the **first-ever global survey of Earth's surface water**. It aims to measure the height of water in Earth's oceans, lakes, reservoirs, and rivers.
- **Key Instrument:** SWOT utilizes a specialized instrument called the **Ka-band Radar Interferometer (KaRIn)**.
    - **How it works:** KaRIn bounces microwaves off water surfaces and precisely measures the return time and phase differences of the signals.
    - **Measurements:** This allows it to accurately measure the **height, width, and elevation** of surface water bodies.
- **High Spatial Resolution:** SWOT offers exceptionally high spatial resolution, enabling detailed tracking of dynamic water movements across various water bodies.
- **Global Coverage:** The satellite's frequent Earth orbits allow it to cover **over 55% of large-scale global floods** during their lifecycle, providing unprecedented monitoring capabilities.

II. What are River Waves (Flood/Flow Waves):

- **Definition:** River waves, also known as flood or flow waves, are **temporary surges in water flow** within rivers.
- **Causes:** They are typically caused by:
    - Intense rainfall
    - Rapid snowmelt
    - Ice jams (blockages in rivers due to ice)
    - Dam breaches (catastrophic failures of dams)
- **Characteristics:**
    - Unlike ocean waves (driven by wind and tides), river waves are **transient and unsteady phenomena**.
    - They can stretch for **tens to hundreds of kilometers** along a river channel.
- **Significance:**
    - **Ecological Role:** They play a crucial ecological role by transporting nutrients and organisms throughout river ecosystems.
    - **Flood Risk:** More critically, they pose significant **flood risks** to downstream populations and infrastructure.
- **Previous Limitations:** Traditionally, such large-scale river waves could only be detected locally by **ground stream gauges**. These gauges are **sparse in many global regions**, leaving vast areas unmonitored and making accurate, real-time flood prediction difficult.

III. Recent Achievement & Its Significance:

- **The Breakthrough:** NASA and Virginia Tech researchers successfully measured the **speed and height of flood waves** on U.S. rivers using SWOT satellite data. This is a scientific first, demonstrating the satellite's capability to monitor such dynamic phenomena from space.
- **How it was done:** SWOT's KaRIn instrument captured the precise height and extent of the water surface, and by observing changes over time, scientists could deduce the wave's speed and amplitude.
- **Implications:**
    - **Enhanced Flood Prediction:** This capability provides unprecedented data for more accurate and timely flood forecasting, allowing communities to prepare better and mitigate damages.
    - **Global Monitoring:** It overcomes the limitation of sparse ground gauges, enabling global monitoring of flood events, especially in remote or data-poor regions.
    - **Improved Water Management:** Better understanding of river dynamics supports more effective management of water resources, including reservoir operations and navigation.
    - **Climate Change Research:** Provides critical data for studying the impacts of climate change on hydrological cycles, including changes in flood frequency and intensity.

Conclusion: The SWOT satellite's success in measuring river flood waves from space represents a monumental leap in our ability to monitor Earth's dynamic water systems. This capability is poised to revolutionize flood prediction, enhance water resource management, and deepen our understanding of the planet's changing climate, offering invaluable benefits to communities worldwide.

Chenab Valley - Geography, Demography & Strategic Significance

Context: The Chenab Valley has recently been in the news due to a significant anti-terror operation in its Kishtwar district, resulting in the unfortunate demise of a soldier. This highlights the region's continued strategic importance and security challenges.

I. About Chenab Valley:

- **Geographical Location:** The Chenab Valley, also known as the Chenab Region, refers to the **river valley of the Chenab River**.
- **Administrative Units:** It primarily encompasses the districts of **Kishtwar, Doda, and Ramban** within the Jammu Division of Jammu and Kashmir.
- **Regional Context:** It constitutes the **eastern region of the Jammu Division** in the Union Territory of Jammu and Kashmir.
- **Topography:**
    - **Northern Boundary:** Lies to the north of the majestic **Pir Panjal Range**.
    - **Southern Boundary:** Bordered by the **Zanskar Range** to the south.
    - **Landscape:** Characterized by **deep gorges** carved by the Chenab River, **lush meadows**, and **cascading rivers**, forming a distinctive and beautiful mountainous landscape.
- **Area:** It covers an approximate area of **11,885 sq. km**.

II. Demography and Culture:

- **People:** The inhabitants of the Chenab Valley are often referred to as **"Chenabis"** or simply **"Chenabi"**.
- **Ethnic and Linguistic Diversity:** The region is a rich **mosaic of ethnic groups**, reflecting centuries of migration and cultural interaction. It is known for its linguistic diversity, with multiple languages spoken, including:
    - **Kashmiri**
    - **Gojri**
    - **Bhaderwahi**
    - **Sarazi**
    - **Kishtwari**
    - **Padari**
    - This linguistic and ethnic diversity contributes to the unique cultural fabric of the region.

III. Economic and Strategic Significance:

- **Hydroelectric Potential:** The Chenab River and its tributaries offer immense hydroelectric potential. This has led to the development of several significant dams and power projects, crucial for India's energy security:
    - **Baglihar Dam (Doda)**
    - **Dulhasti Dam (Kishtwar)**
    - **Salal Dam (Reasi, though influenced by the Chenab basin)**
- **Connectivity:** The region is primarily traversed by **National Highway 244 (NH-244)**, which is a vital lifeline connecting various towns and districts within the valley and linking it to other parts of Jammu and Kashmir.
- **Tourism:** Despite security challenges, the Chenab Valley boasts several picturesque tourist attractions, indicating its potential for tourism development:
    - Bhaderwah (often called 'Mini Kashmir')
    - Jai Valley
    - Padri Pass
    - Sinthan Top
    - Lal Draman
    - Jantroon Dhar
- **Security Concerns:** The recent anti-terror operation highlights the strategic and security sensitivities of the region, given its rugged terrain and proximity to traditional infiltration routes. The presence of security forces for counter-terrorism operations is a continuous feature.

Chagos Archipelago – Sovereignty Handover and Geopolitical Implications

Context:

India has recently welcomed the United Kingdom's decision to hand over the sovereignty of the **Chagos Archipelago**, including the crucial atoll of **Diego Garcia**, to **Mauritius** under a historic deal. This development marks a significant turn in a long-standing decolonization dispute.

I. About the Chagos Archipelago:

- **Location:** An island group situated in the **central Indian Ocean**, approximately 1,000 miles (1,600 km) south of the southern tip of the Indian subcontinent.
- **Political Status (Pre-deal):** It was an **overseas territory of the United Kingdom**, established on November 8, 1965, known as the **British Indian Ocean Territory (BIOT)**.
- **Key Islands/Atolls:** The archipelago comprises several islands, with the most significant being:
    - **Diego Garcia Atoll:** The **largest** and most southerly island (about 30 sq. km). It houses a strategic **US military base**, making it geopolitically crucial.
    - Other principal islands include Danger Island, Egmont Islands, Eagle Islands, Nelsons Island, Peros Banhos atoll, Three Brothers Islands, and the Solomon Islands.
- **Geography:** The islands feature flat and low terrain, with most areas not exceeding 2 meters in elevation. There are **no rivers or natural lakes** on the islands.
- **Climate:** Experiences a **tropical marine climate** characterized by high temperatures, elevated humidity, and moderation by the pervasive trade winds.

II. History and Dispute over Sovereignty:

The history of the Chagos Archipelago is deeply intertwined with colonialism, forced displacement, and international law:

1. **Early Inhabitants:** The archipelago's first inhabitants, known as the **Chagossians**, were primarily **enslaved people forcibly brought from Madagascar and Mozambique** by French enslavers to work on coconut plantations. Over centuries, they formed a distinct indigenous people with their own language and culture.
2. **British Acquisition (1965):** In 1965, during Mauritius's path to independence, the British convinced Mauritian nationalist politicians to **cede their claim to the Chagos Islands** in exchange for independence. This move was controversial and widely criticized as a violation of territorial integrity.
3. **Formation of BIOT (1966) & Forced Displacement:** In 1966, the Chagos Islands became the **'British Indian Ocean Territory' (BIOT)**, explicitly denying any claim to independence. This designation led to the **forcible removal of the Chagossians** from their ancestral lands. Most were relocated to Mauritius and the Seychelles.
4. **US Military Base:** The UK subsequently made an agreement with the **United States to host a strategic military base on Diego Garcia**, crucial for Indian Ocean defenses.
5. **Mauritius's Consistent Claim:** Mauritius, which gained independence from Britain in 1968, has **consistently maintained its claim** over the Chagos Islands, arguing that their detachment was illegal and violated international law.

6. **International Legal Rulings:**
    - **International Court of Justice (ICJ) Advisory Opinion (2019):** The ICJ dismissed the UK's right to govern the Chagos Islands and called on its government to withdraw from the archipelago, stating that its detachment from Mauritius was unlawful.
    - **International Tribunal for the Law of the Sea (ITLOS) & UN General Assembly:** Both have also affirmed Mauritius's sovereignty over the archipelago.

III. Geopolitical Significance of Diego Garcia:

- **Strategic Location:** Diego Garcia's central location in the Indian Ocean makes it an invaluable asset for naval and air operations across a vast region, from the Middle East to Southeast Asia.
- **US Military Base:** It hosts a critical US military base, providing:
    - A deep-water port for naval vessels.
    - An airbase for long-range bombers and surveillance aircraft.
    - A key intelligence gathering and logistics hub.
- **Power Projection:** The base allows the US to project power and maintain a significant military presence in the Indian Ocean, safeguarding vital sea lanes and responding to regional contingencies.

IV. Recent Developments and India's Stance:

- **UK's Decision to Hand Over:** The UK's recent decision to hand over sovereignty to Mauritius marks a significant shift in its policy, aligning with international legal rulings and mounting pressure.
- **India's Welcome:** India has welcomed this decision. This stance is consistent with India's long-standing support for decolonization, its close ties with Mauritius, and its broader interest in a peaceful and rule-based Indian Ocean Region.
- **Future of US Base:** While sovereignty is being transferred, reports suggest that the long-term future and operational status of the US military base on Diego Garcia will be subject to a new agreement between the US and Mauritius.

EDITORIALS

Crux of The Hindu & Indian Express

Geography

Lithium - "White Gold" and its Geochemical Properties

Context:

A recent study published in *Science Advances* by Duke University has made a significant breakthrough by uncovering the **distinctive geochemical properties of lithium-rich brines** found in salt pans (salars) in South America and Asia. This research provides crucial insights into the unique chemistry of these vital mineral sources.

I. About Lithium:

- **Classification:** Lithium (Li) is a **lightweight, silvery-white alkali metal**.
- **Density:** It holds the distinction of having the **lowest density among all metals**, making it highly desirable for lightweight applications.
- **Reactivity:** It reacts **vigorously with water**, a key characteristic of alkali metals.
- **Alloys:** Lithium forms valuable alloys with other metals:

- **Aluminium and Magnesium:** These alloys enhance material strength while simultaneously reducing weight.
- **Applications:** This property makes lithium alloys ideal for **aerospace applications** (e.g., aircraft components) and certain **battery technologies**.

- **"White Gold" & Critical Mineral:** Lithium is often referred to as **"white gold"** due to its pivotal role as a **critical mineral**. It is indispensable for the **renewable energy sector**, especially in the production of:
  - **Electric Vehicle (EV) batteries:** The backbone of the ongoing electric mobility revolution.
  - **Energy Storage Systems (ESS):** Essential for grid-scale renewable energy integration (e.g., storing solar and wind power).

II. Global Lithium Supply and Sources:

- **Dominant Source:** Approximately **40% of the global lithium supply** is currently derived from **evaporative brine mining** in vast salt flats (known as **salars**).
- **Key Global Regions:**
  - **Central Andes ("Lithium Triangle"):** This region, spanning parts of **Chile, Argentina, and Bolivia**, holds the world's largest known lithium reserves in its high-altitude salars.
  - **Tibetan Plateau (Asia):** Another significant region for lithium-rich brine deposits.
- **Other Sources:** While brines are dominant, lithium is also extracted from hard rock mineral deposits (e.g., spodumene) and increasingly, from geothermal brines and clay deposits.

III. Key Findings of the Duke University Study:

The study focused on understanding the unique geochemistry of lithium-rich brines, particularly at **Salar de Uyuni in Bolivia**, which is the world's **largest lithium brine reserve** and located in a high-altitude arid region.

- **Dominant pH Regulation by Boron:** The study found a striking difference compared to seawater:
  - In **seawater**, **carbonate molecules** (like bicarbonate and carbonate ions) are the primary controllers of pH.
  - In these lithium-rich salar brines, the **pH is controlled almost entirely by boron compounds**.
- **Role of Boron Compounds:** Boron, present predominantly in the form of **boric acid** and **borates**, was identified as the key determinant of both the **pH and alkalinity** of these natural brines.
- **Geochemical Process during Evaporation (Mining Ponds):**
  - During the solar evaporation process in mining ponds (a common method for lithium extraction), the **concentration of boron significantly increases** as water evaporates.
  - This increased concentration of boron causes **boric acid to break down**.
  - The breakdown of boric acid, in turn, **releases hydrogen ions (Hz)** into the brine.
  - The release of hydrogen ions directly **lowers the pH**, making the brine **highly acidic**.

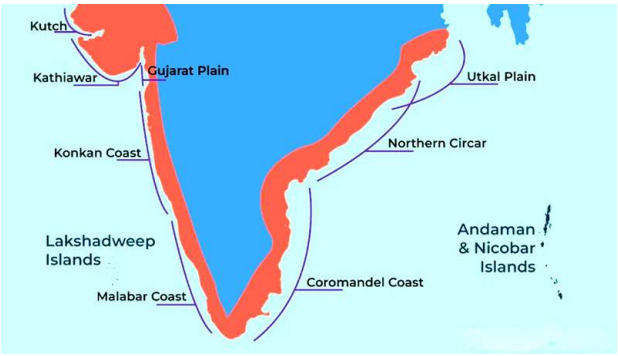
IV. Implications and Significance:

- **Optimizing Lithium Extraction:** Understanding the pH dynamics and the role of boron is critical for:
  - **Improving efficiency:** Optimizing the chemical processes involved in separating lithium from other elements in the brine.
  - **Reducing costs:** Potentially leading to more cost-effective extraction methods.

- **Minimizing environmental impact:** By better managing the chemistry of the residual brines.

- **Geochemical Understanding:** The study provides fundamental insights into the complex geochemical processes occurring in these unique hypersaline environments.
- **Sustainable Mining:** Better scientific understanding can lead to more sustainable and environmentally sound practices for lithium extraction, addressing concerns about water usage and waste disposal in arid regions.
- **Global Supply Chain:** As demand for lithium skyrockets with the EV revolution, optimizing extraction from key sources like salars is vital for ensuring a stable global supply.

Why India's Coastline Got Longer



Context:

Recently, the **Union Ministry of Home Affairs** announced in its 2023-2024 annual report that the length of **India's coastline has increased from 7,516.6 km to 11,098.8 km**. This big jump wasn't due to new land or islands, but because of a mathematical idea called the **coastline paradox**.

I. Why Was This in the News?

- In December 2024, the Indian government's **Ministry of Home Affairs** stated that India's coastline length had grown.
- The old figure (7,516.6 km) was from the **1970s**, based on the measuring methods available back then.
- The new, longer figure (11,098.8 km) didn't come from India gaining new land or from natural events like earthquakes stretching the land.
- The reason for this big difference is a problem in geometry known as the **coastline paradox**.

II. What is the Coastline Paradox?

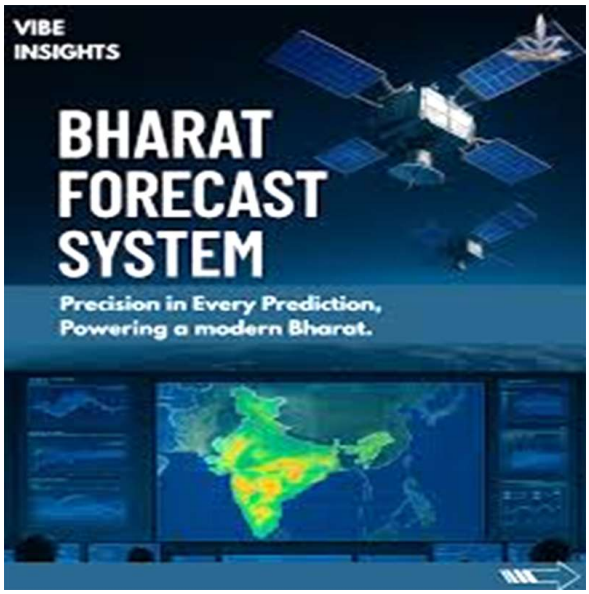
- **Who Discovered It:** A British mathematician and physicist, **Lewis Fry Richardson**, first pointed out this problem in the early 1950s. Later, a Polish-French peer, **Benoît Mandelbrot**, studied it more deeply using mathematics in 1967 and made it well-known.
- **The Idea:** The coastline paradox explains that when you try to measure a coastline, its **length actually gets longer the more carefully or precisely you measure it**.
- **No Single Length:** This means a coastline doesn't have one single, fixed length. Instead, its length depends on the **scale** (or size of the measuring tool) you use. It's more like a **fractal dimension**, meaning it has complex, self-repeating patterns at different scales.
- **Why It Happens:**
  - Coastlines are naturally **very irregular and jagged**, not straight lines. They have tiny inlets, bays, rocks, and sandy edges.
  - When you use a **large measuring unit** (like a long ruler or a rough map), you **smooth over** all these small details. You miss out on the smaller curves and jagged parts.
  - But if you use a **smaller and more detailed measuring unit** (like a shorter ruler or a very detailed map), you start to **capture more of these intricate contours and jagged edges**.
  - Because you're now including all these previously "missed" small details, the **total measured length of the coastline increases**.

- **Example:** Imagine measuring a coastline:
    - If you use a **200-km-long ruler**, it will jump over many small bends and inlets, giving a shorter total length.
    - If you use a **50-km ruler**, you'll catch more of those bends, and the measured length will be longer.
    - If you measure with a **1-km unit**, you'll include every small river mouth, tidal flat, and tiny creek, making the length even longer.
- **Hypothetical Limit:** If you could hypothetically measure a coastline with a unit as tiny as a water molecule, the measured length would become unbelievably long, almost **approaching infinity**.
- **The Paradox:** So, a coastline is a finite piece of land, but its measured length can seem almost infinite depending on how you measure it. This is the core of the paradox.

III. Significance for India:

- **Improved Tools:** India's new coastline measurement is a direct result of using **better, more detailed tools and techniques**, likely involving satellite imagery and advanced mapping technologies. These tools can capture the intricate details of the coastline much more precisely than the methods available in the 1970s.
- **Better Planning:** A more accurate measurement of the coastline helps in:
    - **Coastal zone management:** Planning for development and conservation in coastal areas.
    - **Environmental protection:** Understanding erosion and pollution impacts.
    - **Disaster management:** Better preparing for tsunamis, storms, and sea-level rise.
    - **Maritime security and navigation:** For shipping and naval operations.

Bharat Forecasting System (BFS) - India's Weather Gets Smarter



Context:

The India Meteorological Department (IMD) is soon going to start using the **Bharat Forecasting System (BFS)**. This new system offers the highest level of detail (resolution) among weather models worldwide, promising much more accurate weather predictions for India.

I. What is the Bharat Forecasting System (BFS)?

- **Indigenous Development:** It is an **advanced weather forecasting system built entirely in India**. This is a big step for "Atmanirbhar Bharat" (self-reliant India) in science.
- **Developed By:** It was created by the **Indian Institute of Tropical Meteorology (IITM)**, located in Pune. IITM works under the Ministry of Earth Sciences.
- **Key Feature - High Resolution:** BFS will give weather forecasts with a **6 km resolution**. This means it can predict weather changes in much smaller areas, down to individual villages or panchayats. This is the **highest resolution in the world** for an operational weather model.
    - *Comparison:* Before, India mostly used the Global Forecast System (GFS) which had a 12 km resolution. BFS is a big improvement.

- **Benefits of Finer Resolution:** This higher detail will help forecasters predict **local weather events much more accurately**, such as:
    - Heavy rainfall in specific small areas.
    - Precise paths and intensity of cyclones.
    - Localized climate variations.

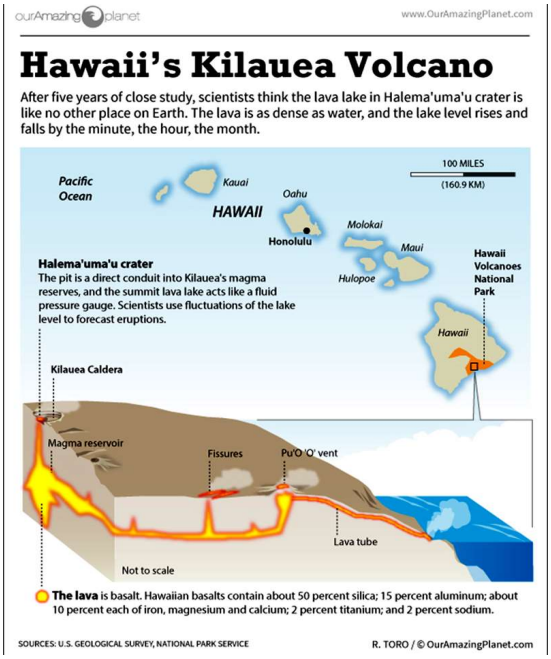
II. How BFS Works and What Powers It:

- **Supercomputer Power:** BFS is run by the **Arka supercomputer**, which is located at IITM, Pune.
    - *Specs:* Arka is very powerful, with 11.77 petaflops (a measure of processing speed) and 33 petabytes of storage.
    - *Speed:* This new supercomputer will **greatly reduce the time it takes to produce forecasts** compared to the older "Pratyush" supercomputer. Forecasts that once took 12-14 hours will now be ready in 4-6 hours.
- **Data Input:** The BFS model uses data from a network of **40 Doppler Weather Radars** spread across India.
    - *More Radars:* The plan is to increase the number of Doppler radars to **100 gradually**. This will allow the IMD to give even more localized forecasts and **nowcasts** (weather forecasts for the next two hours) for the entire country.
- **Geographic Coverage:** BFS can provide 6 km resolution forecasts for the **tropical region** (the area between 30 degrees South and 30 degrees North Latitudes). India's mainland mostly falls within this tropical belt.
- **Technology Used:** BFS is mainly a **Numerical Weather Prediction (NWP) model**. This means it uses complex mathematical equations and computer programs to simulate the atmosphere and predict weather based on current conditions.
    - *Modern Twist:* Recently, **Artificial Intelligence (AI) and Machine Learning (ML)** have been added to BFS to make it even better and more accurate.
- **Global Collaboration:** Unlike many other global weather models, BFS data will be **open and available to researchers worldwide**. This will help in working together and advancing weather science globally.

III. Significance and Benefits:

- **Improved Early Warnings:** BFS will significantly improve early warnings for severe weather events.
- **Support for Key Sectors:** More precise forecasts will greatly benefit:
    - **Farmers:** Helping them make better decisions about planting, harvesting, and irrigation, potentially reducing crop loss.
    - **Disaster Management:** Allowing authorities to plan and prepare for floods, cyclones, and heatwaves with much greater accuracy, enabling timely evacuations.
    - **Water Resource Management:** Better rainfall predictions aid in managing water resources more efficiently.
    - **Public Safety:** Providing localized alerts to keep people safer.
- **Global Leadership:** India is now one of the few countries in the world, and the only one in the tropics, to operate such a high-resolution weather forecasting system in real-time. This strengthens India's position as a leader in meteorological science.
- **"Nari Shakti" (Women Power):** The project was led by four women scientists, highlighting the vision of "Nari Shakti" in scientific advancements.

Kilauea Volcano - Hawaii's Active "Shield"



Context:

The **Kilauea volcano** on Hawaii's Big Island recently showed strong activity, with **lava fountains reaching over 1,000 feet into the air**. This event reminds us of Kilauea's continuous activity and its importance as one of the world's most active volcanoes.

I. About Kilauea Volcano:

- **Location:** Kilauea is located in the southeastern part of the **Island of Hawaii** (often called the Big Island), which is part of the **Hawaii state, United States**.
- **Activity Level:** It is known as one of the **world's most active volcanoes**. It has been erupting **continuously since 1983**.
- **Type of Volcano:** It is a **shield-type volcano**. (More on this below).
- **Size:** It rises 4,190 feet (1,227 meters) above sea level.
- **Summit Features:**
    - Its top part (summit) has a large, bowl-shaped crater called a **caldera**.
    - Inside this caldera, there is a **lava lake** known as **Halemaumau**. This lava lake is considered by local Hawaiian tradition to be the home of **Pele, the Hawaiian volcano goddess**.
- **Neighboring Volcano:** Kilauea's slopes blend with those of the nearby large volcano, **Mauna Loa**, on its west and north sides.
- **Eruption Style:** Kilauea's frequent eruptions are usually **not explosive** (meaning they don't violently throw out ash and rocks). Instead, they are typically **contained within Halemaumau**, where the lava sometimes rises and overflows onto the crater floor and sides.

II. Key Facts about Shield Volcanoes:

- **Appearance:** Shield volcanoes are the **largest volcanoes on Earth that actually look like traditional mountains** (not counting huge flood basalt areas which are flat).
- **Famous Examples:** The **Hawaiian shield volcanoes** (like Kilauea, Mauna Loa, Mauna Kea) are the most well-known examples of this type.
- **Lava Type:** They are made almost entirely of **basalt**, a type of lava that is **very fluid (runny)** when it erupts.
- **Shape:** Because the lava is so fluid, it flows easily and spreads out over large areas, creating volcanoes that are **broad with gentle slopes**, resembling a warrior's shield lying on the ground (hence the name "shield volcano"). They are **not steep** like cone-shaped volcanoes.
- **Eruption Characteristics:**
    - Eruptions are usually **not explosive** unless water somehow gets into the volcano's opening (vent).
    - Instead, they are marked by **low-explosivity fountaining**, where lava shoots up like a fountain. This can form small cone-shaped hills called **cinder cones** or **spatter cones** around the vent.

- However, the vast majority (90%) of a shield volcano is made up of solidified **lava flows**, not fragmented rock material (pyroclastic material) from explosive eruptions.

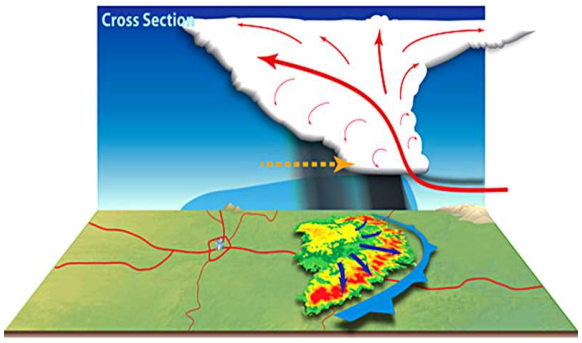
- **Formation Time:** They are built up by **repeated eruptions** that happen over very long periods, sometimes up to a million years or even longer.

Bow Echo

Context:

The **intense storm that hit Delhi recently appeared in an unusual crescent** or archer's **bow shape on the India Meteorological Department's (IMD's)** weather radar imagery, technically termed a "bow echo."

What is a 'Bow Echo'?



- A bow echo is essentially a **line of storms**, also called a **squall line**, that appears in a distinctive **archer's bow or crescent shape** on weather radar imagery.
- **Scale and Duration:** A bow echo can extend from **20 km to 100 km** in length and typically lasts between **3 and 6 hours**.
- **Significance for Meteorologists:** Meteorologists specifically track bow echoes because they are often a **precursor to more destructive windstorms**.
- They are associated with severe straight-line winds.
- **Origin of Term:** The term "bow echo" was coined in the **1970s by Ted Fujita**, a Japanese American meteorologist renowned for developing the Fujita scale for classifying tornadoes.

How Does a Bow Echo Form?

The formation of a bow echo involves a self-sustaining cycle of atmospheric processes:

- **Rain-Cooled Air Descent:** When precipitation from thunderstorms falls, it cools the air.
  - This **rain-cooled air descends to the ground** due to its higher density.
- **Horizontal Spread and Gust Front:** As this cool air reaches the surface, it **spreads out horizontally**.
  - This creates a leading edge or boundary known as a **gust front**, which separates the rain-cooled air from the surrounding warm, moist air at the surface.
- **Lift and New Thunderstorms:** The gust front acts like a mini cold front, **pushing up the warm, moist air into the atmosphere**.
  - This forced ascent of warm, moist air leads to the **formation of new thunderstorms** along the gust front.
- **Reinforcing Cycle:** These new thunderstorms produce more rain, which in turn creates more rain-cooled air.
  - This continuous production of rain-cooled air helps the **gust front to maintain and even intensify its strength**.
- **Bow Formation:** As this process repeats and intensifies, a point is reached where there is a

strong inflow of air on the trailing side of the line of storms.

- This inflow, combined with the strong winds at the leading edge, causes the entire squall line to **bend outwards, forming the characteristic archer's bow shape**.

- **Sustained Strong Winds:** The cycle continues as long as new thunderstorms keep forming at the front, helping the system to grow and move forward, generating and sustaining **strong, damaging straight-line winds**.

Bow Echoes in India

- **Not a New Phenomenon:** Bow echoes are **not a new phenomenon in India**.
- **Previous Occurrences:**
  - On **May 31, 2022**, a bow echo formed over Delhi and Noida. Although short-lived (lasting about an hour), it produced winds of up to 100 kmph.
  - Such squall lines have also been observed during thunderstorm activity in **Odisha** in recent times.
- **Common Occurrence:** According to senior IMD scientists, these phenomena have appeared **often in India during intense thunderstorms**.
- **Delhi Storm Example:** The recent Delhi storm (May 2025), with winds reaching up to 100 kmph, was a clear example of a bow echo's destructive potential.

Ker Sangri

Context:

Rajasthan's famous dish, Ker Sangri, has recently received a Geographical Indication (GI) tag, signifying its unique regional identity and traditional preparation methods.

About Ker Sangri

- **Dish:** Ker Sangri is a traditional and celebrated delicacy from **Rajasthan**.
- **Ingredients:** It is made using two desert plants that grow naturally in the dry and sandy lands of the Thar Desert:
  - **Ker:** A small, round berry.
  - **Sangri:** A bean that grows on the **Khejri tree**.
- **Historical Significance:** Historically, Ker and Sangri served as **survival food during times of drought** when fresh vegetables were scarce. This origin has contributed to its cultural significance.
- **Preparation:**
  - The raw Ker berries have a bitter taste. They are made delicious through a careful and slow process involving **soaking, boiling, and then cooking** with Sangri.
  - Key additions include curd, red chillies, and various spices.
  - The final dish is described as **tangy, spicy, and full of earthy flavour**.
- **Nutritional Value:** Ker Sangri is not just tasty but also healthy, being **high in fibre, low in fat, and rich in nutrients**.
- **Traditional Consumption:** People in Rajasthan typically eat it with **bajra roti and ghee**, making it a filling and balanced meal.
- **Cultural Significance:** The Sangri bean grows on the **Khejri tree, which is sacred in Rajasthan**. The **Bishnoi community** has protected this tree for hundreds of years, considering it a symbol of life.

Geographical Indication (GI) Tag for Ker Sangri

The GI tag for Ker Sangri means that **only products made in Rajasthan using the local method can be called by this name**.

What is GI Tag :

- A Geographical Indication (GI tag) is a sign used on products with a specific geographical origin, possessing unique qualities or reputation due to that origin.
- It serves as an intellectual property right (IPR), attributing a product's quality, reputation, or other characteristic to its geographical origin.
- GIs are recognized as an aspect of IPRs under the Paris Convention for the Protection of Industrial Property and the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement.

Benefits:

A GI tag lets approved users stop others from using the indication if their product doesn't meet the standards. A GI tag confers the following rights to the registered proprietors:

1. Legal protection against unauthorized use by others.
2. Exclusive right to use the GI tag for the specified goods or products.
3. Ability to prevent misuse, imitation, or misleading representations of the GI tag.
4. Legal recourse against infringement or unfair competition.

Type of Products:

1. Geographical indications can be used for a wide range of products, including agricultural products, foodstuffs, wines, spirits, handicrafts, and industrial products.
2. However, such products must possess specific qualities or characteristics attributable to their geographical origin.

Eligibility Criteria:

1. Any trader's group, association, or organization can apply for a GI tag.
2. They must demonstrate the product's uniqueness with historical records and a detailed production process.
3. GI tags aren't only for popular products; they exist for hundreds of items across states, each recognizing a specific region and product.

International Conventions on GI Tags:

These international conventions and systems play a crucial role in protecting and promoting products with a GI tag, ensuring they maintain their unique identity and quality.

1. Paris Convention: The Paris Convention for the Protection of Industrial Property (1883) provides a multilateral framework for the protection of industrial property rights, including geographical indications. It establishes the principles of national treatment and the right of priority.
2. Lisbon System: The Lisbon Agreement for the Protection of Appellations of Origin and their International Registration (1958) establishes an international registration system for appellations of origin, a specific type of GI. It provides a centralised filing procedure and ensures protection for all contracting parties.
3. Madrid System: The Madrid System for the International Registration of Marks, while primarily focused on trademarks, can also be utilized for the protection of geographical indications through the registration of collective or certification marks.

GI Tag in India:

The Geographical Indication Registry, a division of the Ministry of Commerce and Industry's Department of Industry Promotion and Internal Trade (DIPIT), is responsible for issuing GI tags, further safeguarding these unique products and their geographical origins. The GI tag holds significant importance for India, as it:

1. Promotion and protection: Promotes and safeguards the unique products and traditional knowledge of various regions, contributing to rural development and empowerment.
2. Marketability and competitiveness: Enhances the credibility, marketability, and competitiveness of Indian products in the global market.

3. Preservation of cultural heritage: Preserves the cultural heritage and traditional practices associated with the production of these products.
4. Prevention of misappropriation: Prevents misappropriation and misuse of traditional knowledge by unauthorized parties.
5. Sustainable practices and environmental conservation: Encourages sustainable production practices and environmental conservation in the designated regions.

GI Act of 1999:

The Geographical Indications of Goods (Registration and Protection) Act, 1999 is the main law in India that oversees the registration and protection of geographical indications. The Act's key provisions include:

1. The establishment of the Geographical Indications Registry, responsible for processing and registering GI applications.
2. The criteria for registering a GI, including the association between the product and its geographical origin, and the reputation or quality attributable to that origin.
3. The duration of protection is initially 10 years but can be renewed indefinitely.
4. Provisions for enforcing GI rights, including civil and criminal penalties for infringement.
5. Provisions for registering authorised users and associations of producers.

GI Tag as an IPR:

Geographical Indications are recognized as a form of intellectual property rights under the TRIPS Agreement of the World Trade Organization (WTO). As an IPR, GIs:

Protect the collective rights of producers and communities associated with a particular product.

Prevent the misuse or misappropriation of a product's reputation or characteristics by unauthorized parties.

Contribute to the preservation of traditional knowledge and cultural heritage.

Promote fair trade practices and sustainable development in rural communities.

Other Notable GI-Tagged Indian Foods (Examples)

State	GI Tags
Andhra Pradesh	Handicraft: Srikalahasti Kalamkari, Kondapalli Bommallu, Budithi Bell and Brass Metal Craft, Uppada Jamdani Sarees, Bobbili Veena, Durgi Stone Carvings, Etikoppaka Toys. Food Stuff: Tirupati Laddu, Bandar Laddu Agricultural: Guntur Sannam Chilli, Banaganapalle Mangoes.
Arunachal Pradesh	Handicraft: Idu Mishmi Textiles Agricultural: Khaw Tai (Khamti Rice), Yak Churpi
Assam	Handicraft: Muga Silk Manufactured: Judima
Bihar	Handicraft: Madhubani Paintings, Sujini Embroidery Manufactured: Bhagalpuri Zardalu, Katarni Rice Food Stuff: Silao Khaja
Chattisgarh	Handicraft: Bastar Dhokra, Champa Silk Saree and Fabrics
Goa	Manufactured: Feni Agricultural: Khola Chilli
Gujarat	Handicraft: Sankheda Furniture, Tangaliya Shawl, Jamnagari Bandhani, Mata ni Pachhedi Agricultural: Bhalia Wheat
Himachal Pradesh	Handicraft: Kullu Shawl Agricultural: Kangra Tea
Jharkhand	Handicraft: Sohrai - Khovar Painting.
Karnataka	Handicraft: Mysore Silk, Kasuti Embroidery, Molakalmuru Sarees Handicraft, Sandur Lambani Embroidery, Kinhal Toys, Kolhapuri Chappal Manufactured: Mysore Sandal Soap, Mysore Agarbathi Agricultural: Coorg Orange, Coorg Green Cardamom, Devanahalli Pomello, Appemidi

	Mango, Byadagi Chilli, Indi Limbe, Monsooned Malabar Robusta Coffee, Monsooned Malabar Arabica Coffee
Kerala	Handicraft: Aranmula Kannadi, Alleppey Coil.
	Agricultural: Navara Rice, Pokkali Rice, Kaipad Rice, Chengalikodan Nendran Banana, Nilambur Teak, Tirur Betel Leaf (Tirur Vettila), Attappady Thuvara
Madhya Pradesh	Handicraft: Chanderi Sarees, Maheshwar Sarees and Fabrics
	Agricultural: Sharbati Gehu
	Food Stuff: Jhabua Kadaknath Black Chicken Meat, Ratlami Sev
Maharashtra	Agricultural: Nashik Grapes, Ajara Ghansal Rice, Mangalwedha Jowar, Navapur Tur Dal, Lasalgaon Onion, Sangli Raisins, Ambemohar Rice, Alphonso
	Handicraft: Kolhapuri Chappal
Manipur	Handicraft: Shaphee Lanphee, Wangkhei Phee
Mizoram	Handicraft: Pawndum, Tawlhlohpuan
Odisha	Handicraft: Konark Stone Carving, Khandua Saree and Fabrics, Gopalpur Tussar Fabrics, Dungaria Kondh Embroidered Shawl
	Agricultural: Kandhamal Haladi, Koraput Kalajeera Rice
Rajasthan	Handicraft: Thewa Art Work, Molela Clay Work, Sanganeri Hand Block Printing, Bagru Hand Block Print, Pokaran Pottery.
	Natural: Makrana Marble
Tamilnadu	Handicraft: Salem Fabric, Kancheepuram Silk, Madurai Sungudi, Thanjavur Paintings, Salem Silk (Salem Venpattu), Kovai Kora Cotton Sarees, Arani Silk, Pattamadai Pai (Pattamadai Mat), Toda Embroidery, Mahabalipuram Stone Sculpture, Thirubuvanam Silk Sarees, Dindigul Locks, Kandangi Sarees.
	Manufactured: East India Leather.
	Agricultural: Madurai Malli, Erode Manjal (Erode Turmeric).
	Food Stuff: Kovilpatti Kadalai Mittai, Salem Sago.
	Natural: Marthandam Honey.
Telangana	Handicraft: Pochampalli Ikat, Nirmal Toys and Craft, Gadwal Sarees, Cheriyal Paintings, Pembarthi Metal Craft, Adilabad Dokra, Telia Rumal
Uttar Pradesh	Handicraft: Khurja Pottery, Mahoba Gaura Patthar Hastashlip, Mainpuri Tarkashi, Sambhal Horn Craft
	Agricultural: Mango Malihabadi Dusseheri, Kalanamak Rice.
West Bengal	Handicraft: Nakshi Kantha, Baluchari Saree, Dhaniakhali Saree, Purulia Chau Mask
	Agricultural: Tulapanji Rice, Gobindobhog Rice
	Darjeeling Tea (2004): The first product in India to receive a GI tag, known for its special aroma and light taste.
	Food Stuff: Joynagar Moa, Bardhaman Sitabhog.
Union Territory	GI Tags
Jammu & Kashmir	Handicraft: Kani Shawl,
	Agricultural: Ramban Sulai Honey, Mushqbudji Rice, Bhaderwah Rajmash, Kashmir Saffron
Pondicherry	Handicraft: Villianur Terracotta Works, Tirukanur Papier Mache Craft
Ladakh	Handicraft: Pashmina Wool
	Agricultural: Ladakh Raktsey Karpo Apricot

Joint GI Tag Products of States

1. Karnataka and Kerala: Monsooned Malabar Robusta Coffee, Monsooned Malabar Arabica Coffee
2. Kerala and TN: Alleppey Green Cardamom
3. Maharashtra, Gujarat, Dadara & Nagar Haveli, and Daman Diu: Warli Painting
4. Punjab / Haryana / H.P / Delhi / Uttarakhand / U.P / J&K: Basmati
5. Punjab, Rajasthan and Haryana: Phulkari
6. Manipur and Nagaland: Chak - Hao

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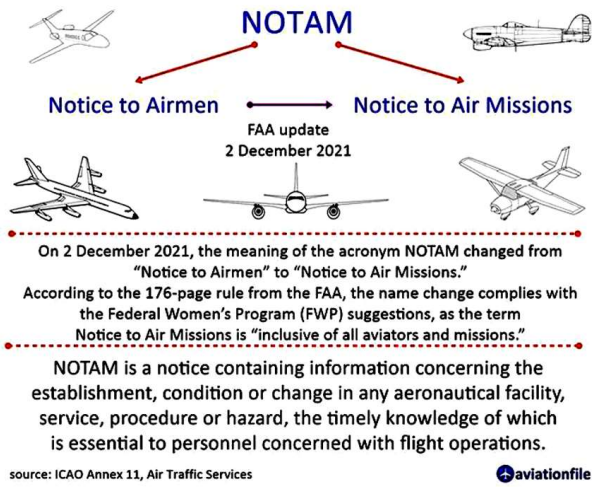
Internal Security

Notice to Air Mission (NOTAM)



Context: India recently issued a NOTAM to close its airspace for Pakistan-registered, operated, or leased aircraft, airlines, and military flights.

About Notice to Air Mission (NOTAM)

- **Definition:** A notice containing information concerning the **establishment, condition, or change** in any **aeronautical facility, service, procedure, or hazard**.
- **Purpose:** The timely knowledge of this information is **essential to personnel concerned with flight operations.**
- **Function:** NOTAMs update pilots about changes in airspace, airports, and equipment that affect aircraft operations.
- **Issuing Authority:** A **bulletin issued by a country's aviation authority.**

Reasons for Issuance

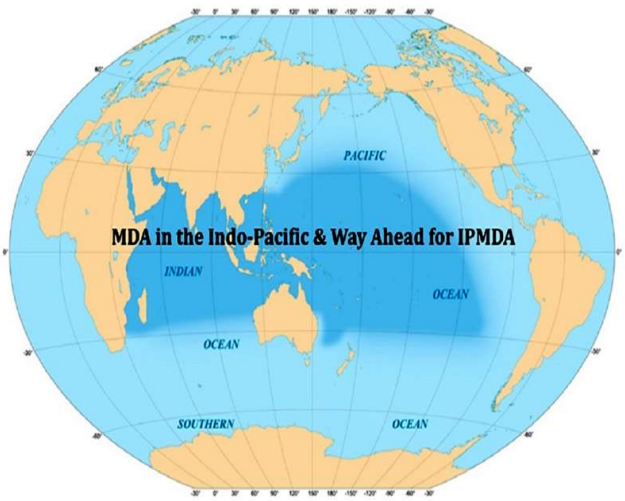
NOTAMs are issued by national authorities for various reasons, including but not limited to:

- **Hazards:** Air-shows, parachute jumps, glider or micro-light flying.
- **VIP Flights:** Flights by important people such as heads of state.
- **Infrastructure Closures:** Closed runways, taxiways, etc.
- **Equipment Unserviceability:** Unserviceable radio navigational aids, unserviceable lights on tall obstructions.
- **Military Activities:** Military exercises with resulting airspace restrictions.
- **Temporary Obstacles:** Temporary erection of obstacles near airfields (e.g., cranes).

Characteristics & Communication

- **Encoding:** For conciseness and precision, NOTAMs are **encoded**, though the code is usually self-evident.
- **Communication Method:** Communicated by the issuing agency using the **fastest available means** to all addressees for whom the information is directly operationally significant and who would not otherwise have at least seven days' prior notification.
- **Accessibility:** Typically accessible through:
    - Online platforms
    - Electronic flight planning tools
    - Aviation weather services
- **Importance for Pilots:** Pilots who do not review NOTAMs before flight put themselves (and others) in danger, as the information is crucial for informed decisions regarding flight activities.

Indo-Pacific Maritime Domain Awareness (IPMDA)



Context: The U.S. Defence Security Cooperation Agency (DSCA) recently certified a possible Foreign Military Sale (FMS) of maritime surveillance technology to India, bolstering the IPMDA initiative.

About Indo-Pacific Maritime Domain Awareness (IPMDA)

- **Initiator:** A **Quad-led initiative**.
- **Launch:** Launched during the **Quad Leaders' Summit in Tokyo in May 2022**.
- **Core Objectives:**
  - To **track "dark shipping"**: Vessels that switch off tracking systems (like Automatic Identification System - AIS) to evade detection, often associated with illicit activities like smuggling, illegal fishing, or sanctions evasion.
  - To build a **faster, broader, and more accurate maritime surveillance network** across the Indo-Pacific region.
  - To **enhance maritime domain awareness** and bring greater transparency to critical sea lanes.
- **Targeted Sub-regions:** Focuses on three strategic sub-regions of the Indo-Pacific:
  - The **Pacific Islands**
  - **Southeast Asia**
  - The **Indian Ocean Region (IOR)**

Purpose and Functions of IPMDA

- **Primary Objective:** To enhance maritime domain awareness and bring greater transparency to critical sea lanes of the Indo-Pacific region.
- **Nature:** A **technology and training initiative**.
- **Tools Used:** Utilizes advanced tools like **commercial satellite radio frequency (RF) data** to monitor and detect maritime activity in near real-time.
- **Beneficiaries:** Aims to provide **partner countries in Southeast Asia, Pacific, and IOR** with **timely and actionable maritime intelligence** to protect their exclusive economic zones (EEZs).

Details of the U.S. Approval to India

- **Potential Sale Value:** Maritime surveillance technology worth **$131 million**.
- **Key Components of the Deal:**
  - **SeaVision software** and its enhancements.
  - A **Technical Assistance Field Team (TAFT)** for training.
  - Remote software and analytics support.
  - Program documentation and logistics assistance.
- **SeaVision:** A key maritime situational awareness tool widely used for vessel tracking and coastal surveillance. It is a web-based platform that aggregates and visualizes vessel tracking data from multiple sources (AIS, satellite, radar) for security, safety, and environmental missions, enabling custom alerts and analytics.

Operation Kagar

Context: The Telangana Chief Minister recently called for a national-level debate on Operation Kagar.

About Operation Kagar

- **Nature:** A large-scale **counter-insurgency initiative**.
- **Launch:** Launched by the Indian government in **2024**.
- **Aim:** To **dismantle the Maoist (Naxalite) insurgency**, particularly in the **"Red Corridor"** (spanning Chhattisgarh, Telangana, and neighboring states).
- **Deployment:** Around **1 lakh paramilitary troops** have been deployed. This includes:
    1. Central Reserve Police Force (CRPF)
    2. Elite CoBRA units (Commando Battalion for Resolute Action)
    3. District Reserve Guards (DRG)
    4. State Police
- **Technology & Equipment:** Security personnel are equipped with modern technology such as:
    1. **Drones** for information gathering.
    2. **AI** for intelligence gathering.
    3. **Satellite imagery**.
- **Primary Goal:** To **eradicate Maoist influence by March 2026**.
- **Meaning:** "Kagar" roughly means **'Final Mission'**.
- **Four-Part Plan:**
    1. **Establishing forward operating bases** deep in Maoist territory.
    2. **Building hundreds of fortified police stations** in reclaimed areas.
    3. **Gathering intelligence** through high-tech monitoring.
    4. **Pushing a "generous surrender policy"** (which has seen thousands of Naxalites lay down arms in the past decade).

What do Naxals want in India? (Naxalite Ideology)

- **Core Belief:** They believe the government is unfair, especially to poor people, tribal communities, and farmers. They perceive that rich people and large corporations control too much land and resources, leading to the suffering of the poor.
- **Objective:** They desire a **"revolution"** to take land and power away from the rich and redistribute it to the poor.
- **Methodology:** They **believe in armed struggle** to bring about this change, as they think peaceful methods like voting are ineffective for the poor.
- **Final Goal:** To create a **classless society** where everyone is treated equally, based on communist ideas (Maoist ideology).

Abdali Missile

Context: Pakistan recently claimed to have conducted a 'successful' training launch of the Abdali Weapon System.

About Abdali Missile (Hatf-II)

- **Type:** Short-range, road-mobile, solid-fuel **ballistic missile**.
- **Developer:** Developed by Pakistan's **Space and Upper Atmosphere Research Commission (SUPARCO)**.
- **Purpose:** Designed for **tactical battlefield use**.

- **Warheads:** Can deliver both **conventional and nuclear warheads**.
- **Range:**
    - The **latest test claims a maximum range of 450 kilometers** (about 280 miles).
    - This doubles the previously reported operational range of 180–200 km.
- **Guidance System:** Equipped with an **advanced inertial navigation system**.
- **Accuracy:** Offers a **Circular Error Probable (CEP) of 100–150 meters**, indicating high accuracy for its class.
- **Launch Platform:** Launched from a **road-mobile Transporter-Erector-Launcher (TEL)**, enabling rapid deployment and mobility.
- **Payload Capacity:** Can carry a single payload (high explosive, submunitions, or conventional warhead) weighing between **250–500 kg**.
- **Propulsion:** The missile's **solid-propellant engine** allows for quick reaction time and easy storage, enhancing its battlefield utility.
- **Operational Status:** The system has been in operational service with **Pakistan's Army Strategic Forces Command since 2005**.
- **Naming:** Named after Ahmad Shah Abdali, an 18th-century Afghan ruler known for military campaigns in the Indian subcontinent. (Pakistan often names its missiles after historical Muslim rulers or invaders of India.)

INS Tamal

Context: In the wake of rising tensions with Pakistan, the Indian Navy is set to bolster its maritime strength with the induction of its second advanced warship, INS Tamal.

About INS Tamal

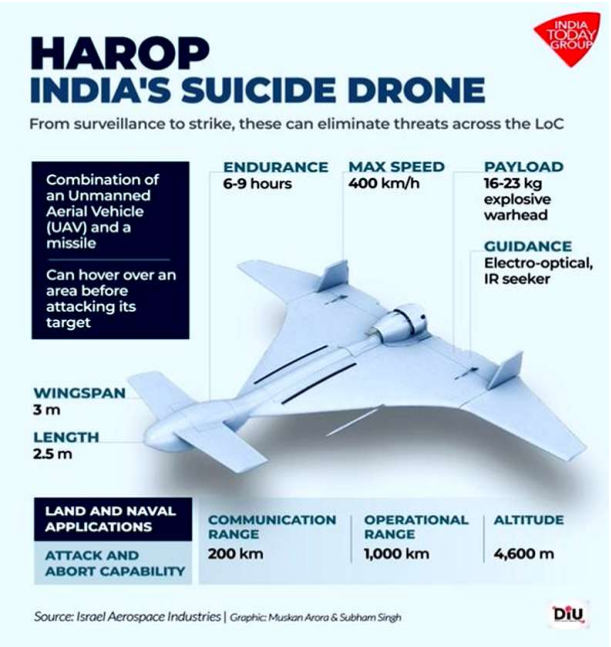
- **Type:** A state-of-the-art **stealth guided missile frigate**.
- **Class:** An upgraded **Krivak-III class frigate**.
- **Procurement:** Part of a significant **$2.5 billion deal between India and Russia for four stealth frigates**:
    - Two (INS Tushil and INS Tamal) built in Russia.
    - Two (Triput and Tavasya) to be manufactured at Goa Shipyard Limited (GSL) through a technology transfer deal (estimated cost around Rs 13,000 crore).
- **Predecessor: INS Tushil** was the first of this class, commissioned into the Indian Navy in December 2024.
- **Significance for India:** INS Tamal will be the **last warship to be commissioned outside India or imported**, signifying India's growing self-reliance in warship design and construction.

Key Features of INS Tamal

- **Operational Capability:** Designed for **blue water operations**, capable of engaging in various naval warfare dimensions, including **air, surface, underwater, and electronic warfare**.
- **Dimensions:** Measures 125 meters in length and has a displacement of 3,900 tonnes.
- **Indigenous Content:** Approximately **26% of its components are sourced from Indian manufacturers**, blending Russian design with Indian technology.
- **Performance:**
    - Capable of cruising at speeds of up to **30 knots (approximately 55 km/h)**.
    - Can operate over a range of **3,000 kilometers per deployment**.

- **Weapon Systems:**
    - **Missile Systems:** Carries an array of missile systems, including:
        * **BrahMos supersonic cruise missiles** (for formidable offensive capabilities).
        * Vertically launched **Shtil surface-to-air missiles** (for defensive capabilities against aerial threats).
    - **Undersea Warfare:** Equipped with **anti-submarine torpedoes and rocket launchers**.
- **Aviation Support:** The vessel can also **support the operation of a multi-role helicopter**, enhancing its reach and versatility during missions.
- **Stealth Technology:** Possesses **radar-evading stealth technology**, making it harder to detect by enemy radars.

HAROP Drones



Context: Indian armed forces recently deployed Israeli-origin Harop drones to carry out precision strikes on air defence systems in Pakistan as part of their ongoing 'Operation Sindoor'.

About HAROP Drones

- **Developer:** Developed by the **MBT Missiles Division of Israel Aerospace Industries (IAI)**.
- **Classification:** Belongs to a class of weapons known as **loitering munitions** (also referred to as "suicide drones" or "kamikaze drones").
- **Functionality:**
    - Designed to **hover in a designated area for extended periods** (up to nine hours).
    - Identify hostile targets.
    - **Destroy them by crashing into them with a built-in explosive payload** (one-way mission).
- **Dual Purpose:** Unlike conventional UAVs (Unmanned Aerial Vehicles) which primarily perform surveillance and return, loitering munitions serve a **dual purpose: reconnaissance and attack**.

Key Features of HAROP Drones

- **Targeting System:** Equipped with an **electro-optical (EO) or infrared (IR) seeker** to detect, track, and engage static or mobile threats.
    - Effective against targets such as radar systems, missile launchers, and command posts.
- **Operation Mode:**
    - Capable of **autonomous operation with human oversight**.
    - Offers a **man-in-the-loop control mode**, allowing the operator to make final decisions before impact.
- **Safety/Flexibility:** Equipped with **abort capability**, allowing for mission cancellation mid-flight to avoid collateral damage or if the target is no longer viable.
- **Physical Specifications:**
    - Wingspan: 3 meters
    - Length: 2.5 meters
- **Performance:**
    - Maximum speed: 417 km/h
    - Operational range: 200 km

- Flight endurance: Exceeding six hours
- Service ceiling: Approximately 15,000 feet

- **Payload:** A **16 kg high-explosive warhead**.
- **Accuracy: Circular Error Probable (CEP) of under one meter**, making it highly accurate.
- **Maneuverability:** Can loiter over hostile areas and strike from any angle—including shallow or steep dives.
- **GPS-Denied Environment Capability:** Performs effectively in **GPS-denied environments** due to its **resistance to satellite jamming (GNSS)**.

India's Association with HAROP Drones

- India has been a known **operator of the Harop drone for over a decade**.
- Its deployment by Indian armed forces in 'Operation Sindoor' highlights its integration into India's military strategy for precision strikes, particularly against air defence systems.

High Mobility Artillery Rocket System (HIMARS)

Context: The military of Taiwan recently conducted its first live-firing of the American-supplied High Mobility Artillery Rocket System (HIMARS).

About High Mobility Artillery Rocket System (HIMARS)

- **Nature:** It is a **lightweight, multiple rocket launcher**.
- **Functionality:** Allows for the launching of **multiple, precision-guided rockets**.
- **Manufacturer:** Manufactured by **Lockheed Martin Corporation**, a United States-based security and aerospace company.
- **Purpose:** Intended to engage and defeat various targets, including:
  - Artillery
  - Air defence concentrations
  - Trucks
  - Light armour
  - Personnel carriers
  - Support troop and supply concentrations.

High Mobility Artillery Rocket System Features

- **Mobility:** It is an **air-transportable wheeled launcher** mounted on a 5-ton Family of Medium Tactical Vehicles (FMTV). This makes it highly mobile and rapidly deployable.
- **Ammunition Capacity:** It can carry either:
  - A launcher pod of **six rockets** (e.g., M270 MLRS rockets with a range of approximately **43 miles (~70 km)**).
  - **One MGM-140 Army Tactical Missile System (ATACMS)**, which can hit targets up to **200 miles (~300 km)** away.
- **Rapid Deployment & Firing:**
  - Requires **less than 20 seconds to be prepared for firing**.
  - A full launcher load of six rockets can be fired within **45 seconds**.
- **Shoot-and-Scoot Capability:** The system is designed to **launch its weapons and move away from the area at high speed** before enemy forces can accurately locate the launch site. This enhances survivability.
- **Crew Protection:** The HIMARS is equipped with the **Increased Crew Protection (ICP) cabin**, which is designed to protect the three-man operating crew against:
  - Plume gases (from rocket exhaust)
  - Rocket launch debris
  - Small arms fire.
- **Precision and Effectiveness:** Its precision-guided munitions make it a highly effective asset for striking specific targets with minimal collateral damage.

Exercise Teesta Prahar

Context: The Indian Army recently conducted a comprehensive integrated field training exercise named 'Teesta Prahar' at the Teesta field firing range.

About Exercise Teesta Prahar

- **Nature:** It was a **large-scale integrated field exercise** conducted by the **Indian Army**.
- **Venue:** Carried out at the **Teesta field firing range in West Bengal**.
    - This location is near the **strategic Siliguri corridor**, often referred to as **"Chicken's Neck"**, which is the narrow land connecting India's North-Eastern region with the rest of the country. Its strategic importance makes exercises in this region critical.
- **Objective:** Showcased the Army's **operational readiness and coordination among combat and support arms in riverine terrain**. This indicates a focus on preparedness for operations in river-dominated landscapes.
- **Participants:** Witnessed active participation from various key combat and support arms, including:
    - Infantry
    - Artillery
    - Armoured Corps
    - Mechanised Infantry
    - Para Special Forces
    - Army Aviation
    - Engineers
    - Signals

Key Highlights and Focus Areas

- **Modernization & New Weapon Systems:** A key highlight was the **deployment and validation of newly inducted next-generation weapon systems, military platforms, and advanced battlefield technologies**. This reflects the Indian Army's strong emphasis on modernization and capability enhancement.
- **Jointness and Synergy:** The exercise emphasized **jointness, synergy, and seamless coordination** among different units and arms. This reinforces the Army's ability to operate swiftly and effectively across varied terrain and adverse weather conditions.
- **Tactical Drills:** Featured:
    - **Tactical drills**
    - **Battle rehearsals**
    - **Adaptive maneuvers**
    - All aimed at refining responses to dynamic and evolving combat scenarios.
- **Readiness:** The exercise underscores the Indian Army's commitment to maintaining a high state of readiness and its capability to respond effectively to potential threats in strategically sensitive areas.

Border Security Force (BSF)

Context: Amid escalating cross-border tensions along the western front with Pakistan, the Border Security Force (BSF) has been highlighted as India's first and sharpest line of defense, standing alongside the armed forces.

About Border Security Force (BSF)

- **Designation:** Known as the **"First Line of Defence of Indian Territories"**, BSF is a **primary border-guarding organization of India**.
- **Classification:** It is **one of the seven Central Armed Police Forces (CAPFs)** of the Union of India.
- **Administrative Control:** Operates under the **administrative control of the Ministry of Home Affairs (MHA)**.
- **Establishment:** Raised in the **wake of the 1965 War** on **December 1, 1965**, with the mandate "for ensuring the security of the borders of India and for matters associated therewith."

Role and Deployment

- **Primary Role (Peacetime):** To **protect the country's land borders during peacetime** and **prevent transnational crime** (e.g., smuggling, infiltration).
- **Wartime Support:** They **help the Indian Army during wartime** due to their familiarity with local people and topography in border regions.
- **Current Deployment:** Currently, BSF is deployed at:
    - The **Indo-Pakistan International Border**.
    - The **Indo-Bangladesh International Border**.
    - The **Line of Control (LoC) along with the Indian Army** (in certain sectors).
    - In **Anti-Naxal Operations** in affected states.

Distinctive Features and Capabilities

- **Size:** BSF currently stands as the **world's largest border guarding force**, with **186 battalions and 2.57 lakh personnel**.
- **Specialized Wings:** It includes an expanding air wing, marine wing, artillery regiments, and commando units.
- **Unique CAPF Features:** The BSF is the **only CAPF to have its own Air Wing, Marine Wing, and artillery regiments**, which provide crucial support to the General Duty Battalions in their operations.
- **Animal Wings:** Has a separate **camel and dog wing** that enables operations in varied terrains like the India-Pakistan border in the Rann of Kutch and desert areas of Rajasthan.
- **Tear Smoke Unit (TSU):** The force also maintains a **Tear Smoke Unit (TSU)**, which is unique in India. The TSU is responsible for producing tear gas munitions required for anti-riot forces across the country.
- **Powers of Arrest, Search, and Seizure:** BSF has been given powers of arrest, search, and seizure under various Acts, including:
    - Passport Act 1967
    - Passport Act (Entry into India) 1920
    - Customs Act
    - NDPS Act (Narcotic Drugs and Psychotropic Substances Act)
    - Arms Act
- **Leadership:** The **head of the BSF is known as the Director General (DG)**, who is typically an **officer from the Indian Police Services (IPS)**.

Logo and Motto

- **Logo:** The BSF logo features **two spikes of grains**, embracing the National Emblem of India, with the typeface BSF.
- **Motto:** The motto of BSF is **"DUTY UNTO DEATH"**, reflecting its commitment and dedication.

Minuteman III Missile - A Pillar of US Nuclear Deterrence

Context:

The United States Air Force (USAF) recently carried out a successful test launch of the **Minuteman III intercontinental ballistic missile (ICBM)**. This missile can carry a nuclear warhead and reach almost any target on Earth. This test highlights its continued importance in the US defense strategy.

I. What is the Minuteman III?

- **Type:** The LGM-30G Minuteman III is an **American-made intercontinental ballistic missile (ICBM)**.
- **Designation Explained:**
  - "L" means it's **launched from a silo** (an underground tube).
  - "G" means it's for **surface attack** (hitting targets on land).
  - "M" stands for **guided missile** (it can be controlled to hit its target).
- **Introduction:** It was first used in the **early 1970s**.
- **Key Innovation:** The Minuteman III was the **first missile in the US arsenal** to have **MIRVs** (Multiple Independently Targetable Reentry Vehicles). This means it could carry several warheads, and each warhead could hit a different target.
- **Part of Nuclear Triad:** It is the **only land-based part** of the **U.S. nuclear triad**. The nuclear triad refers to a country's nuclear weapons stored in three ways: on land (ICBMs), at sea (submarine-launched ballistic missiles or SLBMs), and in the air (bombers). This makes sure that even if one part is attacked, the others can still launch a strike.
- **Developer:** It was developed by **Douglas Aircraft Company** (which later became part of Boeing).
- **Lifespan & Modernization:** It was originally meant to be used for only about ten years. However, it has been **modernized** many times and is still in service. Its replacement, the **Ground-Based Strategic Deterrent (GBSD)**, is expected to be ready for use in **2029**.
- **Current Stock:** The United States has around **440 Minuteman III missiles** in its arsenal.

II. Features of the Minuteman III:

- **Engine:** It uses a **three-stage, solid-fuel rocket engine**. Solid fuel makes it ready to launch quickly.
- **Size:** It is 18.2 meters (about 60 feet) tall, has a diameter of 1.85 meters, and weighs over 34,000 kilograms when launched.
- **Speed:** It is extremely fast, reaching about **15,000 mph (Mach 23)** at its highest speed (hypersonic).
- **Range:** It has a very long range of about **13,000 kilometers**, meaning it can hit targets across different continents.
- **Payload:**
  - It can carry a payload of **three re-entry vehicles** (the part that carries the warhead back to Earth).
  - Even though it could originally carry three nuclear warheads, it now typically carries **a single warhead**. This change was made to follow **arms control agreements** between nuclear powers, aiming to reduce the number of deployed nuclear weapons.
- **Housing and Security:**
  - Each missile is kept in a **hardened underground silo** (a strong, reinforced underground bunker).
  - These silos are connected to a **launch control center** by strong cables.
  - **Two officers** are always on duty, monitoring the missiles 24/7, maintaining a constant alert status.
- **Reliability:**
  - It has a **fast launch time**, which is crucial for quick response.
  - It has an almost **100 percent testing reliability**, showing it works as intended.

- It also has **backup airborne launch controllers** (people in planes who can launch the missiles if ground control is destroyed) to make sure the US can always strike back if attacked.

III. Significance for US Defense and Global Politics:

- **Deterrence:** The Minuteman III is a key part of the US's **nuclear deterrence strategy**. Its presence and capabilities are meant to prevent other countries from attacking the US or its allies with nuclear weapons, as they know the US can strike back powerfully.
- **Stability:** Even though they are powerful weapons, ICBMs like the Minuteman III contribute to a form of strategic stability by ensuring a "second-strike capability" (the ability to retaliate even after being attacked), which discourages a first strike.
- **Arms Control:** Its current configuration with a single warhead highlights the impact of international arms control treaties on limiting nuclear arsenals.
- **Modernization Efforts:** The push for a replacement (GBSD) shows the ongoing need for advanced nuclear capabilities in a changing geopolitical landscape.

INS Brahmaputra - An Indian Warship's Comeback

Context:

The Indian Navy's **INS Brahmaputra**, a guided missile frigate, was badly damaged in a dockyard accident last year. However, recent reports from senior officials indicate that it is expected to be seaworthy again by the end of 2025 and fully ready for combat by mid-2026. This shows the Indian Navy's commitment to restoring its important assets.

I. About INS Brahmaputra:

- **Type of Ship:** It is the **first** ship of its kind (the lead ship) in the **Brahmaputra-class** of **guided missile frigates** built in India.
  - *What is a Guided Missile Frigate?* A frigate is a type of warship that is smaller than a destroyer but bigger than a corvette. A "guided missile frigate" means it is equipped with missiles that can be guided to hit their targets, making it a powerful combat vessel.
- **Built By:** It was built in India by **Garden Reach Shipbuilders and Engineers Limited (GRSE)**, located in Kolkata. This highlights India's growing ability to build its own warships (indigenous construction).
- **Commissioned:** It officially joined the Indian Navy on **April 14, 2000**.
- **Roles and Missions:** INS Brahmaputra takes on various important jobs for the Indian Navy, including:
  - **Coastal and offshore patrolling:** Guarding India's coastlines and nearby waters.
  - **Monitoring sea routes:** Keeping an eye on important shipping lanes.
  - **Maritime diplomacy:** Representing India's navy in foreign countries and during joint exercises.
  - **Counter-terrorism and anti-piracy missions:** Fighting against terrorism and piracy at sea.

II. Features of INS Brahmaputra:

- **Ship's Symbol (Crest):** Its symbol (crest) features a grey, **one-horned Indian rhinoceros**. This animal is found in the Brahmaputra valley,

and the ship is named after the Brahmaputra River. The background has brown color with white and blue sea waves.

- **Size:**
  - It weighs about 5,300 tonnes (displacement).
  - It is 125 meters long (about 410 feet).
  - It is 14.4 meters wide.
- **Speed:** It can travel at speeds over **27 knots** (which is about 50 kilometers per hour).
- **Weaponry:** It is well-armed with a variety of weapons for different types of threats:
  - **Guns:** Medium-range and close-range guns, and anti-aircraft weapons.
  - **Missiles:** Surface-to-surface missiles (to hit other ships or land targets) and surface-to-air missiles (to hit aircraft or incoming missiles).
  - **Torpedo Launchers:** For attacking submarines underwater.
- **Sensors and Helicopters:**
  - It has many **sensors** to detect things underwater, on the surface, and in the air for all types of naval warfare.
  - It can also **operate helicopters** like the **Sea King and Chetak**, which are used for anti-submarine warfare, reconnaissance, and search and rescue.
- **Crew:** It needs a large crew to operate, with **40 officers and 330 sailors**.

III. Significance of INS Brahmaputra:

- **Indigenous Capability:** As the first of its class built in India, INS Brahmaputra symbolizes India's growing capability in **shipbuilding and naval technology**. It shows India's commitment to "Make in India" for defense.
- **Naval Strength:** It is an important part of the Indian Navy's fleet, adding to its strength and ability to protect India's maritime interests in the Indian Ocean Region and beyond.
- **Multi-Role:** Its design allows it to perform various tasks, making it a versatile asset in different naval operations.
- **Damage Recovery:** The ongoing work to restore it after the accident shows the Indian Navy's strong maintenance and repair capabilities, ensuring that valuable assets are brought back into service.

India-Pakistan Relations – Indus Waters Treaty & Recent Developments

Context

- Following the **terror attack in Pahalgam (April 22, 2025)** where **26 Indian tourists** were killed, India has initiated a series of **punitive measures** against Pakistan.
- A central strategic move has been the **cut-off of water flow** from **Baglihar Dam (Chenab River)** and plans for similar steps at the **Kishanganga Dam (Jhelum River)**.
- These actions reflect India's intent to not allow a **"single drop" of Indus water** to reach Pakistan following **suspension of the Indus Waters Treaty (IWT)**.

Indus Waters Treaty (IWT) – Background

- **Signed**: 1960
- **Parties**: India and Pakistan
- **Brokered by**: World Bank

- **River Allocation**:
    - **Eastern rivers** (Ravi, Beas, Sutlej): Allocated to **India**
    - **Western rivers** (Indus, Jhelum, Chenab): Allocated to **Pakistan**, with **limited non-consumptive rights to India** (e.g., hydropower)

Recent Developments

- **Suspension of IWT** post-Pahalgam attack; seen by Pakistan as an **"act of war"**.
- India:
    - **Closed sluice gates** of **Baglihar Dam**, reducing water flow to Pakistan by **up to 90%**.
    - Planned **similar maintenance-based shutdown** at **Kishanganga Dam**.
    - Cited as a **"short-term punitive action"** with long-term strategic implications.
- These moves followed **hydrological testing and de-silting operations** by NHPC.

Strategic Significance of the Dams

1. Baglihar Dam (Chenab River)

- Located in **Ramban district, J&K**
- Equipped with **sluice spillways** to control water release
- Previously challenged by Pakistan in World Bank arbitration

2. Kishanganga Dam (Jhelum tributary)

- Located in **Gurez Valley**, North Kashmir
- Legally contested by Pakistan (impact on Neelum River)
- Subject to **International Court of Arbitration** and **Neutral Expert** rulings

India's Broader Water and Infrastructure Strategy

- Ministry of **Jal Shakti** and **Home Affairs** coordinating on **Indus River water reallocation**.
- Emphasis on using India's full entitlement under IWT for **national benefit**, particularly in **northern states**.
- Deployment of **50+ NHPC engineers** to Jammu & Kashmir.

Major Ongoing Hydropower Projects on Chenab River

Project	Capacity (MW)	Progress	Completion Target
Pakal Dul	1,000	66%	By 2027-28
Kiru	624	55%	By 2027-28
Kwar	540	19%	By 2027-28
Ratle	850	21%	By Nov 2028 (coffer dam near completion)

- Total expected generation: **3,014 MW**, over **10,541 million units/year**
- Implemented by **NHPC + JKSPDC Joint Venture**

Hydropower Potential in Jammu & Kashmir

- **Total estimated**: 18,000 MW
- **Identified**:
    - **Chenab basin**: 11,283 MW
    - **Jhelum basin**: 3,084 MW
    - **Ravi basin**: 500 MW
- **Utilization so far**: Only **~23.81%** of potential harnessed

Pakistan's Reaction

- Strong protest over IWT suspension; termed it an **"act of war"**
- **Ceasefire violations** for 10 consecutive days along **LoC**
- **Ballistic missile test** on April 26 – termed by India as **provocative**
- In **June 2024**, a **Pakistan delegation** and **World Bank Neutral Expert Michel Lino** inspected **Ratle project** in **Kishtwar**

India's Comprehensive Punitive Measures Against Pakistan

Sector	Action
Water	Suspension of IWT; halting flow from Baglihar and Kishanganga
Trade	Banned **all imports** from Pakistan
Shipping	Prohibited **Pakistani-flagged ships** from Indian ports
Postal	**Shut down** all postal services with Pakistan
Airspace	**Closed Indian airspace** to Pakistani carriers

India's Strategic Position

- PM Narendra Modi: Armed forces have **"complete operational freedom"** for retaliation.
- India's broader objective: Apply **coercive pressure across diplomatic, economic, and military fronts**.

Indian Army has received a new batch of Russian-made Igla-S air defence missiles

Context

- In the wake of the **April 22 Pahalgam terror attack**, which killed **26 Indian tourists**, India has expedited military preparedness measures, particularly along the **western front with Pakistan**.
- As part of this, the **Indian Army has received a new batch of Russian-made Igla-S air defence missiles** under **emergency procurement**.

What is Igla-S?

- **Type**: **Very Short Range Air Defence System (VSHORADS)** – Man-Portable Surface-to-Air Missile (MANPADS)
- **Origin**: Russia
- **Features**:
    - Shoulder-fired; **infrared homing guidance**
    - **Range**: Up to **6 km**
    - **Altitude ceiling**: Up to **3.5 km**
    - **Targets**: Low-flying aircraft, helicopters, drones, and cruise missiles
    - **Improved version** over previous Igla models with:
        * Better **seeker technology**
        * Greater **resistance to electronic countermeasures**

Procurement & Deployment

- **Cost**: ₹ 260 crore (~$30 million)
- Delivered via **emergency procurement mechanism** to boost **border air defence**
- **Deployment**:
    - Forward areas along the **western frontier (Pakistan border)**
    - In service with **forward formations** to counter enemy fighter jets, drones, and helicopters
- Part of broader initiative to **replace outdated Igla models from the 1990s**
- **Refurbishment** of older systems by a **domestic defence firm** to maintain readiness

Complementary Defence Measures

1. Indigenous Drone Countermeasures

- **Integrated Drone Detection and Interdiction System (IDD&IS)**:
    - Detects, jams, and neutralizes drones **beyond 8 km**
    - Uses **laser technology** to destroy drones
    - Recently used to **down a Pakistani drone** near the **16 Corps zone** in Jammu

2. Additional Procurement Plans

- Indian Army seeking:
    - **48 additional Igla-S launchers**
    - **~90 more missiles** via **fast-track acquisition**
- Indian Air Force also pursuing **parallel procurement** to expand aerial threat coverage

3. DRDO Initiatives

- Development of **Directed Energy Weapons (DEW)**:
    - Targeting larger aerial threats: **UAVs, cruise missiles, aircraft**

- Plans to deploy **low-level transportable radar units** to detect low-altitude intrusions

Strategic Significance

- Deployed in response to increased **Pakistani drone activity** and **missile testing**
- Enhances **India's layered air defence capability** along the LoC and other vulnerable zones
- Ensures rapid-response capability and **greater operational flexibility** in rugged terrain

India-Russia Defence Cooperation

- Russia remains a **key defence supplier**:
  - Other major systems: **S-400**, **Su-30MKI**, **T-90 tanks**, **INS Vikramaditya**
- The Igla-S is part of a continued effort to **modernise India's tactical air defence systems**
- India's diversification strategy also includes developing **indigenous systems (DRDO)** and **partnerships with Western countries**

EDITORIALS

Crux of The Hindu & Indian Express

Internal Security

INS SHARDA HADR EXERCISE – MALDIVES (May 2025)

Why in News?

- **INS Sharda**, an offshore patrol vessel of the Indian Navy, arrived at **Maafilaafushi Atoll, Maldives**, to conduct a **Humanitarian Assistance and Disaster Relief (HADR)** exercise from **4th to 10th May 2025**.
- The exercise is a critical element of **India's regional maritime diplomacy** under the **"MAHASAGAR" vision**.

What is MAHASAGAR?

- Stands for **Mutual and Holistic Advancement for Security and Growth Across Regions**.
- A maritime cooperation framework aimed at enhancing:
  - **Security**
  - **Growth**
  - **Stability**
  - **Humanitarian Readiness** in the **Indian Ocean Region (IOR)**.

Operation Overview

Attribute	Details
Ship Involved	**INS Sharda** – Offshore Patrol Vessel of the Indian Navy
Location	**Maafilaafushi Atoll**, Maldives
Dates	**4th – 10th May 2025**
Partner Nation	Maldives National Defence Force (**MNDF**)
Exercise Type	**HADR – Humanitarian Assistance and Disaster Relief**
Mission Focus	Strengthen readiness for post-disaster response, regional cooperation

Key Objectives of the HADR Exercise

Interoperability & Coordination

- **Joint Disaster Response Protocols**
- Enhanced **communication and coordination mechanisms** between Indian Navy and MNDF.

Key Functional Areas:

Activity	Purpose
Search & Rescue (SAR)	Locate and evacuate affected populations post-disaster
Medical Aid	On-site trauma care and public health support
Logistics Support	Transport of food, water, relief materials, and equipment
Joint Drills	Simulated real-time HADR scenarios for capacity-building
Training Sessions	Sharing best practices, protocols, and equipment familiarization
Community Engagement	Involving local population for awareness and resilience training

Strategic & Diplomatic Significance

For India:

- Reinforces India's image as a **first responder** in the Indian Ocean Region.
- Strengthens **bilateral maritime security and trust** with Maldives.
- Upholds India's vision of being a **Net Security Provider** in the IOR.

For Maldives:

- Enhances MNDF's preparedness and capabilities.
- Builds **confidence in India's support** during crises and natural disasters.

Regional Importance:

- Demonstrates regional commitment under the **MAHASAGAR doctrine**.
- Helps to counterbalance the influence of **external actors like China** in the IOR.
- Adds depth to India's **Neighbourhood First** and **SAGAR** (Security And Growth for All in the Region) policies.

INTERNATIONAL MARITIME DEFENCE EXHIBITION (IMDEX) – 2025

1. Context

- **INS Kiltan**, an anti-submarine warfare corvette of the Indian Navy, **arrived in Singapore** to participate in **IMDEX Asia 2025**, held at the **Changi Exhibition Centre**.
- This is part of the Indian Navy's **operational deployment** in the region.
- The visit underscores India's commitment to:
    - Strengthening the **India–Singapore maritime partnership**.
    - Enhancing **interoperability** and **regional maritime security**.
    - Showcasing **India's naval capability and heritage**.

2. About IMDEX Asia

- **IMDEX (International Maritime Defence Exhibition)** Asia is the **premier maritime and defence exhibition** in the **Asia-Pacific region**.
- **Held biennially in Singapore** since **1997**.
- Serves as a global platform for
    - Navies, coast guards, and maritime industries.
    - Displaying **naval platforms, warships, and maritime technologies**.
    - Engaging in **strategic maritime dialogue**.

3. Key Objectives and Strategic Relevance

Military Diplomacy

- Promotes **naval diplomacy** through **bilateral and multilateral engagements**.
- Facilitates **cross-deck visits**, joint activities, and exchanges among participating navies.

Strategic Cooperation

- Encourages **interoperability and coordination** in areas like:
    - Maritime domain awareness (MDA)
    - Search and rescue (SAR)
    - Anti-submarine warfare
    - Maritime security operations

Defence Industry Interface

- Platform for **defence firms** to engage with navies and showcase:
    - **Emerging maritime technologies**
    - **Shipbuilding capabilities**
    - **Surveillance and combat systems**
- Encourages **indigenous defence manufacturing collaborations**.

4. Indian Navy's Role and Activities at IMDEX 2025

- Crew of INS Kiltan to participate in:
  - **Professional exchanges** with the **Republic of Singapore Navy (RSN)**.
  - **Multilateral interactions** with other regional navies.
  - **Curated visits** for schoolchildren and defense industry delegates.
- Activities designed to:
  - Promote awareness of **India's maritime heritage**.
  - Foster **people-to-people ties** through soft power engagement.
  - Demonstrate India's focus on **blue water naval presence**.

5. International Maritime Security Conference (IMSC)

- A flagship event during IMDEX, established in **2009**.
- Jointly organised by:
  - **Republic of Singapore Navy (RSN)**
  - **S. Rajaratnam School of International Studies (RSIS)**
- Brings together:
  - Navy chiefs and coast guard heads
  - Policymakers and strategic thinkers
  - Defence industry stakeholders

Conference Themes

- Maritime domain awareness
- Non-traditional security threats (piracy, trafficking, IUU fishing)
- Cooperative approaches to maritime challenges
- Regional and global maritime norms

6. Strategic Importance for India

Regional Diplomacy and Security

- Reinforces India's **Act East Policy** and **Indo-Pacific strategy**.
- Promotes India as a **net security provider** in the Indian Ocean Region (IOR).
- Enhances cooperation with ASEAN and Quad partners.

Technological Showcasing

- Opportunity to present **'Make in India' naval platforms**.
- Positioning Indian defence manufacturing in global markets.

Maritime Soft Power

- Promotes India's **naval professionalism** and commitment to **open, inclusive maritime commons**.

Turkey's Hand in Pakistan's Drone Attacks – May 2025

Why in News

- On May 9, 2025, Indian defence officials revealed that Pakistan attempted drone intrusions across the Line of Control (LoC) and international border using Turkish-origin armed drones.
- Preliminary forensic analysis identified the drones as **Songar armed drones**, manufactured by Turkey's **Asisguard**.
- It is marking a significant moment in the evolving defence ties between Turkey and Pakistan.

Incident Overview

- On the night of **May 8**, Pakistan attempted drone incursions at **36 locations** along India's northern and western borders—from **Siachen to Sir Creek**.

- Around **300–400 drones** were deployed.
- Drone debris analysis suggests the use of **Songar armed drones** from **Asisguard (Turkey)**.
- **Indian Armed Forces briefing** was conducted by Wing Commander Vyomika Singh and Col Sofiya Qureshi.

Significance of the Discovery

- This is the **first known use of Turkish Songar drones** by Pakistan against India.
- India traditionally highlights Pakistan's military support from **China**—Turkey's involvement signals a diversification of Islamabad's defence suppliers.
- The event underscores the **growing Turkey-Pakistan defence partnership**.

Turkey-Pakistan Defence Relations

- **Strategic and institutionalised cooperation** over the last decade:
    - Regular **joint military exercises**
    - High-level visits and strategic dialogue
    - Defence **technology transfers**
- **Key Defence Collaborations**:
    - Delivery of **F-16 upgrades** from Turkish Aerospace Industries to Pakistan Air Force (PAF)
    - **Bayraktar TB2 UAVs**: Ordered in 2021, delivered in 2022
    - **National Aerospace Science and Technology Park (NASTP)**: Pakistani R&D collaboration with Turkish drone firm **Baykar**
- **Political Support**:
    - On May 7, 2025, Turkish President Erdogan called Pakistan PM Shehbaz Sharif to express **solidarity** after Indian strikes on terror camps.
    - Erdogan backed Pakistan's "calm and restrained" posture and endorsed Islamabad's call for a probe into the **Pahalgam terror attack** (April 22), which India rejected.

Technical Specifications of Songar Armed Drone

- **Manufacturer**: Asisguard (Asis Electronics, Turkey)
- **Weight**: Max Take-Off Weight (MTOW): 45 kg
- **Dimensions**: 145 cm rotor-to-rotor width, 70 cm height
- **Operational Altitude**: Up to 2,800 m (MSL); 400 m (AGL)
- **Navigation**: GPS and GLONASS based
- **Range**:
    - **Operational range**: 3 km
    - **Night sensor range**: 10 km
- **Weapon System**:
    - NATO-class **5.56×45 mm machine gun**
    - **200 rounds ammunition** capacity
    - Supports **single and burst (15-round)** fire modes
    - Accuracy: hits within **15 cm area from 200 m**
- **Camera & Surveillance**:
    - Dual-camera system: 10x zoom pilot camera + gun-mounted camera
    - Real-time video transmission & post-mission recording

Strategic Implications

- Marks a **broadening of Pakistan's military partnerships** beyond China.
- Raises concerns about **proliferation of armed drone technologies** in South Asia.
- Suggests a **deeper military and political alignment** between Turkey and Pakistan, possibly affecting India's regional security calculus.

India's Response and Strategic Considerations

- Enhanced drone monitoring and **forensic analysis** underway.
- Likely to **raise the issue diplomatically** with Turkey.
- May push for **increased indigenous counter-UAV capabilities**.
- India needs to **closely monitor emerging military-technological alliances** in the region.

India Shoots Down Pakistan's PL-15 Missile in Punjab: A New Escalation in the India-Pakistan Conflict

1. Recently, Amid rising tensions between **India** and **Pakistan**, a significant development occurred in **Punjab**, India.
2. when a **PL-15 long-range air-to-air missile**, which was launched by the **Pakistan Air Force (PAF)**, was successfully intercepted and recovered in **Hoshiarpur**.
3. The missile, made in **China**, was found **intact** and unexploded, making its recovery crucial for both **intelligence** and **military strategy**.

What is PL-15?

- PL-15 is a radar-guided long-range air-to-air missile developed by the People's Republic of China. It is used by the country's air force.
- The Pakistan Air Force also uses the weapon.
- The PL-15 has a maximum range of 200 kilometres.
- It is guided with a combination of inertial, satellite navigation, datalink and active radar, the Global Times, China's state mouthpiece, reported in 2021.
- It was developed by the Luoyang-based China Airborne Missile Academy (CAMA).
- It was test-fired in 2011.
- It entered China's military in 2015.
- It was seen on China's Chengdu J-10C, the Shenyang J-16 and the Chengdu J-20 platforms.
- Its export variant was displayed in the 2021 Zhuhai Airshow. The export variant's range is 145 km.
- It uses a dual-pulsed solid-fuel rocket motor. It can achieve speeds greater than Mach 5, which is 5 times the speed of sound.
- The length of the missile is 4 metres, and its diameter is 200 millimetres.
- According to an HT report, Pakistan also used Turkish-origin armed drones.
- Most of these attacks were thwarted by the Indian armed forces using the S-400 air defence systems, Akash surface-to-air missiles, Barak 8 defences, and anti-drone technologies.
- India reportedly counterattacked using Scalp cruise missiles and Hammer smart weapons, and loitering munitions—essentially sensor-equipped kamikaze drones.

Key Points from the Incident

- **Missile Recovery and Significance**
  - The **PL-15 missile**, fired by a **PAF JF-17 fighter jet**, was recovered intact in Hoshiarpur, India.
  - Its unexploded nature makes this recovery especially critical.
  - Experts are analyzing the missile to understand its **trajectory**, its **potential operational intent**, and the precise mechanisms used in the attack.
  - This will help India understand how the missile was launched and whether there was any targeting information that could suggest Pakistan's plans.

- **Missile Neutralization**
    - Sources confirmed that all missiles fired by Pakistan during this escalation were either **intercepted** or **neutralized** by India's air defense systems.
    - The missile strikes, targeting Indian **military installations** across **Jammu and Kashmir**, **Punjab**, **Rajasthan**, and **Gujarat**, were successfully thwarted.
    - This success demonstrates the **effectiveness** of India's **air defense ecosystem**, which has been **developed** over the past decade.
- **India's Air Defense Capabilities**
    - India's **air defense architecture** includes advanced systems such as:
        * Integrated Counter-Unmanned Aerial System (UAS) Grid
        * S-400 Triumf systems
        * Barak-8 missiles
        * Akash Surface-to-Air Missiles
        * DRDO's anti-drone technologies
    - The **S-400 Triumf** air defense systems, a major strategic asset, have been operational since 2018.
    - Three of the **five S-400 squadrons** from a **Rs 35,000 crore deal** are stationed along the **China-Pakistan borders**, enhancing India's ability to intercept and neutralize missile threats.
- **Indian Response**
    - In retaliation, India launched strikes deep into **Pakistani territory**, **destroying** a Chinese-supplied **HQ-99 air defense unit** in **Lahore** and causing significant **damage** to Pakistan's **radar infrastructure**.
    - This highlights India's readiness and the growing effectiveness of its **aerial defense strategies** in countering missile threats.
- **Strategic Overview**
    - India's successful missile interception and the response show the **strategic importance** of air defense systems and preparedness in the region.
    - This operation is a **direct result of years of careful planning** and consistent upgrading of defense mechanisms, beginning in **2014**.

Operation Sindoor: A Response to Terrorism

The missile interception and retaliation are part of a broader strategy under **Operation Sindoor**, which began as a response to the **Pahalgam terror attack** on April 22, 2025.

1. **Operation Sindoor** is an **integrated military operation** conducted by India's **Army**, **Navy**, and **Air Force**.
2. The operation targeted key **terrorist bases** belonging to groups like **Jaish-e-Mohammed (JeM)** and **Lashkar-e-Taiba (LeT)** across Pakistan and **Pakistan-Occupied Kashmir (PoK)**.
3. This operation was launched in retaliation for the **Pahalgam attack**, which saw the deaths of **26 innocent civilians**, some of whom were targeted due to their religious identity.
4. As a consequence of this military action, key figures within the **JeM**, including **Maulana Masood Azhar**, acknowledged the loss of several family members in the missile strikes, which included the deaths of **10 relatives** and **4 associates**.

Conclusion: A New Era in India's Defense Strategy

The incident in **Punjab** and the **successful interception of the PL-15 missile** mark a **new chapter** in India's defense strategy. This event demonstrates:

- **India's strengthened air defense capabilities**, developed over years of careful investment and strategic planning.
- **India's readiness to respond decisively** to any aggression from Pakistan, especially in the context of **cross-border terrorism**.

- **The strategic importance of the S-400 systems** and other advanced missile defense technologies, which provide a strong shield against both conventional and long-range air-to-air missile threats.

The ongoing escalation between India and Pakistan, highlighted by missile exchanges and military strikes, underscores the growing importance of **aerial defense** and **counter-terrorism strategies** in ensuring national security. The recovery of the **PL-15 missile** further strengthens India's resolve to protect its sovereignty and respond effectively to external threats.

Baloch Leaders Declare Independence from Pakistan: Call for Recognition from India and UN

1. Introduction

- **Baloch nationalist leaders** have symbolically declared the **independence** of **Balochistan** from **Pakistan**, intensifying the long-standing insurgency in the southwestern province.
- **Mir Yar Baloch**, a prominent Baloch activist, declared the formation of the **Republic of Balochistan** on social media and called on **India** and the **United Nations (UN)** to officially recognize the declaration.

2. Key Developments in the Declaration of Independence

- **Mir Yar Baloch's Declaration**:
  - Proclaimed the formation of a **Republic of Balochistan** and called for international recognition.
  - Requested **India** to establish a **Baloch embassy** in **New Delhi** and for the **UN** to help fund basic state functions, including issuing **currency** and **passports**.
  - Baloch activists posted **images** of people waving **Baloch flags** and **maps** showing an independent Balochistan.
  - Balochistan has a **history of separatism**, with long-standing calls for **greater autonomy** or complete **independence** from Pakistan.
- **Call for International Support**:
  - Baloch leaders are calling for **greater international attention** and engagement, especially from **India**.

3. Armed Conflict and Recent Attacks

- **Balochistan Liberation Army (BLA)**, a **militant group** fighting for Baloch independence, claimed responsibility for a series of **coordinated attacks**:
  - 71 attacks across **51 locations** targeting **Pakistani military**, **police stations**, **intelligence facilities**, **mineral transport**, and **highway infrastructure**.
  - These attacks were part of **Operation Herof**, which BLA claims is aimed at **dismantling Pakistan** as a **terror-exporting state**.
- **BLA's Statement** (May 11, 2025):
  - Warned that **Pakistan's military** setbacks and its use of **religious extremism** have created lasting instability in the region.
  - Rejected ceasefire talks with Pakistan, considering them a **deceptive tactic**.
  - Urged **regional powers**, including **India**, to be cautious of Pakistan's intentions.

4. Historical Context and Human Rights Concerns

- **Balochistan's History**:
    - Balochistan was a **princely state of Kalat** before being **annexed by Pakistan** in 1948, which led to the first **Baloch insurgency**.
    - Since then, Baloch nationalist groups have fought for **greater autonomy** or **independence**.
- **Human Rights Violations**:
    - Reports from **human rights organizations** highlight **enforced disappearances**, **extrajudicial killings**, and **attacks on civilians** by Pakistan's military.
    - The **killing of prominent Baloch rally driver Tariq Baloch** has intensified criticism of Pakistan's **"kill and dump" policy**, where alleged separatists are targeted.

5. Strategic Importance of Balochistan: Gwadar Port

- **Gwadar Port**, located in Balochistan, is a **strategically significant** deep-water port under the **China-Pakistan Economic Corridor (CPEC)**.
    - **CPEC** aims to connect **China's Xinjiang** province to the **Arabian Sea**, making Gwadar crucial for trade and energy flows.
    - Despite **billions of dollars in investment**, local **Baloch communities** have voiced concerns over **exclusion** from the benefits and forced **evictions** from their lands without proper **compensation**.
- **Militant Attacks on Gwadar**:
    - Baloch insurgents have frequently targeted **Gwadar Port** and **Chinese workers** involved in CPEC projects, highlighting local resentment against the **Chinese-Pakistani partnership**.

6. India's Role and Diplomatic Signals

- **Baloch Activists' Outreach to India**:
    - Baloch leaders have **intensified outreach to India**, including **symbolic gestures** like calling for the renaming of **Jinnah's House** in **Mumbai** to **Balochistan House**.
    - These actions are seen as a **symbol of solidarity** with the Baloch cause and a call for **India's support** in their fight for independence.
- **India's Diplomatic Stance**:
    - India has historically **supported Baloch nationalists** in diplomatic forums but has not officially recognized their independence.
    - The recent **declaration of independence** by Baloch leaders may **strain India-Pakistan relations**, as Pakistan could view any support from India as interference in its internal affairs.

7. Implications for Regional Stability

- **Symbolic Declaration of Independence**:
    - While the declaration remains symbolic and lacks **formal international recognition**, it has **significant implications** for **regional stability**.
    - Analysts warn that such movements could **embolden other separatist groups** within **Pakistan**, particularly in **Kashmir** and **Sindh**, and complicate efforts to stabilize the Baloch region.
- **Risks of Escalation**:
    - The declaration and subsequent calls for recognition by **India** and the **UN** could lead to further **escalation** of violence in Balochistan, with possible **international involvement**.
    - **Pakistan's response** to the declaration remains to be seen, but it is likely to view it as a **provocation** and a challenge to its sovereignty.

Conclusion

The **declaration of independence** by Baloch nationalist leaders has **reignited tensions** in Balochistan, calling attention to **Pakistan's treatment of the province** and the ongoing **insurgency**. Although symbolic, this declaration highlights **historical grievances** and **human rights violations**, urging **India** and the **United Nations** to recognize Balochistan's right to self-determination. The situation in **Balochistan** is a complex mix of **ethnic conflict**, **strategic interests**, and **international diplomacy**, with the potential to influence broader **South Asian geopolitics**.

Pakistan's nukes should come under IAEA watch: India

1. Context of the Statement
    1. On May 15, 2025, the **Defence Minister visited Jammu and Kashmir for the first time after the launch of Operation Sindoor.**
    2. During his address at Badami Bagh Cantonment in Srinagar, he made strong remarks concerning Pakistan's nuclear weapons and its continued support for terrorism.
2. Concerns over Pakistan's Nuclear Weapons
    1. The Defence Minister questioned whether Pakistan's nuclear weapons are safe in the hands of a**n "irresponsible" and "rogue" nation.**
    2. He stated that Pakistan's reckless nuclear threats amount to nuclear blackmail against India.
    3. He asserted that India will never yield to such nuclear blackmail or coercion.
    4. He urged the global community to assess whether a state like Pakistan can be trusted with nuclear weapons.
    5. He called for Pakistan's nuclear arsenal to be placed under the supervision of the **International Atomic Energy Agency (IAEA)**.
3. About the International Atomic Energy Agency (IAEA)
    - The International Atomic Energy Agency (IAEA) is the world's leading intergovernmental organisation for scientific and technical cooperation in the nuclear field.
    - It promotes the safe, secure, and peaceful use of nuclear science and technology, especially in accordance with global non-proliferation norms.
    - The IAEA Statute was approved o**n 23 October 1956 and came into force on 29 July 1957.**
    - The headquarters of the IAEA is located in **Vienna, Austria.**
    - The agency currently has **178 member states, indicating its wide global mandate and acceptance.**
    - The IAEA is an autonomous international organization within the United Nations system.
    - It reports to both the United Nations General Assembly and the UN Security Council.
    - It is popularly referred to as the "Atoms for Peace and Development" organization within the UN framework.
    - Its primary goal is to ensure that nuclear energy is not diverted for military or weapons purposes.
    - The institutional structure of the IAEA includes three main bodies:
        - The **General Conference**, consisting of all member states, meets annually to approve the budget and set policy.
        - The **Board of Governors**, with 35 members, meets multiple times a year to approve safeguard agreements, perform statutory functions, and appoint the Director General.
        - The **Secretariat**, led by the Director General, is responsible for the agency's day-to-day operations.

- The IAEA enforces nuclear safeguards through monitoring, on-site inspections, data analysis, and other verification techniques.
- These safeguards are a critical part of the **Nuclear Non-Proliferation Treaty (NPT) framework.**
- The agency also assists countries in enhancing their capacities to handle nuclear or radiological emergencies.
- It facilitates scientific cooperation and technical exchange among member states for peaceful nuclear development.

4. India's National Security and Counter-Terrorism Doctrine

1. The Defence Minister credited Prime Minister Narendra Modi with reshaping India's national security and counter-terrorism approach.
2. He stated that any attack on Indian soil is no longer considered an isolated act but is treated as an act of war.
3. He emphasized a policy shift towards a more proactive and assertive national defence strategy.

5. Details of Operation Sindoor

1. The Defence Minister described **Operation Sindoor** as the **largest and most decisive anti-terror operation** in India's history.
2. He explained that the operation was launched in response to the **Pahalgam terror attack**, in which 26 civilians lost their lives.
3. He clarified that the operation was not only an act of retaliation but also a demonstration of India's proactive security doctrine.
4. He remarked that terrorists targeted Indians based on their 'dharma', while India responded based on their 'karma'.
5. He stated that it was India's moral duty, or *dharma*, to eliminate such threats.

6. Message to Terrorist Groups and Pakistan

1. The Defence Minister issued a warning to terror groups and their cross-border handlers that they may run but cannot hide from Indian forces.
2. He highlighted the precision targeting capabilities of Indian security forces.
3. He declared that the responsibility of counting casualties now lies with the enemy.
4. His message was aimed at deterring future attacks and sending a strong signal across the border.

7. Indigenous Defence Capability and Border Preparedness

1. He emphasized India's progress in **indigenous defence manufacturing** under the 'Make in India' initiative.
2. He noted that India is now producing modern arms, missile systems, drones, and communication technologies domestically.
3. He mentioned that **logistical infrastructure and connectivity** have been significantly improved along the **Line of Control (LoC)** and **Line of Actual Control (LAC)**.
4. He asserted that Indian forces are more prepared and better equipped than ever before to respond to external threats.

8. India's Policy on Dialogue with Pakistan

1. The Defence Minister reiterated India's firm position that **"talks and terrorism cannot go hand in hand."**
2. He clarified that if talks are to happen in the future, they will be strictly focused on **terrorism** and **Pakistan-occupied Kashmir (PoK)**.

9. Past Commitments and Pakistan's Track Record

1. He recalled that Pakistan had made commitments over two decades ago during the tenure of former Prime Minister Atal Bihari Vajpayee.
2. He stated that Pakistan had then promised to stop exporting terrorism but has repeatedly failed to honour that pledge.
3. He accused Pakistan of betraying India's trust and continuing to support terrorist infrastructure.
4. He demanded that Pakistan dismantle its terror camps and ensure its territory is not used for anti-India activities.

J&K Police Invokes PSA Against 23 in Srinagar

Background and Summary of the Event:

1. On May 18, 2025, the Jammu and Kashmir Police invoked the **Public Safety Act (PSA)** against **23 individuals** in **Srinagar city**.
2. This action was taken as part of a broader crackdown on what police described as **"subversive and criminal elements inimical to the security and public order of the nation."**
3. According to an official police statement, those booked were identified as **terror associates of proscribed terrorist organisations** and were **involved in public disturbance and subversive activities**.
4. The police further stated that despite several criminal cases having been registered earlier against these individuals, they continued to engage in unlawful activities even after being granted bail by the courts.
5. All 23 individuals detained under the PSA have been **transferred to jails outside the Kashmir Valley** to prevent their influence locally.
6. This marks the **first instance** in recent years where the police have **publicly disclosed the number of PSA detentions in Srinagar**, as such data was previously kept confidential.

About the Public Safety Act (PSA), 1978 (Jammu & Kashmir):

- The **Public Safety Act** is a **preventive detention law** specific to Jammu and Kashmir.
- It allows authorities to **detain individuals without trial** for a period of up to **2 years** in case of threats to **state security**, and up to **1 year** for threats to **public order**.
- The PSA has been repeatedly criticised by human rights organisations, including **Amnesty International**, for its **broad and vague provisions**, **absence of judicial oversight**, and alleged **misuse against dissenters**.
- Despite the Government of India's consistent claims of **restored normalcy in Kashmir**, the use of PSA in 2025 indicates continuing security concerns.

SIA Raids and Investigations Under UAPA:

1. On the same day, the **State Investigation Agency (SIA)** conducted **raids at 11 different locations** in **central and north Kashmir**.
2. These raids were part of a case concerning the activities of **militant sleeper cells** operating in the valley.
3. The raids come shortly after similar operations were conducted in **south Kashmir**, indicating a region-wide sweep by the SIA.
4. According to the SIA's official statement, **substantial incriminating materials** were seized during the raids and several **suspects were detained for questioning**.
5. The case is registered under the **Unlawful Activities (Prevention) Act (UAPA)**, which is India's primary counter-terrorism law.
6. The preliminary investigation has revealed that these individuals were **actively engaged in terrorist conspiracy** and **propagating anti-India narratives**.
7. The alleged activities were aimed at **challenging India's sovereignty and territorial integrity**, while also seeking to **incite public disorder and communal hatred**.

Youth Radicalisation Concerns:

- A significant concern expressed by the SIA was that most of the individuals under investigation for online radicalisation fall within the **age group of 18 to 22 years**.
- The agency emphasised the need for **active involvement of teachers, parents, and peers** in monitoring online activity and recognising signs of radicalisation.

- The SIA advised that suspicious behaviour among youth should be **reported to local police authorities**, so that **timely counselling and intervention** can be provided.

Broader Governance and Security Implications:

1. The large-scale detentions under PSA and continuing SIA raids **raise questions about the narrative of peace and normalcy in Jammu and Kashmir**, often promoted by the government.
2. While the official justification for these actions is based on **national security and public order**, critics argue that such measures could lead to **alienation, suppression of dissent**, and **human rights violations**.
3. The situation reflects a **tension between ensuring internal security** and **protecting civil liberties**, particularly in a sensitive region like Kashmir.

Legal and Constitutional Aspects:

Legal Aspect	Provision
Preventive Detention	Article 22 (3)-(7) of the Indian Constitution
Public Safety Act, 1978 (J&K)	State-specific law for preventive detention
Unlawful Activities (Prevention) Act	Central law for preventing unlawful and terrorist activities

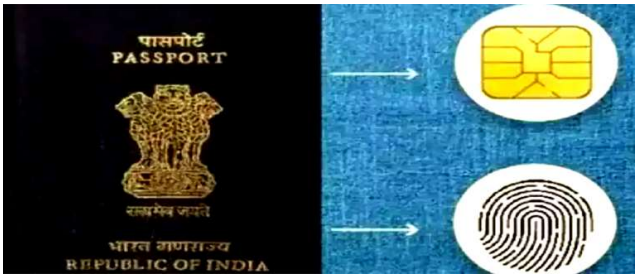
Ethical and Societal Considerations (GS Paper IV):

1. There is an ethical dilemma in balancing **national security concerns** with the **rights of individuals**, especially when **young people** are involved.
2. **Preventive detention without trial** challenges the principles of **natural justice and due process**.
3. The state has a moral responsibility to ensure **de-radicalisation and rehabilitation** rather than only relying on punitive measures.
4. The involvement of community institutions like **schools, families, and religious leaders** is critical to prevent youth radicalisation.

Conclusion:

The invocation of PSA against 23 individuals and the continued raids by the SIA reveal that Kashmir remains a complex security challenge. While the government projects a narrative of peace, these measures reflect deeper concerns about radicalisation, sleeper cells, and anti-national activities. Addressing the situation requires a multi-pronged approach, involving security operations, legal safeguards, youth engagement, and human rights protection.

"India launches e-passports with enhanced security features"



- Recently in **May 2025**, India officially launched **biometric e-passports** for its citizens, joining a group of over **120 countries** including the **United States, Canada, France, Japan, and Australia**.
- The launch marks a major technological advancement in **passport security, border control, and digital identity management**.
- The initiative aligns India with **ICAO (International Civil Aviation Organization) Document** standards and aims to provide **secure, seamless, and internationally compatible travel documents**.
- This step reflects India's **growing commitment to digital governance**, **enhanced national security**, and **global interoperability** in travel documentation.

What is a Biometric E-passport?

1. A biometric e-passport, also called an **electronic passport (e-passport)**, is an upgraded version of a conventional passport that integrates **physical documents with digital identity verification**.

2. It contains a **Radio Frequency Identification (RFID) chip** embedded in the back cover of the passport booklet.
3. The RFID chip securely stores:
    - The holder's **demographic information** (name, date of birth, passport number, etc.)
    - **Biometric facial data** for facial recognition
    - **Fingerprints** for identity verification
4. A **small gold rectangle symbol** on the cover indicates that the passport has embedded electronic features.

Security Features of E-passports

Biometric e-passports use multiple encryption and authentication technologies to ensure data security and prevent tampering:

1. **Basic Access Control (BAC):** Restricts unauthorized access to the chip; only authorized scanners can read the data.
2. **Passive Authentication (PA):** Validates that the stored data is authentic and has not been altered or cloned.
3. **Extended Access Control (EAC):** Adds a further layer of encryption, especially for sensitive biometric data such as fingerprints.
4. These features comply with the **ICAO Document 9303** for globally accepted electronic travel documents.

Benefits of Biometric E-passports

1. **Enhanced Security:** Biometric data ensures that the passport is used only by the rightful owner, reducing the chances of **identity theft** and **fraud**.
2. **Faster Immigration Processing:** E-passports allow passengers to use **automated e-gates** at international airports, minimizing waiting times at immigration counters.
3. **Global Recognition:** Indian e-passports are compliant with ICAO standards, making them **readily accepted at most global airports and border control points**.
4. **Prevention of Counterfeiting:** The embedded digital chip and security protocols make it extremely difficult to forge or duplicate, enhancing **document authenticity**.
5. **Convenience for Travellers:** Automated clearance at busy airports improves the travel experience, particularly during peak seasons or high-traffic periods.
6. **Strengthening National Security:** The system allows for better tracking of individuals crossing borders and prevents illegal immigration or document misuse.
7. **Digital Data Management:** Updating and renewing information becomes quicker and more streamlined with digital records embedded in the passport.
8. **Support for Digital Governance:** This step complements India's digital transformation efforts and moves the country closer to **paperless travel and identity systems**.

Cities Where E-passports Were First Rolled Out

India began issuing biometric e-passports under the **Passport Seva Programme 2.0**, a modernization of the passport system.

1. **Pilot launch began in April 2024** in selected cities including:
    - Nagpur
    - Jammu
    - Shimla
    - Amritsar
    - Chennai
    - Surat
    - Bhubaneswar
    - Panaji
    - Raipur
    - Jaipur
    - Hyderabad
    - Ranchi
2. In **Tamil Nadu**, e-passport issuance began at the **Regional Passport Office (RPO) in Chennai** on **March 3, 2025**.
3. Within just three weeks of launch, **over 20,700 e-passports** were issued in the state.
4. A **nationwide rollout** is expected by **mid-2025**, after which e-passports will become the **default standard for all new and renewed passports**.

How E-passports Improve International Immigration Experience

1. E-passports enable travelers to **pass through automated e-gates** at airports, where biometric verification occurs via chip scanning.
2. This allows for:
    - **Shorter wait times**
    - **Reduced human intervention**
    - **Real-time identity verification**
    - **Improved throughput at busy immigration counters**
3. Countries such as **Singapore, the UAE, and the UK** already have such systems in place, and Indian travelers will now be able to use these facilities more efficiently.

Manufacturing and Data Security

1. All e-passports are produced by the **India Security Press (ISP)** located in **Nashik**, Maharashtra.
2. The ISP is a government-owned entity under the **Ministry of Finance** and is responsible for maintaining the **integrity and security of biometric data**.
3. Centralized manufacturing supports:
    - **National data protection**
    - **Compliance with privacy regulations**
    - **The Make in India initiative**

Why India Adopted E-passports

India adopted biometric e-passports to address multiple evolving challenges and global standards, including:

1. **Improving national and border security**
2. **Preventing document forgery and identity theft**
3. **Simplifying immigration and visa control mechanisms**
4. **Complying with ICAO travel documentation standards**
5. **Providing Indian citizens with secure, globally recognized travel documents**

Russia's Planned ICBM Launch (May 2025)

Context :

- **Recently, Ukraine's Military Intelligence (GUR)** reported that **Russia is preparing to launch an intercontinental ballistic missile (ICBM)** as part of a "training and combat" exercise.
- The **launch is expected from Russia's Sverdlovsk region**, with a missile range of **over 10,000 km (6,200 miles)**.
- **Purpose of Launch (as per Ukraine):**
    - **Psychological warfare** to **intimidate Ukraine**, the **European Union (EU)**, and **NATO**.
    - Demonstrates Russia's **nuclear deterrent capability** amid the ongoing war in Ukraine.

Strategic Significance

- Comes at a time when:
    - The war is into its **fourth year**.
    - Ukraine is facing **heavy pressure on the eastern front**.
    - **Diplomatic efforts** for peace have **stalled**.
- Russia's move may be seen as:
    - A **message to the West** to **deter deeper involvement**.
    - A **test of strategic readiness** amid ongoing geopolitical tensions.

Details on the Missile: RS-24 Yars (SS-29)

Feature	Details
Type	Intercontinental Ballistic Missile (ICBM)
Entered Service	February 2010
Replaces	SS-19 Stiletto and SS-18 Satan
Launch Platforms	Both silo-based and mobile launchers
Length	~22.5 meters
Diameter	~2 meters
Launch Weight	~49,000 kg
Range	2,000 km (min) to 10,500 km (max)
Propulsion	3-stage, solid propellant
Warheads	Up to 10 MIRVs (each ~300 kilotons, thermonuclear)
Guidance System	Inertial + GLONASS
Countermeasures	Active & passive decoys, in-flight maneuverability
Strategic Value	Designed to **evade modern Ballistic Missile Defense** systems (e.g. THAAD, GMD, Patriot PAC-3)

Analysis and Implications

- **Ukraine's interpretation** indicates this launch is more **political theater than routine testing**.
- **Russia's silence** is consistent with its policy of **not commenting** in advance on missile test launches, citing military secrecy.
- The launch, if it occurs, may:
  - Escalate **nuclear rhetoric and tensions**.
  - Prompt **international condemnation** or **further NATO defensive posturing**.
  - Affect **global arms control discussions**, especially regarding New START and future arms limitation talks.

Global Reactions & Risk Factors

- **NATO/EU** may:
  - Increase surveillance and missile defense readiness.
  - Respond with statements warning against escalation.
- **UN or international bodies** could be urged to call for restraint.
- **Risk of Miscalculation**: Even "training" launches carry escalation risks in a conflict zone.

Conclusion

Russia's planned RS-24 Yars ICBM launch, if executed, represents both a **show of strength** and a **strategic message** to its adversaries. While it may not signal immediate nuclear intent, such actions **exacerbate global security tensions**, particularly in the **European theater** where war is ongoing. Monitoring global diplomatic and military responses will be crucial.

Indian Govt To Buy 500 Invar Anti-Tank Guided Missiles

Context: In May 2025, the **Ministry of Defence is finalising a major procurement order for 500 Invar anti-tank guided missiles (ATGMs) from Bharat Dynamics Ltd (BDL),** intended to enhance India's armoured warfare capabilities and **enhance the firepower of T-90 tanks.** This comes shortly after Operation Sindoor.

Procurement Details

- **Buyer:** Ministry of Defence, Government of India.
- **Supplier:** Bharat Dynamics Ltd (BDL).
- **Item:** 500 Invar anti-tank guided missiles (ATGMs).
- **Estimated Value:** ₹ 2,000–3,000 crore.
- **Purpose:** To bolster India's armoured warfare capabilities, specifically enhancing the firepower of **T-90 tanks**. Invar missiles are designed to be launched from tank platforms.

- **Deployment Status:** Invar missiles are already deployed on India's frontline T-90 main battle tanks and are known for their precision strike capability.
- **Approval Process:** The final value of the deal will determine the level of approval required:
    - Up to ₹ 2,000 crore: Cleared by the Defence Minister.
    - Closer to ₹ 3,000 crore: Cleared by the Finance Minister.
    - Above ₹ 3,000 crore: Requires approval of the Cabinet.
- **Strategic Initiative:** This procurement is part of a broader government initiative to promote **self-reliance in defence manufacturing** under the **Make in India** campaign.
- **BDL's Role:** Bharat Dynamics Ltd is a key supplier to the Indian Armed Forces and is at the forefront of this indigenization effort.
- **Recent Context:** The planned acquisition comes shortly after **Operation Sindoor**, a precision military strike against terrorist infrastructure in Pakistan following a deadly attack in Pahalgam.

About Invar Missile

- **Type:** It is an **anti-tank guided missile (ATGM)**.
- **Launch Platform:** Designed to be launched specifically from **tank platforms**, particularly from the barrel of **T-90 tanks**.
- **Deployment:** Has been in active deployment by Indian forces.
- **Capability:** Known for its **long-range precision strike capability**.
- **Target:** Can neutralize adversary tanks, including those fitted with **Explosive Reactive Armour Protection** (ERA, a type of add-on armour that explodes outwards on impact to disrupt incoming projectiles).
- **Origin & Production:** The Invar missile is originally built by **Rosoboronexport of Russia**, and it is produced under **license in India by Bharat Dynamics Limited (BDL)**.

Invar Missile Features

- **Control System:** Semi-automatic control system, indicating a degree of human guidance during flight.
- **Guidance:** Utilizes **laser beam riding** for guidance, where the missile follows a laser beam emitted by the firing platform.
- **Resistance: Jamming immune**, implying it is resistant to electronic countermeasures aimed at disrupting its guidance.
- **Warhead:** Equipped with a **tandem warhead**, which is designed to defeat ERA and then penetrate the main armour of a tank.
- **Target Engagement:** Can destroy both **stationary and moving targets with speeds up to 70 kmph**.
- **Effectiveness:** Has a **high hit and kill probability**, indicating its reliability in engaging targets.
- **Specifications:**
    - **Length:** 695 mm (missile), 395 mm (throwing device)
    - **Caliber:** 125 mm (matching the bore of the T-90 tank gun)
    - **Range:** 5 km (effective engagement distance)
    - **Flight time:** 17.6 seconds (for maximum range)
    - **Weight:** 17.2 kg (missile), 7.1 kg (throwing device)

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Raghuji Bhosale I

Context: Recent news regarding the reclamation of Raghuji Bhosale I's sword by the Maharashtra government.

About Raghuji Bhosale I

- **Period:** 1695 – February 14, 1755
- **Significance:**
  - **Founder of the Bhosale family of Nagpur.**
  - Important commander in the Maratha army during the reign of **Chhatrapati Shahu Maharaj**.
  - **Title:** Bestowed with the title of **'Senasahibsubha'** by Chhatrapati Shahu Maharaj for his bravery and war strategy.
- **Military Campaigns & Expansion:**
  - Led campaigns against the **Nawab of Bengal in 1745 and 1755**, expanding the Maratha empire to Bengal and Odisha.
  - Established dominance over **Chanda, Chhattisgarh, and Sambalpur**.
  - Defeated the **Nawabs of Cuddapah and Kurnool**, establishing military and political dominance in South India.
- **Historical Recognition:** Considered the **most courageous Maratha warrior of the 18th century.**

Nagpur Bhonsles

- **Role in Maratha Empire:** Along with Peshwe, Holkar, Gaikwad, and Scindia families, the Nagpur Bhonsle family played a significant role in expanding the Maratha Empire.
- **Founder:** The Nagpur branch of the Bhonsle dynasty was **founded by Raghoji Bhonsle I** in the early 18th century.
- **Geographical Influence:** Expanded Maratha influence in central and eastern India, including parts of present-day Madhya Pradesh, Chhattisgarh, Jharkhand, and Odisha.
- **Lineage & Origin:**
  - One of the **royal or Kshatriya clans of the Marathas.**
  - Considered themselves descendants of **Udaipur's Sisodia Rajputs.**
  - **Known as Hinganikar:** An ancestor rehabilitated the village Beradi near Hingani (present-day Pune district).
- **Economic & Military Prowess:**
  - Ruled over a **mineral-rich region (iron and copper).**
  - Skilfully used these resources to craft everyday items and **formidable weapons.**
  - Their **weaponry is renowned for exceptional craftsmanship.**

Lairai Devi Temple

Context: A recent stampede at the annual Lairai Jatra procession in Shirgaon village, North Goa, led to deaths and injuries, drawing attention to the Shree Lairai Devi temple.

About Lairai Devi Temple

- **Location:** Shirgao village, Bicholim taluka, **North Goa**.
- **Deity:** Dedicated to **Goddess Lairai**, who is believed to be an incarnation of **Goddess Parvati**.
- **Significance:** Holds immense cultural and religious significance for the local community.
- **Architecture:** Reflects traditional Goan design, featuring intricate carvings and vibrant interiors.
- **Religious Harmony:** A symbol of religious harmony, with local **Hindus and Catholics regarding Lairai Devi and the Virgin Mary of Mapusa as sisters**.

Annual Lairai Devi Jatra (Shirgao Jatra)

- **Key Event:** Best known for hosting this annual festival.
- **Ritual:** The central and dramatic ritual is **fire-walking (Agnidivya)**, performed by devotees called **"dhonds."**
- **Process of the Festival:**
    - Begins with processions, devotional dances, and drumming.
    - At midnight, a massive bonfire is lit.
    - In the early hours, the fire-walking ritual commences.
    - Devotees chant the goddess's name as they cross the embers, believing the righteous will remain unharmed.
- **Attendance:** The event draws tens of thousands of devotees from Goa, Maharashtra, and Karnataka.
- **Community Impact:** Fosters strong community bonds and reinforces local traditions.

Buddhavanam

Context: The contestants of Miss World 2025 from 22 countries recently visited Buddhavanam, a Buddhist theme park, on the occasion of Buddha Purnima.

About Buddhavanam

- **Nature:** It is a **Buddhist theme park**.
- **Location:** Located on the **northern bank of the Krishna River in Telangana**, India.
- **Government Initiative:** Sanctioned by the Government of India as part of developing an **integrated Buddhist Circuit**, with a vision to attract a large number of domestic and international tourists, particularly from Southeast Asia.
- **Area:** Spreads over an extent of **279 acres**.
- **Purpose:** Developed to **showcase the life and teachings of Gautama Buddha**.
- **Key Features:** It features various sections:
    - Entrance Plaza
    - **Buddhacharitha Vanam (Life of Buddha)**: Depicts key events from Buddha's life.
    - **Jataka Park**: Highlights **stories from Buddha's previous lives** (Jataka tales).
    - **Dhyana Vanam**: Designated for **meditation**.
    - **Stupa Vanam**: Home to the imposing **Maha Stupa**, with intricate carvings on its drum and dome, and a virtual hanging sky with lotus petals inside.
    - **In-house Buddhist Heritage Museum**: Showcases artifacts and information related to Buddhist heritage.

Historical Significance (Nagarjunakonda Connection)

- **Proximity:** Located just beside **Nagarjuna Sagar**, a reservoir formed due to the construction of the dam across the river Krishna.
- **Historical Capital: Nagarjunakonda or Sriparvata - Vijayapuri**, served as the capital city of the **Ikshvaku dynasty**, which ruled Andhradesa during the **3rd and 4th centuries A.D.**
- **Buddhist Scholar: Nagarjunakonda was named after the famous Buddhist scholar and Madhyamika philosopher Acharya Nagarjuna**.
- **Centre of Mahayana Buddhism:** Nagarjunakonda was a significant **centre of Mahayana Buddhism**, where many Buddhist sects had their monasteries, shrines, and stupas built to propagate the Dhamma (Buddhist teachings).
- **Archaeological Discoveries:**
    - **Excavations conducted at Nagarjunakonda between 1954 and 1960** revealed the existence of:
        * A Maha Stupa
        * Votive Stupas
        * Chaityas (prayer halls)
        * Silamandapas (pillared halls)
        * A good number of Buddhist sculptural panels and antiquities.
    - Non-Buddhist structures also exposed included a palace complex and a few Brahmanical temples built of bricks.
    - The sculptural panels typically depicted major events from the life of the Buddha and Jataka stories.
- **Preservation Efforts:** Most of the excavated structures were **reconstructed on the Nagarjunakonda Island** (an island formed in the reservoir) and at Anupu, a ferry point on the right bank of the Krishna river, to preserve them from submersion due to the Nagarjuna Sagar Dam.

Shri Banke Bihari Temple

Context: The Supreme Court recently granted the Uttar Pradesh government the go-ahead to implement its Rs 500 crore development plan for the Shri Banke Bihari Temple Corridor in Vrindavan.

About Shri Banke Bihari Temple

- **Deity:** It is a **Hindu temple dedicated to Lord Krishna**. It is believed to house the combined form of Radha and Krishna.
- **Location:** Situated in the holy city of **Vrindavan, in the Mathura district of Uttar Pradesh**.
- **Meaning of Name:**
    - The name **"Banke" is derived because the idol of Lord Krishna is bent at three angles** (the Tribhanga posture).
    - **"Bihari" means the supreme enjoyer**. Thus, "Banke Bihari" refers to Krishna, the supreme enjoyer, who is bent in three places.
- **Establishment:** The idol was originally worshipped by **Swami Haridas**, a revered saint and musician, who was also a guru of the famous singer Tansen. Swami Haridas is believed to have brought the idol to light from Nidhivan.
- **Temple Construction:** The present temple complex housing 'Banke Bihari' was **constructed in 1864** (some sources indicate 1862).
- **Architectural Features:** It is a unique example of **Indian craftsmanship**, particularly

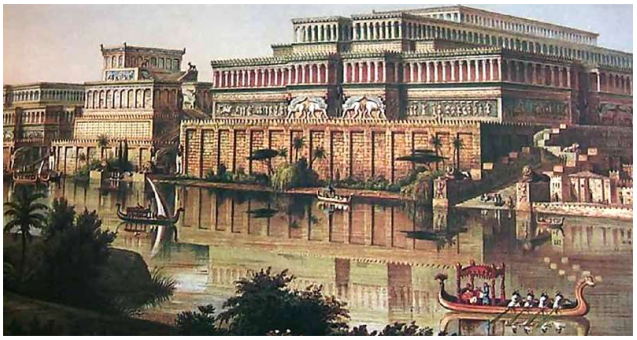
showcasing the **Rajasthani style** of architecture. The walls and ceiling inside the temple feature **oil paintings** depicting deities and scenes.

- **Unique Rituals:** Unlike many temples, there are no bells in the temple premises, and no early morning *aarti* (Mangala Sewa) is performed, out of respect for the deity's "rest." The *darshan* (viewing) of the idol is periodically interrupted by curtains drawn closed, as it is believed that gazing too long at the idol's beauty can overwhelm devotees or make the deity follow the devotee home.

Role in Freedom Struggle

- **Center of Revolutionary Activities:** This temple was noted as a **main center of revolutionary activities** during India's freedom struggle.
- **Secret Publication:** From this location, the revolutionary newspaper **"Bundelkhand Kesari" was published secretly**.

Nineveh



Context: During recent excavations in the ancient metropolis of Nineveh, archaeologists came across large parts of a monumental relief, including King Ashurbanipal (668-627 BCE), the last great ruler of the Assyrian Empire, accompanied by two important deities and other figures.

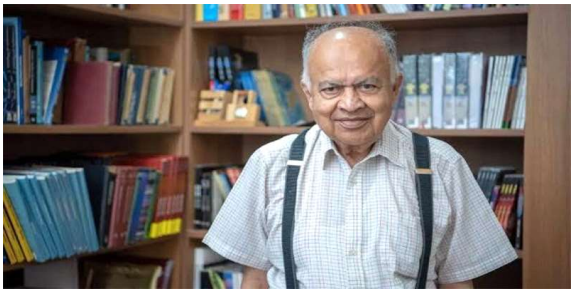
About Nineveh

- **Location:**
  - One of the most important sites in **northern Mesopotamia**.
  - Situated on the **east bank of the Tigris River**.
  - Located within the modern city of **Mosul, Iraq**.
- **Significance:**
  - It was the **oldest and most populous city of the ancient Assyrian empire**.
  - Became the **capital of the Assyrian Empire under King Sennacherib** in the late 8th century BCE.
- **Early Settlement & Religious Center:**
  - The area was settled as early as **6000 BCE**.
  - By **3000 BCE**, it had become an important **religious center for the worship of the goddess Ishtar**.
- **Assyrian Rule and Development:**
  - Came directly under Assyrian rule during the reign of **Shamashi Adad I (r. 1813-1791 BCE)**.
  - Most fully developed during the **Neo-Assyrian Empire (912-612 BCE)**, particularly by **Sennacherib (r. 705-681 BCE)**.
- **Peak of Grandeur:** Prior to its fall, Nineveh was considered the **largest urban center in the world** for a period. It was ornamented by **gardens, statuary, parks, and a zoo**, and was regarded as a great **cultural center**.
- **Fall of Nineveh:** The city was **destroyed in 612 BCE** by a **coalition led by Babylonians and Medes**, which effectively toppled the Assyrian Empire.

Recent Excavations and Findings

- Archaeologists discovered large parts of a **monumental relief** in the ancient metropolis.
- The relief includes depictions of **King Ashurbanipal (668 to 627 BCE)**, who was the **last great ruler of the Assyrian Empire**.
- He is accompanied by **two important deities** (identified as Ashur and Ishtar) and other figures.
- This find is significant as it provides rare depictions of major deities alongside the king in Assyrian palace reliefs, offering new insights into Assyrian religion and iconography.

Jayant Narlikar



Context: Eminent astrophysicist, science communicator, and Padma Vibhushan awardee Dr. Jayant Vishnu Narlikar passed away in Pune recently.

About Jayant Narlikar

- **Identity:** One of India's most **distinguished astrophysicists** and a global name in theoretical cosmology. Also a renowned **science communicator** and author.
- **Birth:** Born on July 19, 1938, in Kolhapur, Maharashtra.
- **Education:**
    - Earned his B.Sc degree from the **Banaras Hindu University (BHU)** in 1957.
    - Pursued higher studies at **Cambridge University**, where he became a 'Wrangler' (top mathematics student) and earned the **Tyson Medal in the Mathematical Tripos** – a mark of top academic distinction.
- **Career Highlights:**
    - **Tata Institute of Fundamental Research (TIFR):** Joined in 1972 and **led the Theoretical Astrophysics Group until 1989**, during which time the group gained international recognition.
    - **Inter-University Centre for Astronomy and Astrophysics (IUCAA):** In 1988, the University Grants Commission (UGC) entrusted him with establishing IUCAA inside the Savitribai Phule Pune University campus. He served as its **founding director** until his retirement in 2003.
    - **International Astronomical Union:** Served as **President of the Cosmology Commission of the International Astronomical Union** from 1994 to 1997.
- **Research Focus:** Best known for co-developing the **Hoyle–Narlikar theory of gravity**.
- **Space Research:** From 1999 to 2003, he **led a space research experiment to collect microorganisms from the upper atmosphere** (up to 41 km), exploring the possibility of extraterrestrial life forms reaching Earth.
- **Science Communication:** Authored numerous popular science books and articles, and frequently appeared on radio and television to explain complex scientific ideas in simple terms, making science accessible to the public.

Awards and Recognition

- **Kalinga Award (1996):** Honoured by **UNESCO** for his contributions to **science popularization**.
- **Padma Vibhushan (2004):** Received India's **second-highest civilian award**.
- **Sahitya Akademi Award (2014):** Honoured for his Marathi autobiography (likely 'Chaar Nagaratil Majhe Vishwa' or 'My World in Four Cities') with its highest prize for regional literature.
- **Fellowships:** Was a Fellow of all three national science academies of India (INSA, NASI, IASc), the Royal Astronomical Society of London, and the Third World Academy of Sciences.

Hoyle-Narlikar Theory of Gravity

- **Alternative to General Relativity:** Dr. Jayant Narlikar is best known for co-developing the Hoyle–Narlikar theory of gravity—an **alternative to Einstein's general relativity**.
- **Champion of Steady-State Theory:** This theory also championed the **steady-state theory of the universe**, a bold counterpoint to the widely accepted Big Bang model.
- **Synthesis with Mach's Principle:** The Hoyle–Narlikar theory offered a formulation of

gravitation that **synthesized Einstein's general relativity with Mach's principle**.

- **Mach's Principle** proposes that the inertial mass of a particle depends on the distribution of mass across the universe—an idea that challenged conventional Big Bang cosmology and continues to stimulate scientific debate.

- **Support for Steady-State Theory:** The theory produced evidence to support what is known as the **steady-state theory of the universe**.
  - **Contrast with Big Bang:** Unlike the Big Bang theory that suggests a definite beginning, and possibly an end, to the universe, the steady-state theory maintains that the universe **has always been, and would continue to be, the way it is — infinite in extent, without a beginning or an end**.
  - **Continuous Matter Creation:** It **acknowledged an expanding universe** (which was experimentally verifiable) but proposed that the universe was able to **maintain a constant density by continuously creating new matter** to fill the voids created by expansion.
- **Origin of Steady-State Theory:** The steady-state theory was first put forward in **1948 by British scientists Sir Hermann Bondi, Thomas Gold, and Sir Fred Hoyle**. It was further developed by Hoyle (and later with Narlikar) to address problems that had arisen in connection with the alternative big-bang hypothesis.
- **Decline:** While elegant, the steady-state theory eventually lost favour with the discovery of the Cosmic Microwave Background Radiation (CMBR) in 1964, which strongly supported the Big Bang model.

INSV Kaundinya - Reviving India's Ancient Maritime Heritage

Context:

The Indian Navy has recently inducted **INSV Kaundinya**, a meticulously reconstructed 5th-century stitched ship. This unique initiative, driven by the **Ministry of Culture** and the **Indian Navy**, aims to revive and showcase India's rich maritime traditions, drawing inspiration from the ancient **Ajanta Cave paintings**.

I. About INSV Kaundinya:

- **Name:** INSV Kaundinya is named after **Kaundinya**, a legendary Indian sailor believed to have reached Southeast Asia in ancient times. This naming symbolizes India's historical role in transoceanic trade and cultural exchange.
- **Genesis:** The project was launched in **July 2023** under a tripartite agreement involving:
  - **Ministry of Culture:** Funded the project to promote maritime heritage awareness and symbolize India's ancient shipbuilding tradition.
  - **Indian Navy:** Provided expertise and will operate the vessel.
  - **Hodi Innovations:** Likely the shipbuilding firm or organization involved in the reconstruction.
- **Purpose:** To serve as a living testament to India's sophisticated shipbuilding heritage, enhance maritime heritage awareness, and potentially foster cultural diplomacy.

- **Planned Voyage:** INSV Kaundinya is scheduled to sail along an **ancient maritime trade route from Gujarat to Oman later in 2025**, replicating historical voyages.

II. Traditional Shipbuilding Techniques Employed:

The construction of INSV Kaundinya is a marvel of archaeological and engineering interpretation, reviving a unique ancient method:

- **"Stitched Ship" Technique:** This is the hallmark of its construction. Unlike modern shipbuilding that uses metal fasteners, the wooden planks of INSV Kaundinya are joined using:
    - **Coir ropes:** Made from coconut fibers.
    - **Coconut fibres:** Used for stitching and perhaps caulking.
    - **Natural resin:** For sealing and waterproofing.
    - **Absence of Metal Nails:** This technique not only makes the ship flexible and resilient to ocean waves but also prevents damage from ferrous metals in saltwater.
- **Design Inspiration:** The ship's design is directly based on a **5th-century maritime scene depicted in the Ajanta mural paintings**, specifically in Cave 2. This highlights the interdisciplinary approach combining art history with naval architecture.
- **Challenges in Design:** As **no surviving blueprints** of such ancient ships exist, the design process was complex. It involved:
    - Interpreting **2D artistic representations** from the murals.
    - Extensive **archaeological analysis**.
    - Application of modern **naval architectural principles**.
    - **Hydrodynamic analysis** to ensure seaworthiness and stability.

III. Symbolism and Cultural Integration:

Every element of INSV Kaundinya is imbued with rich Indian cultural and historical symbolism:

- **Sails:** Feature prominent motifs:
    - **'Gandabherunda':** A mythical two-headed eagle, symbolizing strength, protection, and regal power, often seen in South Indian iconography.
    - **The Sun:** Universal symbol of vitality, light, and guidance, crucial for ancient navigators.
- **Bow Adornment:** The ship's bow is adorned with a **'Simha Yali'**, a mythical lion-like figure common in traditional South Indian maritime iconography, signifying courage and guardian spirit.
- **Harappan-style Stone Anchor:** The presence of a stone anchor on the deck directly connects the ship to India's **Indus Valley Civilisation's maritime legacy**, indicating a continuum of seafaring traditions dating back millennia.
- **Cultural Exchange:** The entire project underscores India's ancient role in **transoceanic trade and profound cultural exchange** with various regions, particularly Southeast Asia and the Middle East.

IV. About Ajanta Paintings (Relevant Connection):

- **Location & Period:** The Ajanta Caves are located in **Maharashtra, India**, and date from the **2nd century BCE to the 6th century CE**. They represent one of the earliest and most significant surviving examples of Indian mural art.
- **Technique:** The paintings follow the **tempera technique** (painting on dry plaster with pigments), utilizing natural vegetable and mineral dyes (e.g., red ochre, black, brown).
- **Themes:** The murals predominantly focus on **Buddhist themes**, including:
    - **Jataka Tales:** Stories of the Buddha's previous lives.
    - The **life of the Buddha**.
    - **Avadanas:** Stories of noble deeds.
    - Often interwoven with intricate **nature motifs** and decorative patterns.

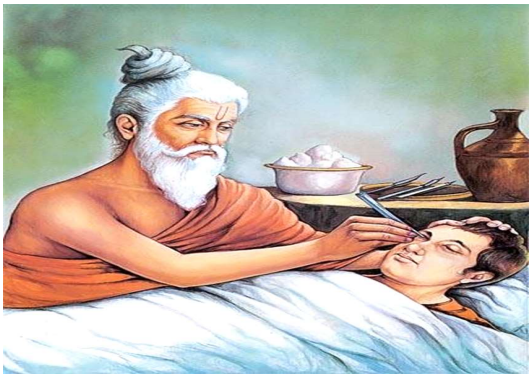
- **Artistic Style:** Figures are depicted with heavy proportions, expressive gestures, and distinctive hairstyles, showcasing emotional depth and spiritual symbolism. The depiction of the ship in these paintings attests to the significant maritime activities of the period.

V. Significance :

- **Cultural Heritage:** Highlights India's rich and ancient maritime history, shipbuilding prowess, and cultural connections across oceans.
- **Soft Power Diplomacy:** The planned voyage can serve as a powerful tool for cultural diplomacy, showcasing India's historical linkages with Gulf nations.
- **Archaeology and Historical Interpretation:** Demonstrates the application of archaeological findings (Ajanta murals) to reconstruct historical practices.
- **Technological Revival:** Showcases the revival of traditional, sustainable shipbuilding techniques.
- **Indian Navy's Role:** Emphasizes the Indian Navy's commitment to preserving and promoting national heritage alongside its defence mandate.
- **Prelims & Mains Relevance:** Important for Art & Culture, History (Ancient India), Current Affairs, and Science & Technology (indigenous technology, engineering).

Conclusion: INSV Kaundinya is more than just a ship; it is a tangible bridge to India's glorious maritime past, a symbol of self-reliance in traditional knowledge, and a beacon for renewed cultural engagement on the high seas.

Charaka and Sushruta - Pioneers of Ancient Indian Medicine



Context:

The Vice-President of India recently unveiled statues of **Charaka and Sushruta** at Raj Bhavan, Goa. This act serves as a reminder of their enduring legacy and significant contributions to ancient Indian medical science, particularly Ayurveda and surgery.

I. Charaka and the Charaka Samhita:

- **Period & Title:** Charaka was a prominent court physician during the **Kushan period** (c. 1st-2nd century CE). He is widely revered as the **Father of Medicine in India**.
- **Literary Contribution:** His magnum opus is the **Charaka Samhita**, which is a foundational text of **Ayurveda**.
    - It was a comprehensive revision and expansion of the older *Agnivesha Samhita*.
- **Content of Charaka Samhita:** The text provides an encyclopedic treatise on various aspects of medicine, covering:
    - **Physiology (Sharira Sthana):** Detailed understanding of the human body.
    - **Diagnosis (Nidana Sthana):** Methods for identifying diseases.
    - **Prognosis (Vimana Sthana):** Predicting the course of a disease.
    - **Prevention (Chikitsa Sthana):** Emphasis on preventive care and a holistic approach to health.
    - **Internal Medicine (Chikitsa Sthana):** Extensive discussion on various diseases and their treatments.
    - **Pharmacology (Kalpa Sthana and Siddhi Sthana):** Descriptions of medicinal plants and formulations.
- **Part of Brhat-Trayi:** The Charaka Samhita is one of the three core texts of Ayurveda, collectively known as the Bṛhat - Trayi **(Great Trilogy)**, alongside the **Sushruta Samhita** and **Ashtanga Hridaya**.

- **Later Expansion:** The text was later expanded and completed by Dṛḍhabala, ensuring its continued relevance and comprehensiveness.
- **Ethical Emphasis:** Charaka placed strong emphasis on **medical ethics**, outlining the expected conduct of physicians, the importance of patient care, and the role of diet and lifestyle in preventive care.
- **Global Relevance:** The Charaka Samhita remained an authoritative medical text for over **two millennia**. Its influence extended beyond India, as evidenced by its **translations into Arabic, Latin, and other foreign languages**, demonstrating its global medical relevance and impact on ancient and medieval medical traditions.

II. Sushruta and the Sushruta Samhita:

- **Period & Title:** Sushruta, often dated to the **7th century BCE**, is hailed as the **Father of Surgery** and is considered by many as potentially the **world's first documented surgeon**.
- **Literary Contribution:** He authored the **Sushruta Samhita**, another foundational text of Ayurveda, specifically dedicated to surgical principles and procedures.
- **Surgical Innovations:** The Sushruta Samhita is remarkable for its detailed descriptions of surgical techniques, including:
    - Over **300 surgical procedures**, encompassing various specialties.
    - Descriptions of over **120 surgical instruments**, illustrating advanced understanding of surgical tools.
    - Classification and treatment of various types of **fractures and dislocations**.
    - Pioneering techniques such as **rhinoplasty (nasal reconstruction)**, **skin grafting**, **cataract surgery**, and even **caesarean sections**.
- **Holistic Approach to Surgery:** Beyond mere procedures, the Sushruta Samhita also integrates:
    - Detailed **anatomical knowledge**.
    - Protocols for **surgical training**.
    - Emphasis on comprehensive **patient care**.
    - Importance of **hygiene** and sterile practices.
    - Principles of **scientific observation and empirical learning**.
- **Evidence-Based Medicine:** Sushruta's teachings implicitly display principles of **evidence-based medicine** (though not termed as such then), relying on observation, experimentation, and logical reasoning, centuries before such concepts became formalized in modern medical systems.

III. Collective Significance and Legacy:

- **Foundational Pillars of Ayurveda:** Charaka and Sushruta are indispensable figures in the history of Ayurveda, representing its two major branches: internal medicine and surgery.
- **Holistic Health System:** Their works collectively form the basis of Ayurveda's holistic approach to health, integrating physical, mental, and spiritual well-being.
- **Contribution to Global Knowledge:** Their systematic approach to medicine and surgery, documented in their respective Samhitas, profoundly influenced medical traditions in Persia, the Arab world, and beyond, contributing significantly to the global pool of medical knowledge.
- **Relevance Today:** Their emphasis on diet, lifestyle, preventive care, and surgical principles continues to be relevant, showcasing the timeless wisdom embedded in ancient Indian medical science.

Keezhadi Excavations - Unveiling an Ancient Urban Sangam-Era Civilization

Context:

The **Archaeological Survey of India (ASI)** has recently requested **Amarnath Ramakrishna**, the archaeologist who initiated and led the initial phases of the Keezhadi excavations, to resubmit his excavation report after revisions. This ongoing process highlights the importance and detailed scrutiny of the findings from this significant site.

I. About Keezhadi Excavation:

- **Location:** The Keezhadi excavation site is situated near **Madurai** in the state of **Tamil Nadu**, specifically along the banks of the **Vaigai River**. This geographical location is significant as the Vaigai River basin was a cradle of ancient Tamil civilization.
- **Significance:** It is considered one of the **most significant archaeological findings in Tamil Nadu** since the discovery of the **Adichanallur site**, which primarily focused on megalithic burials. Keezhadi, in contrast, reveals an extensive urban settlement.
- **Period:** Archaeological findings at Keezhadi estimate the settlement to date between the **5th century BCE and the 3rd century CE**. This places it firmly within the flourishing **Sangam Period** of South Indian history.
- **Nature of Settlement:** Excavations have revealed a highly developed **urban, literate, and craft-oriented society**. This suggests:
    - **Early Urbanisation in South India:** Indicating the existence of sophisticated urban centers in the Deccan contemporaneous with, or even earlier than, some developments in North India.
    - **Independent Urbanisation:** Importantly, the findings suggest that this urbanisation in South India might have developed **independent of North Indian influences**, challenging earlier notions of a singular origin point for urban development in the subcontinent.

II. Key Findings from Keezhadi:

The archaeological evidence from Keezhadi has provided crucial insights into the life and times of the Sangam era:

- **Brick Structures:** Extensive remains of brick structures, indicating planned urban settlements with well-built houses and possibly public structures.
- **Drainage System:** Evidence of a well-laid out drainage system, pointing to advanced civic planning and sanitation.
- **Pottery:** Numerous pottery shards, including black and red ware, rouletted ware, and fine grey ware. Some pottery bears Tamil-Brahmi inscriptions, indicating a high degree of literacy.
- **Craft Activities:** Abundant evidence of craft production, such as:
    - Beads made of glass, terracotta, and semi-precious stones.

    - Iron objects, suggesting advanced metallurgy.
    - Terracotta figurines, indicating artistic and cultural practices.
    - Spinning whorls and dyeing vats, pointing to textile production.
- **Literacy:** The discovery of graffiti marks and Tamil-Brahmi script on pottery strongly suggests a **literate society** during the Sangam period, pushing back the known timeline of literacy in South India.
- **Trade Links:** Findings like Roman artefacts indicate trade links with other parts of the world.

III. Understanding the Sangam Period:

- **Etymology:** The term **'Sangam'** is derived from the Sanskrit word **'Sangha'**, meaning an assembly or association. In this context, it refers to the **Tamil literary academies or assemblies** patronized by the **Pandya kings** (especially in Madurai), which were instrumental in compiling and preserving a vast body of Tamil literature.
- **Chronology:** Generally dated from around **300 BCE to 300 CE**, though some scholars propose slightly different timelines.
- **Political Structure:** The period saw the flourishing of three powerful Tamil kingdoms:
    - **Cheras:** (West coast, with capitals like Vanji)
    - **Cholas:** (North-eastern parts, capital at Uraiyur, later Puhar/Kaveripattinam)
    - **Pandya:** (Southern parts, capital at Madurai)
- **Source of Information: Sangam literature** is the primary source of information for this period, providing vital insights into:
    - **Governance:** Kingship, administration, military.
    - **Economy:** Agriculture, trade (internal and external, including with the Roman Empire), crafts.
    - **Social Life:** Caste system (Varna system was not as rigid as in North India, more based on profession), family structures, various social groups.
    - **Culture:** Religion (indigenous deities, early influence of Brahmanism, Jainism, Buddhism), art, music, festivals.
    - **Warfare:** Detailed descriptions of battles and heroic deeds.
- **Key Sangam Texts:**
    - **Tolkappiyam:** The oldest extant Tamil grammar text, providing insights into Tamil language, poetics, and sociology of the period.
    - **Pattupattu (Ten Idylls):** A collection of ten long poems, offering vivid descriptions of landscapes, people, and daily life.
    - **Ettutogai (Eight Anthologies):** A collection of eight anthologies of short poems, covering themes of love (Aham) and war/heroism (Puram).
    - **Padinenkilkanakku (Eighteen Minor Works):** Didactic texts focusing on ethics, morals, and codes of conduct.
    - **The Three Great Epics:** (though some dated slightly later than classical Sangam period)
        * **Silappadikaram:** (The Story of the Anklet) by Ilango Adigal.
        * **Manimekalai:** (The Story of Manimekalai) by Sittalai Sattanar.
        * **Civaka Cintamani:** (Jivaka's Precious Gem) by Tiruttakkatevar.

EDITORIALS

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History, Art & Culture

Gond Painting and Madhubani Painting - Traditional Indian Art Forms

Context:

Recently, a group of artists visited the President of India as part of the **"Artists in Residence"** program at Rashtrapati Bhavan. This highlights the importance of traditional Indian art forms like Gond and Madhubani paintings, which **represent India's rich cultural heritage.**

I. About Gond Painting:

- **Origin:** It is a famous folk art of the **Gond tribal community** in **central India**. It specifically originated among the Gond tribe found in states like **Madhya Pradesh, Maharashtra, Andhra Pradesh, and Chhattisgarh**.
- **Themes:** Gond paintings deeply connect with nature and tribal life. They feature:
    - **Nature and Forests:** Animals (often vibrant and detailed), trees, birds, rivers.
    - **Celestial Bodies:** Sun, moon, and stars.
    - **Mythology:** Stories of gods and goddesses like **Bhima and Parvati**, and mythical creatures like the **Shachi bird**.
    - **Daily Life:** Depictions of hunting, farming, and tribal rituals.
- **Materials and Techniques:**
    - Artists traditionally use **natural materials** such as charcoal (for black), colored soil, plant sap, and natural dyes.
    - These colors are applied on **mud walls, cloth, or paper** using simple tools like **twigs and leaves**.
- **Distinctive Style:** Each Gond artist has their own special way of filling the images. These unique patterns are like their **signature**. Common patterns used to fill outlines include:
    - **Dots**
    - **Fine Lines**
    - **Curved Lines**
    - **Dashes**
    - **Fish Scales**
    - These patterns are put together like a collage to create a complete picture.
- **Cultural Significance:** Gond art is not just painting; it's a way for the tribe to record their history, beliefs, and connection with nature.

II. About Madhubani Painting:

- **Origin:** It originated in the **Mithila region of Bihar, India** (and parts of Nepal). Traditionally, it was primarily **created by women** in the region.
- **Themes:** Madhubani paintings are rich in religious and cultural themes:
    - **Hindu Mythology:** Stories and characters from Hindu epics like the **Ramayana**.
    - **Hindu Deities:** Often depicts gods and goddesses like **Krishna, Durga, and Saraswati**.
    - **Daily Life:** Scenes from village life, marriage ceremonies, and festivals.
    - **Festivals:** Depictions of various festivals like Holi and Tussar.

- **Symbolic Messages:** Carries symbolic meanings related to fertility, good luck, prosperity, and auspiciousness (good fortune).

- **Materials and Techniques:**
  - Historically, these paintings were done on **mud walls and cloth**. Now, they are also found on **paper and canvas**.
  - Artists use **natural pigments** derived from plants (e.g., turmeric for yellow), lamp black (for black), and cow dung (for texture and color).
  - **Precise linework** is a hallmark.
  - **Double outlining:** A key feature where figures and patterns are often outlined twice.
  - **Intricate geometric patterns:** The spaces within the main figures are filled with detailed geometric designs and patterns.
- **Cultural Significance:** Madhubani painting was often done on walls for auspicious occasions like weddings and festivals, serving as a form of cultural expression and blessing.

III. Comparison and Significance:

Feature	Gond Painting	Madhubani Painting
Origin	Gond tribe, Central India (MP, Chhattisgarh, etc.)	Mithila region, Bihar
Primary Artists	Tribal community members (men and women)	Traditionally by women
Core Themes	Nature, forest, animals, tribal life, local myths	Hindu mythology, deities, Ramayana, daily life, festivals
Key Style Elements	**Dots, fine lines, dashes** as filling patterns; individual artist's signature pattern	**Double outlining, intricate geometric patterns**, bold lines
Traditional Surfaces	Mud walls, cloth, paper	Mud walls, cloth; now also paper and canvas
Purpose	Expressing connection to nature, recording beliefs	Auspicious occasions, blessings, cultural expression

- **Cultural Heritage:** Both Gond and Madhubani paintings are vibrant examples of India's rich and diverse folk and tribal art traditions.
- **Economic Impact:** These art forms provide livelihoods for many artists, especially from rural and tribal communities.
- **Soft Power:** They represent India's cultural richness on the global stage.
- **Conservation:** Efforts are needed to preserve these traditional art forms and ensure their continuity across generations.

Supreme Court Steps In: Identify Agamic Temples in Tamil Nadu

What Happened?

- On **May 14, 2025**, the **Supreme Court of India** asked a committee (set up by the **Madras High Court**) to **identify Agamic and non-Agamic temples** in Tamil Nadu **within 3 months**.
- Until this identification is complete, **no new priests (archakars)** should be appointed to **Agamic temples**.
- Once the process is over, the **State can appoint priests** to the **non-Agamic temples**.

What Are Agamic Temples?

- **Agamic temples** follow **Agamas**, which are **ancient Hindu religious texts** that prescribe **strict rules for rituals, worship, and priesthood**.
- These temples follow **specific customs and traditions** for how worship should be done and who can perform it.

- **Non-Agamic temples** do not follow these strict texts and may have more flexible practices.

Who Will Identify These Temples?

- A **committee** headed by **Justice M. Chockalingam** (a retired judge from Madras High Court) will do the identification.
- One member, **M.P. Sathyavel Murugan**, has been removed from the committee due to objections raised.

Special Focus: Rameswaram Temple

- The **Supreme Court also ordered** the **Tamil Nadu Hindu Religious and Charitable Endowments (HR&CE) Department** to:
    - **Fill the vacant positions of priests and temple workers** (called maniyams) at **Ramanathaswamy Temple in Rameswaram**.
    - These appointments must **follow the temple's traditions** and religious customs.

What Was the Case About?

- A group of traditional temple caretakers, **Srirangam Koil Miras Kainkaryaparargal Sangam**, filed a petition.
- They said they are only concerned about **Agamic temples**, not others.
- Their main concern was that **non-qualified or non-traditional people** were being appointed as priests in Agamic temples, going against age-old customs.

What Did the Lawyers Say?

- **Senior advocate Dushyant Dave** said **Agamic temples are very important**, and their traditions must be protected.
- He also said the petitioners are even challenging the **stipends (payments)** given to **trainee priests**, though the State said it's just **training Hindus of all castes** to serve as priests.

Background

- In **November 2023**, the **Supreme Court ordered a "status quo"** (no changes) on priest appointments in Agamic temples.
- This was in response to claims that the Tamil Nadu government was trying to appoint **"non-believers" or non-traditional individuals** as priests.
- The government replied that **appointments are a secular matter** and that it wants to **train Hindus of all backgrounds** to become priests, under HR&CE Department supervision.

What's Next?

- The **next hearing** will be held in **September 2025**.
- By then, the committee is expected to **finish identifying Agamic temples**, and the court will decide the next steps.

"PM Modi to launch revamped manuscripts mission on June 9"

Introduction and Context

1. On **June 9, 2025**, **Prime Minister Narendra Modi** will launch the **revamped National Mission for Manuscripts (NMM)**, now rebranded and expanded as the **'Gyan Bharatam Mission'**.
2. This initiative was **announced in the Union Budget 2025–26** and aims to revive, restructure, and scale up the documentation and conservation of India's vast manuscript heritage.

3. The mission is a significant step toward preserving **India's ancient textual traditions**, which are crucial for safeguarding the country's civilisational knowledge and linguistic diversity.

About the Gyan Bharatam Mission

1. The **Gyan Bharatam Mission** aims to cover more than **one crore manuscripts** across India.
2. It will be responsible for the **survey, documentation, digitisation, and conservation** of manuscripts found in **academic institutions, libraries, museums, and private collections**.
3. The project will have a **centralised and tech-enabled approach** to make India's ancient knowledge systems digitally accessible and globally visible.

Budgetary Allocation and Financial Support

1. The **Union Budget 2025–26** increased the allocation for the National Mission for Manuscripts from **₹ 3.5 crore to ₹ 60 crore**, showing a nearly **17-fold increase** to support its restructuring.
2. Additionally, a **Special Finance Committee** has separately allocated **₹ 491.66 crore for the mission over a six-year period (till 2031)** to facilitate autonomy and capacity building.
3. The mission is now part of a **Central Sector Scheme**, meaning it will be fully funded and executed by the **Government of India**, ensuring strong institutional support and accountability.

Institutional Structure and Autonomy

1. The National Mission for Manuscripts (NMM) was originally established in **February 2003** under the **Ministry of Tourism and Culture**.
2. Until recently, it functioned as a unit under the **Indira Gandhi National Centre for the Arts (IGNCA)**.
3. In 2025, steps were taken to make the NMM **an autonomous institution**, with the Ministry of Culture leading the transition.
4. From **January to March 2025**, the NMM's funding was temporarily routed through the **Sahitya Akademi**, reflecting administrative restructuring.

Key Stakeholders and Expert Consultation

1. On **October 14, 2024**, the Ministry of Culture convened a high-level expert consultation chaired by **Culture Minister Gajendra Singh Shekhawat** to shape the mission's new direction.
2. The meeting was attended by noted scholars and linguists such as:
    - **Prof. Udaya Narayana Singh** (former Chairperson, CIIL)
    - **Prof. K. Ramasubramanian** (IIT Bombay)
    - **Dr. M.A. Alwar** (Samskriti Foundation)
    - **Dr. Sudha Gopalakrishnan** (Founder Director, NMM)
    - **Chamu Krishna Shastry** (Chairman, Bharatiya Bhasha Samiti)
    - **Shrinivasa Varakhedi** (Vice-Chancellor, Central Sanskrit University, Delhi)
    - A **programme manager from Google Arts and Culture**, indicating possible tech collaboration.

Current Achievements and Limitations of the NMM

1. As per latest data, the **NMM has prepared metadata for 52 lakh manuscripts** (5.2 million) across India.
2. **Over 3.5 lakh manuscripts** have been **digitised**, encompassing around **3.5 crore pages** of textual content.
3. The mission has also **conserved around 9 crore folios (90 million pages)** over the past 21 years.
4. However, only **around 1.3 lakh manuscripts have been uploaded** online, and merely **70,000 are available for public viewing**.

5. The reason for this limited access is the **absence of a clear access policy**, particularly concerning manuscripts owned by private collectors, who own nearly **80% of all manuscripts in India**.

Challenges Identified

1. The earlier version of NMM **did not meet its full potential**, largely due to **lack of autonomy, low funding**, and **limited outreach to private holders**.
2. Without a **well-defined access policy**, private collectors have little incentive to allow digitised manuscripts to be publicly viewed.
3. There is a **technological gap** in making the digitised content accessible on modern platforms with metadata, translations, or cross-lingual interfaces.

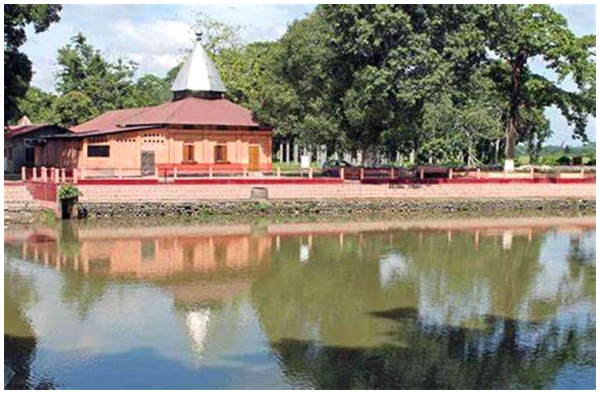
Expected Outcomes of the Revamped Mission

1. The revamped **Gyan Bharatam Mission** is expected to **establish a comprehensive, accessible national digital manuscript archive**.
2. It aims to facilitate the **rediscovery of classical Indian knowledge systems** in areas such as medicine, astronomy, mathematics, philosophy, and arts.
3. It will help **bridge traditional and modern scholarship** by integrating ancient manuscripts into contemporary academic discourse.
4. The digitised and preserved texts could support **language revival, indigenous research, and educational curriculum reforms**.

Conclusion

The **revamped National Mission for Manuscripts**, being relaunched as **Gyan Bharatam Mission**, represents a transformative moment in India's cultural and intellectual history. By allocating enhanced funding, ensuring autonomy, and integrating modern technology, the government aims to **safeguard and revitalise India's manuscript wealth**. This initiative is expected to foster national pride, promote India's civilisational heritage globally, and serve as a foundation for **future scholarship in Indian knowledge systems**.

Assam's Nagshankar Becomes Model Temple for Turtle Conservation



Background

- Nagshankar temple in Assam's Biswanath district has been designated as a **model temple for turtle conservation**.
- The recognition was announced during an event held on May 23, 2025, coinciding with **World Turtle Day**.

Event and Organisers

- The event was organised by multiple stakeholders including:
  - Kaziranga National Park and Tiger Reserve
  - Assam State Zoo
  - Nagshankar Temple Committee
  - DBT-NER Biotech Hub, Chaiduar College
  - Conservation groups like Turtle Survival Alliance (TSA) Foundation India, Aaranyak, and Help Earth
- Local MLA **Padma Hazarika** officially acknowledged the temple on behalf of the community and authorities.

Cultural Significance of Turtles in Assam

- In Assam, turtles have traditionally been conserved in temple ponds as they are believed to be **reincarnations of Lord Vishnu**.
- The turtles at Nagshankar temple, maintained by TSA, are considered some of the **best conserved** in the state.

Conservation Efforts at Nagshankar

- Nagshankar temple promotes turtle conservation at the **grassroots level**, making it a model for other temples.
- Activities at the event included the release of a **freshwater turtle identification brochure** to educate the public.
- The temple also honoured **'Kaso Mitras'**—community members acting as turtle guardians.

Ecological Importance of Turtles

- Turtles are called the **"vultures of the aquatic ecosystem"** because they clean water bodies by scavenging on dead and decomposed matter.
- Protecting turtles is crucial for maintaining healthy aquatic ecosystems, as highlighted by Anjali Das, president of Kaso Sakhi, a women's weavers' group supported by TSA that creates turtle motif handloom products.

Biodiversity at Nagshankar Temple

- The temple premises include a **large pond** that has **250-300 turtles** belonging to some of the world's rarest species.
- Some of these turtles are believed to be **hundreds of years old**.
- The Nagshankar conservation project sustains **13 species of freshwater turtles**, categorized by their conservation status according to the International Union for Conservation of Nature (IUCN):

Species	Scientific Name	IUCN Status
Black softshell turtle	*Nilssonia nigricans*	Critically Endangered
Assam roofed turtle	*Pangshura sylhetensis*	Critically Endangered
Indian softshell turtle	*Nilssonia gangetica*	Endangered
Peacock softshell turtle	*Nilssonia hurum*	Endangered
Indian narrow-headed softshell	*Chitra indica*	Endangered
Spotted pond turtle	*Geoclemys hamiltonii*	Endangered
Tricarinate hill turtle	*Melanochelys tricarinata*	Endangered
Indian flapshell turtle	*Lisemmys punctata*	Vulnerable
Indian roofed turtle	*Pangshura tecta*	Vulnerable
Brown roofed turtle	*Pangshura smithii*	Near Threatened
Assam leaf turtle	*Cyclemys gemeli*	Near Threatened
Indian tent turtle	*Pangshura tentoria*	Least Concern
Indian black turtle	*Melanochelys trijuga*	Least Concern

About Nagshankar Temple

- **Nagshankar Temple** is an **ancient Hindu shrine** dedicated to **Lord Shiva**.
- Located on the **north bank of the river Brahmaputra**, within the administrative district of **Biswanath**, Assam.

Historical Significance

- The temple is believed to have been originally **built by King Narasankar of Nagakha in the 4th century AD**.
- It was later **restored by the Ahom king Su-sen-pha in 1480**.

Biodiversity on Campus

- The temple campus is also home to other animals such as:
  - **Peacocks**
  - **Deer**
  - **Pythons**

Significance

- The temple combines **religious, historical, and ecological importance**, making it a unique cultural heritage site.
- The turtle conservation efforts here reflect traditional reverence and modern environmental stewardship.

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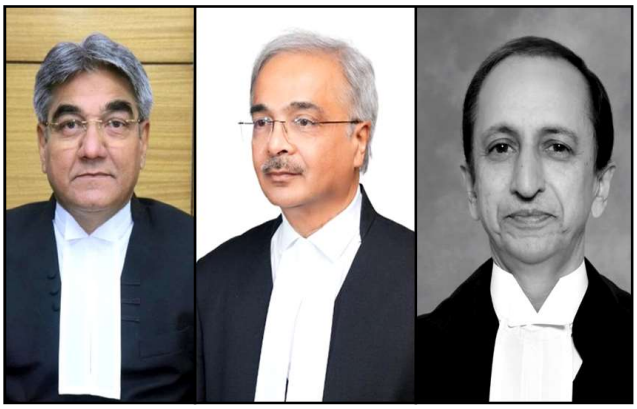
Persons in News

Justices N.V. Anjaria, Vijay Bishnoi and A.S. Chandurkar



- The **Supreme Court** got 3 new **judges** in **Justices N.V. Anjaria**, **Vijay Bishnoi** and **A.S. Chandurkar**, who were sworn in by Chief Justice of India B.R. Gavai in a short ceremony on Friday (**May** 30, **2025**). With this, the number of **judges** of the court has reached its sanctioned **strength** of **34**.
- **Government & Public Sector:**
  - **Dr. Ajay Kumar:** Assumed charge as the **new Chairman of UPSC.**
  - **Praveen Sood:** The Government of India has extended the tenure of **Central Bureau of Investigation (CBI) Director Praveen Sood by one year**, effective beyond his original term ending **May 24, 2025**. Sood, who assumed office on May 25, 2023, for a two-year term, will now serve until May 24, 2026.
  - **Alok Joshi: Former R&AW chief appointed Chairman of the revamped National Security Advisory Board.**
- **Academic/Research Institutions:**
  - **Sachin Chaturvedi:** Eminent economist, took charge as the Vice-Chancellor of Nalanda University.

Awards and Honours

President Murmu

- **President** Droupadi **Murmu** presented India's esteemed peacetime **gallantry awards** at Rashtrapati Bhavan. The **awards** included six Kirti Chakras and thirty-three Shaurya Chakras, conferred upon personnel from the armed forces, paramilitary forces, and police who demonstrated **valor**.

Jagadguru Rambhadracharya and poet-lyricist Gulzar

President Droupadi Murmu presented the 58th Jnanpith Award to Sanskrit scholar Jagad-guru Rambhadracharya and poet-lyricist Gulzar

International Awards

Banu Mushtaq:

Banu Mushtaq made history by becoming the first Kannada writer to win the International Booker Prize for her short story collection, "Heart Lamp," which was translated into English by Deepa Bhasthi. This historic win recognizes her unique literary voice and powerful storytelling that explores the lives of Muslim women in Karnataka, India.

Mariangela Hungria (Brazilian Scientist)

Mariangela Hungria, a Brazilian microbiologist, **won the 2025 World Food Prize for her work in biological nitrogen fixation and developing microbial technologies** that reduce reliance on chemical fertilizers. Her research, particularly in rhizobia-based nitrogen fixation, has significantly boosted crop yields, especially soybeans, and reduced the need for synthetic fertilizers

La Prensa

La Prensa, a Nicaraguan newspaper, was awarded the 2025 UNESCO/Guillermo Cano World Press Freedom Prize on May 7, 2025. The newspaper was recognized for its courageous efforts to report the truth in a repressive environment under President Daniel Ortega's regime. UNESCO praised La Prensa for its commitment to free press despite facing political pressure, censorship, and violent crackdowns..

Shubhanshu Shukla

Set to **become the first Indian astronaut to travel to the International Space Station (ISS) for Axiom Mission 4,** and is one of the four astronauts for India's Gaganyaan mission.

Abdulla Khaleel (Maldivian Foreign Minister)

Visited India (May, 2025) to strengthen maritime and economic ties, signaling a diplomatic reset after a period of tension.

Donald Trump (U.S. President)

U.S. President Donald Trump announced a delay in the planned 50% tariffs on the European Union, giving both sides until July 9 to negotiate a deal. That move eased some of the trade tension that had investors rushing to gold as a safe haven.

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