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Why Bangladesh Leader Yunus' Remarks on Northeast India Have Angered India



Background:

- **Muhammad Yunus**, the **interim leader of Bangladesh**, sparked a diplomatic controversy with remarks made during his **four-day visit to China** from **March 26 to 29, 2025**. These comments, about India's northeastern states, have led to a heated political debate and significant backlash in India.
- His statements come at a time when **India-Bangladesh relations** are already strained, especially as **China** has been increasingly making overtures to **Bangladesh**, complicating India's diplomatic landscape in the region.

What Did Yunus Say?

- **On Northeast India's Geography:** Yunus described the seven northeastern states of India (Assam, Arunachal Pradesh, Manipur, Meghalaya, Nagaland, Mizoram, and Tripura), collectively known as the **"Seven Sisters"**, as **"landlocked"**, stating they have **"no way to reach out to the ocean"**.
- **Bangladesh as a Strategic Gateway:** He further declared that **Bangladesh** is the **"only guardian of the ocean"** for this region.
- He suggested that Bangladesh could serve as an economic link for Northeast India to the wider world, especially by facilitating trade between China and the rest of the globe.

- **China's Economic Interests:** Yunus added that Bangladesh could potentially act as an extension of the **Chinese economy**, offering opportunities to build, produce, and market goods, which would be exported to China and beyond.

How Did India Respond?

Yunus' comments have drawn sharp criticism from various quarters, particularly from political leaders in **Northeast India**.

1. Leaders from Northeast India:

- **Himanta Biswa Sarma**, the **Chief Minister of Assam**, strongly condemned Yunus' remarks.
- Sarma deemed them **"offensive"** and noted that such comments play into the **vulnerability narrative** of India's **"Chicken's Neck" corridor** – the narrow land strip (22 km wide) that connects the Northeast to the rest of India.
- He also stressed the need for improving **infrastructure** in the region, including the development of **robust railway and road networks** to strengthen India's connectivity.
- He suggested that the **Chicken's Neck** vulnerability could be mitigated by exploring alternative road routes, bypassing Bangladesh entirely, which would lessen India's dependence on the corridor.
- **Pradyot Kishore Debbarma**, the founder of **Tipra Motha**, also reacted strongly.
- He sarcastically suggested that if Bangladesh continued to provoke India, the country might consider more drastic measures, such as **"breaking up Bangladesh"** for **direct access to the sea**.

2. National Political Reactions:

- **Pawan Khera**, a **Congress leader**, criticized the Indian government's foreign policy, accusing Bangladesh of **aligning with China to encircle India**, especially with regard to the **Northeast**.
- He warned that **Manipur** and **Arunachal Pradesh** were already at risk, pointing out that **China has been establishing villages in Arunachal**.
- **Gaurav Gogoi**, a **Congress MP** from Assam, also raised concerns. He pointed out the contradiction between the **"strong ties"** that **Prime Minister Narendra Modi** emphasized in his communications with Bangladesh and Yunus' recent remarks, which were viewed as **undermining India's territorial integrity**.

3. Condemnation from Manipur's Ex-Chief Minister:

- **N Biren Singh**, the former **Chief Minister of Manipur**, also **condemned Yunus' comments**, accusing Bangladesh of trying to use Northeast India as a **strategic pawn** in its **geopolitical maneuvering**, especially with China's involvement. Singh reiterated that **India's unity and territorial integrity** are **non-negotiable**.

Why Are Yunus' Remarks Problematic for India?

• The "Chicken's Neck" Corridor:

- The **Siliguri Corridor**, also called the **Chicken's Neck**, is the **only land link** between India's northeastern states and the rest of the country.
- It is strategically critical as it is the narrow strip of land (about 22 km wide) connecting India with **Bangladesh** and providing access to the **Northeast**.

- **Any disruption in the Chicken's Neck** would sever the **Northeast's connection** with the rest of India, effectively isolating the region.
- This geographic vulnerability is a long-standing concern for India, as it could be used to disrupt vital supplies, trade, and troop movement.

• Strategic Importance:

- The Northeast is not just important from an internal connectivity perspective; it also holds **geopolitical value** in India's relations with neighboring countries like **China, Bhutan, and Nepal**.
- With **China's increasing presence** in South Asia, particularly through its **Belt and Road Initiative (BRI)**, the growing closeness between **Bangladesh and China** is seen as a **strategic concern** for India.
- Yunus' comments may be viewed as **Bangladesh positioning itself** as a potential **geopolitical ally of China**, which could pose challenges to India's strategic positioning in the region.

• Economic and Trade Implications:

- Yunus implied that Bangladesh could serve as a **link for regional trade**, facilitating access to the sea for China, which is a crucial aspect of China's broader **economic ambitions** in the region.
- This shift in Bangladesh's position could have far-reaching consequences for India's economic ties with Bangladesh, particularly in terms of **trade routes** and **logistics**.

The Bigger Picture: India-Bangladesh Relations

- **Recent Tensions:** India and Bangladesh have had a **complicated diplomatic history**, with cooperation in areas like **trade**,

counterterrorism, and regional stability being somewhat offset by concerns over issues like border security and water-sharing agreements.

- **China's Influence in Bangladesh:** The growing ties between Bangladesh and China have raised alarms in India.
- China's increasing influence in Bangladesh, especially its economic and infrastructure projects, are perceived as a potential challenge to India's regional dominance.

Bangladesh Crisis & Its Implications on India

In a surprising development, Bangladesh's Prime Minister, Sheikh Hasina, who had been in power for 15 years, resigned and fled to India by helicopter after weeks of violent unrest. Over 300 people have died in the violence, and the political situation is now unstable. This crisis is significant for India due to the close geographical, economic, and cultural ties between the two nations.

1. History of Bangladesh:

Bangladesh, a nation in South Asia, has a rich history:

Time Period	Events
14th Century	The Bengal Sultanate was established by Sultan Shamsuddin Ilyas Shah, marking the rise of Islam in the region.
Under British Rule	Bangladesh, as part of British India , was heavily exploited for its resources. Nationalist movements led to the formation of the All India Muslim League in 1906.
1947-1971	After the partition of India in 1947, East Pakistan (now Bangladesh) was part of Pakistan, but growing demands for autonomy led to the Bangladesh Liberation War of 1971 . Bangladesh achieved independence on December 16, 1971 .
Post-independence	Since gaining independence, Bangladesh has alternated between democratic rule and military governance. The country has grown economically, though it has faced internal political struggles.

2. Demographics of Bangladesh:

- **Population:** Bangladesh has over **16.51 crore** people, with a significant portion in the **working-age population**, contributing to its growing economy.
- **Youth and Labor Force:** The **young workforce** is key to Bangladesh's economic rise, though youth unemployment remains a challenge.

3. Education and Literacy in Bangladesh:

- Bangladesh has seen **impressive improvements** in literacy and education in recent decades.
- However, full literacy is still a distant goal.
- The country is aiming to achieve **100% literacy** in the near future.
- The **GDP** has steadily risen, partly due to improvements in the **education system**, which has fueled productivity and innovation.

4. India's Role in the Creation of Bangladesh:

India played a **decisive role** in Bangladesh's creation during the **Bangladesh Liberation War of 1971**:

- **Diplomatic Support:** India provided significant support to the **Awami League** and its leader **Sheikh Mujibur Rahman**, who sought independence for East Pakistan.
- **Military Intervention:** India's **military forces**, alongside the **Mukti Bahini**, launched a successful campaign to defeat Pakistani forces and secure Bangladesh's independence.
- **Humanitarian Assistance:** India offered refuge to millions of **Bangladeshi refugees**, providing shelter, food, and medical aid.

5. Significance of India-Bangladesh Relations:

Geopolitical Significance:

- India shares a **4,096 km land border** with Bangladesh and depends on Bangladesh for **strategic connectivity** to its northeastern states.
- The **Siliguri Corridor** (also known as the **Chicken's Neck**) is critical for India's access to the Northeast.

Economic Ties:

- Bangladesh is India's **largest trade partner** in South Asia, with bilateral trade reaching **USD 15.9 billion** in FY 2022-23.
- India exports a range of goods to Bangladesh, including machinery, chemicals, and textiles.

Cultural Ties:

- India and Bangladesh share a deep **historical and cultural connection**, particularly in the **Bengali language, literature, and music**.

- The countries celebrate their shared heritage and often engage in cultural exchanges.

Multilateral Cooperation:

- Both nations cooperate in forums like **SAARC**, **BIMSTEC**, and the **Indian Ocean Rim Association**.
- Bangladesh plays a vital role in India's **Act East Policy**, which focuses on strengthening ties with Southeast Asia.

6. Recent Developments Leading to the Crisis in Bangladesh:

Erosion of Democracy:

- The elections in **2014**, **2018**, and **2024** were marred by allegations of **rigging**, violence, and opposition boycotts.
- The lack of a free and fair democratic process eroded public trust in the government.

Student Protests:

- **Student-led protests** against a controversial **quota system** for freedom fighters' families turned violent, leading to over **130 deaths**.
- The government's **heavy-handed response** to the protests further escalated the situation.

Islamic Fundamentalism:

- Radical Islamic groups such as **Hefazat-e-Islam** and **Jamaat-e-Islami** have gained traction, pushing for the creation of an **Islamic state** under **Sharia law**.
- These are challenging Bangladesh's secular framework.

7. Impact of the Bangladesh Crisis on Bilateral Trade:

Trade Disruption:

- Bangladesh is India's **largest trading partner** in South Asia, and the ongoing political crisis could disrupt **trade flows**, especially as **duty-free access** under the **South Asian Free Trade Area (SAFTA)** agreement could be affected.

Indian Investments:

- Indian businesses with operations in Bangladesh, particularly in the **textile sector**, are at risk.
- About **25%** of Bangladesh's textile units are owned by Indian companies, which could face uncertainty due to the unrest.

Power Sector:

- Bangladesh imports **electricity** from India, and projects like the **Adani Power's Godda plant** could face significant delays.
- **Rooppur Nuclear Plant**, where Indian companies are involved, could also face disruptions.

Textile Industry:

- Bangladesh's **garment industry**, the second-largest globally, might face challenges in sourcing raw materials like **Indian cotton**, affecting both countries' economies.

Infrastructure Projects:

- Key projects like the **Agartala-Akhaura Rail Link** and the **Mongla Port** development could face delays, affecting connectivity and regional integration.

8. Status of Minorities in Bangladesh:

- **Minority Persecution:** Bangladesh has witnessed **rising violence** against religious minorities, especially **Hindus**.
- Reports suggest that **land-grabbing** and **violence** against minorities are often **politically motivated**, with government agencies complicit in such activities.
- **Declining Minority Population:** The **Hindu population** in Bangladesh has dwindled from around **19%** in 1971 to just **8.6%** today. The situation for minorities is increasingly precarious.

9. Importance of the Citizenship Amendment Bill (CAB) for Hindus:

- The **CAB** is crucial for **Hindu refugees** fleeing religious persecution from Bangladesh.
- It provides a pathway to **Indian citizenship** for Hindus, Sikhs, Buddhists, Jains, and Christians from Bangladesh who arrived in India before **2014**.
- The growing **minority persecution** in Bangladesh makes the CAB an important legislative tool for protecting these communities.

10. Other Implications of the Bangladesh Crisis on India:

Security Risks:

- The Bangladesh crisis may embolden **extremist groups** in the region. India is concerned about the rise of radical groups with links to **Lashkar-e-Taiba (LeT)** and other **terrorist outfits** operating in Bangladesh.

Border Management:

- The **unfenced border** between India and Bangladesh is a **vulnerable point**, and unrest could lead to increased **drug trafficking**, **arms smuggling**, and **terrorist activities** crossing over into India.

Refugee Crisis:

- Political instability could lead to a **mass exodus** of refugees from Bangladesh into India, as seen in the 1971 war.
- This would put pressure on India's resources and security.

Strategic Challenges:

- Bangladesh's growing **ties with China**, especially through the **Belt and Road Initiative**, are a concern for India.
- Bangladesh's **economic dependence on China** could shift the regional balance in China's favor.

Trump's Reciprocal Tariffs: Impact on India and the Global Economy



1. Introduction:

- On April 2, 2025, US President Donald Trump announced **reciprocal tariffs** against major trading partners, aimed at addressing the **US trade deficit** of approximately **\$1.2 trillion**.
- This trade deficit signifies that the US imports significantly more than it exports.
- The reciprocal tariffs are a key element of Trump's broader economic agenda to counter this imbalance and assert a more aggressive trade policy stance.

Key Terms and Concepts:

- **Trade Deficit:** Occurs when a country imports more than it exports.
- **Reciprocal Tariffs:** Tariffs are taxes imposed on imported goods. Reciprocal tariffs imply that the US will charge the same tariff rate on imports as the exporting country levies on the US goods.
- **Protectionism:** Economic policy to protect domestic industries from foreign competition.
- **Stagflation:** A combination of stagnation and inflation in an economy.
- **WTO (World Trade Organization):** International organization dealing with global trade rules.
- **Intellectual Property (IP):** Legal rights to inventions, designs, and brand names.
- **Foreign Direct Investment (FDI):** Investment made by a foreign entity in a country's economy.
- **Smoot-Hawley Act:** The Smoot-Hawley Tariff Act, passed in 1930, raised US tariffs on over 20,000 imported goods, aiming to protect domestic businesses and farmers, but ultimately worsened the Great Depression by sparking retaliatory tariffs and hindering international trade.

2. Background on the US Trade Deficit:

- The **US trade deficit** occurs when the value of US imports exceeds the value of exports.
- With a deficit of **\$1.2 trillion**, this imbalance is considered a major concern for the US economy.
- **Trade deficits** are often seen as a sign of economic imbalance and are a focal point for policymakers who aim to protect domestic industries from foreign competition.

3. Announcement of the Tariffs:

- **Base Tariffs (10% on all countries):** A base tariff of **10%** is set to be applied to all trading partners, marking a significant increase from the previous tariff rate of about **2.5%**.
- This base rate will be enforced starting from **April 5, 2025**.

- **Country-Specific Tariffs:** These tariffs will be levied based on the difference between tariffs imposed by other countries on US goods and the “discounted reciprocal tariffs” which are **half** of the tariffs these countries impose.
- The country-specific tariffs took effect from **April 9, 2025**.

Country	Trump estimates of tariffs on US goods	Trump's 'reciprocal' tariffs	US trade deficit in 2024 (with a minus sign) in \$ millions	US Trade Deficit as a percentage of the total US Trade deficit	Per capita income (US is at \$ 89,680)
Cambodia	97%	49%	-12,300	1.0	\$ 2,950
Vietnam	90%	46%	-1,22,071	10.1	\$ 4,990
Sri Lanka	88%	44%	NA	NA	NA
Bangladesh	74%	37%	-6,152	0.5	\$ 2,770
Thailand	72%	36%	-45,609	3.8	\$ 7,750
China	67%	34%	-2,95,402	24.6	\$ 13,870
Taiwan	64%	32%	-73,937	6.1	\$ 34,920
Indonesia	64%	32%	-17,883	1.5	\$ 5,250
Switzerland	61%	31%	-38,463	3.2	\$ 1,11,720
South Africa	60%	30%	-8,837	0.7	\$ 6,520
Pakistan	58%	29%	-2,989	0.2	NA
India	52%	26%	-45,664	3.8	\$ 2,940
South Korea	50%	25%	-66,007	5.5	\$ 37,670
Japan	46%	24%	-68,468	5.7	\$ 35,610
Malaysia	47%	24%	-24,830	2.1	\$ 14,420
EU	39%	20%	-2,31,769	19.3	\$ 45,240
Israel	33%	17%	-7,425	0.6	\$ 54,370
Philippines	34%	17%	-4,880	0.4	\$ 4,440
UK	10%	10%	11,857	-1.0	\$ 54,280
Brazil	10%	10%	7,351	-0.6	\$ 10,820
Singapore	10%	10%	2,829	-0.2	\$ 93,960
Chile	10%	10%	NA	NA	\$ 17,930
Australia	10%	10%	-73,927	6.1	\$ 67,980
Turkey	10%	10%	-1,453	0.1	\$ 16,880
Colombia	10%	10%	1,347	-0.1	\$ 7,900
World			-12,02,872		\$ 14,450

Source: White House, IMF, Indian Express Research

4. Details of the Tariff Structure: The tariff structure varies by country and is based on two key factors:

- **Per capita income** (the average income per person in a country): Lower-income countries like **Cambodia** (per capita income: \$2,950) and **Bangladesh** (lower than India) have been hit with very high tariffs despite their smaller share in the US trade deficit.
- **Share in the US Trade Deficit** : Countries contributing significantly to the US trade deficit like **China** and the **EU** have received high tariffs despite having higher per capita income levels.

5. Analysis of Tariffs by Country:

- **Cambodia:** Has the highest tariff at **40%**, despite accounting for only 1% of the US trade deficit.
- The country's low per capita income of **\$2,950** contributes to this high tariff.
- **Bangladesh:** With an even lower per capita income, Bangladesh faces a **37%** tariff. It contributes only **0.5%** to the US trade deficit.

- **China:** With a much higher per capita income and a **25%** share in the US trade deficit, China is subject to a **34%** tariff.
- **European Union (EU):** The EU, which accounts for almost **20%** of the US trade deficit, faces a **20%** tariff.
- **Switzerland and Singapore:** Both countries, with higher per capita incomes than the US, have been subjected to tariffs despite their positive trade relations with the US.
- **Countries with a US Trade Surplus:** Even countries with which the US has a **trade surplus** (where the US exports more to the country than it imports from it) such as the **UK, Brazil, Singapore, and Colombia**, are not spared, and tariffs have increased sharply for these regions as well.

6. India's Position:

- **Tariff on India:** India has been assigned a **26%** tariff, reflecting concerns raised by the US regarding India's trade policies.

India-US Trade Relations

- India-US Bilateral Trade (April-November 2024-25):
 - **Total trade:** \$82.52 billion
 - **Indian exports to the US:** \$52.89 billion
 - **Indian imports from the US:** \$29.63 billion
 - **India's trade surplus:** \$23.26 billion
- The US was India's **2nd-largest trading partner** during this period.

US TRADE WITH INDIA, OTHER KEY COUNTRIES

TABLE 1

TOP IMPORTS FROM THE US

Top 5 items that comprise 60% of India's imports from US (2023-24)

Items	Value
Mineral fuels & oils	12.96
Precious, semi precious stones	5.16
Nuclear reactors, boilers	3.75
Electrical machinery	2.3
Aircraft and parts	2.25

TOP EXPORTS TO THE US

Top 5 items that comprise 67% of India's exports to US (2023-24)

Items	Value
Engineering goods	17.62
Electronic goods	10.49
Gems and jewellery	9.9
Drugs and pharmaceuticals	8.72
Petroleum products	5.83

Value in \$billion

- **US Trade Department's Report on India:**

- **High Agricultural Tariffs:** India's **WTO-bound tariff rates** (tariff rates agreed upon at the World Trade Organization that a country is bound to follow) on agricultural products are among the highest in the world, averaging **113.1%**, with rates reaching up to **300%**.
- This provides India with considerable flexibility in raising tariffs at will.
- **Unilateral Tariff Increases:** India has raised tariffs multiple times without public consultation or proper notice.
- For example, in the **2019-2020 budget**, tariffs were increased on **70 product categories** without prior notification, and similar hikes were made in subsequent budgets.
- **Protectionist Policies:** The US has criticized India's increasing **protectionist stance** (policies aimed at shielding domestic industries from foreign competition), particularly since 2014.
- It includes the imposition of tariffs on various goods such as **telecommunications equipment, solar products, and electronics**.
- **Intellectual Property and FDI:** India's **IP enforcement** (the protection of patents, copyrights, trademarks, and other intellectual property) is considered inadequate, and the **FDI** (investment by a foreign entity in a country's economy) restrictions in retail are seen as obstacles to fair trade.

- **Subsidies and Distortion:** India provides substantial **subsidies** (financial assistance provided by the government to support industries) in agriculture, including **credit subsidies, debt waivers**, and subsidies for **fuel, electricity, and fertilizers**.
- These distortions affect the competitive landscape for imported products.
- **Localized Internet Shutdowns:** India has been criticized for **shutdowns of the Internet** (temporary suspensions of internet access) in various regions, disrupting commercial operations and impeding trade in the digital economy.

7. Global Economic Implications:

- **Impact on the US Economy:**

- **Slower Growth:** The tariffs are expected to **slow down global trade**, which will lead to lower economic growth both in the US and worldwide.
- Stock markets may face downward pressure as companies revise their earnings expectations.
- **Higher Inflation:** The tariffs will increase the cost of imports, contributing to higher prices for US consumers.
- This could lead to significant **inflationary pressure** (increase in the price level of goods and services) unless the US dollar strengthens to offset these higher costs.

- **Risk of Stagflation:** The US could experience **stagflation** (a situation where the economy experiences slow growth and high inflation simultaneously).
- It is a scenario which would likely create political and economic challenges for the Trump administration.
- **Impact on Global Trade:**
 - **Slower Growth Globally:** Countries around the world will face **slower economic growth** and **higher inflation** due to increased tariffs.
 - The extent of the impact will vary depending on the degree to which they depend on trade with the US.
 - **European and Asian Responses:** The **EU** (38% of global trade) and **Asia** (35% of global trade) could look to mitigate the impact by strengthening trade ties within their own regions, reducing their dependence on the US over time.

8. How Should India Navigate These Tariffs? India faces the dual challenge of protecting its **domestic policy** (policies regulating domestic industries and market access) choices while responding to external pressure. India's options include:

- **Defend Protectionist Policies:** India may choose to maintain its protectionist stance and continue raising tariffs on selected goods.
- **Reform Domestic Policies:** Alternatively, India can use the **external pressure** to implement

reforms that address global concerns, including:

- **Improved Transparency:** Reforming its tariff-setting processes to ensure greater **transparency** (clear communication of trade policies) and consistency.
- **IP Enforcement:** Strengthening **intellectual property laws** and enforcement.
- **Reform in Agriculture Subsidies:** Reducing agricultural subsidies that distort global markets.
- **FDI and Market Access:** Opening up markets further, especially in sectors like **retail** and **banking**, to attract more **foreign direct investment**.



CURRENT EVENTS OF INTERNATIONAL IMPORTANCE

Role of Global South in Achieving Ukraine Peace



1. **Context:** As the **Ukraine war edges toward a fragile ceasefire**, discussions are heating up over who should oversee the implementation of peace.
2. The Global South, encompassing nations from **Africa, Asia, and Latin America**, is emerging as a credible alternative to **NATO-led forces**. This is due to its neutral stance and extensive experience in UN peacekeeping.

What is the Global South:

- **Coalition of Developing Nations:** A group of developing countries across Africa, Asia, and Latin America advocating for more equitable global governance.
 - Example: BRICS (Brazil, Russia, India, China, South Africa) and G77 serve as its collective voice.
- **Neutrality in Ukraine War:** These nations have maintained a non-aligned position, in contrast to the West's support for Ukraine and Russia's alliances.
 - Example: India has balanced its ties with Russia (for energy imports) and Ukraine (for humanitarian aid).
- **UN Peacekeeping Legacy:** The Global South has contributed 60% of UN peacekeepers, with India alone deploying 290,000 troops in over 50 missions.

- **Economic and Diplomatic Influence:** Represents 75% of the world's population and 40% of global GDP (PPP).
- **Demand for a Multipolar World Order:** Challenges Western dominance in institutions like the UN Security Council (UNSC) and the International Monetary Fund (IMF).

Why EU/US Peace Efforts Failed in Ukraine:

- **NATO's Perceived Bias:** Russia views NATO as a threat and opposes its involvement in peace efforts, seeing its troops as "Trojan horses."
- **Lack of Trust from Moscow:** Western military aid, totaling over \$175 billion, has fueled Russian fears of encirclement and aggression.
- **Domestic Opposition in Europe:** Around 70% of French citizens opposed troop deployment in 2024, limiting the EU's political flexibility.
- **Dependence on US Leadership:** The EU lacks strategic autonomy, and ambiguous stances by leaders like Trump have undermined long-term peace efforts.
- **Escalation Risks:** Stationing NATO forces near Russian borders increases the risk of a full-scale war.

Why Ukraine Peace Matters Globally:

- **Food Security:** Ukraine's grain exports feed over 400 million people; the war has disrupted key agricultural supply chains.
- **Energy Stability:** Ongoing conflict has disrupted EU gas supplies, causing energy insecurity and price hikes worldwide.
- **Nuclear Threat:** Shelling near the Zaporizhzhia plant poses a risk of a disaster on the scale of Chernobyl.
- **Refugee Crisis:** Over 8 million displaced Ukrainians are straining host countries and European economic systems.
- **Global Economic Spillover:** War-driven disruptions have contributed to global inflation and economic instability since 2022.

Role of Global South in Securing Ukraine Peace:

- **Neutral Mediators:** Countries like India, Indonesia, and South Africa can mediate without aligning with Western blocs.
- **UN-Led Peacekeeping:** The African Union's peacekeeping efforts in Somalia and Sudan demonstrate readiness for neutral enforcement.
- **Demining and Reconstruction:** Nations like Chile and India have expertise in mine-clearing and rebuilding war-torn areas.
- **Gender-Inclusive Peacebuilding:** India's 2007 all-women UN peace unit in Liberia sets a precedent for inclusive diplomacy.
- **Financial and Logistical Support:** Institutions like the BRICS Bank and Global South organizations can provide financial and logistical assistance for post-war recovery.

Conclusion:

The Global South must take the lead in Ukraine's peace process to ensure impartiality and sustainability. India, with its extensive UN peacekeeping experience, should spearhead this mission. An UN-backed, non-NATO force offers the best hope for lasting stability.

The Beijing India Report 2024



Why in News?

- The **Beijing India Report 2024** was recently released on the **30th anniversary** of the **Beijing Declaration and Platform for Action (1995)**.

- The report highlights India's progress on **gender equality** while revealing gaps in addressing the **gender-climate nexus**.

Background: Beijing Declaration & Platform for Action (1995)

- **Adopted by the UN** at the **Fourth World Conference on Women**, this framework aimed at promoting gender equality globally.
- It identified **12 critical areas** for action, including **poverty, education, health, violence against women, and decision-making**.
- The Declaration emphasized that **women's rights are human rights** and called for **legal and social reforms** to achieve gender equality.

India's Progress

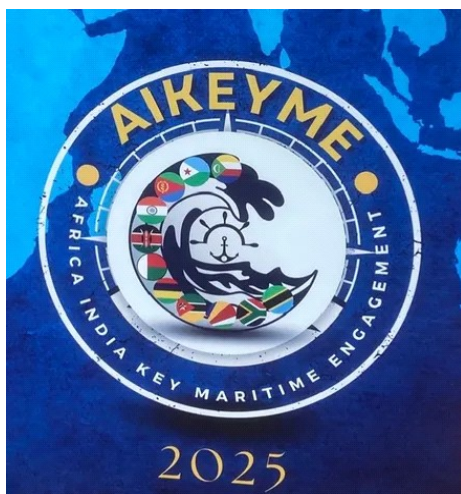
- India, as a signatory to the Beijing Declaration, has made strides in **legislation** aimed at promoting gender equality, including:
 - **Protection of Women from Domestic Violence Act (2005)**
 - **Prevention of Sexual Harassment (POSH) Act (2013)** for workplace safety.
- **However, implementation remains inconsistent**, revealing a gap between **legislation** and the **lived reality** for women in India.

India's International Commitments

India is a signatory to several **international frameworks** focused on gender equity and climate justice, including:

- **Universal Declaration of Human Rights (1948)**
- **International Covenant on Civil and Political Rights (ICCPR, 1966)**
- **Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW, 1979)**
- **UN Convention Against Corruption (2003)**
- **Agenda 2030 for Sustainable Development**
- **Beijing Declaration and Platform for Action (1995)**

Africa India Key Maritime Engagement (AIKEYME)



Why in News?

- The inaugural edition of the **Africa India Key Maritime Engagement (AIKEYME)**, a large-scale multilateral maritime exercise, began in **Dar-es-Salaam, Tanzania**.

About AIKEYME

- **AIKEYME** is a **multilateral maritime exercise** between India and African nations, inaugurated in **April 2025** in **Dar-es-Salaam, Tanzania**.
- **Co-hosting Nations:** **India** and **Tanzania** jointly host the exercise, reflecting their shared strategic interests in the **Indian Ocean Region (IOR)**.
- **Participating Nations:** 11 nations are participating: **India, Tanzania, Comoros, Djibouti, Eritrea, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, and South Africa**.
- **Primary Aim:** The exercise aims to **develop cooperative solutions** to regional maritime challenges and enhance **naval interoperability** and **coordination** between the partner navies.
- **Strategic Vision:** The exercise aligns with **India's SAGAR (Security and Growth for All in the Region)** vision and **MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions)** initiative, which was unveiled by **PM Modi** in **March 2025**.

- **Indian Naval Participation:** The Indian Navy has deployed **INS Chennai** (Destroyer), **INS Kesari** (Landing Ship Tank), and **INS Sunayna** as part of the engagement.
- **IOS SAGAR Initiative:** **INS Sunayna** is part of the **Indian Ocean Ship (IOS) SAGAR mission**, involving joint surveillance and goodwill port calls in **Tanzania, Mozambique, Mauritius, Seychelles, and the Maldives**.
- **Exercise Duration:** The exercise is being conducted over **six days** (April 13–18, 2025), divided into **harbour** and **sea phases**.

United Nations Security Council (UNSC)



United Nations
Security Council

Why in News

- **Kuwait's Permanent Representative** to the UN, who chairs the **Intergovernmental Negotiations (IGN)** on UNSC reforms, recently affirmed that **India will "surely" be a strong contender** if the **UN Security Council (UNSC)** is expanded.

Key Points

- **What is the UNSC?**
 - The **United Nations Security Council (UNSC)** is one of the **five principal organs** of the United Nations, primarily responsible for **maintaining international peace and security**.
 - Under the **UN Charter**, all **member states** are required to comply with **UNSC decisions**, including the determination of **threats to peace**, recommending **settlement methods**, imposing **sanctions**, and authorizing **military actions**.
- **Structure and Membership:**
 - The UNSC has **15 members**:

5 Permanent Members (P5) with veto power: China, France, Russia, the United Kingdom, and the United States.

10 Non-Permanent Members, elected by the **UN General Assembly** for **two-year terms**, representing various regions:

- * 5 from **Africa/Asia**
- * 1 from **Eastern Europe**
- * 2 from **Latin America**
- * 2 from **Western Europe/others**
- o The UNSC is headquartered at the **UN Headquarters** in **New York City**.
- **India's Advocacy for Reform:**
 - o **India**, along with **Brazil, Germany, and Japan** (the **G4 Nations**), is actively advocating for **UNSC reforms**.
 - o India's Permanent Representative recently declared that the **current UNSC structure** is **outdated**, no longer reflecting **contemporary geopolitical realities**.
 - o The **G4 proposal** calls for:
 - * Expanding the Council from **15 to 25 or 26 members**.
 - * Including **11 permanent members** and **14-15 non-permanent members**.
 - * Encouraging **Member States** to submit proposals for formal negotiations on reform.

Latest Development:

- Recently, **US President Donald Trump** proposed **formal recognition of Crimea as Russian territory**, potentially reversing **America's long-standing opposition** to the annexation of the region.

About Crimea:

- **Crimea** is an **autonomous republic** situated in **southern Ukraine**, located between the **Black Sea** and the **Sea of Azov**.
- The **Crimean Peninsula** is connected to mainland Ukraine through the **Perekop Isthmus**, a narrow **8 km** land strip, and is separated from the **Sea of Azov** by the **Arabat Spit**.
- The **Kerch Strait** connects Crimea to **Russia** via the **Crimean Bridge**.
- Historically known as the **Tauric Peninsula**, **Crimea** has witnessed multiple **invasions** and empires, including the **Ottomans** and **Russians**, vying for control over it.
- The **Crimean Mountains**, especially **Ai-Petri**, dominate the southern landscape, while small rivers like **Salhir** and **Alma** traverse the region.
- The **Kerch Peninsula** in the east contains **iron ore**, **mud volcanoes**, and **mineral springs**, fostering a **spa** and **mining industry**. The **Kerch Bridge** connects this area to **Russia**.
- The city of **Simferopol** serves as the **administrative capital** of Crimea, while **Sevastopol**, a deep-water port, is the base of **Russia's Black Sea Fleet**.

Crimea



The Economist

India-Bhutan 6th Joint Group of Customs (JGC) Meeting



Why in News

- The **6th Joint Group of Customs (JGC) Meeting** between **India and Bhutan** was recently held in **Thimphu, Bhutan**.
- The meeting focused on strengthening **bilateral customs cooperation**, improving **cross-border trade**, and aligning **customs procedures** with **global standards**.

Key Highlights of the Meeting

- The **India-Bhutan JGC** is an **annual mechanism** aimed at improving trade facilitation and resolving issues related to **customs procedures**.
- It focuses on **reforming customs operations**, making them **more efficient** and aligned with **global best practices**.
- The meeting underscored the importance of **customs cooperation** for facilitating the smooth flow of goods between the two nations.

Significance of India–Bhutan Customs Cooperation

- **India is Bhutan's largest trading partner**, accounting for **about 80% of Bhutan's total trade**. This makes the **customs relationship** crucial for both countries' economic exchanges.
- **Bhutan, being a landlocked country**, relies heavily on **Land Customs Stations (LCSs)** for trade. These stations are located at strategic points along the **India-Bhutan border**, with **10 LCSs** in total:
 - **6 LCSs in West Bengal**
 - **4 LCSs in Assam**
- These customs stations facilitate trade and ensure the **smooth movement of goods** between the two countries.

Key Facts about Bhutan

- **Location:** Bhutan is a **landlocked Himalayan country** bordered by **India** to the south, east, and west, and **China** (Tibet Autonomous Region) to the north
- **Indian States Bordering Bhutan:** Sikkim, West Bengal, Assam, and Arunachal Pradesh.
- **Capital:** Thimphu.

- **Economic Hub:** **Phuntsholing** is Bhutan's key **financial and trade hub**, located along the India-Bhutan border.
- **Political System:** Bhutan is a **parliamentary monarchy**, having transitioned to democracy in **2008** with the first **democratic elections**. The **King of Bhutan** remains the **Head of State**.
- **Official Name:** **Kingdom of Bhutan**.
- **Local Name:** **Druk Gyal Khap** (meaning "Land of the Thunder Dragon").
- **Longest River:** **Manas River** (376 km), a **transboundary river** that flows through southern Bhutan into India. This river is an important **ecological and trade corridor**.

India and Chile to Start Talks for Comprehensive Trade Pact : PM



1. Introduction:

- On **April 1, 2025**, Prime Minister **Narendra Modi** announced that **India** and **Chile** have initiated discussions for a **comprehensive trade pact** (an agreement to regulate trade relations, addressing various sectors such as goods, services, and investments).
- The aim of this pact is to create a **mutually beneficial** (both countries will gain from the agreement) and comprehensive economic relationship, with a focus on sectors such as mining and critical minerals.
- This announcement came after an agreement between state-owned **copper mining firms** from both countries, aiming to enhance Chile's access to India's mining market.

Key Facts about Chile:

Location & Borders:

- **Geography:** Chile is a long, narrow country located in South America with an average width of just 110 miles (~178 km).
- **Borders:**
 - **North:** Peru
 - **Northeast:** Bolivia
 - **East:** Argentina
 - **West:** Pacific Ocean
- **Overseas Territories:** Chile has sovereignty over Easter Island, the Juan Fernández Archipelago, and other islands in the Pacific Ocean.

Physical Features:

- **Mountainous Terrain:** The Andes Mountains, the longest mountain range in the world, dominate Chile's geography.
- **Deserts:** The Atacama Desert in the north, the driest non-polar desert in the world.
- **Highest Peak:** Ojos del Salado (6,893 m), an active stratovolcano located in the Atacama region.
- **Natural Hazards:** Chile is prone to earthquakes, tsunamis, and volcanic eruptions due to its position on the Pacific Ring of Fire.

Economic Importance:

- **Copper Mining:** Chile is the world's largest producer of copper, a key metal used in electronics, renewable energy, and electric vehicles.
- **Lithium Reserves:** Part of the "Lithium Triangle" along with Argentina and Bolivia, a crucial area for the global supply of lithium used in battery production.
- **Rivers:** The Loa River, Chile's longest river, originates from the Andes.

Political and Cultural Aspects:

- **Capital:** Santiago
- **Official Language:** Spanish
- **Government:** Unitary Presidential Republic
- **Cultural Heritage:** Chile has a rich blend of

European and Indigenous influences, particularly Spanish colonial heritage.

- **Geopolitical Significance:** Chile is known as the "Gateway to Antarctica" due to its proximity to the Southern Hemisphere.



Key Terms and Concepts Explained:

- **Comprehensive Trade Pact:** An agreement that covers multiple sectors of trade, such as goods, services, and investments, between two or more countries.
- **Memorandum of Understanding (MoU):** A formal agreement between two or more parties that outlines their intentions to cooperate in specific areas without the legal binding force of a contract.
- **Critical Minerals:** Essential minerals that are important for advanced technological processes, including those used in electronics, renewable energy, and defense sectors.
- **Mineral Beneficiation:** The process of improving the quality of raw minerals to make them more usable for various industries.
- **Letter of Intent:** A non-binding document that signifies a commitment by parties to negotiate and enter into an agreement in the future.
- **UN Security Council (UNSC):** One of the 5 main organs of the United Nations, responsible for maintaining international peace and security. It consists of 5 permanent members and 10 non-permanent members.
- **Dialogue:** A peaceful method of resolving conflicts through communication and negotiation.

- **Soft Power:** The ability to influence others through cultural, ideological, and diplomatic means rather than coercive methods like military force.

2. Bilateral Trade and Diplomatic Relations:

- **Mining Deal and MoUs:** During the event at **Hyderabad House**, 3 MoUs and an agreement were signed.
- A key agreement was the **Agreement for Cooperation and Exchange of Information** between **CODELCO** (Corporación Nacional del Cobre de Chile, the national copper corporation of Chile, and the world's largest copper producer) and **Hindustan Copper Limited** (India's state-owned copper mining company).
- The deal aims to promote cooperation in **mining exploration** and **mineral beneficiation**.
- Sharing knowledge and expertise in these areas will enhance the capabilities of both sides.

3. Focus on Critical Minerals:

- **Critical minerals** (minerals essential for advanced technologies, such as lithium, cobalt, copper, etc.) will be a priority in these discussions.
- Both countries aim to create **resilient supply and value chains** for these minerals, which are essential for various industries, particularly in renewable energy and technology.

4. India-Chile Cooperation in Antarctica:

- **Gateway to Antarctica:** Chile is strategically located near **Antarctica**, and Prime Minister Modi described it as a "gateway to Antarctica."
- Both countries signed a **Letter of Intent** (a document outlining the intention to engage in a future agreement) to deepen their cooperation in the exploration of Antarctica.
- This cooperation will be based on sharing scientific research and resources related to **Antarctic exploration**.
- **Digital Infrastructure and Renewable Energy:** India expressed its readiness to share its

experience in sectors like **digital public infrastructure** (technological systems and services provided by the government, such as e-governance, digital identity, etc.), **renewable energy**, and **railways** highlighting India's expanding role in global innovation.

5. Yoga and Cultural Exchange:

- Prime Minister Modi also mentioned that Chile has embraced **Yoga** as part of a healthy lifestyle.
- Chile officially declared **November 4 as National Yoga Day**, a recognition of India's cultural influence and soft power.

6. Enhancing Diplomatic Relations:

- **7 Decades of Relations:** President **Gabriel Boric Font** of Chile visited India to **consolidate the bilateral relationship**, which has spanned over **7 decades**.
- This visit marks a significant step in strengthening the ties between the two nations, with Chile aiming to deepen its relationship with India in various sectors.

7. Cooperation on International Issues:

- **UN Security Council Reform:** India and Chile agreed on the need for **reform in the UN Security Council (UNSC)**.
- Both nations emphasized that international disputes should be resolved through **dialogue**.
- They also concurred that a reformed UNSC would be crucial for addressing global crises more effectively.
- **International Disputes:** Although Chile has disputes with neighboring countries like **Peru** and **Argentina**, it has played a significant role in crisis resolution.
- For instance, Chile condemned Russia's military actions in Ukraine and participated in a peace summit focused on resolving the **Ukraine-Russia conflict**.

Conclusion:

The cooperation between India and Chile is poised to strengthen in critical sectors like mining, technology, and international diplomacy. The trade

pact and agreements signed during President Boric's visit reflect the shared interest in enhancing the economic and diplomatic ties between the two nations. This move also highlights India's growing role in global issues, particularly in areas like sustainable energy, scientific cooperation, and peacebuilding.

6th BIMSTEC Summit



- **Date & Host:** The **6th BIMSTEC Summit** was hosted by **Thailand**, the current chair of the BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation).
- **Theme:** "BIMSTEC: Prosperous, Resilient, and Open."
- **Prime Minister Narendra Modi's Participation:** PM Modi participated and presented a **21-point action plan** to enhance cooperation among the BIMSTEC countries.

Prime Minister's Statement at the 6th BIMSTEC Summit :

Opening Remarks:

- **Gratitude to Thailand:** PM Modi expressed **Gratitude to Prime Minister Her Excellency Shinawatra** and the **Government of Thailand** for organizing the Summit so well.
- **Condolences for Earthquake Victims:** On behalf of the people of India, PM conveyed **deep condolences** for the **loss of lives and property** caused by the recent **earthquake in Myanmar and Thailand** and wished a speedy recovery to those affected.

BIMSTEC's Importance and Leadership:

- **Leadership Acknowledgment:** PM Modi praised **Prime Minister Shinawatra** and her team for their **strong leadership** in guiding BIMSTEC over the last 3 years.

- **BIMSTEC as a Bridge:** He highlighted that **BIMSTEC** acts as an **important link** between **South and Southeast Asia** and is becoming a **strong platform** for **regional cooperation, growth, and shared prosperity**.
- **BIMSTEC Charter:** PM mentioned that the **BIMSTEC Charter** came into effect last year and expressed confidence that the **Bangkok Vision 2030** will help build a **more prosperous, secure, and inclusive** Bay of Bengal region.

Proposals for Strengthening BIMSTEC:

- **Institutional Strengthening:**
 - PM emphasized the need to **expand BIMSTEC's role** and **strengthen** its institutions.
 - The **Home Ministers' Mechanism** will help fight **cybercrime, terrorism, drug trafficking, and human trafficking**.
 - India offered to host the **first meeting** of this mechanism later this year.
- **Connectivity Initiatives:**
 - **Physical, digital, and energy connections** are key to regional progress.
 - The **BIMSTEC Energy Centre** in **Bengaluru** has started its work.
 - PM proposed faster progress toward **electric grid connection** across the region.
 - India shared its **Digital Public Infrastructure (DPI)** and offered to conduct a **study** to understand the needs of BIMSTEC countries in this area.
 - **Connecting payment systems**, especially linking **India's UPI** with other BIMSTEC countries, will benefit **trade, business, and tourism**.
- **Economic Connectivity:**
 - PM proposed creating a **BIMSTEC Chamber of Commerce** and holding an **annual BIMSTEC Business Summit** to increase **economic ties** among member nations.

- He also suggested a **feasibility study** to look into **trade in local currencies** within BIMSTEC countries.

Maritime and Security Cooperation:

- **Indian Ocean Security:** PM confirmed the shared goal of a **free, open, and safe Indian Ocean**.
- The **Maritime Transport Agreement** signed at the summit will boost cooperation in **shipping and cargo transport**.
- **Sustainable Maritime Transport Centre:** India proposed setting up this Centre to support **capacity building, research, innovation, and better coordination on maritime policies**.
- It will also work on improving **maritime security** in the region.

Disaster Management and Public Health:

- **Disaster Management:**
 - In light of the recent earthquake, PM emphasized the region's vulnerability to **natural disasters**.
 - India proposed the **BIMSTEC Centre of Excellence for Disaster Management** to improve **preparation, relief, and recovery** efforts.
 - India will also host the **4th Joint Exercise for BIMSTEC Disaster Management Authorities** later this year.
- **Cancer Care and Traditional Medicine:**
 - India committed to providing **training and support** for cancer care in BIMSTEC countries and setting up a **Centre of Excellence** to promote **research on traditional medicine**.
- **Agriculture:**
 - PM proposed creating a **Centre of Excellence** in India to share **agricultural knowledge**, promote **research**, and build **skills** for farmers in the region.

Scientific and Technological Cooperation:

- **Space Cooperation:** India proposed sharing its **space expertise**, including **training for**

personnel, developing nano-satellites, and using remote sensing data for BIMSTEC countries.

Youth Development and Cultural Initiatives:

- **BODHI Initiative:**
 - The **BODHI (BIMSTEC for Organized Development of Human Resource Infrastructure)** initiative will train **300 young people** from BIMSTEC countries every year in India, focusing on **skills development**.
- **Scholarships and Training:**
 - India will offer **scholarships** to BIMSTEC students at India's **Forestry Research Institute** and expand the **scholarship scheme** at **Nalanda University**.
 - An annual **training program for young diplomats** from BIMSTEC countries will also be organized.
- **Cultural Heritage:**
 - PM highlighted the region's **shared cultural heritage**, including examples like **'Bali Jatra' of Odisha, Buddhist and Hindu traditions, and linguistic connections**.
 - To celebrate this, India will host the **BIMSTEC Traditional Music Festival** later this year.
- **Youth Exchange Programs:**
 - India will host the **BIMSTEC Young Leaders' Summit** and launch the **BIMSTEC Hackathon** and **Young Professional Visitors Programme** to encourage **innovation and collaboration**.

Sports and Celebrations:

- **BIMSTEC Athletics Meet:** India will organize the **BIMSTEC Athletics Meet** in 2025.
- **BIMSTEC Games (2027):** India will host the **first BIMSTEC Games** in **2027** to celebrate BIMSTEC's **30th anniversary**.
- **Inclusive Development and Collective Security:**

- PM Modi stated that BIMSTEC is a **model for inclusive growth** and **collective security**.
- It is also reflecting the spirit of “**Sabka Saath, Sabka Vikas, Sabka Prayas**” (Together, For Everyone’s Growth, Through Everyone’s Effort).

- **Congratulations to Bangladesh:**

- In conclusion, PM Modi warmly welcomed **Bangladesh** as the **incoming Chair of BIMSTEC** and wished them success in leading the group.

About Tipitaka (World Tipitaka):

- **Presented to PM Modi:** The Thai Prime Minister presented PM Modi with **The World Tipitaka: Sajjhaya Phonetic Edition**, a significant Buddhist text.
- **Significance of Tipitaka:** The **Tripitaka** (meaning “Three Baskets”) is the foundation of **Buddhist scriptures** and consists of three parts:
 - **Vinaya Pitaka:** Rules for monastic life.
 - **Sutta Pitaka:** Buddha’s discourses and teachings.
 - **Abhidhamma Pitaka:** Philosophical and psychological analyses of Buddhism.
- **Pali Canon:** Another name for the **Tripitaka** in Theravada Buddhism.

Key Agreements & Documents Adopted at the Summit:

- **Summit Declaration:** Highlights the shared vision and commitments for a **Prosperous, Resilient, and Open BIMSTEC**.
- **BIMSTEC Bangkok Vision 2030:**
 - A comprehensive roadmap for the next 5 years.
 - Aligns with the **UN Sustainable Development Goals (SDGs)**.
 - Focuses on:
 - * **Prosperity** (trade, sustainable development, poverty alleviation),
 - * **Resilience** (agriculture, public health, disaster preparedness),

- * **Openness** (tourism, connectivity, inclusiveness).

- **BIMSTEC Maritime Transport Cooperation Agreement:**

- Aims to enhance **cargo** and **passenger movement** across the **Bay of Bengal**.
- Establishes a **Joint Shipping Coordination Committee** and a **structured dispute resolution mechanism**.

- **Rules of Procedure for BIMSTEC Mechanisms:**

- Complements the **BIMSTEC Charter (2022)**, enhancing **institutional clarity, decision-making, and functional coherence**.

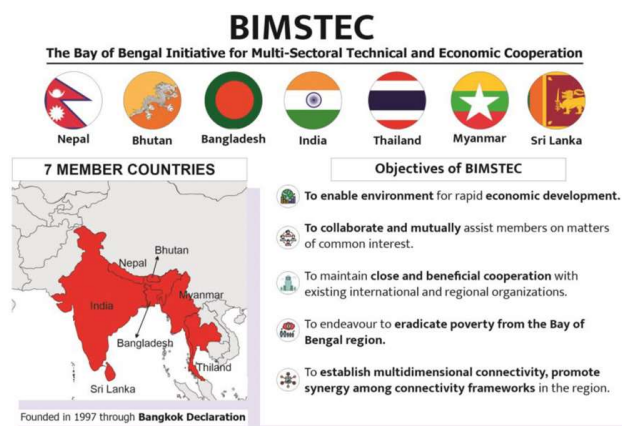
- **MoUs with International Organizations:**

- **Indian Ocean Rim Association (IORA):** Expands external cooperation on **maritime** and **blue economy** sectors.
- **UNODC:** Strengthens collaboration in **counter-narcotics, criminal justice reform, and transnational crime prevention**.

- **Approval of Eminent Persons Group (EPG) Report:**

- Provides strategic recommendations for:
 - * **Institutional reform,**
 - * **Sectoral prioritization,**
 - * **Long-term visioning for BIMSTEC.**

What is BIMSTEC:



- **Formation:** Founded in **June 1997** as BIST-EC, later expanded to BIMSTEC in 2004.
- **Members:** **Bangladesh, Bhutan, India, Nepal, Sri Lanka, Myanmar, Thailand.**
- **Represents:** Over **1.7 billion people** (22% of the global population).
- **GDP:** A combined GDP of approximately **USD 4.5 trillion.**
- **Permanent Secretariat:** Located in **Dhaka, Bangladesh.**

BIMSTEC's Strategic Importance for India:

1. **Strategic Bridge:** Acts as a link between **South Asia** and **Southeast Asia**, central to India's **Act East Policy**.
2. **Alternative to SAARC:** BIMSTEC excludes **Pakistan**, facilitating smoother cooperation.
3. **Connectivity & Energy:**
 - **India–Myanmar–Thailand Trilateral Highway** is a key project connecting India's Northeast with ASEAN nations.
 - India hosts the **BIMSTEC Energy Centre** in **Bengaluru**, working on projects like **electric grid interconnection** and **renewable energy**.
4. **Security Cooperation:** India leads **counter-terrorism, cybersecurity, and disaster management** initiatives within BIMSTEC.
5. **Cultural Diplomacy:** India promotes **youth engagement, sports, and cultural exchanges** through various initiatives like the **BIMSTEC Games (2027)** and **Traditional Music Festival**.

Key Differences Between BIMSTEC and SAARC:

1. **Geopolitical Scope:** BIMSTEC bridges **South Asia** and **Southeast Asia**; SAARC is confined to **South Asia**.
2. **Exclusion of Pakistan:** BIMSTEC excludes **Pakistan**, facilitating smoother cooperation compared to SAARC's deadlock due to **India-Pakistan tensions**.
3. **Functional vs Political Focus:** BIMSTEC is focused on **functional cooperation** (trade, connectivity, disaster management), while SAARC has often been stalled by **political rivalry**.

4. Summits and Progress:

- BIMSTEC has held **4 summits** since **2016**.
- SAARC has **not met since 2014**, rendering it largely **inactive**.

5. Sectoral Leadership: BIMSTEC has restructured sectors with **member countries leading specific areas (e.g., India leads Security, Thailand leads Connectivity).**

6. India's Role: India's leadership is more welcomed in BIMSTEC, whereas in SAARC, **Pakistan's resistance** often hinders progress.

Challenges Faced by BIMSTEC:

1. Slow Implementation of Projects:

- **FTA** signed in 2004 remains **unimplemented**.
- Connectivity projects like the **Trilateral Highway** and **Kaladan Project** face delays due to funding and land acquisition issues.

2. Weak Institutional Capacity:

- The **BIMSTEC Secretariat** is understaffed and underfunded.
- Lack of a **permanent funding mechanism** hinders the execution of large-scale initiatives.

3. Political Consensus:

- BIMSTEC functions on a **consensus model**, which sometimes leads to **policy paralysis**.

4. Regional Tensions:

- **Myanmar's political instability** and other bilateral disputes occasionally affect cooperation.

5. Low Intra-Regional Trade:

- Intra-regional trade remains **below 10%**, despite efforts to implement the **FTA**.

6. Visibility & Public Awareness:

- BIMSTEC lacks the **visibility** of groups like **ASEAN** and faces challenges in raising public and private sector engagement.

Way Forward for BIMSTEC:

1. **Speed Up Implementation:** Accelerate pending agreements like the **FTA** and **Coastal Shipping Agreement**.
2. **Strengthen Institutions:** Augment the **BIMSTEC Secretariat** with more staff and resources.
3. **Enhance Connectivity:** Ensure the **BIMSTEC Master Plan for Transport Connectivity** is implemented with **digital infrastructure** and **cross-border power grids**.
4. **Promote Regional Cooperation:** Engage the private sector, civil society, and academia to drive initiatives.
5. **Deepen Security Cooperation:** Increase counter-terrorism, cybersecurity, and maritime security cooperation.

Conclusion:

The **6th BIMSTEC Summit** demonstrated **India's leadership** in advancing regional integration. The initiatives presented at the summit focus on **enhancing connectivity, trade, security, energy cooperation, and cultural diplomacy**, contributing to India's vision for **shared prosperity, sustainable growth, and peace** across the **Bay of Bengal region**. With its exclusion of politically contentious issues like Pakistan, BIMSTEC is emerging as a **more effective regional platform** than SAARC for **functional cooperation**.

Cambodia Hails Opening of Naval Base Renovated by China



Context :

- On **April 5, 2025**, Cambodia's Prime Minister **Hun Manet** inaugurated the **Ream Naval Base** following renovations funded by **China**.
- The event comes after growing concerns raised by **the United States** regarding China's strategic involvement in the base.
- It is located along Cambodia's southern coastline in the **Gulf of Thailand**.
- Cambodia's leadership has repeatedly denied that the base is being built for exclusive Chinese use, emphasizing its openness to joint exercises and international cooperation.

2. Background of the Base and Strategic Importance:

Location of Ream naval base in Cambodia



- The **Ream Naval Base**, situated near the **disputed South China Sea**, has been a point of contention due to its potential to provide **China** with a key **strategic position** in the region.
- The **South China Sea** is a critical waterway with overlapping territorial claims by multiple countries, including **China, Vietnam, and the Philippines**.
 - **China's Role in Renovation:**
 - * Since **2022**, China has been contributing to the **revamping** of the base, which was originally **partly funded by the United States**.

- * The base now features a **363-meter pier** and facilities designed for hosting **military operations**, including **joint military exercises**.
- **US Concerns:**
 - * The **United States** has expressed concerns that the base could be used by the **Chinese navy**, potentially expanding China's **military footprint** in Southeast Asia.
 - * These concerns stem from a **2019 report** suggesting a **secret agreement** for China to use the base for **warships**.
 - * further intensifying suspicions about the region's military balance.

4. The Geopolitical Context:

Cambodia's growing alliance with **China** has become a significant part of its foreign policy in recent years. As a longstanding ally of **China** in **Southeast Asia**, Cambodia has:

- **Bilateral Investments:**
 - China has invested billions in **Cambodian infrastructure** under the **Belt and Road Initiative (BRI)**, strengthening **economic ties** between the two nations.
 - This has led to **increased Chinese influence** over Phnom Penh, especially as **Washington's relationship with Cambodia** has become more strained in recent years.
- **US-Cambodia Relations:**
 - The **US-Cambodia** relationship has declined in recent years, particularly after a **2019 Wall Street Journal report** that raised concerns over a secret deal that would allow **China** to station **warships** at the **Ream base**.

- This has led to further **US military visits** to Cambodia in recent years, including the docking of a **US warship** at **Sihanoukville** in **December 2023**.
- **Japan-Cambodia Cooperation:**
 - In contrast, **Japan** has also strengthened its ties with **Cambodia**, and recently, a **Japanese warship** became the first to dock at the **Ream Naval Base**.
 - It is signaling **Japan's strategic interest** in the region.

5. Cambodia's Defense Modernization:

The **Ream Naval Base** is part of Cambodia's broader **defense modernization** efforts, which include:

- **Warship Donations from China:**
 - China has pledged to **donate two warships** to Cambodia.
 - boosting the country's naval defense capabilities.
- **Strengthened Defense Relations with Other Nations:**
 - Cambodia has also **expanded defense ties** with other powers like the **United States** and **Japan** to balance its relations with **China** and ensure regional stability.

Implications for India and the Indo-Pacific

- **Concerns for India:**
 - The expansion of the **Ream Naval Base** has significant consequences for India, particularly in relation to its maritime interests in the **Indo-Pacific region**.
 - The base's location near vital sea lanes frequently used by the **Indian Navy** raises alarms about the potential for strategic encirclement.
 - If the **People's Liberation Army Navy (PLAN)** establishes a presence there, it could hinder India's operations in the region, especially during regional conflicts.

- **Impact on Maritime Security:**
 - An increased Chinese presence at Ream would enhance its naval capabilities in Southeast Asia, potentially challenging India's interests in both the Bay of Bengal and the Indian Ocean Region.
 - As a result, India may need to bolster its naval presence in the Andaman and Nicobar Islands to more effectively monitor and counter Chinese activities in these key waters.

Prime Minister Modi's Visit to Sri Lanka



1. Prime Minister Narendra Modi arrived in **Colombo, Sri Lanka** on the night of **April 4, 2025**, for a 2 -day visit.
2. This visit came shortly after PM Modi's participation in the **BIMSTEC Summit** in **Thailand**, marking it as part of a broader regional diplomatic engagement.
3. **Theme of the Visit: "Friendship of Centuries – Commitment to a Prosperous Future"**
4. The visit focused on strengthening the bilateral relationship between India and Sri Lanka, addressing key strategic, economic, and cultural issues, and signing several significant agreements.

Historical Context:

1. Modi's visit came after Sri Lanka experienced a major political shift in **2024**, with the rise of **President Anura Kumara Dissanayake** from the **National People's Power (NPP)** alliance.
2. PM Modi is the **first foreign leader** to visit Sri Lanka since **President Anura Kumara Dissanayake** took office in **September 2024**.

3. **December 2024** saw Dissanayake's first official visit to **India**, where both nations laid out a roadmap for future cooperation in a **joint statement**.

Key Updates :

1. PM Modi's Arrival and Welcoming Ceremony :

- a. **Prime Minister Modi** was warmly welcomed at **Bandaranaike International Airport** by **five top Sri Lankan ministers**, including **Foreign Minister Vijitha Herath**, **Health Minister Nalinda Jayatissa**, and **Fisheries Minister Ramalingam Chandrasekar**.
- b. PM Modi was also given a **guard of honor** at **Independence Square** in **Colombo**.
- c. It is marking his **4th visit** to Sri Lanka in the last decade.
- d. Additionally, The ceremonial welcome was a reflection of the **strong and deep-rooted** ties between India and Sri Lanka, with both nations celebrating shared **cultural, historical**, and **spiritual heritage**.

2. Bilateral Talks with President Dissanayake : Addressing Key Issues:

- PM Modi held extensive **delegation-level talks** with President **Anura Kumara Dissanayake**. Their discussions included several key areas:
 - A significant **defence cooperation agreement** was signed.
 - It is marking a moment in the relationship, particularly given the **35-year history** since India withdrew its **Indian Peace Keeping Force (IPKF)** from Sri Lanka.
 - This agreement is expected to enhance both countries' **security** and **defence collaboration**.
 - **Economic Support:** PM Modi reaffirmed India's commitment to Sri Lanka's economic recovery, especially in light of the **2019 economic crisis** and **Sri Lanka's financial distress in 2022**.
 - India had previously extended **\$4.5 billion** in financial aid during the crisis.

- o One of the major highlights of the visit was the signing of **debt restructuring** agreements.
- o Over the past 6 months, India has converted over **\$100 million** in loans into **grants**, helping Sri Lanka recover.
- o India has also agreed to **reduce interest rates** to provide financial relief.
- o **Currency Swap Agreement:** A separate **currency swap agreement** was finalized to **stabilize Sri Lanka's foreign reserves**.
- o It is a crucial aspect of their ongoing economic recovery.

3. Virtual Inauguration:

1. Several significant projects were launched:

- a. 5000 solar rooftop units installed at religious places across Sri Lanka.
- b. A temperature-controlled warehousing facility at Dambulla.
- c. The **120 MW Sampur Solar Power Project** was also inaugurated by PM Modi and President Dissanayake.
- d. Both nations signed an agreement to develop **Thirukoneswaram temple (Trincomalee)**. It is located in the east of Sri Lanka, as an **energy hub**.
 - * **Sacred City (Anuradhapura), and the Sita Eliya temple complex (Nuwara Eliya) will receive Indian support for development.**
- e. PM Modi also announced a comprehensive training program, supporting 700 Sri Lankan citizens annually in various skill development initiatives.
- f. This project is expected to boost Sri Lanka's energy sector and create long-term economic opportunities.
- g. India also pledged **multi-sectoral grant assistance** for the **eastern region** of Sri Lanka, including support for

infrastructure development and **humanitarian aid**.

2. Cultural Cooperation:

- a. In alignment with the shared Buddhist heritage, PM Modi announced the **Holy Relics of Lord Buddha from Gujarat would be sent to Sri Lanka** for the **International Vesak Day celebrations in May 2025**.

3. Digital Cooperation:

- a. Another **MoU** was signed to strengthen collaboration in the **digital** domain.
- b. This pact will focus on enhancing Sri Lanka's **digital infrastructure** and increasing **cybersecurity** cooperation between the two countries.

4. Addressing the Fishermen Issue

1. The longstanding issue of **Indian fishermen** being detained by Sri Lankan authorities was discussed.
2. **Foreign Secretary of India** explained that the issue originated in **1974** when the **international maritime boundary line** was drawn.
3. And escalated with the **Fisheries and Aquatic Resources Act of 1996** and subsequent amendments in **2018** and **2023**, which imposed **stricter penalties** on fishermen violating Sri Lanka's territorial waters.
4. **PM Modi** and **President Dissanayake** agreed on the need for a **humanitarian approach** to resolve the matter with further discussions expected to take place between the 2 governments to ensure the **release** of detained fishermen.

5. Additional Diplomatic Developments

1. President Dissanayake requested PM Modi's intervention to facilitate **technical discussions** regarding Sri Lanka's claim to extend the **continental shelf** beyond its **exclusive economic zone**.
2. Sri Lanka is seeking to assert its maritime boundaries in the **United Nations**.

3. PM Modi also paid a visit to the **Indian Peace Keeping Force (IPKF) memorial**, honoring the Indian soldiers who sacrificed their lives during the peacekeeping operations in Sri Lanka in the 1980s.
4. PM Modi emphasized **Sri Lanka's importance** in India's **Neighbourhood First Policy** and **Vision MAHASAGAR**.

Key Facts: PM Modi Awarded Sri Lanka's Mitra Vibhushana



1. **Award: Sri Lanka Mitra Vibhushana**, Sri Lanka's highest civilian honour
2. **Awarded to PM Modi:**
3. **Awarded by: Sri Lankan President Anura Kumar Dissanayake**
4. **Reason:** Recognized for his **exceptional contributions** to strengthening **India-Sri Lanka relations** and his role in promoting **friendship and solidarity** between the two nations.
5. **Significance of the Award:**
 - a. **Mitra Vibhushana** is **Sri Lanka's highest civilian honour** for foreign dignitaries who have shown **deep friendship and solidarity** with Sri Lanka.
 - b. It is the foremost award granted to foreigners, **ranking higher** than other national honours like the **Sri Lanka Ratna** (equivalent to Bharat Ratna in India).
6. **Prime Minister Modi's Dedication:**
 - a. PM Modi dedicated the award to **India's 1.4 billion people** and the

deep-rooted friendship between India and Sri Lanka.

- b. The visit was framed under the theme: **"Friendship of Centuries – Commitment to a Prosperous Future."**

7. Award Details:

a. Medal Composition:

- * **Silver medal** studded with **Navarathna** (nine Sri Lankan gems).
- * **Globe** surrounded by **lotus petals**, symbolizing global unity and harmony.
- * **Pun Kalasa** (ceremonial pot with rice sheaves), symbolizing **prosperity and renewal**.
- * **Symbols of the Sun and Moon**, representing the **timeless nature** of the relationship.
- * **Dharma Chakra** at the center, signifying the shared **Buddhist heritage** of both nations.

- b. **Ribbon:** Worn around the neck with a **6.5 cm wide ribbon**.

8. Historical Context of the Award:

- a. **Instituted:** In **2008** by then-President **Mahinda Rajapaksa**.

9. Past Recipients:

- a. **2008:** The inaugural recipient was **Maldives President Maumoon Abdul Gayoom**, recognized for his efforts in **enhancing bilateral relations** and regional cooperation.
- b. **2014:** The award was given to **Palestinian President Mahmoud Abbas** and **former President Yasser Arafat** (posthumously) for their contributions to international peace and cooperation.

10. PM Modi's 22nd International Honour:

- a. The **Mitra Vibhushana** is **PM Modi's 22nd international award**, underscoring his global influence and India's growing diplomatic footprint.

Historical Ties Between India and Sri Lanka

1. Cultural and Religious Connection:

- a. **Buddhism** was introduced to Sri Lanka in the 3rd century BCE by **Emperor Ashoka's son Mahinda**, creating a long-standing cultural and religious bond.
- b. **Chola Dynasty** (10th century CE) invasions from South India left a lasting cultural impact on Sri Lanka, influencing **art, architecture, and language**.

2. Independence and Political Cooperation:

- a. Both nations gained independence from British rule, with **India** in 1947 and **Sri Lanka** in 1948. India assisted Sri Lanka in establishing democratic institutions post-independence.

3. Sri Lankan Civil Conflict:

- a. The **Liberation Tigers of Tamil Eelam (LTTE)** formed in 1976, sparking an armed conflict with Sri Lankan forces from 1983 to 2009.
- b. The **1987 Indo-Sri Lanka Agreement** led to the introduction of the **13th Amendment** and the deployment of the **Indian Peace Keeping Force (IPKF)** in Sri Lanka to aid in peace efforts.
- c. The assassination of **Rajiv Gandhi** in 1991 by LTTE members shifted India's approach to the conflict.

4. End of Civil War (2009):

- a. Sri Lanka's **Civil War** ended through a military operation, but the aftermath has continued to shape bilateral relations, especially regarding the Tamil population.

What is the 13th Amendment to the Constitution of Sri Lanka ?

The **13th Amendment** to the **Constitution of Sri Lanka** was enacted in **1987** as part of the **Indo-Sri Lanka Accord**. It aimed to address the **demands for greater autonomy from the Tamil minority, particularly in the Northern and Eastern provinces, which had been a**

focal point of civil conflict.

Key Features:

1. **Devolution of Powers:** It allows for the **transfer of certain powers from the central government to provincial councils**. This includes areas like **agriculture, health, education, and local governance**.
2. **Official Languages:** **Tamil and English were recognized as official languages alongside Sinhala**.
3. **Provincial Councils:** Elected councils were established for each province, enabling local governance and legislative powers.

Context:

The amendment was **intended to promote peace and reconciliation following a prolonged civil war between the Sri Lankan government and the Liberation Tigers of Tamil Eelam (LTTE)**. However, the full implementation of the amendment has faced challenges, particularly in the Tamil-majority regions.

India's Engagement with Sri Lanka Across Various Fields

1. Economic Cooperation:

- a. **India-Sri Lanka Free Trade Agreement (ISFTA)** (2000) boosted trade relations.
- b. India is Sri Lanka's largest trading partner, and Sri Lanka is one of India's key trading partners in the **SAARC** region.

2. Cultural Relations:

- a. Shared **Buddhist heritage** connects both countries, jointly celebrating Buddha's enlightenment anniversary.
- b. The **Cultural Cooperation Agreement** (1977) promotes cultural exchange programs, and the **Indian Cultural Centre** in Colombo organizes various cultural events.

3. Defence and Security Cooperation:

- a. Since 2012, India has participated in the **Indo-Sri Lankan Defence Dialogue**, and both nations conduct joint **military** (Mitra Shakti) and **naval** (SLINEX) exercises.

4. Multilateral Cooperation:

- a. Both nations are active members of **SAARC, BIMSTEC**, and the **Indian Ocean Rim Association (IORA)**, and collaborate in global organizations like the **United Nations** and the **World Bank**.

China's Expanding Footprint in Sri Lanka - A Strategic Concern for India

1. Chinese Investments in Sri Lanka:

- a. Sri Lanka has **received \$3.7 billion** in investments from China, primarily for infrastructure development.
- b. Key investments include:
 - * **New oil refinery in Hambantota.**
 - * Expansion of **Belt and Road Initiative (BRI)** projects in Sri Lanka.

2. Hambantota Port - Security Flashpoint:

- a. **Hambantota Port** is a **key strategic asset** that has become a **security concern** for India.
 - * The port was **leased to China for 99 years** after Sri Lanka defaulted on **loan repayments** to China.
 - * The lease raised concerns about **China's growing influence** in the Indian Ocean region and its potential military use.

3. Chinese Vessels in Sri Lanka:

- a. Chinese **surveillance vessels**, such as **Yuan Wang 5**, have docked at the Hambantota port, further escalating security concerns for India.
- b. These vessels are believed to be involved in **maritime surveillance**, raising alarms about **China's strategic and military interests** in the region.

4. Sri Lanka's Position:

- a. Despite India's concerns, Sri Lanka continues to allow **Chinese vessels** to

dock at its ports under the **pretext of "replenishment"**.

- b. This continued access to strategic ports has **complicated Sri Lanka's relationship with India**, especially in terms of maritime security.

PRESIDENT OF INDIA'S VISIT TO PORTUGAL



Context:

- On **April 7, 2025**, the President of India, **Smt. Droupadi Murmu**, visited **Portugal** as part of a state visit.
- This visit marks a significant moment in **India-Portugal bilateral relations**, especially as both countries celebrate **50 years of diplomatic ties**.

City Key of Honour – A Symbol of Friendship

- The **Mayor of Lisbon** presented the '**City Key of Honour**' to President Murmu at the **Lisbon City Hall**.
- This is a **symbolic gesture of respect and friendship**, acknowledging the strong and growing relationship between the two nations.
- The President appreciated Lisbon's cultural diversity, technological innovation, and global outlook, noting the **potential for cooperation** in areas like **digital transition and innovation**.

Banquet by the President of Portugal

- A **banquet was hosted in her honour** by **President Marcelo Rebelo de Sousa** at **Palacio da Ajuda**.

- In her remarks, President Murmu emphasized the **centuries-old cultural ties** between India and Portugal.
- These ties are visible in shared **architectural styles, historical monuments, linguistic influences, and culinary traditions**.

Key Areas of Bilateral Cooperation

President Murmu highlighted the growing cooperation in several areas:

Science and Technology

- Both countries are engaging in **joint research, technological innovation**, and scientific exchanges.

Defence

- There's a growing interest in **defence partnerships**, joint training, and **strategic collaboration**.

Startups & Innovation

- Focus on **start-up ecosystems, digital entrepreneurship**, and innovation-driven economic models.

Education and Culture

- Collaboration between **academic institutions** and promotion of **cultural exchange programs**.

Information and Communication Technology (ICT) & Digital Infrastructure

- Portugal is seen as a **key partner in India's digital journey**, including **Digital Public Infrastructure (DPI)** initiatives.

India as a Knowledge-Based Economy

- President Murmu reiterated India's focus on becoming a **knowledge-based, innovation-driven economy**.
- Areas of emphasis include:
 - **Digital technology**
 - **Sustainable development**
 - **Inclusivity through tech and innovation**

Portugal's Role in India-EU Relations

- Portugal has historically supported **India-EU ties**:
 - Hosted the **1st India-EU Summit (2000)**.

- Hosted the **India-EU+27 Summit (2021)** under its EU presidency.

Global Significance of the Visit

- This visit underlines **India's strategic diplomacy in Europe**.
- Strengthens India's ties with **smaller but influential EU nations** like Portugal.
- It promotes **multilateral cooperation**, enhances **soft power**, and supports India's role as a **global tech and cultural leader**.

India-Italy Relations and the India-Middle East-Europe Economic Corridor (IMEEC)



1. Introduction

- **India and Italy have been deepening their bilateral relationship** across multiple sectors including trade, defence, clean energy, and high technology.
- A recent progress in this evolving partnership was marked by the **visit of Italian Deputy Prime Minister and Foreign Minister Antonio Tajani to India in April 2025**.
- During his visit, India and Italy agreed to strengthen cooperation under the framework of the **Joint Strategic Action Plan (JSAP) 2025–2029**.
- He also reaffirmed their commitment to the implementation of the **India-Middle East-Europe Economic Corridor (IMEEC)**.

2. India-Italy Bilateral Relations:

Historical Background

- India and Italy established **diplomatic relations in 1947**, the same year India gained independence.

- The ties between the two nations have historically been rooted in shared cultural values, cooperation in the fields of architecture, art, design, and education.

Strategic Partnership

- India and Italy elevated their relationship to a **Strategic Partnership** in March 2023 during the visit of Italian Prime Minister **Giorgia Meloni** to India.
- This signaled a commitment to long-term collaboration in key strategic areas including defence, technology, and global governance.

High-Level Engagements

- Since the announcement of the strategic partnership, there has been a steady exchange of high-level visits and policy coordination.
- Prime Minister Narendra Modi met PM Giorgia Meloni during the **G20 Summit in Brazil (2024)** and the **G7 Summit in Hiroshima (2023)**, further consolidating the bilateral agenda.

3. Joint Strategic Action Plan (JSAP) 2025–2029

The **JSAP 2025–29** provides a structured framework to deepen India–Italy cooperation across a wide spectrum of areas.

Key Areas of Cooperation under JSAP:

1. Trade and Investment
2. Defence and Security
3. Space and Science & Technology
4. Clean Energy and Climate Action
5. Artificial Intelligence, Cybersecurity, and Digital Innovation
6. Mobility of Professionals and Students
7. Cultural and Academic Exchanges
8. Multilateral Cooperation

During his visit, Antonio Tajani and Dr. S. Jaishankar reviewed progress under the JSAP and reaffirmed the commitment to achieving tangible outcomes.

4. Economic and Trade Relations

Trade Statistics

- **Bilateral trade between India and Italy stood at approximately \$15.2 billion** during FY 2023–24.

- India's exports to Italy were worth **\$8.4 billion**, while imports amounted to around **\$6.8 billion**.
- Italy is India's **4th largest trading partner in the European Union**, after Germany, the Netherlands, and Belgium.

Key Sectors of Economic Engagement

Trade and investment between the two nations span several vital sectors, including:

- Automotive and Engineering Goods
- Machinery and Industrial Equipment
- Pharmaceuticals and Chemicals
- Textiles, Leather, and Fashion
- Green Energy Technologies and Biofuels

Investment Links

- As of 2024, Italian Foreign Direct Investment (FDI) into India is valued at over **\$3 billion**, with over **700 Italian companies operating in India**.
- Indian companies have also invested more than **€400 million** in Italy, especially in IT, textiles, and manufacturing.

5. Strategic and Defence Cooperation

- India and Italy have significantly expanded cooperation in defence manufacturing and technology exchange.
- The two countries are exploring **joint ventures** in the field of naval shipbuilding, aerospace, and defence electronics under India's **Make in India** initiative
- Italy also supports India's **Indo-Pacific policy**, and both sides have held strategic dialogues on regional security, maritime cooperation, and counterterrorism.

6. Science, Technology, and Clean Energy

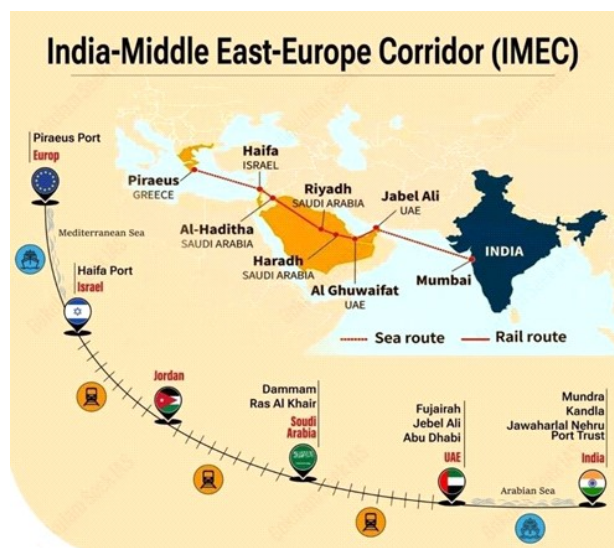
- India and Italy are enhancing collaboration in high-technology sectors, particularly in:
 - **Artificial Intelligence (AI)**
 - **5G and telecommunications**
 - **Cybersecurity**
- **Space exploration**, through cooperation between ISRO and the Italian Space Agency

- In clean energy, both nations are working together on the development of **green hydrogen, solar energy, and biofuels**.
- Italy has expressed support for India's climate initiatives such as **Mission LiFE (Lifestyle for Environment)**.

7. People-to-People and Cultural Ties

- There is a vibrant Indian diaspora of approximately **200,000 people living in Italy**, primarily from Punjab.
- The two nations have expanded academic exchanges and cultural partnerships, including MoUs between leading universities.
- Cultural diplomacy efforts focus on promoting yoga, Ayurveda, and Indian classical arts in Italy, while Italian language and arts are gaining popularity in India.

8. What is India–Middle East–Europe Economic Corridor (IMEEC) ?



- The **India-Middle East-Europe Economic Corridor (IMEEC)** is a **multimodal connectivity initiative** launched through a **Memorandum of Understanding (MoU)** signed during the **G20 Summit in New Delhi (2023)**.
- Signatories included **India, the European Union, France, Germany, Italy, Saudi Arabia, the UAE, and the United States**.
- IMEC is a **strategic infrastructure initiative** under the broader umbrella of the **Partnership for Global Infrastructure and Investment (PGII)**, which was originally

announced at the **G7 Summit in the UK in 2021**.

- It is seen as a **counter to China's Belt and Road Initiative (BRI)**.

Corridor Route

The corridor includes:

- **Rail and road infrastructure**
- **Ports and shipping lanes**
- **Energy pipelines and digital data cables**

Corridor Structure

- **Eastern Corridor:** Connects **India to the Gulf region**.
- **Northern Corridor:** Connects the **Gulf to Europe** via Israel.

Proposed Route:

India → UAE → Saudi Arabia → Jordan → Israel → Europe (via Greece and Italy)

Strategic Objectives

- Enhance **regional connectivity and trade**.
- Strengthen **energy and supply chain security**.
- Promote **infrastructure development and economic integration**.
- Serve as an **alternative to China's Belt and Road Initiative (BRI)**.

India–Italy Role in IMEEC

- India and Italy have agreed to jointly work on the timely implementation of IMEEC.
- Italy has appointed a **special envoy for IMEEC**, which was welcomed by India as a demonstration of Italy's proactive approach.
- The cooperation will likely focus on **infrastructure investment, policy alignment, and logistics integration**.

9. Multilateral and Regional Cooperation

- India and Italy share common positions on many global issues and collaborate closely in multilateral fora including:
 - **G20, G7, and United Nations**
 - **World Trade Organization (WTO) reforms**
 - **Climate finance and global digital governance**

- Italy supports India's **permanent membership** in the United Nations Security Council (UNSC) and India's efforts toward greater representation in global decision-making bodies.

Conclusion

India–Italy relations are witnessing a historic high with structured institutional cooperation under the **JSAP 2025–29** and shared interest in implementing the **IMEEC**. As global geopolitics shifts, both countries are aligning their strategic and economic interests to build a resilient, connected, and cooperative future across regions.



Crux of The Hindu & Indian Express

International Issues

China Halts Export Of Key Metals, Magnet As Trade War With US Intensifies



Why in News?

- China has halted the export of **key rare earth metals and permanent magnets** as its trade tensions with the United States continue to escalate.

- This move is part of Beijing's broader strategy to weaponize its dominance over the global supply of rare earths, impacting global industries such as defense, electronics, automotive, aerospace, and semiconductors.

What Has China Done?

- China has **suspended the export** of several **critical rare earth elements and magnets** through its ports.
- The suspension is **not limited to the US** but affects exports to all countries.
- A **new regulatory framework for exports** is being drafted. Until it is finalized, shipments of key products have effectively been halted.
- Going forward, exports of these materials from China will require **special export licenses**, which are not yet operational, leading to uncertainty and supply disruption.

China's Dominance in Rare Earths

- China accounts for approximately **90% of global production** of **rare earth elements (REEs)** — a group of 17 chemically similar metals.
- The country also dominates **processing and manufacturing** of REE-based **permanent magnets**.
- China's dominance extends especially to **heavy rare earth elements (HREEs)**, which are harder to source globally.

Elements Under Export Control:

The suspended exports include:

- Samarium**
- Gadolinium**
- Terbium**
- Dysprosium**
- Lutetium**
- Scandium**
- Yttrium-related items**

These are classified under **medium and heavy rare earth categories**.

What is Rare Earth Elements (REEs) and Why Are These Metals Important?

- Rare Earth Elements (REEs) are a group of **17 chemically similar elements**.
- These include **15 lanthanides** plus **scandium** and **yttrium**.
- **Abundance**: Despite their name, REEs are relatively **abundant** in the Earth's crust.
- However, they are rarely found in concentrated and **economically exploitable forms**.

Significance of REEs

1. Critical for Modern Technology

- REEs play a **crucial role** in the manufacturing of several high-tech devices and products such as:
 - **Smartphones**
 - **Electric vehicles**
 - **Wind turbines**
 - **LED lights**
 - **Flat-screen TVs**

2. Defense and Aerospace Use

- REEs are integral to the production of advanced military and aerospace equipment:
 - **Precision-guided missiles**
 - **Jet engines**
 - **Radar systems**
 - **Other critical military technologies**

3. Green Energy Transition

- REEs are essential for the development of **clean energy technologies**, such as:
 - **Solar panels**
 - **Batteries** (especially for electric vehicles and energy storage systems)
 - **Permanent magnets** used in **wind turbines** and **electric vehicles**

4. Strategic Importance

- Due to their widespread use across **technology, defense, and green energy sectors**, and with **limited global suppliers** (especially China's dominance), REEs are considered **strategically important** for both **national security** and **economic stability**.

Strategic Control and Global Trade

- **China's Dominance**: China controls a significant portion of global REE production, making the element a point of geopolitical tension.
- **Trade and Supply Chain Concerns**: The reliance on a few countries for REE supply makes these elements critical for **national security**, and their disruption can affect **global technology supply chains**.

Without these elements, production in several high-tech and defense-related sectors becomes severely impaired.

Impact on the United States

- The US is **highly dependent on China** for rare earths.
- It has **only one REE mine** (Mountain Pass, California), and it still sends ores to China for processing.
- The halted exports threaten supply chains of major US companies like **Lockheed Martin, Tesla, and Apple**.
- While the US maintains **stockpiles** of some rare earths, these are **insufficient for long-term needs**, especially for defense contractors.

Trade War Context

- The export halt is seen as **retaliation** against US tariff hikes. Recently, the US raised tariffs on Chinese goods to **54%** under President Trump.
- On **April 2, 2025**, China placed **formal export restrictions** on a broad category of rare earths and related products.

Strategic Objectives of China

- The move is designed to **exert pressure on Western countries**, particularly the US, by leveraging China's **monopoly in critical minerals**.
- It aims to signal China's capability to **weaponize its supply chains** in the face of geopolitical hostility and economic sanctions.
- It also serves as a **deterrent** against further US tariffs and restrictions on Chinese tech companies.

India–EU Space Cooperation & Global Space Governance

◆ Context:

- Marjolijn van Deelen, **EU Special Envoy for Space**, has emphasized **India's potential role in shaping international norms** for responsible behaviour in outer space.



- This statement comes amidst rising global concerns about **space debris**, **ASAT (Anti-Satellite)** weapon testing, and **Rendezvous and Proximity Operations (RPOs)**.

◆ Key Highlights:

Responsible Space Governance:

- EU is working to establish a **framework of norms, rules and principles** to regulate activities in space.
- India is seen as a **key strategic partner** in co-developing this global framework.
- Focus areas** include:
 - Regulating **RPOs** (close spacecraft approaches)
 - Avoiding the creation of **debris** in orbit
 - Cyber threats** such as **jamming** and **spoofing**

RPOs (Rendezvous & Proximity Operations):

- Involve spacecraft manoeuvring near or docking with another satellite.
- Not inherently dangerous, but unregulated or hostile RPOs pose **strategic risks**, especially to **sensitive satellites**.
- EU seeks international agreement on RPO protocols.

India's ASAT Test – International Perception:

- In **March 2019**, India conducted **Mission Shakti**, an ASAT test targeting a satellite at ~300 km altitude in Low Earth Orbit (LEO).
- EU supports a **ban on destructive ASAT testing**, emphasizing that the creation of debris should be avoided.
- No formal discussions with India on its ASAT capabilities yet; focus is currently on **cooperation, not criticism**.

Need for Regulation:

- Space congestion** and increasing private/commercial actors demand **space traffic management norms**.
- EU plans to introduce a **Space Act** to:
 - Enhance **European industry competitiveness**
 - Ensure **safety and sustainability** in space operations
 - Promote **joint programs** over fragmented national efforts

◆ India–EU Space Dialogue: The Road Ahead

- India and EU are working towards initiating a **formal space security dialogue**.
- Aim: Discuss threats, identify regulatory gaps, and promote **sustainable practices**.
- Will involve **governments, space agencies, businesses, and civil society** on both sides.

◆ Global Concerns Identified by the EU:

- Destructive ASAT Testing** – Creates long-lived space debris.
- Cyber Threats** – Satellite communications vulnerable to hacking and spoofing.
- Close-proximity Manoeuvres** – Unregulated RPOs can endanger strategic space assets.
- Space Debris** – Risk of **collision with operational satellites**, impairs future missions.

◆ Strategic Significance for India:

- India has a **growing space sector** with:
 - Successful **ISRO missions** (e.g. Chandrayaan, Aditya-L1)
 - Expanding **private space startups** and **international collaborations**

- Opportunity to lead on:
 - **Space sustainability**
 - **Security frameworks**
 - **Commercial space governance**
- Enhances India's stature in global **space diplomacy** and **norm-building**

◆ **Way Forward:**

- Formalize **India–EU Space Dialogue** to address governance, security, and commercial interests.
- Develop shared positions on **space traffic rules, debris mitigation, and dual-use technologies**.
- Leverage India's credentials in **non-weaponized, peaceful space missions** to advocate for **space as a global commons**.

China's Assertive Tactics in the Yellow Sea: A New Chapter in the Indo-Pacific Geopolitics



Context:

- China's growing assertiveness in the **Yellow Sea** echoes its aggressive tactics in the **South China Sea**, particularly through incremental territorial expansion and "**salami slicing**".
- The latest tensions have arisen between **China** and **South Korea** over the construction of a massive steel rig and other structures in a disputed **Provisional Maritime Zone (PMZ)**, deepening concerns about territorial encroachments and the broader implications for regional security.

Key Developments:

The Standoff in the Yellow Sea:

- On **February 26, 2025**, a **two-hour-long standoff** occurred between **Chinese and South**

Korean Coast Guards in the **Provisional Maritime Zone (PMZ)** near **Socotra Rock** (Jeodo in Korean, Suyan Islet in China).

- **South Korea** sent its research vessel, **Onnuri**, to inspect a **massive steel structure** deployed by China, reportedly for **salmon aquaculture**.
- **China** blocked South Korea's inspection, citing its right to deploy the structure within its **EEZ**.
- **South Korea** disputed this, invoking the **2001 Korea-China Fisheries Agreement**, asserting its right to inspect the structure.

Chinese Installation in the PMZ:

- Satellite images show **large steel platforms** and a **71.5-meter underwater cage**, the **Shen Lan 2 Hao**, for **salmon aquaculture** in the **PMZ**.
- This area is a **jointly managed zone** under a **2000 agreement**, where South Korea and China share **exclusive economic zones (EEZs)**.
- China's actions are seen as a violation of the **2001 Fisheries Agreement**, as it did not inform South Korea prior to deploying the structure.

Implications of the Chinese Move:

- **China's strategy** mirrors tactics seen in the **South China Sea**, where it has used "**salami slicing**"—gradual, incremental encroachments—combined with a civilian **coast guard presence** to assert territorial claims.
 - **Shen Lan 2 Hao** is part of China's broader effort to bolster its presence in the region, potentially for **resource extraction** (oil, fisheries), while avoiding overt militarization.
 - **South Korea** sees China's actions as part of an effort to claim more territory and gain control over rich marine resources.
- ◆ **"Salami Slicing" in the Yellow Sea:**
- The term "**salami slicing**" refers to **incremental territorial advances** made under the guise of civilian activities, designed to test the resolve of rival nations without triggering outright military conflict.
 - This approach has been notably used by China in the **South China Sea** and is now appearing in the **Yellow Sea**, with **China's Coast Guard**

and **civilian boats** engaging in **gray-zone operations** to establish control over contested waters.

◆ **Strategic Implications for the Indo-Pacific:**

China's Civil-Military Fusion:

- **China's civil-military fusion** blurs the lines between **coast guard operations, military activities, and civilian actions**.
- This **dual-use strategy** allows China to project power without overt militarization, a tactic central to its **gray zone operations**.
- **Chinese coast guard and fishing fleets** have been suspected of **intelligence gathering** under the guise of civilian activity, which complicates the security dynamics of the region.

Potential Risks for Regional Stability:

- **Escalating Tensions:** China's tactics risk triggering greater tensions not only with **South Korea**, but also with **Japan, the United States**, and other Indo-Pacific countries concerned with freedom of navigation and security in the region.
- **International Norms:** There is a growing call from like-minded countries to **establish a rules-based order** to regulate maritime disputes and **salami-slicing tactics**.
- Countries like the **US, Japan, India, and Australia** have increasingly cooperated in the **Quad** framework to counter China's maritime expansion.

◆ **China's Influence in the Yellow Sea: A Long-Term Strategy?**

- **Resource Extraction:** The **Yellow Sea** is rich in natural resources, including **oil and fisheries**, making it strategically important for both China and South Korea.
- **Incremental Encroachments:** China's **rig installations**, which began in 2018, have grown in size, signaling a **long-term strategy** to

solidify control over contested areas and resources.

- **Geopolitical Shifts:** As China strengthens its presence in the **Yellow Sea**, it could further complicate regional dynamics, particularly with the US's **freedom of navigation operations** and **South Korea's military alliances**.

◆ **Global and Regional Reactions:**

South Korea's Response:

- South Korea has lodged a formal protest with **China**, invoking the **2001 Korea-China Fisheries Agreement** and demanding transparency in the deployment of new structures.
- The **Korean government** also highlighted the **violation of joint agreements** in the **PMZ**, calling for an international resolution to the dispute.

International Responses:

- The **United States, Japan**, and other Indo-Pacific nations are watching developments closely, given the potential impact on regional **maritime security and freedom of navigation**.
- **China's growing presence** in the **Yellow Sea** is likely to intensify diplomatic pressure for a more robust and clear **rules-based maritime order**.

◆ **India's Perspective:**

- **India** shares similar concerns regarding China's maritime activities in the Indo-Pacific, particularly in areas like the **South China Sea**.
- As part of the **Quad** initiative, India is committed to **upholding a free, open, and rules-based Indo-Pacific**.
- India's position on **maritime security** in the Indo-Pacific underscores the need for **cooperation** among regional powers to counter China's expansionist maritime policies.

India Skirts Maritime Border Dispute with Pakistan by Fresh Continental Shelf Claim

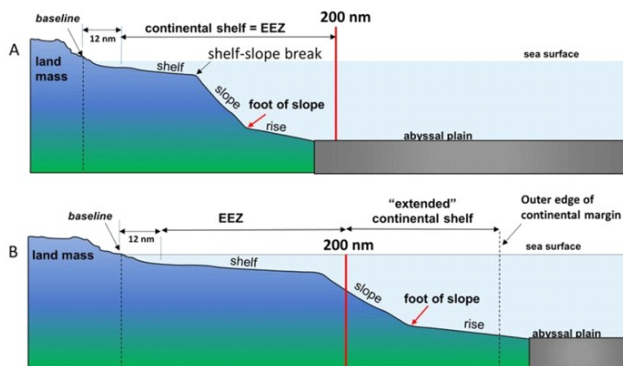


Current News:

- India has recently expanded its claim in the **Central Arabian Sea** by almost **10,000 square kilometers** as part of its **Extended Continental Shelf (ECS)**.
- Simultaneously, India **modified an earlier ECS claim** to avoid a longstanding maritime dispute with **Pakistan** over the **Sir Creek** area.
- India submitted its **modified claims** to the **United Nations** earlier in April 2025, as part of its submission to the **Commission on the Limits of the Continental Shelf (CLCS)**.

Key Concepts to Understand:

- 1st we need to understand these key terms :



1. Territorial Sea:

- The **12 nautical miles** from a country's coastline where it has full sovereignty, similar to its land territory.

2. Exclusive Economic Zone (EEZ):

- Extends **200 nautical miles** from the coastline.
- A state has exclusive rights to **fishing, mining, and energy exploration** in this area.

3. Extended Continental Shelf (ECS):

- Beyond the 200 nautical miles of the EEZ.
- Countries can claim additional seabed area if **they can provide scientific proof that the shelf extends naturally from their landmass**.

4. Commission on the Limits of the Continental Shelf (CLCS):

- A **UN body** that reviews ECS claims submitted by coastal states.
- **CLCS's recommendations are binding**, determining where a country's continental shelf ends beyond 200 nautical miles.

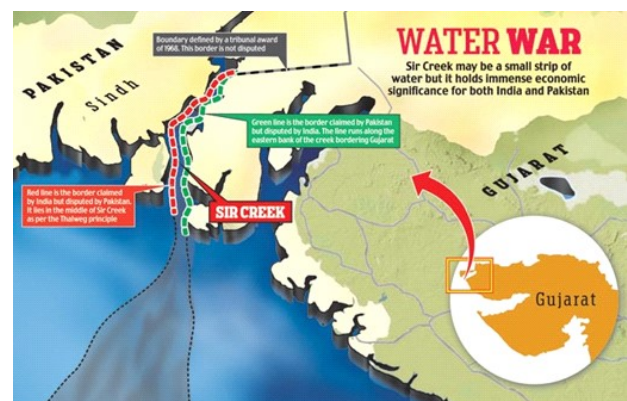
India's ECS Claim Journey: Background

1. Initial Claim (2009):

- In **2009**, India made its 1st submission to the **CLCS** for an **extended continental shelf** in the **Bay of Bengal, Indian Ocean, and Arabian Sea**.
- India claimed an **additional 1.2 million square kilometers** beyond its 200 nautical miles EEZ, based on geological evidence that the seabed extends naturally from its landmass.

2. Pakistan's Objection (2021):

- In **2021**, **Pakistan** raised an objection to India's ECS claim, especially in the **Western Arabian Sea**.
- The objection was focused on the **Sir Creek** area, a disputed waterway between Gujarat (India) and Sindh (Pakistan).
- Pakistan argued that the area was **under dispute** and should not be included in India's claim.



3. CLCS Rejection of India's Claim (2023):

- The **CLCS** rejected **India's entire claim in the Arabian Sea region**—this includes all of India's ECS claim in the Arabian Sea, not just the disputed part with **Pakistan**.
- So, it wasn't just the **Sir Creek** area that was rejected, but the **whole Arabian Sea portion**.
- The reason for the rejection was partly due to the **dispute** with **Pakistan** over the Sir Creek area, which affected the broader claim in that region.

4. What this means:

- The **entire Arabian Sea claim** was initially rejected in **March 2023**.
- However, the **CLCS** gave India the opportunity to **submit a modified claim**. This is where India stepped in and **modified** its original submission to resolve the dispute with Pakistan.

India's Response (April 2025):

1. India then split the claim into 2 parts:

- One for the **Central Arabian Sea** (which is **undisputed** and **not affected** by any conflict with Pakistan or other countries).
 - * India has **submitted a revised claim** for this area, which is **undisputed** by any neighboring countries, adding an additional **10,000 square kilometers** based on new scientific data.
- Another for the **Western Arabian Sea**, which includes the **disputed areas near Sir Creek**.
- India **excluded this part** from the current submission, effectively avoiding the dispute with Pakistan.

- 2. India's strategy was to **secure the undisputed areas** first, especially the **Central Arabian Sea**, and then address the disputed **Western Arabian Sea** through **bilateral discussions** with Pakistan.

Strategic Importance of the Modified Claim:

1. Economic Opportunities:

- The **Extended Continental Shelf** gives India the **exclusive right to explore and extract** resources like **oil, gas, and minerals** from the seabed.
- This new claim, if approved, could be economically significant as it provides India with **access to valuable underwater resources** such as **polymetallic nodules**.

2. Avoiding Disputes:

- By excluding the **Western Arabian Sea** region (near **Sir Creek**) from the current submission, India effectively **avoids conflict** with Pakistan and increases the chances of the claim being accepted by the **CLCS**.
- This approach also allows **India to focus on undisputed areas** and **secure them first** before addressing the more contentious regions.

3. Overlapping Claims with Oman:

- While some parts of India's ECS claim overlap with **Oman's continental shelf**, the two countries have **mutually agreed** to keep this area **undisputed** since **2010**. This ensures that the overlap does not cause tensions.

About the Sir Creek Dispute:

1. Geography:

- **Sir Creek** is a **96-km-long tidal estuary** that divides the **Kutch region of India** from **Sindh province of Pakistan**.
- This narrow water body extends into the **Arabian Sea** and remains a major point of contention between the two countries.

2. Historical Dispute:

- India and Pakistan differ in their interpretation of the **Thalweg principle**, a rule in maritime law that suggests a boundary should be drawn in the middle of a navigable channel.
- **India** wants the boundary based on this principle, while **Pakistan** argues that Sir Creek is **not navigable**, so the Thalweg principle does not apply.

Role of the Commission on the Limits of the Continental Shelf (CLCS):

1. Purpose:

- The **CLCS** was established in **1997** under the **United Nations Convention on the Law of the Sea (UNCLOS)**.
- Its role is to evaluate and provide recommendations on the **outer limits of a country's continental shelf** beyond the 200 nautical miles EEZ.

2. Review Process:

- **CLCS** reviews **scientific data** provided by countries and makes **binding recommendations** on where the **outer limit** of the continental shelf should be.
- **21 experts** from fields like **geology, geophysics, and hydrography** comprise the commission, ensuring that the recommendations are scientifically sound.

Global and Regional Implications:

1. Regional Cooperation:

- **India and Oman** have a **cooperative agreement** about the overlapping portions of their continental shelf, ensuring that they will not dispute the area even though both have claims.

2. Future of India's Claims:

- India's claims in the **Bay of Bengal** and the **Indian Ocean** are still under review by the **CLCS**, facing objections from **Myanmar** and **Sri Lanka**.
- The **CLCS** is expected to begin consultations for these areas in the coming months.

Conclusion:

India's **modified claim** for an **Extended Continental Shelf** in the **Central Arabian Sea** represents a **strategic move** to avoid maritime disputes, particularly with **Pakistan** over the **Sir Creek** region, while securing rights to valuable seabed resources. This move highlights India's approach of using **scientific evidence** and **diplomatic strategies** to navigate complex maritime boundaries and avoid conflicts, with the goal of securing economic benefits from the **seabed**.

Why Pakistan Has Put Its Ambitious Canals Project on Hold



What's the News?

- On **April 24, 2025**, the **Pakistan government** decided to **pause its ambitious canal project** after widespread protests in **Sindh**.
- The project, intended to **irrigate millions of acres** of uncultivable land, has sparked **political and regional tensions**, particularly between **Punjab** and **Sindh**.

What is Green Pakistan Initiative (GPI) ?

- The canal project is a central part of the **Green Pakistan Initiative (GPI)**, a **\$3.3 billion** plan to modernize Pakistan's **agriculture sector**.
- Launched in **2023** by **Prime Minister Shehbaz Sharif** and **Army Chief General Asim Munir**, the GPI aims to introduce **advanced technology**, improve **irrigation infrastructure**, and increase **agricultural yields**.
- **Goal:** Revitalize agriculture, mitigate **food shortages**, and address **climate-related challenges** impacting the country's economy.
- **Background:** Pakistan has struggled with food shortages in recent years, spending valuable **foreign exchange** on food imports.

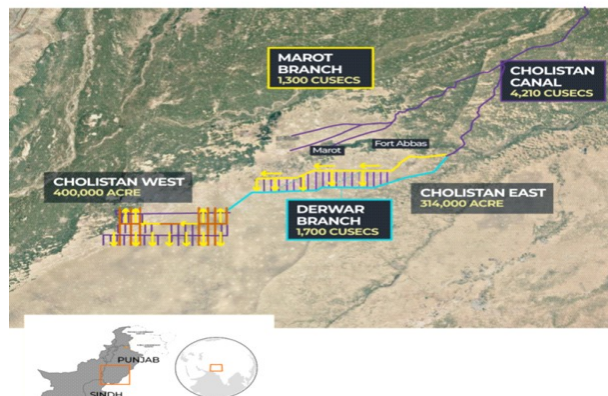
The Canal Project: Strategic Importance

- In **July 2024**, **President Asif Ali Zardari** approved the construction of **6 strategic canals** to boost **food security** and agricultural development.

PAKISTAN

Proposed Cholistan canal

The Cholistan Canal is one of six canals planned by the Green Pakistan Initiative. The 176km canal has three branches, with a total capacity of 4,120 cusecs (cubic foot per second) of water. However, many farmers in Sindh object to the construction, saying it could affect their access to water.



- The most significant project is the **Cholistan Canal**, a **176 km long canal** designed to irrigate the **arid lands of Cholistan** in southern **Punjab**, bordering **India's Rajasthan**.
 - Estimated cost: **\$800 million**.
 - The canal is expected to irrigate **5,000 sq km (1.2 million acres)** of previously uncultivable land.

Sindh's Concerns

- **Water Source Issues:** The **Cholistan Canal** is intended to be supplied by **floodwater** from India's **Sutlej River**. However, Pakistan's dependency on the **Indus River system** makes the Sutlej alone insufficient for irrigation.
- **Existing Water Stress:** Pakistan's water system is already **over-stressed**, and critics argue that the new canals will exacerbate existing water shortages.
- **Impact on Sindh:** Sindh, a lower riparian province, fears that the project will:
 - **Compromise its water supply.**
 - **Harm the Indus delta**, leading to **seawater intrusion** and **ecosystem damage**.

Provincial Rivalries

- **Punjab vs. Sindh:** The project has revived **long-standing provincial rivalries**. Sindh's residents view the canals project as a **Punjab-dominated** initiative, potentially undermining their **water rights**.
 - **Historical Grievances:** Sindh has historically felt marginalized by water management policies favoring Punjab, leading to **anti-Punjab sentiments**.
 - Sindh's opposition to the canals project is fueled by fears that it will **deprive** them of vital water resources.

PPP's Political Dilemma

- **Pakistan Peoples Party (PPP)**, which governs Sindh, found itself in a difficult position, torn between supporting the canals project for national interest and addressing **local opposition**.

- Initially, **PPP co-chairman Asif Ali Zardari** supported the project, calling the canals "**vital**". However, the backlash in Sindh led to a **shift in stance**.
 - **Public Discontent:** Protests in Sindh intensified, with **student leader Muneer Hussain** declaring that the project would harm the poor people of Sindh.
 - **Political Fallout:** The controversy created tensions within the ruling coalition, particularly between the PPP and **Punjab-based PML-N**.

Decision to Pause the Project

- In response to the escalating unrest, **Prime Minister Shehbaz Sharif** announced the decision to **put the canals project on hold**.
 - This decision was made alongside **PPP co-chairman Bilawal Bhutto-Zardari**, who emphasized that no water from Sindh would be diverted to other regions.
 - Despite the decision, protests in Sindh have continued, and there is **uncertainty** about the future of the project.

What's Next?

- **Project Reconsideration:** The canals project may be **revised** or **modified** to address Sindh's concerns, potentially with more **guarantees** for the province.
- **Sindh's Position:** The people of Sindh remain **wary**, and the PPP faces pressure to ensure that any future decisions do not compromise Sindh's water rights.

Conclusion

The **pause** in the **canals project** highlights the **complexity** of water management issues in Pakistan, balancing **regional needs** with national agricultural goals. **Sindh's opposition** underscores the importance of **fair distribution** of resources, especially in a country with **limited water supply** and increasing **climate stress**.





Comptroller and Auditor General (CAG)



Comptroller and Auditor General (CAG)

Current News

- **Event:** The Comptroller and Auditor General (CAG) report on 'Prevention and Mitigation of Vehicular Air Pollution in Delhi' highlights serious concerns regarding Air Quality Monitoring, Vehicular Pollution, and Government Accountability.

About the Comptroller and Auditor General (CAG)

- **Role:** The CAG of India heads the Indian Audit and Accounts Department (IA-AD) and is responsible for auditing government expenditures to ensure financial accountability.
- **Constitutional Basis:** As per Article 148 of the Indian Constitution, the CAG oversees financial transactions at both central and state levels.
- **Democratic Pillar:** The CAG is a key pillar of Indian democracy, alongside the Supreme Court, Election Commission, and Union Public Service Commission (UPSC).
- **Legal Framework:** The CAG's duties and powers are defined by the Comptroller and Auditor-General's (Duties, Powers and Conditions of Service) Act, 1971, with amendments in 1976, 1984, and 1987.

Constitutional Provisions Related to CAG

- **Article 148:** Defines the appointment, term, and conditions of the CAG.
- **Article 149:** Specifies the CAG's duties and powers to audit government accounts.

- **Article 150:** Requires government accounts to be maintained as prescribed by the President on the CAG's advice.
- **Article 151:** Mandates that CAG audit reports be submitted to Parliament and State Legislatures.
- **Article 279:** Grants the CAG authority to certify "net proceeds" of taxes and duties.
- **Sixth Schedule:** Requires the CAG to audit District and Regional Council accounts.

Appointment and Term of the CAG

- **Appointment:** The President of India appoints the CAG through a warrant.
- **Tenure:** The CAG holds office for six years or until reaching the age of 65, whichever comes first.
- **Oath:** The CAG takes an oath to perform duties impartially.
- **Removal:** The CAG can be removed by the President, similar to a Supreme Court judge, requiring a special majority resolution in both Houses of Parliament.
- **Resignation:** The CAG can resign by submitting a letter to the President.

Independence of the CAG

- **Removal:** The CAG cannot be removed at the President's discretion; only constitutional procedures apply.
- **Post-Tenure:** The CAG cannot hold any further government office after completing tenure.
- **Salary:** The CAG's salary is determined by Parliament, equivalent to that of a Supreme Court judge.
- **Expenses:** Administrative expenses are charged to the Consolidated Fund of India, not requiring parliamentary approval.
- **Autonomy:** No minister can represent the CAG in Parliament or take responsibility for the CAG's actions.

Duties and Powers of the CAG

- **Audits:** The CAG audits expenditures from the Consolidated Fund of India and state funds.
- **Examination:** The CAG examines government corporations, public sector undertakings (PSUs), and other government-funded bodies.

- **Certification:** The CAG certifies net proceeds of taxes and duties.
- **Debt Audits:** The CAG audits debt, advances, and suspense accounts.
- **Reports:** The CAG submits audit reports to the President, which are then presented in Parliament and examined by the Public Accounts Committee (PAC).
- **Parliament Agent:** The CAG acts as an agent of Parliament, ensuring public money is used legally and efficiently.
- **Propriety Audits:** The CAG conducts audits to assess whether government spending is wasteful or extravagant.

Difference Between CAG in India and the UK

- **India:** The CAG of India functions solely as an Auditor-General, without controlling fund disbursement.
- **UK:** Britain's CAG acts as both Comptroller and Auditor-General, exercising direct control over fund releases.

CAG's International Audit Responsibilities

- **International Atomic Energy Agency (IAEA) (2022-2027):** Ensures the safe use of nuclear technology worldwide.
- **Food and Agriculture Organization (FAO) (2020-2025):** Audits operations aimed at achieving global food security.

Protection of Interests in Aircraft Objects Bill, 2025



Why in the News?

- The Rajya Sabha recently passed the Protection of Interests in Aircraft Objects Bill, 2025, which seeks to implement international conventions on the leasing of aviation equipment.

1. What is the Protection of Interests in Aircraft Objects Bill, 2025?

- The bill aims to implement international agreements, particularly the Convention on International Interests in Mobile Equipment (commonly known as the Cape Town Convention of 2001) and its Protocol on Aircraft Equipment.
- India became a signatory to these agreements in 2008.

2. Purpose of the Bill

- **Secure Rights:** The bill is designed to secure the rights over high-value mobile assets such as aircraft, helicopters, and engines.
- **Legal Clarity:** It ensures greater legal clarity and uniformity across the aviation industry.
- **Implementation:** The bill brings these international agreements into India's legal framework, ensuring that creditors and stakeholders in the aviation leasing space are protected under clear guidelines.

3. Key Provisions

- **Rule-Making Power:** The bill empowers the central government to make rules to implement the provisions of the Convention and the Protocol.
- **Registry Authority:** The legislation designates the Directorate General of Civil Aviation (DGCA) as the registry authority for the purposes of the convention.
- **Responsibilities:** The DGCA is responsible for the registration and de-registration of aircraft.
- **Creditor Notification:** The bill requires creditors to notify the DGCA before initiating any remedies in the event of a default.
- **Asset Recovery:** In cases of default, creditors will be entitled to recover assets such as

aircraft, helicopters, and engines within two months, or a mutually agreed upon timeframe.

4. Expected Impact

- **Clarity and Security:** The bill is expected to provide much-needed clarity and security, particularly in the leasing industry.
- **Protection for Creditors:** It ensures that creditors and stakeholders in the aviation leasing space are protected under clear guidelines.

Anti-NEET Bill | President withholds Assent



1. Withholding of Assent:

- The President has withheld assent to Tamil Nadu's Bill seeking exemption from the mandate of NEET-based admissions for undergraduate medical courses in government medical colleges.
- Reason: Based on the recommendations of the Union government.

2. About the Anti-NEET Bill:

- Introduction: Passed by the Tamil Nadu Assembly in September 2021.
- Objective: To exempt the state from the National Eligibility cum Entrance Test (NEET) for medical admissions, advocating for the selection process to be based on Class 12 examination marks.
- Rationale: Concerns that NEET disproportionately affects students from disadvantaged backgrounds.
- Status: Awaiting President's approval but withheld assent.

3. Veto Power of President over State Legislation:

- Article 200 & 201: State bills require the President's assent to become law.
- Governor's Role: Reviews the bill and sends it to the President.
- Presidential Assent Options:
 - Grant assent (bill becomes law).
 - Withhold assent (bill may be reconsidered).
 - Reserve the bill for further consideration.
- Bills Requiring Presidential Assent:
 - Affects national policies or conflicts with Union laws.
 - On Concurrent List topics, like medical education (e.g., Anti-NEET Bill in Tamil Nadu).
- Exemption: Money Bills do not need presidential assent.

Inter-Parliamentary Union (IPU)



Inter-Parliamentary Union

For democracy. For everyone.

Why in News?

- **Lok Sabha Speaker** recently delivered the keynote address on 'Parliamentary Action for Social Development and Justice' at the **150th Assembly of the Inter-Parliamentary Union (IPU)** in Tashkent, Uzbekistan.

About Inter-Parliamentary Union (IPU)

- **Formation:** The IPU was founded in **1889**, making it the first multilateral political organization in the world. It encourages dialogue and cooperation between national parliaments globally.

- **Slogan:** “For democracy. For everyone.”
- **Membership:**
 - The IPU currently comprises **181 national Member Parliaments** and **15 Associate Members**, which are typically parliaments from groups of nations or similar bodies.
- **Objective:**
 - The IPU promotes **democracy** by strengthening parliaments, making them **stronger, younger, gender-balanced, and more diverse**.
 - It defends the **human rights of parliamentarians**, with a dedicated committee of MPs from around the world.
- **Functions:**
 - The IPU convenes over **1,500 parliamentary delegates** and partners in a **world assembly** twice a year, contributing to **global governance**.
 - This includes collaboration with the **United Nations** and supporting the **2030 Agenda for Sustainable Development**.
 - The **Governing Council**, the principal administrative body, meets at each assembly and comprises **three MPs from each Member Parliament**.
- **Headquarters:** Located in **Geneva, Switzerland**.
- **Funding:** The IPU is primarily financed by its members through **public funds**.

Significance of IPU

- The IPU serves as a critical platform for **parliamentarians** from across the world to address global issues, such as **social development, justice, human rights**, and sustainable development.
- It plays a vital role in influencing global **legislation** and policy, especially in relation to **democracy** and **human rights**.

Registrar General of India (RGI)



Why in News?

- The **Registrar General of India (RGI)** has recently issued a **strong caution** to both government and private hospitals across India for **failing to comply** with the **timely reporting of births and deaths**, as required under the law.

About Registrar General of India (RGI)

- **Establishment:** The RGI was established in **1949** by the Government of India, under the **Ministry of Home Affairs**. The **Registrar General** also serves as the **Ex-Officio Census Commissioner of India**.
- **Role:** The primary responsibility of the RGI is to ensure a **systematic collection of population-related statistics** in India, including **population size, growth, and distribution**.
- **Legal Framework:** The RGI is tasked with implementing the **Registration of Births and Deaths Act, 1969**, which mandates the registration of births and deaths across the country.
- **Administrative Structure:** The RGI is typically headed by a civil servant of **Joint Secretary rank**.

Key Functions of the RGI

1. Conducting the Census of India:

- The Census of India is one of the **largest administrative exercises** in the world, offering detailed data on the demographic, socio-economic, and geographic characteristics of India's population.

- The **first complete Census** was conducted in **1881**, and it has been conducted **15 times** since then, with the **most recent Census** in **2011**.
- The Census is conducted under the authority of the RGI, which also serves as the **Census Commissioner**.

2. Linguistic Survey of India (LSI):

- Alongside the Census, the RGI conducts the **Linguistic Survey of India**, which provides a detailed record of India's **linguistic diversity**.
- The **first LSI** was completed by **George Abraham Grierson** in **1928**. The LSI informs **educational** and **social planning** in different states.

3. Civil Registration System (CRS):

- The RGI manages the **Civil Registration System**, which is a mandatory system for the **registration of births and deaths** in India.
- This system serves as a **real-time, continuous** method of collecting population data.
- **Hospitals**, particularly **government-run** hospitals, are expected to act as **registration authorities** for recording births and deaths.

Recent Development

- The RGI has warned hospitals for failing to report **births and deaths** in a timely manner, which is crucial for maintaining the accuracy and reliability of India's population data.

Article 142



Why in News

- On 19 April 2025, **India's Vice-President criticized Article 142**, calling it a “**nuclear missile against democratic forces**,” particularly after its use in the **Tamil Nadu Governor's case**.

Key Points

- **What is Article 142?**
 - Grants the **Supreme Court** the power to pass any order or decree necessary for **complete justice** in any case pending before it.
 - This power is **discretionary** and unique to the Supreme Court, giving it broad authority to act when needed.
- **Concept of Complete Justice:**
 - Ensures justice **beyond technicalities** by addressing legislative gaps.
 - Allows the Court to **override laws** when necessary to uphold **constitutional values, fundamental rights, and social welfare**.
 - Aims at providing justice even when legislative or executive actions fail to deliver it.
- **Historical Context:**
 - Drafted by **Dr. B.R. Ambedkar** and other framers of the **Indian Constitution**, it was intended to be an extraordinary power reserved for the Supreme Court.
 - The Court's jurisprudence under this article has developed over more than **50 years** with **self-imposed limits**.
- **Role in Democracy:**
 - Strengthens democracy by **protecting minority rights** and ensuring **equal treatment** under the law.
 - Acts as a check on **executive and legislative overreach**, ensuring that the **basic structure of the Constitution** is maintained.
- **Judicial Innovation:**
 - Article 142 promotes **judicial creativity**, allowing the Court to create

guidelines and direct **government authorities** in cases of **public interest** and to protect **constitutional values**.

- **Concerns:**
 - **Lack of clarity** on what constitutes “**complete justice**” could lead to **subjectivity** and **inconsistent rulings**.
 - Raises concerns regarding the **separation of powers** and whether its use might undermine **democratic checks and balances**.

Parens Patriae Doctrine

DOCTRINE OF PARENS PATRIAE

Why in News

- **The Bombay High Court**, invoking ‘**parens patriae**’, recently appointed a **daughter as the legal guardian** of her 78-year-old mother diagnosed with **severe dementia**.

Key Points

- **About Parens Patriae Doctrine**
 - **Meaning:** *Parens Patriae* is a Latin term meaning “parent of the nation”. It is a **legal principle** that empowers the state to act as a **guardian** for individuals who are unable to care for themselves.
 - **State’s Protective Role:** Under this doctrine, the state or court assumes a **paternal and protective role** for individuals who cannot protect or manage their own welfare, such as **minors, incapacitated individuals**, and persons with disabilities.
- **Origin**
 - The doctrine originates from **English common law**, where it allowed the government to step in to protect the **welfare of vulnerable groups**.

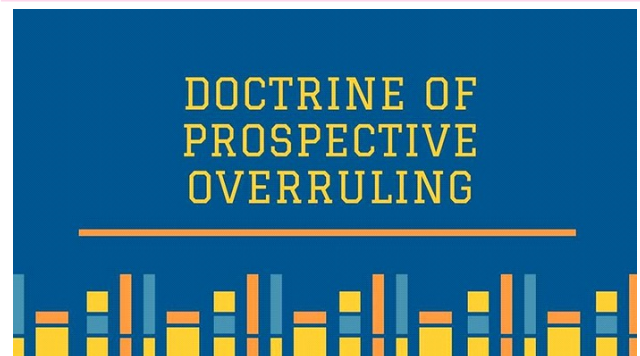
• Applications in Modern Legal Systems

- The principle is applied in various legal areas, such as:
 - * **Juvenile justice:** Ensuring the protection and welfare of children.
 - * **Mental health:** Providing guardianship or protection for mentally incapacitated individuals.
 - * **Consumer protection:** Safeguarding consumers, particularly in areas where they cannot protect their own interests.
 - * **Environmental conservation:** The state intervening to protect public resources for future generations.

• Parens Patriae in the Indian Legal Framework

- In India, the **doctrine reflects the constitutional commitment** to safeguarding the rights of citizens, especially vulnerable groups.
- Indian courts have invoked this doctrine in various cases related to juvenile justice, consumer protection, environmental issues, mental health, and rights of persons with disabilities.

Doctrine of Prospective Overruling



Why in News

- The **Supreme Court of India** in its recent judgment emphasized that the invocation of the **Doctrine of Prospective Overruling** must not be used routinely.

- The Court clarified that it must first satisfy itself that the circumstances demand the application of this legal principle.

Key Points

- **About the Doctrine of Prospective Overruling**
 - **Definition:** The **Doctrine of Prospective Overruling** allows courts to apply a legal decision only to future cases, without affecting past actions or judgments made under the old law.
 - **Purpose:** It ensures that individuals or entities who relied on previous legal rules are not penalized when the law is reinterpreted or overruled.
 - **Contrast with Retrospective Ruling:** Unlike **retrospective rulings**, where the new interpretation of law applies to both past and future cases, this doctrine ensures **stability** in past legal transactions while still allowing the law to evolve.
 - **Historical Context:** This doctrine deviates from the traditional **Blackstonian view of law**, which holds that courts should “maintain and expound the old rule,” rather than create new rules.
- **Origins of the Doctrine**
 - The doctrine was first recognized in **American jurisprudence** and has since been adopted by several countries, including **India** and the **UK**.
 - Its core objective is to maintain fairness and legal stability by ensuring that legal changes do not disrupt settled past transactions.
- **Indian Jurisprudence on the Doctrine**
 - **Introduction in India:** The doctrine was introduced into Indian jurisprudence by the **Supreme Court** in the **I.C. Golaknath vs. State of Punjab (1967)** case.
 - **Importance in Indian Law:** The case marked a key turning point in Indian

constitutional law, as the Supreme Court explicitly recognized and applied the doctrine for the first time.

- **Impact:** The doctrine prevents reopening of settled issues and avoids a multiplicity of proceedings, meaning that actions prior to a legal declaration or change do not stand invalidated.
- **Application in Courts:** Subordinate courts are required to apply the law to **future cases only**, without disturbing past decisions.
- **Specific Dates for Enforcement:** The Supreme Court may also specify the date from which the new legal declaration or ruling shall be applied, preventing the disturbance of decisions taken before that date.

Cabinet Committee on Security (CCS)



Latest Development:

- The CCS met following a terrorist attack in Pahalgam with suspected cross-border links.
- It acknowledged that the attack had possible operational and logistical support from across the border.
- The CCS announced a set of extraordinary retaliatory measures against Pakistan.
- These measures are expected to involve diplomatic, military, and intelligence-based responses.

About the Cabinet Committee on Security (CCS):

- The CCS is one of the most powerful decision-making bodies in the Indian government.
- It is chaired by the Prime Minister of India.
- It is responsible for strategic and high-level decisions concerning national security.

- It formulates policies related to defence, intelligence, and internal and external threats.
- It approves large-scale military procurements and major security infrastructure projects.
- It plays a key role in nuclear command and control.
- It also oversees India's counter-terrorism and strategic planning mechanisms.

Historical Background of the CCS:

- A predecessor to the CCS was created in 1947 by Prime Minister Jawaharlal Nehru.
- It was set up to deal with emerging post-independence national security threats.
- The committee's early focus was on challenges along India's newly drawn borders.
- The first emergency meeting of this committee happened during the 1947–48 Indo-Pak war.
- Nehru chaired it, with Sardar Patel (Home Minister) and Baldev Singh (Defence Minister) as members.
- After the Kargil War in 1999, the need for a more structured national security system was recognized.
- The current form of the CCS was formalized after recommendations from the Group of Ministers on National Security.
- This post-Kargil reform aimed to strengthen India's institutional security setup.

Composition of CCS:

- Prime Minister is the chairperson.
- Minister of Defence is a member.
- Minister of Home Affairs is a member.
- Minister of Finance is a member.
- Minister of External Affairs is a member.
- National Security Advisor acts as the secretary-level coordinator.
- The Defence Minister is a standing invitee to all CCS meetings.
- Other ministers and senior officials may be called as per the agenda.
- Cabinet Secretariat is in charge of maintaining proceedings and records of meetings.

Functions and Scope of CCS:

- It discusses and approves defence acquisitions exceeding a certain financial threshold.
- It reviews and finalizes strategies for border security and counter-insurgency.
- It authorizes operations or doctrines related to nuclear command.
- It reviews intelligence reports related to internal and external threats.
- It can recommend the imposition of President's Rule in extreme internal security cases.
- It makes critical decisions in times of war, military tension, or national emergencies.
- It provides directions for India's response to foreign aggression or covert threats.
- It influences international defence cooperation and strategic partnerships.

About Cabinet Committees:

- Cabinet Committees are not mentioned in the Indian Constitution.
- They are formed under the Transaction of Business Rules, 1961.
- They help manage the workload of the Union Cabinet.
- These committees allow focused discussions on specialized areas.
- Their decisions hold the same authority as those taken by the Union Cabinet.
- They can be standing (permanent) or ad hoc (temporary).

Formation and Structure of Cabinet Committees:

- They are created by the Prime Minister.
- The Prime Minister chooses their composition and assigns their responsibilities.
- The Prime Minister can increase, reduce, or change their functions anytime.
- Each committee typically has 3 to 8 members.
- Most members are Cabinet Ministers.
- Non-Cabinet Ministers and officials can be special invitees.

List of the 8 Cabinet Committees (as of 2025):

1. Cabinet Committee on Economic Affairs.
2. Cabinet Committee on Political Affairs.
3. Cabinet Committee on Investment and Growth.
4. Cabinet Committee on Security.
5. Cabinet Committee on Parliamentary Affairs.
6. Cabinet Committee on Employment and Skill Development.
7. Cabinet Committee on Accommodation.
8. Appointments Committee of the Cabinet.

Leadership:

- All committees are headed by the Prime Minister except the Cabinet Committee on Accommodation and the Cabinet Committee on Parliamentary Affairs.

Telecom Regulatory Authority of India (TRAI)



Telecom Regulatory
Authority of India

Latest Development:

- The **Joint Committee of Regulators (JCoR)** meeting was held at **TRAI headquarters** in **New Delhi**.
- The meeting emphasized the need for a unified and collaborative approach to combat **spam** and **fraudulent calls**.
- Special focus was placed on protecting **senior citizens** from fraud calls and scams.

About Telecom Regulatory Authority of India (TRAI):

- **TRAI** was established under the **Telecom Regulatory Authority of India Act, 1997**, which was passed by **Parliament**.
- Its primary mandate is to regulate **telecom services** in India.
- This includes **tariff fixation/revision**, which was previously the responsibility of the **Central Government**.
- The scope of TRAI's regulation covers **tariffs**, **quality of service**, **interconnection**, **spectrum management**, and **consumer protection**.

- **TRAI** also plays a key **policy role** by issuing **regulations**, **recommendations**, and **orders** that guide **telecom policy-making** and **market practices**.

Composition of TRAI:

- **TRAI** consists of a **Chairperson**, a maximum of **two full-time members**, and **two part-time members**.
- Members are appointed by the **Central Government**.
- The tenure for members is **three years** or until the age of **65 years**, whichever is earlier.

Extent of Government Control over TRAI:

- **TRAI** is **not a fully independent body** and operates under certain **executive constraints**.
- Under **Section 25** of the **TRAI Act**, the **Central Government** can issue **binding directions** to **TRAI**.
- **TRAI's funding** is provided by the **Central Government**.
- Although **TRAI's recommendations** are advisory and not binding, the **Government** must consult **TRAI** for **licensing** of service providers and related matters.
- **TRAI** can notify **telecom service rates** in the **Official Gazette** for services within and outside India.

Joint Committee of Regulators (JCoR):

- The objective of the **JCoR** is to provide a **TRAI-led platform** for fostering **cross-sectoral collaboration** between **regulatory bodies** across multiple sectors.
- These sectors include **telecom**, **IT**, **consumer affairs**, **banking**, **insurance**, and **financial markets**.
- The **JCoR** was created to address **regulatory challenges** in the **digital ecosystem**, especially in areas like **fraud prevention**, **spam control**, and **digital consumer protection**.
- Members of the **JCoR** include representatives from **RBI**, **SEBI**, **IRDAI**, **PFRDA**, **MoCA**, **MeitY**, with **DoT** and **MHA** as special invitees.

Central Consumer Protection Authority (CCPA)



Why in News

- The **Central Consumer Protection Authority (CCPA)** has taken **suo motu cognizance** against **five restaurants in Delhi** for failing to refund **mandatory service charges**, despite a **Delhi High Court judgment** prohibiting such charges.
- This action reinforces the authority's commitment to **safeguarding consumer rights**.

Significance of the Action

- The CCPA's move aims to **protect consumers from undue financial pressure** while availing services at restaurants.
- As per the Consumer Protection (Guidelines), no **hotel or restaurant** can **mandate service charges** or collect them under **alternative names**.
- This step ensures compliance with judicial directions and strengthens the **enforceability of consumer rights**.

About the Central Consumer Protection Authority (CCPA)

- The CCPA was established under **Section 10 of the Consumer Protection Act, 2019**.
- The **Consumer Protection Act, 2019** replaced the older **Consumer Protection Act of 1986** and came into effect on **20 July 2020**.
- **Nodal Ministry:** Ministry of Consumer Affairs, Food and Public Distribution.
- **Headquarters:** New Delhi.

Key Functions and Powers of CCPA

- **Protects and enforces the rights of consumers as a class**, including rights against unfair trade practices and deceptive advertisements.
- **Prevents misleading advertisements** and can **penalize manufacturers, endorsers, and publishers**.
- **Initiates class-action proceedings** related to **product recalls, refunds, and license cancellations**.
- Can **investigate and inquire** into violations through its **Investigation Wing**, headed by a **Director-General**.
- Has powers to **impose penalties, ban products or services**, and order **corrective actions**.
- Ensures the **promotion of consumer welfare schemes** and **market transparency**.

Composition of the CCPA

- The CCPA is headed by a **Chief Commissioner**.
- It includes **two additional commissioners**:
 - One for matters related to **goods**.
 - Another for **services-related complaints**.

EDITORIALS

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Indian Polity & Governance

Parliament Passes Waqf (Amendment) Bill 2025 as Rajya Sabha grants Approval



- In the first week of April 2025, **Parliament passed the Waqf (Amendment) Bill, 2025, with the Rajya Sabha approving it.**
- The Waqf Act, 1995 is renamed as the Unified Waqf Management, Empowerment, Efficiency and Development Act, 1995 (**UMEED**) to reflect broader reform objectives.
- The Upper House cleared the Bill with 128 members voting in favour of it while 95 members voted against the legislation.
- The Rajya Sabha held a discussion on the Bill for around 12 hours. The Lok Sabha has already approved the Bill.

Background :

1. What is Waqf?

- A **Waqf** refers to a **property dedicated by a Muslim individual** for specific purposes such as religious, charitable, or private use under Islamic law.
- **Once property is dedicated as Waqf, it cannot be sold, transferred, or inherited.**
- The benefits or income generated from the Waqf property are used for charitable purposes such as supporting religious institutions, schools, hospitals, or other community welfare activities.

How is Waqf Governed?

- In India, the governance of Waqf properties is governed by the **Waqf Act of 1995**.
- However, India has had a legal framework for Waqf management since the **Muslim Waqf Validating Act of 1913**, which was followed by the **Mussalman Wakf Act of 1923** and later the **Central Waqf Act of 1954**.
- The **Waqf Act, 1995** replaced the previous laws and established the framework under which Waqf properties are administered in India today.

2. Historical Evolution of Waqf Act's Administration in India

The governance of Waqf properties in India has evolved through several legislative acts, aimed at improving administration and addressing the misuse

of Waqf properties. Below is the historical development:

- **Privy Council Ruling (1894):**
 - A landmark ruling where the **Privy Council** declared that Waqf-alal-Aulad (Waqf for family benefit) was invalid.
 - As it should serve the public interest and religious or charitable purposes, not just family interests.
 - This ruling led to dissatisfaction among Indian Muslims.
- **The Mussalman Wakf Validating Act, 1913:**
 - This Act allowed the creation of Waqf for the benefit of family members.
 - It provided the ultimate goal was to serve charitable purposes.
- **The Mussalman Wakf Act, 1923:**
 - This Act aimed to improve the management of Waqf properties by ensuring proper accounting, transparency, and supervision.
- **The Mussalman Wakf Validating Act, 1930:**
 - It reinforced the legal status of family Waqfs created under the 1913 Act, with retrospective effect.
- **The Wakf Act, 1954:**
 - This Act introduced **State Waqf Boards (SWBs)**, which were given the task of the systemic administration and supervision of Waqf properties.
 - The Act also aimed at the protection of Waqf properties from encroachment or misuse.
- **Amendments to the Wakf Act (1959, 1964, 1969, 1984):**
 - These amendments were introduced to refine the administration of Waqf properties and to address various issues that arose.
- **The Waqf Act, 1995:**
 - This Act repealed the 1954 Act and its amendments. It introduced:
 - * **Waqf Tribunals** to adjudicate disputes related to Waqf properties.

- * Strengthening of the **Central Waqf Council (CWC)** with more powers.

- o Despite these efforts, inefficiencies and mismanagement of Waqf properties continued.

- **The Waqf (Amendment) Act, 2013:**

Key Amendments in the Waqf (Amendment) Act, 2013

1. Change in the Definition of Waqf

- Prior to the amendment, the definition of Waqf was limited to “**a person professing Islam.**”
- The 2013 amendment expanded this to allow **any person** to create a Waqf, making it inclusive of individuals regardless of their religious affiliation, as long as the property is dedicated to religious, charitable, or welfare purposes.

2. Sect-Specific Membership in Waqf Boards

- The amendment introduced the provision that **Shia Waqf Boards** must have members who belong specifically to the **Shia sect**, and similarly, **Sunni Waqf Boards** must have members who belong specifically to the **Sunni sect**.

3. Overriding Effect of Waqf Over Other Laws

- The amendment conferred an **overriding effect** of the Waqf Act over any other law that might contradict it.
 - This meant that if any other law conflicted with the provisions of the Waqf Act, the latter would take precedence.

4. District Magistrate's Role in Implementing Waqf Board Decisions

- The amendment placed the responsibility of **implementing the decisions of the Waqf Board** on the **District Magistrate (DM)**.

3. When were the CWC and SWBs Constituted?

- **State Waqf Boards (SWBs):**
 - o The **Waqf Act of 1954** established SWBs to manage and protect Waqf properties at the state level.

- o The Boards ensure that Waqf properties are not misused or encroached upon.

- **Central Waqf Council (CWC):**

- o Established under the **Waqf (Amendment) Act, 1964**, to advise the central government on Waqf matters and supervise State Waqf Boards.

4. Key Administrative Bodies Responsible for Waqf Management in India

The **Waqf Act, 1995** governs the management of Waqf properties, with the following key bodies:

- **Central Waqf Council (CWC):** An advisory body to the Ministry of Minority Affairs.
- **State Waqf Boards (SWBs):** Custodians of Waqf properties, responsible for their management and protection.
- **Waqf Tribunals:** Special judicial bodies to resolve disputes related to Waqf properties.

5. What is the Central Waqf Council (CWC) and its Functions?

The **Central Waqf Council (CWC)** is a statutory advisory body under the Ministry of Minority Affairs. Its functions include:

- Advising **State Waqf Boards** on proper administration.
- Directing State Waqf Boards in cases of irregularities or violations of the Waqf Act.
- Gathering information on finances, surveys, maintenance of deeds, revenue records, and encroachments.

6. Composition of Central Waqf Council

The **CWC** has **22 members**:

- **Muslim Category (10 members):** Includes:
 - o Three persons from all-India Muslim organizations.
 - o Chairpersons of State Waqf Boards (on rotation).
 - o One person to represent mutawallis with an income of ¹ 5 lakh or more.
 - o Three scholars of Islamic law, with two women members.

- **Other Category (12 members):** Includes:
 - Chairperson (Union Minister in charge of Waqf).
 - Three MPs (two from the Lok Sabha and one from the Rajya Sabha).
 - Two former judges from the Supreme Court or High Courts.
 - One prominent lawyer.
 - Four persons from various fields such as administration, financial management, etc.

7. Key Responsibilities of a Mutawalli in Managing Waqf Properties

A **Mutawalli** is the caretaker of a Waqf and is responsible for:

- Ensuring the Waqf funds are used for religious or charitable purposes.
- Maintaining accurate financial records.
- Preventing encroachments or misuse of Waqf properties.
- If the Mutawalli mismanages the property, the **Waqf Board** has the authority to remove them.

8. What is a Waqf Board?

- A **Waqf Board** is a statutory body under the **Waqf Act** created for the administration, management, and regulation of Waqf properties in India.
- There are currently **32 Waqf Boards** for 30 States and Union Territories.

9. Composition of the Waqf Board

The Waqf Board consists of two categories of members:

- **Muslim members (4):** Includes mutawallis with annual incomes of ¹ 1 lakh or more, eminent scholars of Islamic theology, and elected members from local bodies.
- **Other members (7):** Includes MPs, professionals, and government officers. At

least one member from Shia, Sunni, Bohra, and other Muslim communities is ensured, as well as the representation of Muslim women (two members).

10. Functions of State Waqf Boards

The **State Waqf Boards** are responsible for:

- **Registration of Waqfs** (Section 36).
- **Removal of Mutawallis** (Section 64).
- **Leasing Waqf properties** (Section 56).
- **Taking over management** of Waqfs in cases of mismanagement (Section 65).

11. Powers of State Waqf Boards

- The **State Waqf Boards** have significant authority, such as:
 - Registering Waqf properties.
 - Removing Mutawallis for mismanagement.
 - Leasing properties.
 - Preventing encroachments and illegal occupation.

12. How Many Properties Do the Waqf Boards Control?

As per the **Waqf Assets Management System of India (WAMSI)**:

- **Total Waqf Properties:** 8.73 lakh properties.
- **Total Area:** 37.39 lakh acres.
- **Waqf in Rural Areas:** 5.51 lakh properties, covering 20.17 lakh acres.
- **Waqf in Urban Areas:** 3.21 lakh properties, covering 19.03 lakh acres.
- **Pending Litigation:** 31,999 cases, with 16,140 related to encroachment.

*In countries like **Turkey, Egypt, Tunisia**, waqf systems were **abolished or nationalized** in the 20th century. **India** remains one of the few countries where waqf is still protected under a **dedicated legal framework**. As of 2025, India has the **largest legally recognized waqf system in the world**, with **8.72 lakh properties** across states*

Waqf in Numbers:

- As of 2025, India has a total of **8,72,324 immovable** waqf properties, making the Waqf Boards one of the largest landholders in the country after the Armed Forces and Indian Railways.
- These properties span approximately 9.4 lakh acres and are valued at over ¹ 1.2 lakh crore.

Category-wise distribution of waqf properties:

- Graveyards – 1,50,569 properties (17%)
- Mosques – 1,19,200 properties (14%)
- Shops – 1,13,187
- Houses – 92,505
- Agricultural land – 1,40,784 properties (16%)
- Dargahs and mazars – 33,492

State-wise distribution:

- **Uttar Pradesh** holds the largest share with 2,32,547 properties (around 27% of the total)
- Other major states include West Bengal, Tamil Nadu, and Karnataka

Current status of properties:

- Around **7%** of waqf properties are under encroachment
- Nearly 2% of properties are involved in legal disputes
- A significant number remain unregistered or lack formal documentation, as per official reports

Policy Committees and Recommendations

a) Sachar Committee Report (2006):

- Estimated that waqf properties could generate Rs.12,000 crore per year if properly utilized
- Recommended reforms including audits, digitization, and inclusion of women and domain experts in governance

b) Joint Parliamentary Committee Report (2008):

- Recommended structural changes to waqf boards

- Advocated for strict accountability of mutawallis
- Called for better auditing, record management, and legal transparency

13. Are Decisions Made by the Waqf Board Final and Absolute?

- No, the decisions made by the **Waqf Board** are not final. Aggrieved parties can appeal to the **Waqf Tribunal** for review.

14. What is a Waqf Tribunal and its Functions?

A **Waqf Tribunal** was first introduced in the **Waqf Act, 1995 (Section 83)**. Its functions include:

- Adjudicating Waqf disputes.
- Reviewing appeals against decisions made by Waqf Boards.
- Enforcing Waqf laws and governance.

15. Composition of the Waqf Tribunal

The **Waqf Tribunal** consists of three members:

- **Chairman:** A District or Civil Judge.
- **Member:** A state civil service officer (at least the rank of Additional District Magistrate).
- **Member:** A person knowledgeable in Islamic law.

16. Role of the Waqf Tribunal in Reviewing Waqf Board Decisions

- The Tribunal hears disputes related to Waqf properties, including issues of ownership, administration, and management.

17. Appeal Process for Challenging Waqf Board Decisions

- Appeals against **Waqf Board** decisions can be filed with the **Waqf Tribunal**.
- If the parties are not satisfied with the Tribunal's decision, they can file an appeal to the **High Court**.

18. Can High Courts Intervene in Waqf Tribunal Decisions?

- Yes, the **High Court** has the power to intervene in Waqf Tribunal decisions, particularly if there is an error of law or procedural violation.

Key Challenges in Waqf Management Despite Amendments

Problem	Impact
Lack of Transparency	Misuse, corruption, loss of public trust, and failure to ensure properties serve intended purposes.
Incomplete Land Records & Mutation Issues	Ownership disputes, encroachment, and legal uncertainties.
Insufficient Women's Inheritance Rights	Gender inequality, denying women fair share of resources.
Prolonged Litigation & Encroachments	Delayed resolutions, ongoing encroachments, and land misuse.
Waqf Boards' Discretionary Power	Potential misuse, legal complications, and power abuse.
Disputes Over Government Land	Legal battles, loss of land, and undermined Waqf authority.
Poor Accounting & Auditing	Financial mismanagement and resources not used for intended purposes.
Administrative Inefficiencies	Inefficient resolution of issues and poor property management.
Improper Treatment of Trust Properties	Legal disputes and mismanagement of resources.
Lack of Adequate Representation	Biased decisions, lack of inclusivity, and ineffective management.

WAQF (AMENDMENT) BILL, 2024 : UMEED

- To address these key challenges, In August 2024, the **Waqf (Amendment) Bill, 2024** was introduced in the Indian Parliament.
- This bill seeks to amend the existing **Waqf Act of 1995**, proposing major reforms in the way Waqf properties are governed and regulated.
- The bill has brought significant controversy, especially from opposition parties, who have raised concerns about its implications, labeling it as **"unconstitutional," "anti-minority,"** and **"divisive."**
- Despite this opposition, the bill was referred to a **Joint Committee of Parliament** for further examination.

Modernizing Waqf Management: Key Provisions of the Bill

The **Waqf (Amendment) Bill, 2025** introduces reforms designed to streamline and modernize the

management of Waqf properties, particularly concerning legal disputes and governance issues:

1. Non-Muslim Properties Declared as Waqf:

There have been widespread disputes over properties being wrongly declared as Waqf, especially non-Muslim properties.

- This has caused legal issues in several states.

2. Example Disputes:

- Tamil Nadu:** A farmer in **Thiruchenthurai village** faced problems when the Waqf Board claimed the entire village as Waqf land, preventing him from selling his land to pay for his daughter's wedding.
- Bihar:** In **Govindpur Village** (August 2024), the **Bihar Sunni Waqf Board** claimed an entire village, which affected the rights of seven families. This case is currently sub-judice in the **Patna High Court**.
- Kerala:** In **Ernakulam district**, around **600 Christian families** have contested the Waqf Board's claim over their ancestral land, and they have raised the matter with the **Joint Parliamentary Committee**.
- Karnataka:** In **Vijayapura**, farmers protested when the Waqf Board declared **15,000 acres** of land as Waqf property. Similar disputes occurred in **Ballari, Chitradurga, Yadgir, and Dharwad**.
- Uttar Pradesh:** Allegations of corruption and mismanagement were raised against the **Uttar Pradesh State Waqf Board**.

3. Additional Cases of Unlawful Claims:

- In Karnataka (1975 & 2020), **40 Waqf properties** were notified, which included farmlands, public spaces, government lands, and even graveyards and temples.
- In **Punjab**, the **Punjab Waqf Board** claimed land from the **Education Department** in **Patiala**.
- The **Ministry of Housing and Urban Affairs (MoHUA)** reported that **108 properties** under the **Land and Development Office**, **130 properties** under the **Delhi Development Authority**, and **123 properties** in the public domain were declared as Waqf properties, resulting in legal disputes.

Key Recommendations and Key Provisions of the Waqf (Amendment) Bill, 2024:

No.	Key Recommendations	Accepted Key Provisions
1	Separation of Trusts from Waqf: Add a new Clause (2A) to Section 2 of the Waqf Act to separate trusts from waqf. It states that if a Muslim creates a trust under any law, it will not be considered waqf. This ensures that Muslim communities can manage their own trusts, whether created before or after the commencement of the Act, without interference from Waqf Boards.	Accepted: Trusts created by Muslims under any law will not be treated as waqf. This provision helps Muslim communities retain control over their own trusts, ensuring they are not subject to the regulations of the Waqf Act.
2	Use of Technology in Waqf Property Management: Recommend using technology to improve efficiency, transparency, and accountability in managing waqf properties.	Accepted: Introduces the concept of a central portal for waqf property management. This portal will automate the full life cycle of waqf properties, including registration, account management, audit, contributions, and litigation. This ensures transparency and streamlines the process of managing waqf properties.
3	Dedication of Waqf Properties by Practicing Muslims: Only Muslims who have been practicing Islam for at least five years should be allowed to dedicate property to waqf. This reverts the law to the position before the Waqf (Amendment) Act, 2013, which had allowed any person to dedicate property to waqf, not just practicing Muslims.	Accepted: Only Muslims who have been practicing Islam for at least five years can dedicate property to waqf. This provision reinstates the rule that only practicing Muslims can create a waqf, as was the case before the 2013 amendment.
4	Protection of 'Waqf by User' Properties: Properties already registered as waqf by user should remain covered under the Waqf Act unless there is a dispute or the property belongs to the government. This is in response to the existing number of such properties, which are registered with Waqf Boards.	Accepted: Waqf by user properties that are already registered with Waqf Boards will remain under the provisions of the Waqf Act, unless disputed or the property is government land. There are currently about 4.02 lakh Waqf by user properties out of a total of 8.72 lakh waqf properties.
5	Women's Rights in Family Waqf (Waqf-alal-Aulad): Women must receive their rightful inheritance share before any property is dedicated to waqf. It also expands the scope of waqf to provide for the maintenance of widows, divorced women, and orphans if the waqif (the person dedicating the property) intends this.	Accepted: It mandates that the women's inheritance rights must be protected before any property is dedicated to waqf. Furthermore, it ensures that the scope of waqf can extend to provide for the maintenance of widows, divorced women, and orphans, if this is the waqif's intention.
6	Transparent Waqf Property Management: The Mutawalli (the manager of waqf properties) should register details of all waqf properties on a central portal within six months of the Act's commencement. This would increase transparency in the management of waqf properties.	Accepted: It mandates that all Mutawallis must submit the details of waqf properties on a central portal within six months of the commencement of the Waqf (Amendment) Act, 2025. This provision aims to make waqf property management more transparent and accountable.
7	Government Land and Waqf Disputes: An officer above the rank of Collector should be appointed by the State Government to investigate government properties that are claimed to be waqf. This is to avoid unwarranted claims and ensure fairness in determining whether a government property is truly a waqf property.	Accepted: It specifies that an officer above the rank of Collector, appointed by the State Government, will investigate government properties claimed as waqf, ensuring that government properties are not falsely claimed as waqf.

8	Strengthening Waqf Tribunals: Improve the functioning of the Waqf Tribunals by introducing a structured selection process and a fixed tenure for Tribunal members. This would ensure stability and efficiency in the resolution of waqf-related disputes.	Accepted: It establishes a structured process for the selection of Tribunal members, ensures their fixed tenure, and includes one member with knowledge of Muslim law and jurisprudence. The Tribunal will now consist of three members instead of two, as initially proposed.
9	Non-Muslim Representation in Waqf Boards: Two non-Muslim members should be included in both the Central and State Waqf Boards to represent diverse stakeholders involved in waqf property management.	Accepted: It now includes provisions for two non-Muslim members in both the Central and State Waqf Boards to better represent diverse interests and stakeholders.
10	Reduction in Annual Contributions: Reduce the mandatory annual contribution from waqf institutions to the Waqf Board from 7% to 5%, allowing waqf institutions to retain more funds for religious, charitable, or pious activities.	Accepted: The mandatory contribution has been reduced from 7% to 5%, which will allow waqf institutions to allocate more funds for their charitable purposes.
11	Application of the Limitation Act: The Limitation Act, 1963 should apply to waqf property claims. This would ensure that legal claims related to waqf properties are filed within a specific time period, reducing prolonged litigation.	Accepted: The Limitation Act will now apply to waqf property claims, which will help reduce prolonged legal battles and ensure timely resolution.
12	Annual Audit of Waqf Institutions: Waqf institutions with annual earnings of over ₹1 lakh should undergo annual audits by auditors appointed by the State Government. This is to ensure that waqf funds are managed properly.	Accepted: Waqf institutions with earnings exceeding ₹1 lakh per year must now undergo annual audits conducted by auditors appointed by the State Government.
13	Addressing Unlawful Claims (Removal of Section 40): Remove Section 40 of the Waqf Act, which previously allowed Waqf Boards to make arbitrary claims on properties, including entire villages, as waqf. This provision had led to numerous legal disputes.	Accepted: It removes Section 40, stopping the practice of arbitrarily declaring properties, such as villages or entire regions, as waqf. This provision ensures fairer and more regulated administration of waqf properties.

Supreme Court Holds Tamil Nadu Governor's Reservation of 10 Bills for President's Assent is Illegal

Court's prescription

SC observed that Governor is "playing with fire" by holding back crucial Bills

- Governor cannot sit on Bills claiming the House passed them in an invalid session convened after adjourning sine die without prorogation
- Speaker is within jurisdiction in adjourning the House sine die
- Any attempt to cast doubt on the session of the Legislature is fraught with grave perils to democracy

 The Governor, as an appointee of the President, is a titular head of the State
SUPREME COURT BENCH



Issue: Can the Governor delay or block State Bills by sending them to the President after they're passed again by the State Legislature?

Why In News ?

1. In April 2025, The **Supreme Court** of India ruled that the **Tamil Nadu Governor** acted **illegally** by reserving **10 bills** for **President's consideration** after they had already been reconsidered and passed by the state legislature.
2. This was found to be a violation of the **Constitutional principles**.
3. 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:

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

Court's Reasoning:

1. The **Court stressed** that the Governor must **act with due deference to the conventions of parliamentary democracy**.
2. This means the Governor must respect the **will of the people**, as expressed through the legislature and the elected government.
3. 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**.
4. The Governor's duty is not to obstruct the legislative process, but to act as a **facilitator**.
5. 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.

The Role of the Governor:

1. The Court explained that the Governor, as the **Constitutional head** of the state, should not create **roadblocks** or **obstruct** the legislative process.
2. Instead, the Governor should work in **harmony** with the **elected government** and

help resolve conflicts, ensuring the smooth functioning of the state machinery.

3. The Court further said that:
 - a. The Governor must act as a **guide** and **mediator**, helping the state government function effectively.
 - b. The Governor's actions must always be in line with the **Constitutional values** of democracy, respecting the **will of the people** expressed through the **elected legislature**.

Timeline for Governor's Actions:

1. To prevent delays and obstruction in the future, the Court set out clear **guidelines** for Governors to follow when dealing with bills:
 - a. **For reserving a bill for the President:** The Governor must do so within **3 months** of receiving the bill.
 - b. **For bills reconsidered by the legislature:** The Governor must grant assent to the bill within **1 month** after receiving it for the second time.
2. This ensures that **bills do not remain pending indefinitely** and that the Governor's actions are in line with the democratic framework.

The Court's Use of Article 142:

1. 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.
2. 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.

Implications for Other States:

1. After the ruling, **Kerala** also raised concerns about delays by their own Governor in granting assent to bills.
2. The Kerala government asked for the matter to be transferred to the Supreme Court, arguing that the ruling in Tamil Nadu's case should apply to their situation as well.
3. The Court's decision is likely to have broader implications for how Governors handle bills

across the country, promoting more **timely decisions** and ensuring that Governors do not act as obstacles to the legislative process.

About Governor of India

1. The Governor is the nominal executive head of a state, similar to the President at the Centre.
2. Acts as an agent of the central government, ensuring dual roles: constitutional head of the state and representative of the Centre.
3. Usually, there is a governor for each state, but the 7th Constitutional Amendment Act of 1956 facilitated the appointment of the same person as a governor for two or more state

Key Articles

4. Article 153 : Governors of states.
5. Article 154 : Executive power of the state.
6. Article 155 : Appointment of Governor.
7. Article 156 : Term of office.
8. Article 163 : Council of ministers to aid and advise.
9. Article 200 : Assent to bills.
10. Article 213 : Power to promulgate ordinances.

Appointment

1. Appointed by the President through a warrant under his hand and seal.
2. Qualifications :
 - a. Must be a citizen of India.
 - b. Must have completed 35 years of age.
3. Conventions (not legally binding):
 - a. Should be an outsider (not belong to the state of appointment).
 - b. President consults the Chief Minister of the state before appointment.
4. Exceptions : Conventions often violated in practice.

Conditions of Office

1. Term : 5 years, subject to the pleasure of the President.
2. Removal : No fixed tenure; can be removed by the President at any time without assigning reasons.

3. Salary and Allowances :

- a. Increased to Rs. 3.50 lakh per month (as of 2018).
- b. Cannot be diminished during the term.

4. Office Restrictions :

- a. Cannot be a member of Parliament or state legislature.
- b. Cannot hold any other office of profit.
- c. Entitled to use the Raj Bhavan as an official residence.

Oath of Office

1. Administered by the Chief Justice of the State High Court (or senior-most judge if unavailable).
2. Swears to:
 - a. Faithfully execute the office.
 - b. Preserve, protect, and defend the Constitution.
 - c. Devote himself to the service and well-being of the people.

Powers and Functions

A. Executive Powers

1. All executive actions are taken in the Governor's name.
2. Appoints:
 - a. Chief Minister and other ministers.
 - b. Advocate General of the state.
 - c. State Election Commissioner.
 - d. Chairman and members of the State Public Service Commission.
3. Can recommend the imposition of President's Rule under Article 356.

B. Legislative Powers

1. Integral part of the state legislature.
2. Can:
 - a. Summon, prorogue, or dissolve the state legislature.
 - b. Address the legislature at the start of sessions.
 - c. Send messages to the legislature regarding bills or other matters.

- d. Nominate:
 - i. One member from the Anglo-Indian community.
 - ii. One-sixth of the members of the Legislative Council (if applicable) with special knowledge.

- 3. Assent to bills:
 - a. Give assent, withhold assent, return for reconsideration, or reserve for the President's consideration.
- 4. Promulgate ordinances when the legislature is not in session.

C. Financial Powers

- 1. Ensures the Annual Financial Statement (state budget) is laid before the legislature.
- 2. Prior recommendation required for introducing Money Bills.
- 3. Can make advances from the Contingency Fund for unforeseen expenditures.
- 4. Constitutes a Finance Commission every five years to review finances of panchayats and municipalities.

D. Judicial Powers

- 1. Can grant pardons, reprieves, respites, or commute sentences (except death sentences).
- 2. Consulted by the President for appointments of High Court judges.
- 3. Appoints district judges and other judicial officers in consultation with the High Court.

Constitutional Position

- 1. Nominal Head : Real executive power vested in the Council of Ministers led by the Chief Minister.
- 2. Discretionary Powers :
 - a. Reservation of bills for the President's consideration.
 - b. Recommendation for President's Rule.
 - c. Acting as administrator of a union territory (if additional charge).
 - d. Determining royalties for tribal councils in certain states.

- e. Seeking information from the Chief Minister on administrative matters.

3. Situational Discretion :

- a. Appointment of Chief Minister when no clear majority exists.
- b. Dismissal of the Council of Ministers.
- c. Dissolution of the Legislative Assembly.

Special Responsibilities

- 1. Under specific laws, the Governor has additional responsibilities:
 - a. Maharashtra : Development boards for Vidarbha and Marathwada.
 - b. Gujarat : Development boards for Saurashtra and Kutch.
 - c. Nagaland : Law and order during internal disturbances.
 - d. Assam : Administration of tribal areas.
 - e. Manipur : Hill area administration.
 - f. Sikkim : Peace and socio-economic advancement.
 - g. Arunachal Pradesh : Law and order.
 - h. Karnataka : Development board for Hyderabad-Karnataka region.

Comparison with the President

- 1. Veto Power :
 - a. Governor has four options (assent, withhold, return, reserve); President has three.
 - b. Governor cannot veto Money Bills.
- 2. Ordinance-Making Power :
 - a. Similar to the President but limited to state subjects.
 - b. Requires President's instructions in certain cases.
- 3. Pardoning Power :
 - a. Governor cannot pardon death sentences; only the President can.

Contingencies

- 1. If the Governor's office falls vacant, the Chief Justice of the High Court may temporarily discharge the Governor's functions.

2. The President can make provisions for such contingencies.

Significance

1. Represents the federal structure of India.
2. Balances state autonomy with central oversight.
3. Ensures smooth functioning of constitutional machinery in the state.

Key Concerns Related to Governors in India

1. Impartiality Concerns:

- a. Governors are sometimes viewed as agents of the Centre's ruling party, raising doubts about their impartiality.
- b. Example: In 2016, the Governor's actions in Arunachal Pradesh led to the dismissal of the elected government, which was later overturned by the Supreme Court.

2. Questionable Use of Article 356:

- a. Governors have recommended President's Rule in states without conducting a floor test, which raises suspicions of political motivations.
- b. Example: In 2016, the Governor in Uttarakhand recommended President's Rule just before a floor test, suggesting political influence.

3. Overreach in State Matters:

- a. Governors have increasingly intervened in state matters, bypassing elected governments and causing governance paralysis.
- b. Example: In Delhi (2023), the conflict between the Lieutenant Governor and the state government over bureaucratic appointments led to a Supreme Court ruling that the elected government controls services.
- c. Governors also interfere in Vice-Chancellor appointments in state universities, often leading to legal disputes, such as in West Bengal (2023).

4. Lack of Accountability:

- a. Governors are accountable only to the President and can be removed at the Union government's discretion, without a clear impeachment process.
- b. This lack of accountability undermines the governance system and allows Governors to act without facing consequences.

Key Committees and Their Recommendations Related to the Governor

1. Sarkaria Commission (1988):

- a. Governors should not hold statutory powers unrelated to their constitutional role.
- b. Governors should be appointed after consulting the Chief Minister.
- c. Governors should not have recent political affiliations.
- d. Governors' involvement in university governance should be limited, with more influence given to state governments.

2. Punchhi Commission (2010):

- a. Governors should act on Bills within a fixed timeframe (six months for reserved Bills).
- b. Stronger safeguards against the misuse of Article 356 (President's Rule).

3. Venkatachaliah Commission (2002):

- a. Suggested that the appointment of Governors should be managed by a committee consisting of the Prime Minister, Home Minister, Speaker of the Lok Sabha, and the Chief Minister of the relevant state.

Measures to Address Governor-State Disputes

1. Impeachment Process for Governors:

- a. Currently, Governors can only be removed by the President, which reduces accountability.

- b. The Punchhi Commission recommended an impeachment process at the state level to enhance accountability.
- c. The Supreme Court's ruling in **BP Singhal vs Union of India (2010)** emphasized that Governors must be removed for valid reasons to ensure fairness.

2. Amendment to Article 163:

- a. The discretionary powers granted to Governors under Article 163 can lead to political bias.
- b. Amending Article 163 could limit these powers, ensuring they are only used in exceptional cases affecting national interest or constitutional integrity.

3. Review of Gubernatorial Conduct:

- a. Periodic reviews by Judicial Commissions could assess how Governors exercise their powers, ensuring alignment with constitutional norms and reducing unnecessary interference in state governance.

4. Clear Guidelines on Imposing President's Rule:

- a. The Governor's discretion in recommending the President's Rule should be exercised judiciously and backed by objective evidence.
- b. The **S.R. Bommai case (1994)** and the Sarkaria Commission's recommendations suggest that President's Rule should be used as a last resort, only after exhausting all other constitutional remedies.

Supreme Court on Murshidabad Violence & Article 355: Judiciary vs Executive Debate



What Happened in Murshidabad, West Bengal?

- On **April 11**, violence broke out in **Murshidabad**, a Muslim-majority district in West Bengal.
- The protests were against the **Waqf (Amendment) Act**, recently passed by Parliament and signed into law by the President.
- Violence included:
 - **Death** of a father-son duo.
 - Several **injuries**, property damage.
 - **Displacement** of families in Murshidabad.

What the Petitioner is Demanding

- A **lawyer** (Vishnu Shankar Jain) filed a plea in the **Supreme Court**,
 - in context of the pending **2021 post-poll violence case** in West Bengal.
 - a **fresh application** related to Murshidabad violence.
- He is asking the Court to direct the **Central Government** to:
 - **Invoke Article 355**: Centre's duty to protect states from *internal disturbance*.
 - Possibly impose **Article 356**: *President's Rule* in West Bengal.
 - **Deployment of paramilitary forces**.
 - **Constitution of a committee**:
 - * Headed by a retired **Supreme Court judge** and 2 retired **High Court judges**.

- * To probe rights violations, crimes against women, and lawlessness from **2022 to April 2025**.
- o **Protection of fundamental rights:**
 - * Articles **14** (Equality), **21** (Right to Life), and **25** (Religious Freedom).
- o **Direction to the state** to uphold constitutional provisions and protect citizens.

What the Supreme Court Said

- Justice **B.R. Gavai**, leading the bench, **refused to directly intervene**, and said:
- “We are already being accused of intruding into Parliamentary and Executive functions.”
- Meaning: The Court is cautious because it’s **already being criticised** for:
 - o Suggesting a **timeline for the President** to give assent to bills.
 - o Making remarks about the **Waqf law** earlier.

Why Is This a Big Deal?

- Recently, the **Supreme Court has taken steps** that some say are too **aggressive** or **activist**:
 - o Asking the **President** to act quickly on pending bills.
 - o Indicating it could **stay** parts of the **Waqf law**.
- This drew criticism from:
 - o **Vice President Jagdeep Dhankhar**: Accused the SC of behaving like a “**super Parliament**”.
 - o **BJP MPs**: Said courts cannot control the **President or Parliament**.

So, What’s the Core Issue?

The case is about:

1. **Whether the Centre should intervene** in West Bengal using Article 355 or 356 due to recent violence.

2. **Whether the Supreme Court should direct the government** to do so — which might cross into **executive power**.
3. The **growing tension between Judiciary and Executive** about **who has what power** under the Constitution.

“The Supreme Court is hearing a plea to invoke Article 355 due to violence in Murshidabad. But it’s cautious about overstepping into executive territory, especially after being criticised for interfering in legislative and presidential matters. This reflects the ongoing debate on separation of powers and judicial activism.”



Indian Society & Social Justice

Kannadipaya



1. Recent Development:

- **Kannadipaya**, a unique tribal handicraft from Kerala, has recently received the **Geographical Indication (GI) tag**.
- This ensures market protection and provides a global platform for this traditional product.

2. About Kannadipaya:

- **Craft Description:** A traditional craft from Kerala that involves weaving

baskets, mats, and other daily use items using reed bamboo.

- **Craftsmen:** Crafted by the Urali, Mannan, and Muthuvan tribal communities.
- **Material:** Made using *Teinostachyum wightii*, a species of bamboo known locally as 'njoonjiletta'.
- **Name Origin:** The mat has a polished surface that is smooth and reflective, earning it the name kannadipaya (kannadi meaning mirror and paya meaning mat).
- **Size and Flexibility:** Typically measures 0.75-1.0 meters by 2 meters and is so flexible it can be rolled up into a bamboo culm less than 10 cm in diameter.
- **Production Time:** It takes more than a month for a weaver to complete a kannadipaya.
- **Weaving Technique:** Woven using a specific layer of slivers—the fourth or fifth—which can be made ultra-thin and shiny, split from the reed bamboo species endemic to the region.
- **Bamboo Collection:** The collection of bamboo is a full-moon ritual, with each expedition to the forest and back taking a full day and night.

Conclusion:

The GI tag for Kannadipaya highlights the significance of preserving traditional crafts and supporting local artisan communities. This recognition not only protects the craft but also provides a global platform, enhancing its market value and cultural visibility. The intricate process and unique properties of kannadipaya underscore the rich cultural heritage and skilled craftsmanship of the Urali, Mannan, and Muthuvan tribal communities in Kerala.

Khelo India Games - Bihar



1. Upcoming Events:

- Bihar is set to host the Khelo India Youth Games and the Khelo India Para Games in May 2025.

2. About Khelo India:

- Initiative Launch: Launched in 2018, the Khelo India initiative aims to revive India's sports culture by encouraging youth participation and identifying potential Olympians.

3. Key Components of Khelo India:

- **Sports Competitions and Talent Development:**
 - Organizes annual events such as the Khelo India Youth Games, University Games, and Winter Games to identify and nurture young talent.
- **Creation and Upgradation of Sports Infrastructure:**
 - Develops and enhances sports facilities nationwide to provide world-class training environments.

- **Khelo India Centres and Sports Academies:**
 - Establishes centers and academies offering specialized coaching across various sports disciplines.
- **Fit India Movement:**
 - Promotes physical fitness and a healthy lifestyle among citizens through various initiatives.
- **Promotion of Inclusiveness through Sports:**
 - Focuses on gender equality, disability inclusion, and the promotion of indigenous sports to ensure widespread participation.

Conclusion:

Bihar's hosting of the Khelo India Youth Games and Para Games in May 2025 highlights the state's commitment to sports development and youth engagement. The Khelo India initiative, launched in 2018, has been instrumental in reviving India's sports culture. By organizing annual competitions, developing sports infrastructure, and promoting inclusiveness, the program aims to identify and nurture young talent, ultimately contributing to India's success in international sports.

Why India's Education System Fails Marginalised Communities ?



1. Context:

Recent reports have highlighted significant systemic issues within India's education

system, which disproportionately impact marginalized communities (**Scheduled Castes, Scheduled Tribes, and Other Backward Classes**).

2. Both the Supreme Court and activists are calling for reforms to address caste and class-based disparities in access to quality education.

How the Indian Education System Fails Marginalised Communities:

Structural Inequality:

- **Infrastructure Deficiencies:** Schools in rural and urban slum areas often lack essential facilities, qualified teachers, and digital resources.
 - Example: Only 12% of rural schools have functional libraries, according to ASER 2023.

Biased Meritocracy:

- **Competitive Exams:** Standardized tests like JEE and NEET tend to favor students from English-medium schools, urban backgrounds, and those who can afford coaching.
 - Example: 90% of IIT toppers come from elite coaching centers in places like Kota.

Social Discrimination:

- **Campus Segregation:** Caste-based discrimination continues to be a significant issue in educational institutions, manifesting in practices like hostel segregation and daily microaggressions.
 - Example: The suicide of Rohith Vemula at Hyderabad University brought attention to the pervasive institutional casteism.

Underrepresentation:

- **Higher Education Disparities:** Marginalized communities are significantly underrepresented in top academic institutions, with less than 10% of PhD students being from SC/ST backgrounds.
 - Example: In 2018, seven IITs had no ST faculty members.

Economic Barriers:

- **Livelihood Priorities:** Poor families often prioritize immediate economic needs over education, leading to high dropout rates, especially after Class 10.
 - Example: 32% of Dalit girls drop out by secondary school, according to NSSO data.

Government Initiatives:

- **SHREYAS Scheme:** Provides scholarships and coaching support for OBC, EBC, and DNT students to pursue higher education.
- **National Fellowship for SC/ST/OBC Students:** Offers financial assistance for MPhil and PhD studies in Indian universities.
- **Mid-Day Meal Scheme:** Supplies free meals to students to boost school enrollment and attendance, particularly benefiting SC, ST, and economically disadvantaged families.
- **Ambedkar Interest Subsidy Scheme:** Provides interest subsidies on education loans for OBC/EBC students studying abroad.
- **Beti Bachao Beti Padhao (BBBP):** Aims to promote the education and empowerment of girls, especially in underprivileged areas.

Consequences of Systemic Exclusion:

- **Perpetuated Poverty:** Limited access to quality education traps marginalized communities in a cycle of poverty; over 80% of manual scavengers are Dalits.
- **Unequal Representation:** Elite institutions like IITs remain dominated by upper-caste faculty, with 90% of positions held by privileged groups.
- **Social Unrest:** Protests by students, such as those against JNU fee hikes, highlight the deep-seated inequities in higher education access.
- **Economic Impact:** Education inequality results in an annual GDP loss of \$56 billion, as estimated by the World Bank.
- **Mental Health Crisis:** Marginalized students face higher dropout rates due to institutional discrimination and a sense of isolation.

Reforms Needed for an Inclusive System:

- **Redefining Merit:** Assess exam performance while considering socio-economic disadvantages to ensure fairer outcomes.
- **Expanding Affirmative Action:** Implement reservations in faculty hiring and extend them to private educational institutions.
- **Improving Infrastructure:** Modernize rural schools with smart classrooms, internet connectivity, and well-trained educators.
- **Establishing Anti-Discrimination Units:** Create effective grievance redressal mechanisms with strict penalties for caste-based bias and harassment.
- **Vocational Training:** Integrate skill-based learning and career-oriented training as outlined in the National Education Policy 2020 to enhance employability.

Conclusion:

India's education system must evolve into a tool for equality rather than exclusion. Urgent policy reforms, social accountability, and inclusive teaching methods are crucial to address these systemic issues. As Ambedkar emphasized, "Education is the milk of the tigress—drink it, or perish without it."

Koch-Rajbongshi Community – Demand for ST Status & Recent Developments



Context:

The **Koch-Rajbongshi community**, an ethnic group primarily residing in **Assam, West Bengal, and parts of Meghalaya**, is seeking recognition as a Scheduled Tribe (ST) to access government welfare programs and legal protections. Recent developments involve potential easing of legal scrutiny for community members in Assam.

Key Details:

- **Origin & Composition:** The community is a blend of the historically distinct Koch and Rajbongshi groups, with roots in the ancient Kachari Kingdom.
- **Historical Context:** The Koches were once a ruling group with territories spanning multiple states, originating from a Mongoloid ethnic background. The Rajbongshis later emerged within the Koch dynasty, becoming prominent in agriculture.
- **Current Demand:** ST status is sought to ensure socio-economic upliftment and safeguard cultural identity.
- **Recent News:** The Assam government is reportedly considering withdrawing cases filed against members of the Koch-Rajbongshi community in Foreigner Tribunals, signalling potential responsiveness to community concerns.

Significance: This issue highlights the ongoing efforts of indigenous communities in Northeast India to secure recognition and protect their rights. The potential shift in legal proceedings in Assam is a development to watch for its impact on community relations and socio-political dynamics.

PM Inaugurated New Pamban Bridge



Why in News:

The Prime Minister inaugurated the newly modernized Pamban Rail Bridge (Rameswaram Bridge) in 2025.

Key Points:

- **Location:** Connects Rameswaram Island to the mainland of India.

- **Historical Name:** Also known as the Rameswaram Bridge.
- **Original Opening:** Opened in 1914.
- **Historical Significance:** Served as a vital transportation link for over a century.
- **Modernization and Upgrades:**
 - **Vertical Lift Span:** New vertical lift span added in 2025.
 - **First Vertical Lift Sea Bridge:** Makes the Pamban Bridge India's first vertical lift sea bridge.
 - **Clearance:** Provides 22 meters of clearance for ships, an improvement from the previous 19 meters.
 - **Double-Line Electrification:** Supports double-line electrification, allowing for faster train operations between the mainland and Rameswaram Island.
- **Operational Timeline:**
 - **Project Start:** Modernization project began in 2019.
 - **Completion:** Completed by March 2025.
 - **Operational Period:** Newly upgraded bridge became operational during this period.
- **Historical Background:**
 - **Construction and Inauguration:** Commissioned on February 24, 1914.
 - **Role:** Improved connectivity between the mainland and Rameswaram Island.
- **Strategic Importance:**
 - **Sole Link:** For much of its history, the bridge was the only link between Rameswaram Island and the mainland.
 - **Transportation and Economic Activities:** Crucial infrastructure for transportation and economic activities.
 - **Pilgrimage Significance:** Facilitates the movement of pilgrims traveling to the

Rameswaram Temple, a major religious site in Tamil Nadu.

- o Humanitarian Role: Served as an important route for refugees seeking asylum in India during the Sri Lankan Civil War.

University Grants Commission (UGC) : New Regulation on Foreign Qualification Equivalence



Why in News?

- UGC has notified the “**Recognition and Grant of Equivalence to Qualifications Obtained from Foreign Educational Institutions Regulations, 2025.**”
- Finalised after public input on the 2023 draft.
- Aims to create a **standardised, transparent process** for recognising foreign academic qualifications.
- Supports the **NEP 2020** focus on internationalisation of Indian higher education.

What Are Equivalence Certificates?

- Official document certifying that a **foreign degree/diploma/certificate** is **equivalent to an Indian qualification**.
- **UGC will now issue** these certificates (earlier handled by the **Association of Indian Universities (AIU)**).

About the University Grants Commission (UGC)

Origin:

- Based on the **1944 Sargeant Report**, which recommended creating a University Grants Committee.

Formation

- First established in **1945**, expanded in **1947**, and restructured in **1948** following recommendations by **Dr. S. Radhakrishnan**.

Statutory Status:

- Became a statutory body under the **UGC Act, 1956**; formally inaugurated in **1953**.

Headquarters:

- **New Delhi**

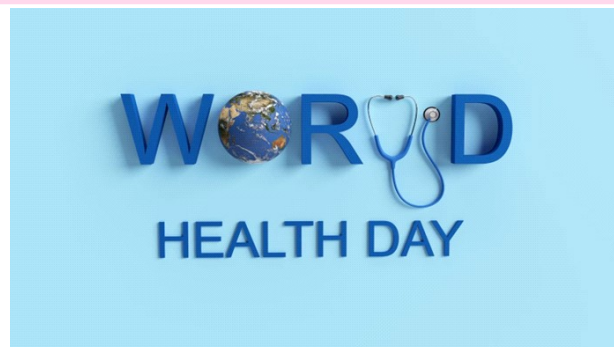
Composition:

- **Chairman, Vice-Chairman, and 10 members**, all appointed by the Central Government.

Key Functions:

- Allocate and assess **grants to universities**
- Recommend **reforms in higher education**
- Assist in the **implementation of national education policies**

World Health Day 2025



Why in News

- **World Health Day 2025** was observed globally on April 7 to raise awareness about key health-related issues.
- The **theme for 2025** is “**Healthy beginnings, hopeful futures.**”

Key Highlights

Marks the **founding anniversary of the World Health Organization (WHO)**, established on **7 April 1948**.

- Celebrated annually since **1950**.
- Each year, a **specific health theme** is selected to spotlight pressing global health challenges.

Theme 2025: “Healthy beginnings, hopeful futures”

- Focuses on **maternal and newborn health**.
- Launches a **year-long campaign** targeting the

elimination of preventable maternal and newborn deaths.

- Aims to strengthen healthcare systems for:
 - **Healthy pregnancies and births**
 - **Postnatal care**
 - **Long-term well-being of women and children**
- Encourages **governments and healthcare organizations** to intensify efforts toward improved healthcare access and quality.

People for the Ethical Treatment of Animals (PETA)



Why in News

On 18 April 2025, animal rights groups including PETA expressed strong support for the **Trump administration's policy changes** aimed at **ending animal testing**, marking a key development in animal welfare advocacy.

Key Points

- **Nature and Purpose:**
 - PETA is a **nongovernmental organization (NGO)** that advocates for the **ethical treatment of animals** and aims to eliminate **animal abuse in business and society**.
 - Focuses on incorporating **animal interests** in public and private decision-making.
- **Founding and Background:**
 - Founded in **1980** by **Ingrid Newkirk** and **Alex Pacheco**, influenced by **Peter Singer's** seminal book *Animal Liberation* (1975).
 - Headquartered in **Norfolk, Virginia, USA**, with a **global presence** and over **nine million members**.

• Core Campaign Areas:

- Opposes **speciesism**—the belief in human superiority over other species.
- Focuses on animal exploitation in:
 - * **Laboratories**
 - * **Food industry**
 - * **Clothing trade**
 - * **Entertainment industry**

• Other Activities:

- Advocates against cruelty to animals often seen as pests (e.g., rodents, birds).
- Works on behalf of **domesticated animals** suffering from neglect or abuse.

• Methods of Advocacy:

- Engages in **public education, undercover investigations, legislative lobbying, animal rescue, protests, and negotiations with corporations and regulators**.

Mahadev Koli Tribe



Why in News

A recent study highlights the **Mahadev Koli tribe's** significant repository of **medicinal and ecological knowledge**, which could play a vital role in enhancing **global climate resilience**.

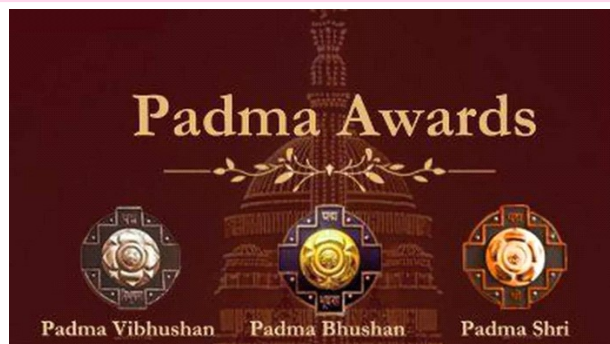
Key Points

• Who are the Mahadev Koli?

- The **Mahadev Koli** or **Mahadeo Koli** are a subcaste of the larger **Koli community** found in the states of **Maharashtra** and **Goa**.
- They derive their name from their god **Mahadev** and reside in the **Mahadev hills** of Maharashtra.

- o The tribe primarily inhabits districts like **Pune, Ahmednagar, and Nasik** in Maharashtra.
- o They are classified as a **Scheduled Tribe** under Indian law.
- **Language and Clans:**
 - o The Mahadev Koli speak **Marathi** and use the **Devanagari script**.
 - o The community is divided into **24 exogamous clans**, with each clan using its name as a surname.
- **Culture and Occupation:**
 - o Their **staple food** includes **rice, nagli, varai, and wheat**.
 - o While **agriculture** is their primary occupation, they are also involved in **cattle production, dairy and poultry farming**, and **wage labor** as secondary occupations.
- **Beliefs and Traditions:**
 - o The Mahadev Koli follow various **Hindu traditions**, and each clan has its own **deity**.
 - o They possess **extensive knowledge of local flora**, utilizing over **50 native tree species** for **medicinal purposes**.
- **Historical Significance:**
 - o A prominent figure from this community is **Tanaji Malusare**, a legendary general in **Chhatrapati Shivaji Maharaj's army**, known for his heroic actions in the **Battle of Sinhagad**.

Padma Awards – 2025



Why in News

The **President of India** recently conferred the **Padma Awards** for 2025 at the **Civil Investiture Ceremony-I** held at **Rashtrapati Bhawan's Ganatantra Mandap**. The awards included **4 Padma Vibhushan, 10 Padma Bhushan, and 57 Padma Shri** recipients.

Historical Background of Padma Awards

- The **Padma Awards** were instituted in **1954**, alongside the **Bharat Ratna**, India's highest civilian honour.
- Initially, the awards were structured in three classes: **Pahela Varg, Dusra Varg, and Tisra Varg**.
- In **1955**, these were renamed as:
 - o **Padma Vibhushan**
 - o **Padma Bhushan**
 - o **Padma Shri**

Categories of Padma Awards

1. **Padma Vibhushan** – Awarded for **exceptional and distinguished service**.
2. **Padma Bhushan** – Conferred for **distinguished service of a high order**.
3. **Padma Shri** – Recognises **distinguished service in any field**.

Eligibility Criteria

- The awards are open to **all individuals**, regardless of race, gender, profession, or nationality.
- **Government servants**, including employees of **Public Sector Undertakings (PSUs)**, are **not eligible**, except for **doctors and scientists**.
- The awards are **not normally conferred posthumously**, except in **highly deserving cases**.
- A **minimum gap of 5 years** is required to receive a **higher category** of Padma award after a previous one. This requirement can be **waived by the Awards Committee** in exceptional cases.
- **Nominations are open to the public**, and **self-nomination is allowed**.

Selection Process

- All nominations are reviewed by the **Padma Awards Committee**, which is constituted **annually by the Prime Minister**.

- The Committee is **headed by the Cabinet Secretary**.
- The Committee's recommendations are submitted to the **Prime Minister** and then to the **President of India** for final approval.
- The awards are usually presented by the **President in March or April**.
- Awardees receive a **Sanad (certificate)** signed by the President and a **medallion**.

Key Features of the Padma Awards

- The total number of Padma awards conferred each year is **capped at 120**, excluding:
 - **Posthumous awards**
 - Awards to **Non-Resident Indians (NRIs)**
 - Awards to **foreign nationals** and **Overseas Citizens of India (OCIs)**
- The Padma award **does not constitute a title** under Article 18 of the Constitution and **cannot be used as a prefix or suffix** to an individual's name.

Fields Covered

The Padma Awards are given for contributions in diverse fields, including:

- **Art and Culture**
- **Social Work**
- **Public Affairs**
- **Science and Engineering**
- **Trade and Industry**
- **Medicine**
- **Literature and Education**
- **Sports**
- **Civil Service**, and more.

GAVI, the Vaccine Alliance



Why in News

Gavi, the international vaccine alliance, is actively engaging with the **Trump administration** to maintain vital funding for the organization. Gavi is emphasizing that a **donation** from the **U.S. government** would not only help the global health initiative but also provide a **boost to the U.S. vaccine industry**.

About GAVI, the Vaccine Alliance

- **Gavi** is an **independent public-private partnership** created in **2000** with the primary goal of improving access to **new and underused vaccines** for **children in the world's poorest countries**.
- **Headquarters**: Based in **Geneva, Switzerland**, Gavi brings together both **public and private sectors** with a shared mission of **equal access to vaccines** for children, regardless of their geographical location.
- **Partnerships**: Gavi collaborates with a wide range of stakeholders, including:
 - **Developing country and donor governments**
 - **World Health Organization (WHO)**
 - **UNICEF**
 - **World Bank**
 - **Vaccine manufacturers**
 - **Research and technical agencies**
 - **Civil society organizations**
 - **Private philanthropists**

Key Activities of GAVI

- **Financial and Technical Support**: Gavi provides **financial support** and **technical expertise** to low- and middle-income countries, enabling them to access **new vaccines** for **vulnerable children**.
- **Market-Shaping**: One of Gavi's core activities is negotiating with **vaccine manufacturers** to lower vaccine costs, ensuring that vaccines are more affordable for poorer countries.

- **Vaccination Efforts:** Since its inception, Gavi has:
 - o Vaccinated **over 1.1 billion children**.
 - o **Saved an estimated 18.8 million lives** (as of 2023).

COVAX Initiative

- Gavi was a key player in leading **COVAX**, a global initiative aimed at **equitable access to COVID-19 vaccines**.
- The program, which began in **2020**, successfully supported the **development, procurement, and delivery** of COVID-19 vaccines across the world and concluded in **2023**.



Crus of The Hindu & Indian Express

Indian Society & Social Justice

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY) in Delhi



Context :

- On **April 5, 2025**, Delhi officially became the **35th State/UT** to implement the **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY)**.
- It is a major milestone in expanding India's largest health insurance initiative.
- The formalization of the implementation was done through a **Memorandum of Understanding (MoU)** signed between the **National Health Authority (NHA)** and the **Government of NCT Delhi**.

Purpose and Nature of AB PM-JAY:

- AB PM-JAY is not an **insurance scheme** but an **assurance scheme**, primarily aimed at providing **financial protection** for economically vulnerable populations.
- The scheme's goal is to provide comprehensive health coverage for **50 crore people** across **12 crore families** in India, including **36 lakh frontline health workers**.

Key Features of AB PM-JAY in Delhi:

- **Financial Protection:**
 - o Beneficiary families in Delhi will receive a health cover of **Rs. 5 lakh per year**.
 - o It includes coverage for healthcare and life insurance under the **Pradhan Mantri Jeevan Bima Yojana**.
- **Senior Citizens' Welfare:**
 - o Senior citizens aged **70 years and above** will be covered under the **Ayushman Vay Vandana Yojana**.
 - o It provides comprehensive healthcare benefits, including coverage for **pre-existing conditions**.
 - o Additionally, Delhi's **state government** will provide an extra **top-up of Rs. 5 lakh per year**, further enhancing the health cover.

Coverage and Impact:

The expansion of AB PM-JAY to Delhi will benefit approximately **36 lakh people**, covering **6.54 lakh families** and around **6 lakh senior citizens**. Key impacts include:

- **Reduced Out-of-Pocket Expenditure:**
 - o The scheme is expected to reduce out-of-pocket **expenditure** on healthcare.
 - o It has also already decreased from **62% in 2014** to **38% today**.
- **Improved Access to Timely Treatment:**
 - o According to a **Lancet study**, the scheme has significantly improved **timely cancer treatment**.

- o showing a **90% rise** in access to cancer treatment within **30 days** for enrolled patients.

Additional Beneficiary Details:

In Delhi, the scheme will cover:

- **30 lakh individuals** from **6.54 lakh families**.
- The scheme includes **1,961 health benefit packages** covering **27 medical specialties**.
- Offering **timely, quality care** and updated medical procedures at **better rates**.

Historical and Social Significance:

- **Towards Universal Health Coverage (UHC):**
 - o AB PM-JAY's expansion to Delhi marks a significant step toward **achieving Universal Health Coverage** and **social security** for vulnerable populations.
 - o Aiming to reduce the **financial burden** of healthcare on economically disadvantaged sections of society.
- **Milestone for Inclusivity:**
 - o This move ensures free access to healthcare for some of the most **vulnerable** populations in Delhi.
 - o It is also promoting **healthcare inclusivity** and equity.

What is Ayushman Bharat:

- Launched in **2018**, **Ayushman Bharat** is the **world's largest publicly funded health insurance scheme**.
- It aimed at providing **universal health coverage** to India's most vulnerable populations, especially in rural areas.
- It consists of 2 main components:
 - o **Ayushman Arogya Mandir (AAM):**
 - * This component aims to transform **Sub Health Centres (SHCs)** and **Primary Health Centres (PHCs)** into **Ayushman Arogya Mandirs (AAMs)**.
 - * It provides **Comprehensive Primary Health Care (CPHC)**.
 - * As of **September 2024**, there

are **1,74,453 AAMs** across India.

- o **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY):**

- * This provides **Rs. 5 lakh per family per year** for **secondary and tertiary care hospitalisation**.
- * By **September 2024**, **35.4 crore Ayushman cards** had been issued, and the scheme was operational in **33 states and UTs**.

What is Ayushman Bharat Digital Mission (ABDM):

- Launched on **September 27, 2021**, the **Ayushman Bharat Digital Mission (ABDM)** aims to create a **digital health ecosystem** in India.
- It is improving **healthcare access and efficiency**, especially in rural areas.
- As of **September 2024**, **66.7 crore Ayushman Bharat Health Accounts (ABHA)** have been created, with **42.01 crore linked health records**.

Ayushman Bharat Initiatives:

- **Ayushman Bhav Campaign (July 2024):**
 - o Conducted **1.89 crore teleconsultations**.
 - o Distributed **free medicines** to **11.64 crore people** and provided **free diagnostic services** to **9.28 crore people**.
 - o Conducted **34.39 crore screenings** for diseases like **TB, diabetes, cancer**, etc.
- **Ayushman Apke Dwar 3.0:**
 - o A program aimed at delivering healthcare services **directly to people's doorsteps**, especially in **rural and remote areas**.
- **Ayushman Melas:**
 - o Health fairs and medical camps organized to provide healthcare services and screenings in **local communities**.

Maternal Mortality in India - UN Report 2023



- A report from the **United Nations** titled **Trends in Maternal Mortality 2000-2023** highlighted the current situation of maternal deaths globally.
- India was shown prominently as one of the countries with the highest maternal mortality rates.
- This report was prepared by the **World Health Organization (WHO), UNICEF, UN Population Fund, World Bank, and UN Department of Economic and Social Affairs**.
- It sheds light on significant trends, causes, and regional disparities that contribute to maternal mortality in India and across the world.

Key Facts and Figures from the Report:

- **India's Global Ranking:**
 - India recorded **19,000 maternal deaths** in 2023, ranking second globally, tied with the **Democratic Republic of Congo (DRC)**.
 - **Nigeria** reported the highest number of maternal deaths in 2023, with approximately **75,000 deaths**, which accounted for **28.7%** of all maternal deaths globally.
 - **India and DRC** each represented **7.2%** of global maternal deaths, while **Pakistan** had about **11,000 deaths**, accounting for **4.1%**.
 - These 4 countries—**Nigeria, India, DRC, and Pakistan**—together accounted for **47%** of all maternal deaths worldwide in 2023.

- **Maternal Mortality Ratio (MMR) in India:**
 - India's **Maternal Mortality Ratio (MMR)** (deaths per 100,000 live births) improved from **362 in 2000 to 80 in 2023**, marking a **78% reduction** over the 23-year period.
 - By comparison, **China** reduced its MMR from **56 in 2000 to 16 in 2023**, a **70% reduction** in the same timeframe.
 - Despite these improvements, India's **MMR of 80 in 2023** is still higher than that of China, signaling ongoing challenges in maternal health in India.
- **Global Trends in Maternal Mortality:**
 - Globally, **maternal deaths** decreased by **40%** from 2000 to 2023, with an estimated **260,000 maternal deaths** worldwide in 2023.
 - This equates to one maternal death approximately **every 2 minutes** globally.
 - The **global decline in maternal deaths** is largely attributed to **improved access to essential health services**, such as antenatal care, skilled birth attendance, and emergency obstetric care.
- **The Impact of COVID-19 on Maternal Mortality:**
 - The **COVID-19 pandemic** had a significant impact on maternal mortality. In **2021, 40,000 additional women** died during pregnancy or childbirth due to the pandemic.
 - This increase in deaths was caused by **COVID-related complications**, as well as the **disruption of maternal health services**.
 - Many healthcare systems were overwhelmed, and women couldn't access the necessary medical care, leading to higher death rates.

- o The total number of maternal deaths in 2021 was estimated at **322,000**, compared to **282,000** the previous year.

Causes of Maternal Mortality:

Maternal deaths are generally caused by complications during pregnancy, childbirth, or the postpartum period. The report identifies three main categories of causes:

- **Direct Obstetric Causes:**
 - o **Haemorrhage** (severe bleeding) is the **leading cause of maternal death** globally, particularly during childbirth or the immediate postpartum period.
 - o Other significant direct causes of maternal death include **hypertensive disorders** (e.g., pre-eclampsia), **infections** (such as sepsis), and complications from **unsafe abortion**.
- **Indirect Causes:**
 - o **Non-communicable diseases (NCDs)** like **diabetes**, **hypertension**, and **heart conditions** are increasing indirect causes of maternal death.
 - o These conditions may predate pregnancy or develop during pregnancy, increasing the risk for the mother.
 - o **Mental health issues**, including **depression** and **substance use disorders**, are also factors that complicate maternal health.
 - o Other conditions like **gestational diabetes**, **epilepsy**, and **asthma** also increase the risk of complications during pregnancy.

Regional Disparities in India:

1. Southern vs. Northern India:

- o **Southern states** like **Kerala**, **Tamil Nadu**, and **Karnataka** have seen substantial improvements in maternal health, mainly due to better access to **private healthcare** and better public health infrastructure.

- o These regions have managed to reduce maternal mortality significantly.
- o **Northern states**, including **Uttar Pradesh**, **Bihar**, and **Madhya Pradesh**, continue to face higher maternal mortality rates.
- o This is mainly due to **limited healthcare infrastructure**, **lack of trained healthcare professionals**, and **low socio-economic conditions**.
- o In these northern states, **primary health centers (PHCs)** and **community health centers (CHCs)** often lack the **resources** and **specialized staff** to handle **complicated pregnancies** or **emergency situations**, leading to many preventable deaths.

2. Socio-Economic Disparities:

- o Women from **poorer** and **rural** regions often have **limited access to quality healthcare**.
- o In these regions, **private hospitals** may be inaccessible due to high costs, and many families rely on **under-resourced government healthcare centers**.
- o The **economic capacity** to afford private healthcare is higher in southern states, leading to better maternal health outcomes there.
- o In contrast, **northern states** with poorer socio-economic conditions see more maternal deaths due to the **lack of emergency obstetric care**.

3. Public Health Centers (PHCs) and Community Health Centers (CHCs):

- o PHCs and CHCs in India are generally equipped to handle **normal deliveries**, but they often struggle with **complicated cases**.
- o They are often **understaffed**, **under-equipped**, and unable to provide **advanced obstetric care** (such as

Caesarean sections or blood transfusions) when needed.

- o Women with **complicated pregnancies** may be **referred to higher-level facilities**, but many do not have the means to reach them in time, particularly in remote areas.

Preventable Causes of Maternal Deaths:

- Many of the causes of maternal deaths, such as **haemorrhage, hypertensive disorders, infections, and unsafe abortions**, are **preventable** with **timely medical intervention**.
- However, despite the availability of **clinical interventions** to treat these conditions, many women still die due to **inaccessible or inadequate care**.
- This is especially true in **low-income or conflict-affected areas**, where healthcare systems are weak and resources are scarce.

Key Recommendations to Address Maternal Mortality:

- **Improving Healthcare Access:**
 - o There is a need to **strengthen healthcare infrastructure**, particularly in **rural and underserved areas**.
 - o **Primary health centers and community health centers** need to be equipped with **trained staff, medical resources, and specialized care** to handle **complicated pregnancies**.
- **Increasing Emergency Obstetric Care:**
 - o Improving **emergency obstetric care** (e.g., **Caesarean sections, blood transfusions**) in **public healthcare centers** can help reduce maternal mortality, particularly in regions where women have limited access to **private hospitals**.
- **Health Education and Family Planning:**
 - o **Family planning services** should be expanded, and women should have better access to **birth control, pre-natal care, and post-natal care**.
 - o **Health education** should be focused on encouraging **regular check-ups** and teaching women the importance of

seeking care early during pregnancy to prevent complications.

- **Tackling Socio-Economic Barriers:**

- o Governments should focus on reducing **socio-economic inequalities** by improving access to healthcare for **low-income families**, and ensuring that all women, especially in remote areas, have access to **skilled medical care**.

- **Addressing the Impact of COVID-19:**

- o Ensuring **continuity of maternal health services** during pandemics and other crises is crucial.
- o Pregnant women need reliable access to **routine check-ups and emergency care**, even during public health emergencies.

Conclusion:

India has made notable progress in reducing maternal mortality, but much work remains. The **high maternal mortality rate** is still a significant challenge, especially in rural areas and poorer states. Improvements in **healthcare infrastructure, training of healthcare providers, and better access to emergency obstetric care** are necessary to save more lives. Addressing **socio-economic disparities** and ensuring **equal access to healthcare** for all women, regardless of their economic status or location, will be critical in achieving further reductions in maternal mortality in India.

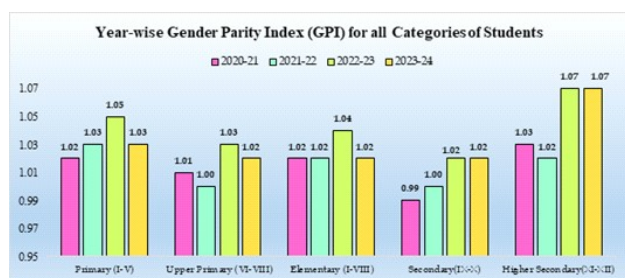
Ministry of Statistics & Programme Implementation (MoSPI) Publication “Women and Men in India 2024: Selected Indicators and Data”



- In **April, 2025**, the **Ministry of Statistics and Programme Implementation (MoSPI)**, Government of India, released the **26th edition** of its annual publication titled **“Women and Men in India 2024: Selected Indicators and Data”**.
- This publication offers a comprehensive overview of the gender landscape in India, presenting **gender-disaggregated data** from official sources across key sectors such as **population, education, health, economic participation, and decision-making**.
- The data is analyzed across both **urban-rural divides** and **geographic regions**.
- It is providing a detailed understanding of the challenges and progress in gender equality in India.
- The publication is an important resource for **policymakers, researchers, and other stakeholders** aiming to develop **gender-sensitive policies** that foster **sustainable and inclusive development**.

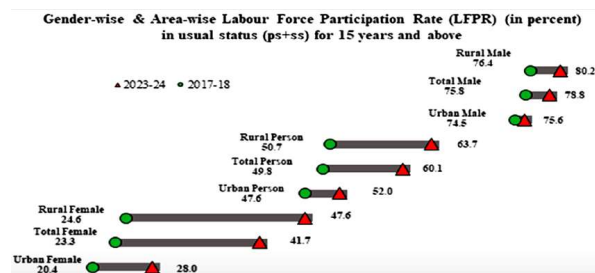
Key Highlights from the Publication:

1. Gender Parity in Education:



- **Primary and Higher Secondary Education:**
 - o **Gender Parity Index (GPI)** is consistently high at the **primary** and **higher secondary** levels, indicating a **strong female enrolment** in these educational stages.
 - o However, there have been **fluctuations** in GPI at the **upper primary** and **elementary** levels, though it generally remains close to **parity**.

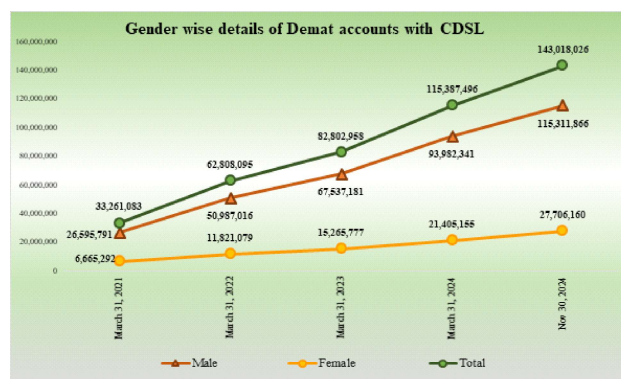
2. Labour Force Participation Rate (LFPR):



- **Labour Force Participation Rate (LFPR)** for **women aged 15 years and above** improved from **49.8% in 2017-18** to **60.1% in 2023-24**.
- This represents a significant rise in women's participation in the workforce, reflecting both improved opportunities and efforts towards gender equality in employment.

3. Financial Inclusion:

- **Bank Accounts and Deposits:**
 - o **Women own 39.2%** of all **bank accounts** in India and contribute **39.7%** to total **bank deposits**.
 - o **Female participation** in banking is highest in **rural areas**, where women make up **42.2%** of bank account holders. This reflects a positive trend towards **financial inclusion**.
- **DEMAT Accounts (Stock Market Participation):**



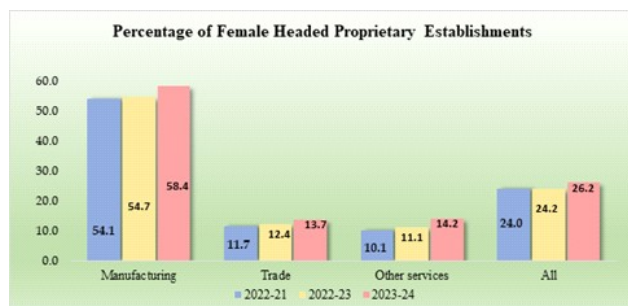
- o There has been a significant increase in the number of **DEMAT accounts** in India.
- o From **March 31, 2021**, to **November 30, 2024**, the total number of DEMAT accounts grew from **33.26 million** to **143.02 million**, marking a rise of over **4 times**.
- o Although **male account holders** still outnumber **female account holders**,

female participation in the stock market is growing.

- o The number of **female DEMAT accounts** rose from **6.67 million** in 2021 to **27.71 million** in 2024.
- o Similarly, **male DEMAT accounts** increased from **26.59 million** in 2021 to **115.31 million** in 2024.

4. Women in Entrepreneurship:

- The publication highlights the **growing trend of women entrepreneurship**.
- The number of **female-headed proprietary establishments** has risen across sectors such as **manufacturing, trade, and other services** over the years 2021-22, 2022-23, and 2023-24.



- Moreover, there has been a notable increase in the number of **startups with at least one woman director**.
- The number of such startups increased from **1,943 in 2017** to **17,405 in 2024**, reflecting the increasing **entrepreneurial spirit** among women in India.

5. Electoral Participation:

- **Growth in Electors:**
 - o The total number of **electors** in India increased from **173.2 million** in **1952** to **978 million** in **2024**.
 - o This shows the expanding electorate over the decades.
- **Female Voter Registration:**
 - o There has been a **notable rise in female voter registration**, showing increasing participation of women in the democratic process.
- **Female Voter Turnout:**
 - o Female voter turnout has varied over the years. It reached **67.2%** in the **2019**

elections, but slightly declined to **65.8%** in **2024**.

- o Despite this slight decline, **female voter turnout** surpassed **male voter turnout** in **2024**, indicating that women are more engaged in the electoral process than before.

6. Gender and Socio-Economic Trends:

- **Gender Parity Index (GPI) in Education:**
 - o The **high GPI** in education at the **primary and secondary levels** reflects the increasing importance placed on girls' education.
 - o However, efforts are needed to maintain and improve gender parity, especially at the **upper primary and elementary** levels.
- **Labour Force Participation:**
 - o The increase in **LFPR** is a positive sign, but it is crucial to ensure that the **quality of employment** for women improves alongside the increase in numbers.
 - o Gender-specific barriers in the workplace, such as pay disparities and lack of leadership opportunities, still need to be addressed.
- **Financial Inclusion:**
 - o **Women's involvement in the financial sector**, especially through **bank accounts** and **DEMAT accounts**, is growing.
 - o This is important for ensuring **economic empowerment** and reducing the gender gap in financial literacy and access to financial services.

7. Key Data Trends and Gender Gaps:

- **Women in Leadership and Entrepreneurship:**
 - o The rising number of **female entrepreneurs** and **women directors**

in startups suggests a positive shift, but there are still challenges in ensuring equal access to resources, networks, and opportunities for women entrepreneurs across different sectors.

- **Women in Decision-Making Roles:**

- o Although there is progress, women remain underrepresented in **senior leadership** and **decision-making positions** across various sectors.
- o Targeted efforts to break glass ceilings and foster equal leadership opportunities are necessary to achieve true gender equality.

Conclusion and Implications:

The release of “**Women and Men in India 2024: Selected Indicators and Data**” by MoSPI provides a detailed, data-driven snapshot of **gender equality trends** in India. The data shows progress in several areas, including **education**, **financial inclusion**, **entrepreneurship**, and **electoral participation**, but challenges remain, particularly in areas such as **decision-making**, **leadership**, and **economic participation**.

PM-POSHAN Scheme Update – Enhanced Material Cost



(Based on April 10, 2025 announcement)

1. What's the News?

- The **Central Government** will bear an **additional cost of ₹954 crore** due to a **9.5% hike** in **material cost** under the **PM-POSHAN Scheme** (earlier Mid-Day Meal Scheme).
- This revision will be effective **from May 1, 2025**, and apply in the **FY 2025–26**.

2. Revised Material Costs (Per Student Per Day)

Category	Earlier Rate	Revised Rate	Increase
Balvatika/Primary	₹6.19	₹6.78	₹0.59 (9.5%)
Upper Primary	₹9.29	₹10.17	₹0.88 (9.5%)

Material cost = cost of raw food items like pulses, vegetables, oil, etc.

3. About PM-POSHAN Scheme

- **Full Name:** Pradhan Mantri Poshan Shakti Nirman (PM-POSHAN)
- **Type:** Centrally Sponsored Scheme
- **Started:** Renamed from Mid-Day Meal Scheme in **September 2021**
- **Target Group:**
 - o **11.20 crore** students
 - o In **Balvatikas and Classes 1 to 8**
 - o Across **10.36 lakh** government and aided schools
- **Goal:**
 - o Improve **nutritional status** of children
 - o Enhance **school attendance**, **retention**, and **concentration**

4. Nutritional Norms (Per Student Per Day)

Class Group	Pulses	Vegetables	Oil
Balvatika/Primary	20g	50g	5g
Upper Primary	30g	75g	7.5g

5. Cost Sharing & Inflation Adjustment

A. Cost Sharing:

- **Centrally Sponsored Scheme:** Cost is shared between **Centre and States/UTs**.
- **States can contribute more** than the prescribed share to enhance nutrition.

B. Inflation Adjustment Mechanism:

- **Labour Bureau (Ministry of Labour)** monitors price trends using:
 - o **Consumer Price Index – Rural Labourers (CPI-RL)**
 - o Based on monthly data from **600 villages across 20 States**

6. Other Components of PM-POSHAN

Component	Details
Food Grains	~26 lakh Metric Tonnes annually (from FCI)
Cost of Food Grains	100% borne by Centre (~₹9,000 crore per year subsidy)
Transport Cost (Depot to School)	100% borne by Centre
Total Per Meal Cost (All Inclusive)	₹12.13 (Primary), ₹17.62 (Upper Primary)

7. Significance of the Revision:

Nutritional Security:

- Accounts for **rising food inflation**, ensuring that children get the required quantity and quality of food.

Equity & Inclusion:

- Continues to support children from **marginalized backgrounds**.

Educational Outcomes:

- Midday meals improve:
 - o **Attendance**
 - o **Learning outcomes**
 - o **School retention rates**

State Autonomy:

- States/UTs are free to **top-up funding** and enhance meal quality.

8. Challenges Ahead

- Implementation gaps** at local level (quality, hygiene, leakages).
- Monitoring and real-time tracking** still needs strengthening.
- Need for **regular revision** of norms based on inflation and dietary changes.
- Nutrition gaps** may still exist in some regions due to poor quality or irregular meals.

9. Best Practices by Some States

- Tamil Nadu: Eggs, bananas, and milk added.
- Odisha: Millets and seasonal fruits included.
- Karnataka: Fortified rice pilot being scaled.

These examples reflect the **flexibility and innovation potential** under the scheme.

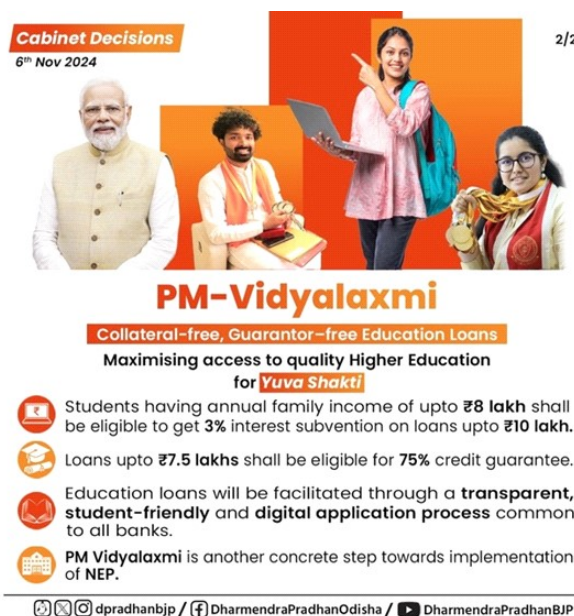
10. Conclusion

- The material cost hike is a **welcome step**, reflecting the government's commitment to **child nutrition** and **human capital development**.
- However, success will depend on:
 - o **Effective fund utilization**
 - o **Strict monitoring**
 - o **Community participation** (e.g. School Management Committees)

PSBs red flag technical glitches in implementing PM Vidyalaxmi scheme

Cabinet Decisions
6th Nov 2024

2/2



PM-Vidyalaxmi
Collateral-free, Guarantor-free Education Loans
Maximising access to quality Higher Education for **Yuva Shakti**

- Students having annual family income of upto **₹8 lakh** shall be eligible to get **3%** interest subvention on loans upto **₹10 lakh**.
- Loans upto **₹7.5 lakhs** shall be eligible for **75%** credit guarantee.
- Education loans will be facilitated through a **transparent, student-friendly** and **digital application process** common to all banks.
- PM Vidyalaxmi is another concrete step towards implementation of NEP.

[dpradhanbjp](#) / [DharmendraPradhanOdisha](#) / [DharmendraPradhanBJP](#)

Why in News?

- In April 2025, public sector banks (PSBs) raised concerns regarding **technical glitches** in the implementation of the **PM Vidyalaxmi Scheme**.
- It is a flagship initiative launched by the Government of India to support meritorious students in accessing higher education through financial aid.
- Despite the scheme's noble objective, PSBs reported issues such as **repeated login**

failures, frequent auto logout, and server-level errors on the online application portal.

- These hurdles have led to a **slow uptake** of the scheme among students.
- In response, the **Ministry of Finance** has instructed banks to launch awareness campaigns to improve outreach and resolve technical challenges.

Background: What is the PM Vidyalaxmi Scheme?

- The **PM Vidyalaxmi Scheme** was approved by the **Union Cabinet in November 2024**, under the leadership of Prime Minister Narendra Modi.
- The scheme aims to **provide financial assistance to meritorious students**, allowing them to pursue higher education without being hindered by financial constraints.
- This initiative is in line with the **National Education Policy (NEP) 2020**, which emphasizes equitable access to quality education and encourages **merit-based, inclusive growth** in the education sector.

Key Features of the PM Vidyalaxmi Scheme

1. Target Group and Eligibility

- **Beneficiaries:** Meritorious students admitted to any of the **top 860 Quality Higher Educational Institutions (QHEIs)**, as identified by the **National Institutional Ranking Framework (NIRF)**, are eligible.
- **Institution Criteria:**
 - **Top 100** in NIRF: Includes both government and private institutions.
 - **Ranked 101–200:** Includes government institutions only.
- **Income Eligibility:**
 - Students from families with an **annual income up to ₹8 lakh**: Eligible for **3% interest subvention**.
 - Students from families with an **annual income up to ₹4.5 lakh**: Eligible for **full interest subvention** under the **Central Sector Interest Subsidy (CSIS)** scheme.

2. Loan Coverage and Financial Assistance

- **Loan Amount:** Students can apply for education loans up to **₹10 lakh**, applicable for both **domestic and international education**.
- **Collateral-Free:** Loans are **without the need for collateral or guarantor**, increasing accessibility.
- **Government Guarantee:** For loans up to ₹7.5 lakh, a **75% credit guarantee** will be provided by the government to reduce default risk for banks.

3. Interest Subvention Structure

- Students with a **family income up to ₹8 lakh**, who do not qualify for other subsidy schemes, will receive a **3% interest subvention** on loans during the moratorium period.
- Students with **family income below ₹4.5 lakh**, pursuing **technical or professional courses**, are entitled to **full interest subvention** under the existing **CSIS scheme**.
- The scheme is expected to benefit **1 lakh students every year**, with a target of reaching **7 lakh students by 2030**.

4. Application Process and Digital Platform

- The scheme is hosted on a **dedicated unified digital portal – PM Vidyalaxmi**, which allows students to apply for loans, interest subvention, and track applications.
- The portal is designed to be **transparent, student-friendly, and interoperable** with all public sector banks.
- The government also plans to integrate **E-vouchers** and **Central Bank Digital Currency (CBDC) wallets** for the seamless disbursement of subsidies.

5. Additional Provisions

- The scheme covers education across **technical, professional, and general streams**.
- Eligible institutions include **central and top state institutions**.
- The **total financial outlay** is **₹3,600 crore** for the period **2024–25 to 2030–31**.

How Does the Scheme Complement Existing Policies?

- The PM Vidyalaxmi scheme strengthens India's education financing framework by building on:
 - Central Sector Interest Subsidy (CSIS):** Provides full interest subvention for students from families with income up to ₹4.5 lakh during the moratorium period.
 - Credit Guarantee Fund Scheme for Education Loans (CGFSEL):** Under PM Vidyalaxmi, the government provides **75% credit guarantee**, encouraging banks to approve loans without seeking collateral.
- Together, these schemes **ensure inclusive, merit-based access to higher education**, especially for economically weaker sections.

Significance of the PM Vidyalaxmi Scheme

- **Promotes Financial Inclusion in Education**
 - By offering **collateral-free loans** and **interest subventions**, the scheme lowers financial barriers for students from low and middle-income families.
- **Boosts Higher Education Enrolment**
 - By covering over **22 lakh students annually**, the scheme is expected to significantly enhance enrolment in top institutions across the country.
- **Digital and Transparent Delivery**
 - The use of a **unified digital platform** ensures transparency, reduces delays, and simplifies the application process.
- **Alignment with NEP 2020**
 - The scheme supports NEP 2020's objective of **equitable access** to higher education, particularly for underprivileged yet meritorious students.
- **Encourages Merit-Based Admissions**
 - It promotes a culture of **academic excellence** by supporting students who qualify for top institutions based on merit.

Challenges in Implementation

Despite its ambitious goals, the scheme currently faces several **technical and administrative hurdles**, including:

- **Portal Access Issues:** Login failures and server errors have disrupted the application process.
- **Low Awareness:** Many students and families remain unaware of the scheme's benefits.
- **Banking Constraints:** PSBs report difficulties in integrating systems with the central portal.

Addressing these challenges is critical to ensure **wider adoption and impact** of the scheme.

Quote to Use in Essays or GS Answers

"Education is the most powerful weapon which you can use to change the world."
— Nelson Mandela



Foreign Portfolio Investment (FPI)



Why in the News?

- The **Supreme Court of India** has directed **Mahua Moitra**, a Member of Parliament, to approach **SEBI** regarding transparency issues in **Foreign Portfolio Investors (FPIs)** and **Alternative Investment Funds (AIFs)**.

1. What is FPI?

- **Foreign Portfolio Investment (FPI)** refers to foreign investments in a country's financial assets like stocks, bonds, and other securities.

- It is different from **Foreign Direct Investment (FDI)** because FPI doesn't involve acquiring control over a business.

2. Key Features of FPI

- Passive Investment:** FPI investors do not manage or control the companies they invest in.
- Short-Term Focus:** FPI typically aims for quick capital gains rather than long-term strategic interests.
- Market Liquidity:** FPI helps improve market liquidity by bringing in foreign capital, making the financial markets more efficient.
- Sensitive to Market Sentiment:** FPI is highly volatile as investors can quickly pull out their funds if there is political or economic instability.

3. FPI Policy in India

- A foreign investor can hold up to **10%** of a company's paid-up capital without it being considered FDI.
- If an investor exceeds 10% ownership, it is considered **Foreign Direct Investment (FDI)**.
- SEBI** (Securities and Exchange Board of India) regulates FPI to ensure compliance with financial laws and maintain transparency in the markets.

4. FII vs. FPI

- Foreign Institutional Investors (FIIs)** are a subset of FPIs.
- FIIs include large investment entities like:
 - Mutual Funds**
 - Pension Funds**
 - Insurance Companies**
 - Hedge Funds**
- While all FIIs are FPIs, not all FPIs are FIIs.
- FIIs** typically take a more structured, long-term investment approach compared to individual FPIs.

5. FPI vs. FDI: Key Differences

Aspect	FDI	FPI
Control & Involvement	Active management, control of business	No involvement in management
Investment Type	Physical assets (factories, offices)	Financial assets (stocks, bonds)
Liquidity & Exit	Difficult to exit, requires selling physical assets	Easy to withdraw, as securities are liquid
Duration	Long-term commitment	Short-term, speculative investment
Capital Flow	Flows into the primary market	Flows into the secondary market
Economic Impact	Promotes economic growth, employment, innovation	Provides liquidity to financial markets

Alternative Investment Funds (AIFs) Notes

1. What are AIFs?

- Alternative Investment Funds (AIFs)** are private investment vehicles that pool capital from investors to invest in specialized, non-traditional assets, different from conventional investments like mutual funds.
- AIFs are regulated by **SEBI** under the **SEBI (Alternative Investment Funds) Regulations, 2012**.

2. Key Features of AIFs

- AIFs can be structured as:
 - Companies**
 - Trusts**
 - Limited Liability Partnerships (LLPs)**
- AIFs usually target **high-net-worth individuals (HNIs)** and institutional investors because of high minimum investment requirements.

3. Categories of AIFs

- Category I AIFs:**
 - These funds invest in sectors that are considered economically or socially beneficial by the government.
 - Examples: **Venture Capital Funds, Angel Funds, SME Funds, Infrastructure Funds.**

- **Category II AIFs:**
 - o These funds include diversified strategies that don't fall under Category I or III.
 - o They cannot use leverage beyond operational needs.
 - o Examples: **Private Equity Funds, Debt Funds, Real Estate Funds, Distressed Asset Funds.**
- **Category III AIFs:**
 - o These funds are involved in high-risk, high-return investments.
 - o They may use complex trading strategies, leverage, and derivatives.
 - o Examples: **Hedge Funds, Private Investment in Public Equity (PIPE) Funds.**
 - o Category III AIFs can be **open-ended** or **close-ended**, unlike Category I and II AIFs, which have a minimum tenure of three years.

4. AIFs vs. FPI

- AIFs focus on specialized investment strategies, such as venture capital or real estate, while FPI is about investing in financial assets like stocks and bonds for short-term profit.
- AIFs can be both **closed** or **open-ended**, whereas FPIs typically involve short-term investments in liquid assets like securities.

Bear Market



Why in News?

- The **S&P 500 index** recently **briefly entered bear market territory**, marking the first such instance since 2022.

What is a Bear Market?

- A **bear market** refers to a **prolonged period** during which **stock prices fall by 20% or more** from recent highs.
- It reflects **widespread investor pessimism, economic slowdown, and reduced market confidence.**

Key Characteristics

- **Duration:** Typically lasts at least **two months** or longer.
- **Scope:** Can apply to **entire markets, indices** (e.g., S&P 500), or **individual stocks.**
- **Market Sentiment:** Driven by **fear, uncertainty, and negative economic outlooks.**
- **Investor Behaviour:**
 - o **Selling Short:** Investors (called "bears") sell borrowed stocks expecting prices to fall so they can buy them back cheaper.
 - o **High Liquidation:** Investors sell off securities in bulk.

Causes

- **Economic recession**
- **High inflation or interest rate hikes**
- **Geopolitical instability**
- **Corporate earnings downturn**

Opposite: Bull Market

- A **bull market** is marked by **rising stock prices, optimism, and economic expansion.**

Index of Industrial Production (IIP)



Why in News?

- Industrial output grew by just **2.9% in February 2025**, marking the **slowest growth** in the last six months, falling short of the **market expectation of 4%**.

About the Index of Industrial Production (IIP)

- The **Index of Industrial Production (IIP)** is a **key statistical tool** to measure **short-term changes** in the volume of production in Indian industries.
- It tracks the **growth or contraction** in industrial activity over a given period and is a crucial indicator of the **economic performance** of the industrial sector.
- Published by the **Central Statistics Office (CSO)**, under the Ministry of Statistics and Programme Implementation (MoSPI).
- The **base year** for the current index is **2011–12**, adopted to better reflect modern industrial structures and production patterns.

Sectoral Composition of IIP (Weight-wise)

- Manufacturing:** 77.63% of total weight (809 items)
- Mining:** 14.37% (29 items)
- Electricity:** 7.99% (1 item)

Sectoral Growth (Year-on-Year in February 2025)

- Mining:** Growth slowed to **1.6%**, down from **8.1%** in February 2024.
- Manufacturing:** Growth was **2.9%**, slower than **4.9%** a year ago.
- Electricity:** Output growth dropped to **3.6%**, compared to **7.6%** in February 2024.

Eight Core Industries (Weight in IIP: 40.27%)

The major industries, listed in order of weightage in the IIP:

- | | |
|----------------------|----------------|
| 1. Refinery Products | 2. Electricity |
| 3. Steel | 4. Coal |
| 5. Crude Oil | 6. Natural Gas |
| 7. Cement | 8. Fertilisers |

Amrit Bharat Station Scheme (ABSS)



AMRIT BHARAT STATION SCHEME

Why in News?

- The **Railway Minister** recently announced that **104 of the 1,300 stations** being redeveloped under the **Amrit Bharat Station Scheme** are now complete.

About Amrit Bharat Station Scheme

- Launched:** February 2023
- Objective:** To **modernize and upgrade** railway stations across the Indian Railways network.
- Target:** 1,300 stations to be redeveloped.
- Approach:** Continuous, long-term station development through the creation and phased implementation of **Master Plans**.

Key Features of the Scheme

- Station Upgrades:** Includes improvement in **accessibility, waiting halls, toilets, cleanliness**, and the installation of **lifts/escalators** where necessary.
- Passenger Amenities:** Features like **free Wi-Fi, local product kiosks** (via schemes like 'One Station One Product'), **business meeting spaces, Executive Lounges**, and **landscaping**.
- Cultural Integration:** Stations will reflect **local culture, heritage, and architecture** in their design.
- Sustainability and Connectivity:** Focus on **multimodal connectivity, eco-friendly solutions, ballastless tracks**, and **Roof Plazas** where applicable.
- Inclusivity:** Special provisions for **Divyangjans** (people with disabilities).
- City Integration:** Emphasizes the integration of station structures with the surrounding city, ensuring seamless **city connectivity**.

Long-Term Goal

To transform these stations into **vibrant city centres** that are not only transit hubs but also contribute to the urban landscape.

Repo Rate



Why in News?

- The **Reserve Bank of India (RBI)** recently reduced the **repo rate** by **25 basis points**, bringing it down to **6%**.

About Repo Rate

- The **repo rate** is the **interest rate** at which the **RBI** lends **short-term funds** to commercial banks against **government securities**.
- It is a key tool for the **RBI** to regulate **liquidity**, control **inflation**, and influence **overall economic activity**.
- By adjusting the repo rate, the RBI can either **encourage** (by lowering the rate) or **discourage** borrowing (by raising the rate), thus influencing the **money supply** in the economy.

Impact of RBI Repo Rate Cut

1. Lower Borrowing Costs:

- Commercial banks** benefit from reduced borrowing costs, which may lead to **lower interest rates** for loans to consumers and businesses.

2. Fixed Deposit (FD) Interest Rates:

- Banks** generally lower **FD rates** after a repo rate cut. While **new FDs** will offer lower returns, **existing FDs** remain unaffected until maturity.

3. Enhanced Credit Flow:

- Lower interest rates can encourage more borrowing, stimulating **investment** and **consumption** in the economy.

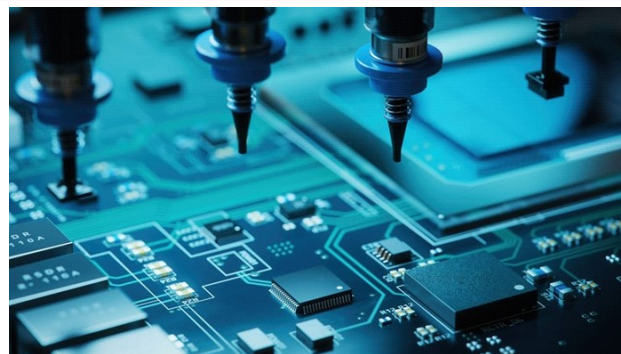
4. Boost to Real Estate and Infrastructure:

- Sectors like **real estate** and **infrastructure** may see **increased activity** due to more affordable financing.

5. Support Amid Global Challenges:

- The **RBI's accommodative stance** aims to support the Indian economy amid **global uncertainties**, such as the impact of **increased U.S. tariffs** on exports.

Surface Mount Technology (SMT)



Why in News

- On 19 April 2025, the **Minister of Electronics and Information Technology** inaugurated **VVDN Technologies' SMT Line at Manesar**, noting that **electronics manufacturing in India** has increased **five-fold** over the last decade, reaching over **Rs 11 lakh crore**.

Key Point

• What is Surface Mount Technology (SMT)?

- A **manufacturing technique** where electronic components are directly mounted on the **surface of a printed circuit board (PCB)**, rather than being inserted through holes.
- Developed in the **1960s and 1970s**, SMT replaced traditional **through-hole technology (THT)**, resulting in **more compact, economical, and efficient** electronic devices.

• How SMT Works:

- Components are **soldered directly** onto the board using **reflow soldering** or **wave soldering**.

- o The process involves several steps: **solder paste application, component placement, reflow soldering, and cleaning.**
- o The end result is a **fully functional circuit board** with **surface-mounted components (SMD).**
- **Industries Using SMT:**
 - o SMT is utilized across **consumer electronics, medical, and aerospace industries**, among others, for manufacturing compact and efficient devices.
- **THT vs. SMT:**
 - o **Cost and Efficiency:**
 - * SMT is generally **cheaper** and offers **higher component density** than THT.
 - * It allows **more components** to be placed **closer together**, enabling **compact** and **lightweight designs.**
 - o **Production Speed:**
 - * SMT production setup is **faster** than THT as it doesn't require drilling holes, saving both **time and labor.**
 - o **Electrical Performance:**
 - * SMT provides **superior electrical performance** and is more efficient for **microelectronics.**
 - o **Simplicity:**
 - * SMT is less complex as components are directly soldered onto the PCB, compared to THT where components must pass through holes.
 - o **Challenges:**
 - * While SMT is efficient, the **initial setup cost** is higher, and **repairing** SMT-based devices is **more difficult.**

Khadi and Village Industries Commission (KVIC)



Why in News

- The **Ministry of Micro, Small and Medium Enterprises (MSMEs)** recently announced that the **turnover of Khadi and Village Industries (KVI)** surpassed **Rs 1.7 lakh crore** in the **financial year 2025 (FY24-25).**

Key Points

- **Establishment and Role**
 - o The **Khadi and Village Industries Commission (KVIC)** was established under the **Khadi and Village Industries Commission Act of 1956.**
 - o It operates as an **apex statutory body** under the **Ministry of Micro, Small, and Medium Enterprises (MSMEs)** in India, focusing on **Khadi and village industries.**
- **Primary Functions**
 - o **Planning, Promotion, and Coordination:** KVIC is responsible for planning and promoting the development of Khadi and other village industries in rural areas, often in collaboration with state and central agencies engaged in rural development.
 - o **Employment Generation:** One of its primary objectives is to **create employment** in rural areas through Khadi and village industries.

- **Product Development:** It focuses on producing **saleable products** and contributing to **self-reliance** among economically weaker sections.
- **Objectives**
 - **Primary Objective:** To build an active and vibrant rural community.
 - **Social Objective:** To generate employment opportunities in rural India.
 - **Economic Objective:** To create products that can be marketed and sold.
 - **Wider Objective:** To foster **self-reliance** in rural economies.
- **Functions**
 - **Raw Material Reserve:** Establishing a strategic reserve of raw materials for producers.
 - **Common Service Facilities:** Creating facilities for processing raw materials and semi-finished goods.
 - **Sales and Marketing:** Enhancing the sale and marketing of Khadi and village industry products.
 - **Research and Development:** Promoting research in production techniques and equipment.
 - **Financial Assistance:** Providing financial assistance to institutions and individuals involved in Khadi and village industries.
 - **Product Quality Assurance:** Ensuring the authenticity and quality of Khadi products.
- **Schemes Under KVIC**
 - **Prime Minister's Employment Generation Programme (PMEGP)**
 - **Market Promotion Development Assistance (MPDA)**
 - **Interest Subsidy Eligibility Certificate (ISEC)**
 - **Workshed Scheme for Khadi Artisans**
 - **Khadi Reform and Development Programme (KRDP)**

- **Scheme of Fund for Regeneration of Traditional Industries (SFURTI)**
- **Honey Mission**
- **Strengthening Khadi Institutions:** Assistance for marketing infrastructure and improving existing weak Khadi institutions.

Central Board of Indirect Taxes and Customs (CBIC)



Latest Development:

- In line with the **Union Budget 2025–26**, the **Central Board of Indirect Taxes and Customs (CBIC)** has introduced **major trade facilitative measures** for **Air Cargo** and **Transshipment**.
- These measures aim to enhance **logistics efficiency** and simplify **customs procedures**.

About Central Board of Indirect Taxes and Customs (CBIC):

- **CBIC** is part of the **Department of Revenue**, under the **Ministry of Finance**.
- It administers **Customs, Central Excise, CGST, IGST, and Narcotics** (where applicable).
- It is responsible for **policy formulation** related to the **levy and collection of indirect taxes**.
- It oversees **Custom Houses, Excise & GST Commissionerates, and Revenue Laboratories**.
- **CBIC** manages **customs operations** at **International Airports, Seaports, Air Cargo Stations, ICDs (Inland Container Depots), LCSs (Land Customs Stations), CFSs (Container Freight Stations), and SEZs (Special Economic Zones)**.
- The **CBIC** is headed by a **Chairman**, supported by **Chief Commissioners** and **Director Generals** across various zones.
- It also operates a **GST Intelligence Wing** to monitor and prevent **tax evasion**.



Crux of The Hindu & Indian Express



Economics

NITI Aayog Develops Portal on Finances of States



नीति आयोग

National Institution for Transforming India

Introduction:

1. In response to complaints from opposition-ruled states regarding perceived discrimination in resource sharing, the **Union Finance Minister, Nirmala Sitharaman**, is set to launch a new portal on April 1, 2025.
2. Developed by NITI Aayog in collaboration with the **National Council of Applied Economic Research (NCAER)**, the portal aims to provide comprehensive insights into the financial health and economic performance of Indian states.

Key Features of the Portal :

1. Overview of the Portal:

- The portal, named '**NITI NCAER States Economic Forum**', will serve as a "comprehensive repository" of data on social, economic, and fiscal parameters.
- It will provide access to research reports, papers, expert commentary, and datasets on the finances of states spanning **30 years**, from **1990-91 to 2022-23**.

2. Four Main Components of the Portal:

- **State Reports:** These will summarize the macro and fiscal landscape of **28 Indian states**, focusing on key indicators such as demography, economic structure, socio-economic trends, and fiscal health.
- **Data Repository:** The portal will offer **direct access to an extensive database** categorized across five verticals:
 - o **Demography**
 - o **Economic Structure**
 - o **Fiscal**
 - o **Health**
 - o **Education**
- **State Fiscal and Economic Dashboard:** This feature will present **graphical representations** of key economic variables, allowing users to view and analyze state-level data in an easily interpretable format.
- **Research and Commentary:** The portal will host **extensive research and analysis** on state finances, fiscal policy, and financial management at both state and national levels.

Objectives and Benefits of the Portal

1. Understanding Macro and Fiscal Trends:

- The portal will help users understand the broader **macroeconomic, fiscal, demographic, and socio-economic trends** affecting each state.
- It will make **sectoral data** easily accessible, addressing the ongoing need for consolidated data in one place.

2. Benchmarking State Performance:

- Users will be able to **benchmark** the data of each state against national figures and other states, promoting comparative analysis.

3. Empowering Policymakers and Researchers:

- The portal will provide a platform for **policymakers, researchers, and other stakeholders** to engage in **informed debates** and discussions about state finances.
- It will facilitate the development of data-driven fiscal policies and financial management strategies.

Expected Impact of the Portal :

- **Informed Decision-Making:** By making state-specific fiscal data accessible in a user-friendly format, the portal will aid policymakers in making informed decisions about resource allocation and fiscal management.
- **Transparency and Accountability:** The public availability of this data will help ensure greater **transparency** in how resources are allocated and managed at the state level.
- **Support for Disadvantaged States:** States that feel marginalized in terms of resource distribution will benefit from the detailed fiscal insights, allowing them to advocate for a more equitable allocation of resources.

Conclusion:

The launch of the 'NITI NCAER States Economic Forum' portal represents a significant step toward transparency and data-driven policymaking in India. By offering detailed reports and datasets on the finances of Indian states, the portal aims to facilitate better understanding, comparative analysis, and informed discussions on fiscal matters, benefiting policymakers, researchers, and citizens alike.

India Aims to Double Share of Manufacturing in GDP to 23%: FM Nirmala Sitharaman



Key Highlights from the Speech:

- **Date & Venue:** April 22, 2025, at the Hoover Institution, Stanford University, California, U.S.
- **Topic:** Laying the foundations for a developed India (Viksit Bharat) by 2047

India's Manufacturing Growth Target:

- **Doubling Manufacturing's Share:** Finance Minister **Nirmala Sitharaman** stated that India

plans to increase the manufacturing sector's share in **GDP** from **12%** to **23%** over the next **two decades** (by 2047).

- **Objective:** This growth is expected to **create jobs**, reduce **import dependencies**, and establish **competitive global supply chains**.

Sunrise Sectors Driving Growth:

- India is focusing on **14 identified sunrise sectors** to boost manufacturing, including:
 - **Semiconductors**
 - **Renewable energy components**
 - **Medical devices**
 - **Batteries**
 - **Labour-intensive sectors** (e.g., **leather** and **textiles**)
- These sectors have the potential to not only enhance India's manufacturing base but also **increase employment** and **exports**.

Need for Scaling Manufacturing:

- **Youthful Workforce:** Scaling up manufacturing is crucial to **absorb India's youthful workforce**.
- **Reducing Import Dependencies:** Expanding domestic manufacturing will help **reduce dependence on imports**, making India less vulnerable to external supply chain disruptions.
- **Global Supply Chains:** India's push towards manufacturing is aimed at making the country a more competitive player in **global supply chains**.

India's Industrial Revolution 4.0:

- She highlighted that **India is undergoing its own transformation** amidst **Industry 4.0**, where digitalization, automation, and advanced manufacturing techniques are becoming the norms.

Contribution of Services vs. Manufacturing:

- **Service Sector Dominance:** Currently, the **service sector** contributes to about **64%** of India's GDP, and the **gig economy** is growing rapidly.
- By 2030, it's expected that **230 million** people will be part of the gig economy.

- **Manufacturing's Role:** Despite the dominance of the service sector, **manufacturing remains essential** for long-term **economic growth** and **job creation**.
- The **manufacturing sector** needs to increase its contribution to **GDP to 22-23% by 2047**.

Government Initiatives to Strengthen Manufacturing:

1. **Production-Linked Incentive (PLI) Scheme:**
 - o The government is using the **PLI scheme** to promote manufacturing in critical sectors, especially those with high employment potential such as **electronics, textiles, and leather**.
2. **Focus on Labor-Intensive Sectors:**
 - o Sectors such as **textiles and leather**, which are labor-intensive, are also receiving special focus, aiming to provide large-scale employment opportunities.

Importance of Manufacturing for Societal and Economic Cohesion:

- **Community Building:** Manufacturing is not only a key driver of economic growth but also plays a critical role in **social cohesion** by providing **employment opportunities** and **financial stability** to communities.
- **Catalyst for Transformation:** Historically, manufacturing has been a cornerstone of the economic transformation of countries.
- From **19th-century Britain to 21st-century East Asia**, manufacturing has been the engine of growth, generating **forward and backward linkages**, driving **skilling**, and pushing **infrastructure and governance reforms**.

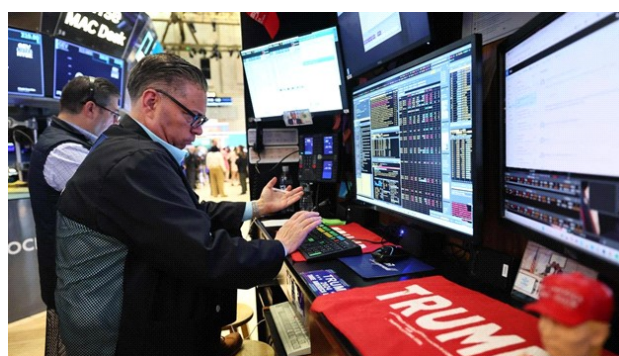
Economic Stability and Predictability:

- **Policy Stability:** On the global stage, Sitharaman emphasized that **consistency in government policies**, a **predictable tax regime**, and **political stability** are crucial for **investment planning** and **sustainable growth**.
- She also reflected on the **impact of tariff-related actions** under the **Trump administration**, stressing that **stability and predictability** in policy are essential for fostering an environment conducive to **growth and investment**.

Conclusion:

India's Path to Developed Nation Status: Nirmala Sitharaman reaffirmed that the country's goal to become a **developed nation by 2047 (Viksit Bharat)** will hinge on scaling up manufacturing. By doing so, India can absorb its large **youth workforce**, reduce its dependency on imports, and build **competitive global supply chains**. The focus on **sunrise sectors** and the continued push for **reforms** will play a vital role in achieving this ambitious goal, ensuring that India is well-positioned in the global economy in the coming decades.

TRUMP TURMOIL IN BOND MARKETS



1. INTRODUCTION

- Recently, U.S. President **Donald Trump**, repeatedly **pressured the Federal Reserve** to lower interest rates.
- He **publicly criticized Fed Chairman Jerome Powell**, calling him a "loser".
- Trump also threatened to **remove Powell from office**, an unprecedented move.
- Though he did not follow through, the **threat damaged the Federal Reserve's independence**.
- The Fed's independence is a **cornerstone of U.S. economic stability**.
- These events triggered **global market uncertainty and investor concern**.

2. MARKET REACTIONS

Dollar and Stock Market

- The U.S. dollar fell in value against major global currencies.
- U.S. stock markets also experienced a decline.
- These movements reflected investor fear and uncertainty about U.S. economic policy.

Bond Market Reaction

- Investors began selling U.S. government bonds.
- When bonds are sold in large numbers, their prices fall.
- As bond prices fall, their **yields** (returns) rise.
- This showed that investors were demanding higher returns due to perceived risks.

Effects on Bond Markets

Effect	Explanation
Bond Yields Rising	Investors fear inflation → Sell bonds → Prices fall → Yields rise.
Dollar Falling	Investors fear mismanagement → Pull out funds → Dollar weakens.
Capital Moving to Europe	Countries like Germany are seen as stable → Their bond yields fall as capital flows in.

3. UNDERSTANDING BONDS AND YIELDS

What is a Bond?

- A bond is a fixed-income financial instrument.
- It is essentially a loan given by the investor to a borrower (such as the government).
- Bonds have a **face value** (the amount repaid at maturity).
- Bonds pay interest over a fixed period.
- They are generally considered safer than stocks.

How Yields Work



- The **yield** is the return an investor gets for holding a bond.
- It is calculated as: **Yield = (Face Value – Market Price) / Market Price**

- For example: If the face value of a bond is ₹100 and the market price is ₹90, then the yield is $(100 - 90) / 90 = 11.11\%$.
- Bond prices and yields move in **opposite directions**.
- If price ↓ → yield ↑
- If price ↑ → yield ↓

4. RISKS FACED BY BOND INVESTORS

Inflation Risk

- Inflation reduces the **real return** from a bond.
- If inflation is higher than the bond's yield, the investor actually loses money.
- **For example:**
 - o If bond yield is 11.11% and inflation is 12%,
 - o the real return becomes negative (–0.89%).
- To protect their returns, investors sell bonds when they expect high inflation.
- This leads to rising bond yields in the market.

Currency Risk

- Currency fluctuations affect international bondholders.
- Example:
An American investor buys an Indian bond :
 - o Suppose 1 USD = ₹90. An investor earns ₹100 → gets \$1.11 return.
 - o If the rupee falls to ₹100/\$, the return becomes just \$1 — **zero real profit**.
- Even though the bond earned rupees, currency depreciation cancels out the gain.
- Investors prefer bonds in **strong, stable currencies** like the U.S. dollar or euro.

5. TRUMP'S TARIFF POLICY AND INFLATION

- Trump imposed tariffs on imports, especially from China.
- Tariffs increase the cost of goods and services.
 - o Tariffs raise prices of goods → **Add to inflation**.
 - o Inflation fear → Higher interest rates → **Investors sell bonds** → Yields rise.
- This causes **short-term inflation** in the domestic economy.

- Inflation forces the central bank to raise interest rates.
- Investors expected this and reacted early by selling bonds.
- This caused bond yields to rise and bond prices to fall.

Key Insight: Tariffs act like a tax on consumers and can worsen inflation.

Investor Behavior

- Investors shifted money out of U.S. bonds.
- They feared inflation, policy instability, and a falling dollar.
- This showed a **loss of confidence** in the U.S. financial system.

CAPITAL SHIFT TO GERMANY

Why Germany Attracted Investment

- Investors looked for safer alternatives to U.S. bonds.
- Germany became a preferred destination for capital.
- German government bonds (Bunds) saw a **rise in demand**.
- This demand caused **German bond yields to fall**.
- Germany has:
 - Low inflation
 - Strong fiscal discipline
 - A reliable and stable currency (Euro)

IMPACT ON DEVELOPING ECONOMIES

Familiar Situation in the Global South

- Developing countries face similar reactions from bond markets.
- If governments in these countries try to increase spending, investors may fear future inflation.
- This fear causes bond yields to rise and currencies to fall.

Example: India

- India implemented the **Fiscal Responsibility and Budget Management (FRBM) Act, 2003**.
 - The FRBM Bill was **first introduced in 2000** by then finance minister Yashwant Sinha.

- It was subsequently **adopted by the Union Cabinet in 2003** and thus, came into effect as from July 5, 2004.
- It obliges the government to lay before Parliament specific financial documents along with the Union Budget which includes:
 - * Medium Term Fiscal Policy Statement
 - * Macroeconomic Framework Statement
 - * Fiscal Policy Strategy Statement
 - * It also includes projections on fiscal deficit, revenue deficit and tax revenue and liabilities as a percentage of GDP.

- This law limits fiscal deficits to maintain investor confidence.
- Even when spending is necessary, the fear of inflation restricts policy options.

8. BROADER GLOBAL IMPLICATIONS

Loss of U.S. Dollar as a Safe Haven

- The U.S. dollar has long been considered a **safe store of global wealth**.
- Trump's actions weakened this trust.
- Investors are now looking for **new safe havens**.

Global Economic Uncertainty

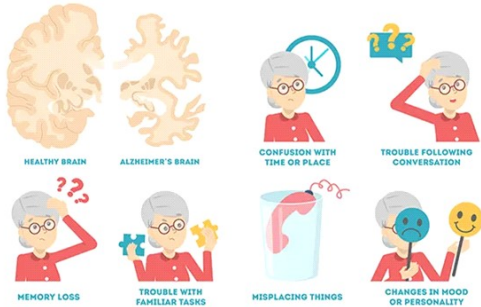
- The global financial system is based on trust and predictability.
- Trump's unpredictability damaged that system.
- The result could be:
 - Trade disruptions
 - Capital flight from emerging markets
 - Rising financial instability
 - Long-term economic crises





What is Alzheimer's Disease?

SYMPTOMS OF ALZHEIMER'S



Alzheimer's Latest News

- **New Drug Development:** A new drug, Gantenerumab, has shown promising results in slowing the progression of early-onset Alzheimer's disease.
- It significantly reduces amyloid plaque buildup, a key marker of the disease.

About Alzheimer's

- **Definition:** Alzheimer's disease is a progressive neurodegenerative disorder that primarily affects memory, thinking, and reasoning abilities.
- **Prevalence:** It is the most common cause of dementia, accounting for 60-80% of all dementia cases worldwide.
- **Mechanism:** The disease disrupts communication between brain cells, leading to a decline in cognitive and functional abilities.

What is Early-Onset Alzheimer's?

- **Age of Onset:** Most cases of Alzheimer's occur in individuals aged 65 or older, but around 5-10% of cases develop before this age, known as Early-Onset Alzheimer's Disease (EOAD).
- **Progression:** EOAD progresses more rapidly than late-onset Alzheimer's and often affects people in their prime working years, making it particularly devastating.

- **Genetic Factors:** Genetic factors play a crucial role in early-onset cases, with mutations in three specific genes—APP, PSEN1, and PSEN2—linked to increased risk.

The Role of Amyloid Beta and Plaque Formation

- **Amyloid Beta Proteins:** The buildup of amyloid beta proteins in the brain leads to the formation of amyloid plaques, a hallmark of Alzheimer's disease.
- **Effects:** These plaques disrupt neural communication, trigger inflammation, and eventually lead to brain cell death.
- **Therapies:** Amyloid-targeting therapies aim to reduce these plaques, potentially slowing disease progression.

About Gantenerumab

- **Drug Status:** Gantenerumab is an experimental drug that was initially discontinued but has now shown promise in new clinical trials.
- **Clinical Trial:** The latest trial focused on patients with genetic mutations known to cause early-onset Alzheimer's. It was a randomized, placebo-controlled study, tracking disease progression using brain imaging and blood biomarkers.
- **Results:** The trial showed a significant reduction in amyloid plaque buildup, suggesting the drug may slow cognitive decline.

How Does Gantenerumab Work?

- **Mechanism:** Gantenerumab is a monoclonal antibody engineered to specifically target amyloid beta proteins.
- **Immune Response:** Once attached to amyloid plaques, it signals the immune system to break them down and remove them from the brain.
- **Microglial Cells:** The drug activates microglial cells, which act as the brain's primary immune defenders, to clear toxic proteins more efficiently.
- **Blood-Brain Barrier:** Gantenerumab can cross the blood-brain barrier, making it more effective than some previous Alzheimer's treatments.

CARTOSAT-3



Current News

- **Event:** ISRO's CARTOSAT-3 captured high-resolution images of the destruction caused by a 7.7-magnitude earthquake in Myanmar on March 28, 2025.
- **Details:** Post-disaster imagery from March 29 was compared with pre-event data from March 18 to assess the damage in Mandalay and Sagaing.

About CARTOSAT-3

- **Description:** A third-generation agile advanced Earth observation satellite developed by ISRO.
- **Replacement:** Replaces the IRS (Indian Remote Sensing) series.
- **Launch:** Launched aboard the Polar Satellite Launch Vehicle (PSLV-C47).

Key Features

1. **Resolution:**
 - Panchromatic resolution of 0.25 meters (sharpest among civil satellites).
2. **Orbit:**
 - Altitude: 509 km.
 - Inclination: 97.5° to the equator.
3. **Weight:**
 - 1,625 kg (more than double the mass of previous Cartosat satellites).
4. **Advanced Technologies:**
 - Highly agile cameras.
 - High-speed data transmission.
 - Advanced computer system.
5. **Commercial Use:**
 - First commercial order from New Space India Limited (NSIL), the commercial arm of ISRO.

Applications of CARTOSAT-3

1. National Security & Defense:

- Military applications: Strategic surveillance, border security, and defense planning.
- Previous use: Cartosat-2 aided in 2016 surgical strikes across the LoC and 2015 Myanmar-Manipur operations.

2. Disaster Management & Urban Planning:

- Assessing natural disasters: Earthquake, floods, and landslide monitoring.
- Urban & Rural Infrastructure Planning: Road networks, water distribution, and land-use regulation.
- Coastal Land Use & Regulation: Monitoring environmental changes along the coastline.

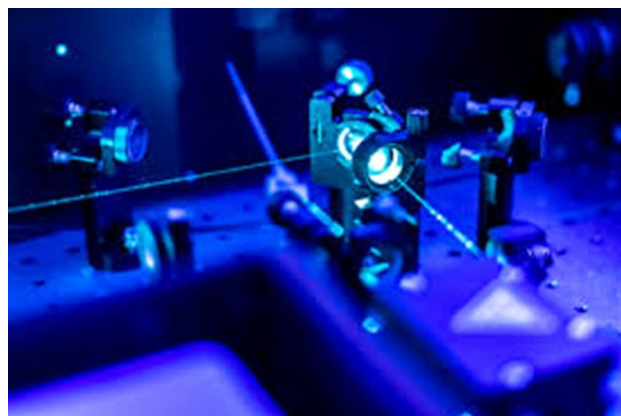
3. Cartography & Remote Sensing:

- High-Resolution Mapping for geospatial applications.
- Detecting natural and man-made changes in geographical features.

Cartosat Satellite Series

- **Cartosat-1 to 3:** High-resolution Earth observation, urban and rural planning.
- **RISAT Series:** Radar-based imaging for cloud-penetrating surveillance.
- **Oceansat Series:** Monitors ocean parameters, weather forecasting, and marine studies.
- **INSAT & Megha Tropiques:** Atmospheric studies and climate research.

Carbon Dioxide (CO₂) Lasers



Current News

- **Event:** Physicists in the US have demonstrated a novel technique to detect radioactive materials remotely using carbon dioxide (CO₂) lasers.

About Carbon Dioxide (CO₂) Lasers

- **Inventor:** The first CO₂ laser was developed by Indian-American scientist Prof. C.K.N. Patel.
- **Description:** A four-level molecular gas laser that operates using vibrational energy states of CO₂ molecules.
- **Efficiency:** Highly efficient, producing high-power continuous or pulsed output.
- **Structure:**
 - A CO₂ molecule consists of one carbon atom at the center and two oxygen atoms on either side.
 - Vibrational Modes:
 - **Symmetric Stretching Mode:** Oxygen atoms move simultaneously towards or away from the fixed carbon atom.
 - **Bending Mode:** Carbon and oxygen atoms vibrate perpendicular to the molecular axis.
 - **Asymmetric Stretching Mode:** Oxygen atoms move in one direction, while the carbon atom moves in the opposite direction.
- **Principle:** The laser transition occurs between vibrational energy states of CO₂ molecules. Energy is transferred from excited nitrogen (N₂) molecules to CO₂, achieving the population inversion necessary for laser action.

Characteristics of CO₂ Laser

- **Type:** Molecular gas, four-level laser.
- **Active Medium:** Gas mixture of CO₂, N₂, and He.

- **Pumping Method:** Electrical discharge.
- **Optical Resonator:** Concave mirrors.
- **Power Output:** Up to 10 kW.
- **Nature of Output:** Continuous wave (CW) or pulsed wave.
- **Wavelength:** 9.6 μm & 10.6 μm (Infrared region).

Detection Mechanism

1. Radioactive Decay & Ionization:

- Radioactive decay emits charged particles (alpha, beta, or gamma rays) that ionize the surrounding air, creating plasma.

2. Avalanche Effect:

- Free electrons in plasma gain energy and collide with other atoms, releasing more electrons, leading to a chain reaction of ionization.

3. Laser Characteristics:

- Researchers used a CO₂ laser emitting long-wave infrared (LWIR) radiation at 9.2 micrometers.
- The longer wavelength reduces unwanted ionization and improves sensitivity.

4. Detection Mechanism:

- The laser accelerates seed electrons in the plasma, creating microplasma balls.
- These microplasmas generate a measurable optical backscatter that can be detected and analyzed.

5. Fluorescence Imaging:

- Used to analyze the plasma formation dynamics and understand the distribution of seed electrons.

6. Mathematical Model:

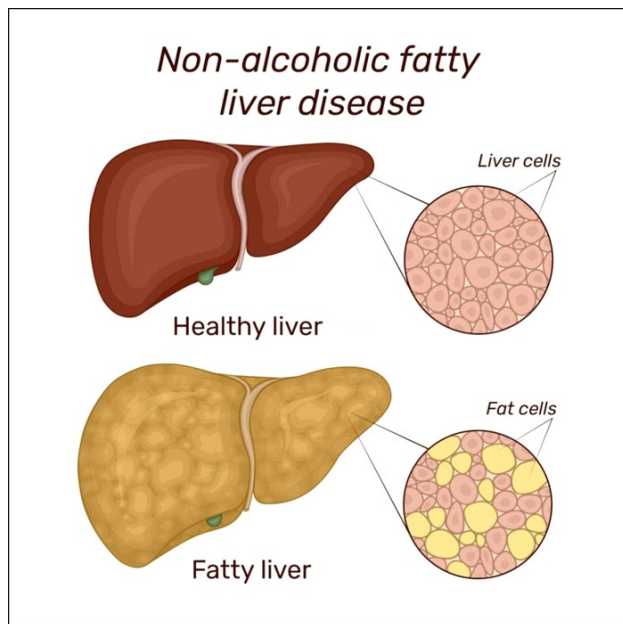
- Developed to predict backscatter signals based on plasma seed densities.
- The model accurately reproduced experimental results, confirming the reliability of the detection technique.

Advancements in Detection Range

Parameter	Previous Techniques	New CO ₂ Laser Technique
Alpha Particle Detection	1 meter	10 meters (10x improvement)
Gamma Ray Detection (Cs-137)	Limited capability	Up to 100 meters
Potential Future Range	~10 meters max	Possibly 1 km+ with improvements

- **Alpha Particles:** Successfully detected from 10 meters away (10x improvement over previous methods).
- **Gamma Rays (Cs-137):** Could potentially be detected from 100 meters away by scaling up laser optics.

Non-Alcoholic Fatty Liver Disease (NAFLD)



Current News

- **Event:** Ranchi is set to become the first district in Jharkhand to implement a large-scale campaign for the screening and management of non-alcoholic fatty liver disease (NAFLD).

About Non-Alcoholic Fatty Liver Disease (NAFLD)

- **Definition:** NAFLD, now known as Metabolic dysfunction-associated steatotic liver disease

(MASLD), refers to a range of conditions caused by a build-up of fat in the liver.

- **Cause:** This buildup of fat is not caused by heavy alcohol use. Heavy alcohol use leading to fat buildup is called alcohol-associated liver disease.
- **Early Stage:** Early-stage NAFLD does not usually cause harm but can lead to serious liver damage, including cirrhosis, if it worsens.
- **Health Risks:** High levels of fat in the liver are associated with an increased risk of serious health problems such as diabetes, high blood pressure, and kidney disease. NAFLD also increases the risk of heart problems in people with diabetes.
- **Types:**
 - **Nonalcoholic Fatty Liver (NAFL):** A milder form of NAFLD.
 - **Nonalcoholic Steatohepatitis (NASH):** A severe form that can cause cirrhosis, liver failure, and liver cancer.

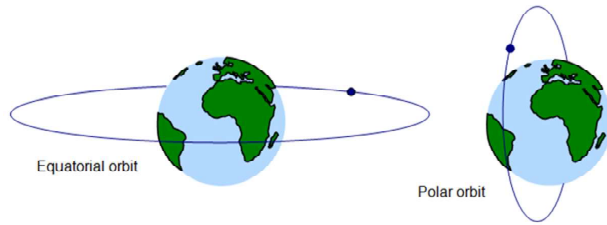
Risk Factors

- **Common in:** People with certain diseases and conditions, including obesity and type 2 diabetes.
- **Affects:** People of any age, including children.

Treatment

- **Medication:** There is currently no specific medication for NAFLD.
- **Recommendations:**
 - **Weight Loss:** Doctors recommend weight loss to reduce fat, inflammation, and fibrosis in the liver.
 - **Associated Conditions:** Treatment may also be recommended for associated conditions such as high blood pressure, diabetes, and high cholesterol, or for complications arising from NAFLD.

Polar Orbit



Current News

- **Event:** SpaceX successfully launched a private astronaut crew on a historic polar-orbiting mission aboard a Falcon 9 rocket from NASA's Kennedy Space Center in Florida.

About Polar Orbit

- **Definition:** A Polar Orbit (PO) is a type of Low Earth Orbit (LEO) that ranges between 200 km to 1,000 km in altitude.
- **Trajectory:** Unlike equatorial orbits, satellites in a polar orbit travel from one pole to the other rather than from west to east.
- **Classification:** A deviation of up to 10 degrees from the exact North-South trajectory is still classified as a polar orbit.

Significance of Polar Orbits

- **Global Coverage:** Polar orbits allow satellites to cover the entire Earth's surface over time as the planet rotates below them.
- **Applications:** Widely used for Earth observation, climate monitoring, and reconnaissance missions.
- **Historic Mission:** The Fram2 mission is the first human spaceflight to use this trajectory, marking a groundbreaking event in space exploration.

Significance of the Fram2 Mission

1. First Human Spaceflight in Polar Orbit:

- Unlike traditional missions that follow an equatorial orbit, this mission orbits Earth from pole to pole.
- This trajectory allows full observation of Earth's surface over time, crucial for climate studies, global surveillance, and research.

2. Expanding Commercial Spaceflight:

- Fram2 is SpaceX's sixth private astronaut mission, solidifying its dominance in the global private spaceflight sector.
- Highlights the growing role of private players in space exploration, reducing reliance on government agencies like NASA.

3. Reusable Spacecraft Innovation:

- The mission uses the Crew Dragon capsule, a reusable spacecraft developed by SpaceX with NASA funding.
- SpaceX has now conducted 16 crewed missions using this capsule, proving the success of reusability in reducing spaceflight costs.

Vibe Coding



Current News

- **Event:** Vibe coding recently became an overnight buzzword in Silicon Valley after being coined by OpenAI co-founder Andrej Karpathy.

About Vibe Coding

- **Definition:** Vibe coding refers to using generative AI to generate the entire code for an app, rather than just assisting with coding.
- **Communication:** It involves communicating with AI in natural language to build apps.
- **Process:** Users prompt Large Language Model (LLM)-based models, such as ChatGPT, to produce the code for an app or service, and the AI system does all the work.

- **Origin:** The term was coined by Andrej Karpathy, a skilled software engineer who was head of AI at Tesla and a founding engineer at OpenAI, the maker of ChatGPT.

Benefits of Vibe Coding

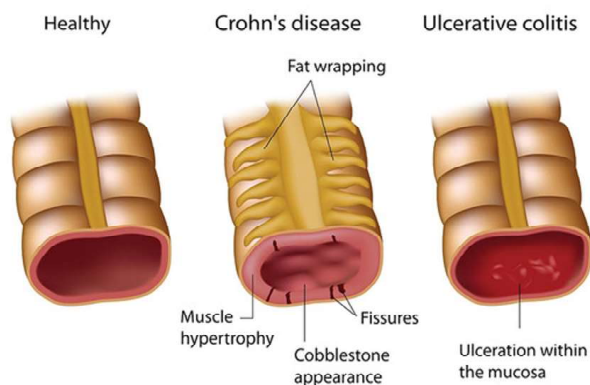
- **Accessibility:** Helps people with ideas for tools, apps, and services to make them a reality without needing to learn the specifics of a programming language.

Potential Risks and Challenges

- **Security Risks:** Replacing experienced human coders with amateurs or untrained coders who give orders to AI chatbots instead of coding from scratch or understanding existing codebases.
- **Contextual Understanding:** Human project managers and coders precisely frame how the code needs to take shape to best serve a specific use case. An AI code generator may not understand the larger context of what it is creating.
- **Efficiency and Maintenance:** Generated code might be too slow to run, too expensive to maintain, and too long to scan regularly for security risks.

Inflammatory Bowel Disease (IBD)

Inflammatory Bowel Disease



Why in the News? Jipmer recently launched a support group for patients with Inflammatory Bowel Disease (IBD).

1. What is Inflammatory Bowel Disease (IBD)?

IBD is a broad term covering a set of conditions that cause inflammation and swelling in the tissues of the digestive tract.

2. Common Types of IBD

• Ulcerative Colitis:

- **Description:** Involves inflammation and ulcers along the lining of the colon and rectum.

• Crohn's Disease:

- **Description:** Inflammation affects the lining of the digestive tract and often extends to deeper layers.
- **Affected Areas:** Most commonly affects the small intestine but can also impact the large intestine and, less frequently, the upper gastrointestinal tract.

3. Symptoms

- Common symptoms for both ulcerative colitis and Crohn's disease include:
 - Abdominal pain
 - Diarrhea
 - Rectal bleeding
 - Extreme fatigue
 - Weight loss

4. Causes

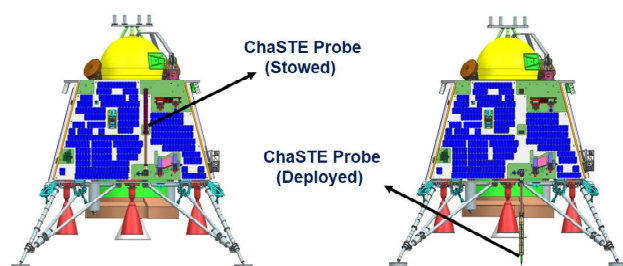
- **Unknown Exact Cause:** The precise cause of IBD is not known, but it is linked to a weakened immune system.
- **Possible Triggers:**
 - The immune system may react incorrectly to environmental factors like viruses or bacteria, leading to inflammation of the gastrointestinal tract.
 - **Genetic Factor:** There appears to be a genetic component; individuals with a family history of IBD are more likely to develop an inappropriate immune response.

5. Treatment

- **Chronic Condition:** IBD is a long-term condition, but treatments are available to manage symptoms and prevent flare-ups.

- **Treatment Options:**
 - **Medications:** Often used to ease symptoms.
 - **Surgery:** May be required in some cases.

Chandrayaan-3's Surface Thermophysical Experiment (ChaSTE)



Why in News:

- Chandrayaan-3's ChaSTE became the first instrument to measure in situ temperatures near the moon's south pole, successfully penetrating lunar soil and deploying a thermal probe.

About ChaSTE :

- Instrument: Surface Thermophysical Experiment (ChaSTE) onboard Chandrayaan-3
- Objective: To measure lunar surface temperatures and provide crucial data on water ice deposits

How ChaSTE Works

1. Thermal Probe: Integrated into the Vikram lander, equipped with 10 temperature sensors placed 1 cm apart along its length, near the nose-tip
2. Deployment Mechanism: Rotation-based mechanism, pushing the probe downward until the tip touches the Moon's surface
3. Penetration: Successfully reached a depth of 10 cm in the Moon's regolith, monitoring temperature variations until September 2, 2023

Key Achievements

1. First Successful Measurement: ChaSTE became the first instrument to measure in situ temperatures near the moon's south pole

2. Crucial Data: Provided essential data on lunar surface temperatures, strengthening evidence of water ice deposits
3. Successful Deployment: Overcame challenges faced by previous missions, such as ESA's Philae and NASA's InSight HP3

Comparisons with Previous Missions

1. ESA's Philae Lander (2014): MUPUS instrument failed due to an awkward landing, preventing probe deployment
 - Mission: Comet 67P/Churyumov-Gerasimenko
 - Failure Reason: Awkward landing prevented the probe from being deployed properly
2. NASA's InSight Lander (2018): HP3 instrument encountered low friction in Martian sand, preventing it from burrowing deep enough to collect meaningful temperature data
 - Mission: Mars Exploration
 - Failure Reason: Low friction in Martian sand, temperature sensors attached to a tether (not on the mole itself)

ChaSTE's Significance

- Lunar Exploration: ChaSTE's findings will contribute to a better understanding of the lunar surface and subsurface temperatures
- Water Ice Deposits: The data collected by ChaSTE strengthens evidence of water ice deposits, essential for future lunar missions

Antimony Discovery in Balochistan, Pakistan



1. Discovery of Antimony:

- Pakistan discovered a massive cache of antimony in the conflict-torn region of Balochistan.

2. About Antimony:

• Chemical Properties:

- Chemical element with the symbol Sb and atomic number 51.
- Classified as a metalloid.
- Solid at room temperature.
- Exhibits poor electrical and heat conductivity.
- Commercial Forms: Ingots, broken pieces, granular, or cast cake.
- Ore Occurrence: Found in deposits associated with volcanic rocks and deep-seated veins formed under moderate to high temperatures and pressure.
- Chief Ore: Stibnite, commonly obtained as a byproduct in lead-zinc-silver mines.

3. Producers:

- Major Producer: **China (88% of the world's antimony)**.
- Other Producers: Bolivia, Russia, and Tajikistan.

4. Uses of Antimony:

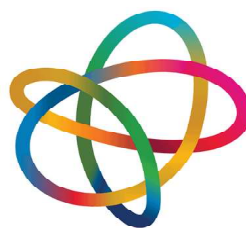
- Electronics Industry: Used in semiconductor devices like infrared detectors and diodes.
- Alloys:
 - Alloyed with lead or other metals to improve hardness and strength.
 - Lead-antimony alloy used in batteries.
 - Other alloys used in type metal (printing presses), bullets, and cable sheathing.

• Compounds:

- Used in flame-retardant materials.
- Used in paints, enamels, glass, and pottery.

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Topological Materials & Quantum Science – UN Declaration 2025



INTERNATIONAL YEAR OF
**Quantum Science
and Technology**

Why in News?

- The **United Nations** has declared **2025 as the International Year of Quantum Science and Technology**, celebrating **100 years since the birth of quantum theory**.
- Focus on advancements like **Topological Materials**, a major outcome of quantum research.

What Are Topological Materials?

- Substances with **different properties on their surface and interior**.
- Example: **Metallic on the surface** (conducts electricity), but **insulating inside** (does not conduct).
- The term “**topological**” refers to unique **quantum-geometric properties** that remain unchanged even if the material's shape is distorted.
- Represent a **new class of quantum matter**, discovered in the **late 20th century**.

Key Scientific Recognition

- **Nobel Prize in Physics (2016)** awarded to **David Thouless, Duncan Haldane, and Michael Kosterlitz** for theoretical work on topological phase transitions and matter.

How Do They Work?

- **Metallic surface:** Electrons move freely (conduction)

- **Insulating core:** Electrons remain localized
- Governed by **quantum mechanical effects**, particularly **spin-orbit coupling**
- Behaviour explained through the **topology of electronic band structures**

Mirror Analogy (For Understanding):

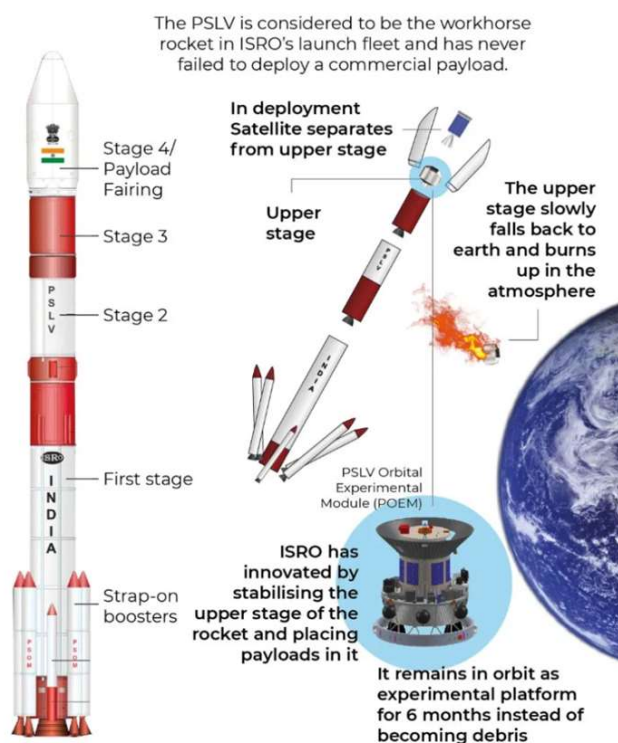
- **Glass front:** Like an insulator (lets light through)
- **Metallic back:** Like a conductor (reflects light)
- Together, this duality allows mirrors to function—just as **topological materials** function with dual properties.

Metals vs Insulators – Basic Difference:

Metals	Insulators
Electrons move freely	Electrons tightly bound to atoms
Conduct electricity & heat	Do not conduct electricity
Reflect light	Allow light to pass through

POEM-4 : ISRO's Orbital Experiment Module

PSLV Orbital Experimental Module (POEM)



Why in News?

- **POEM-4** re-entered Earth's atmosphere and impacted the **Indian Ocean**.
- Monitored by **ISRO's IS4OM** (System for Safe and Sustainable Space Operations Management).

What is POEM-4?

- **POEM-4** (PSLV Orbital Experiment Module-4) is a space research platform developed by **ISRO**.
- Utilizes the **spent fourth stage (PS4)** of the **PSLV** rocket as an orbiting experimental module.
- Part of the **SpaDeX (Space Docking Experiment)** mission, and the fourth deployment in the **POEM series** (following POEM-3).
- **Major improvement:** **Three times** the payload capacity compared to POEM-3, showcasing advancements in **rocket stage reuse** for scientific research.

Payloads on POEM-4

- A total of **24 payloads** hosted:
 - **14 payloads** from **ISRO**
 - **10 payloads** from **non-government entities (NGEs)**, including startups and academic institutions.
- **Notable Payloads:**
 - **Walking Robotic Arm (RRM-TD):** Robotic manipulator for space inspection and servicing tasks.
 - **Debris Capture Robotic Manipulator:** Developed by **Vikram Sarabhai Space Centre (VSSC)**, designed for space debris collection.
 - **Gradient Control Reaction Wheel Assembly (RWA):** Designed by **ISRO Inertial Systems Unit (IISU)**, for attitude control and stabilization of POEM-4.

Launch & Mission Details

- **Launch Date:** **December 30, 2024**, aboard **PSLV-C60**.

- **Orbit Details:** After deployment, POEM-4 remained in a nearby orbit and was later reconfigured for further research.
- **De-orbiting:** POEM-4's engine was restarted to bring it to a circular orbit at **350 km altitude**.
- The platform was **passivated** to prevent accidental break-up and ensure safe operations in orbit.

Three Gorges Antarctic Eye



Why in News?

- **China** recently launched the “**Three Gorges Antarctic Eye**”, a **3.2-meter aperture radio/millimetre-wave telescope**, at the **Zhongshan Station** in Antarctica.

About Three Gorges Antarctic Eye

- **Location:** The telescope is stationed at **Zhongshan Station**, Antarctica.
- **Telescope Specifications:** It is a **3.2-meter radio/millimetre-wave telescope** designed for studying interstellar gas, star formation, and other astronomical phenomena.
- **Development:** Developed by **China Three Gorges University** and **Shanghai Normal University**.
- **Challenges Overcome:** The telescope has been designed to endure **Antarctica's extreme cold** and **strong winds**.
- **Purpose:** The primary goal is to study **interstellar gas** such as **hydrogen** and **ammonia**, as well as to explore **star formation**.

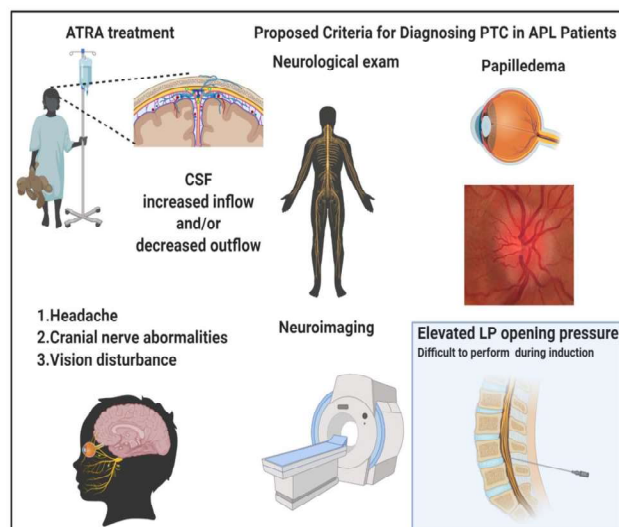
Related Observatories

Observatory	Country	Purpose
INO (India-based Neutrino Observatory)	India	Located in Tamil Nadu , to study solar and atmospheric neutrinos .
IceCube Neutrino Observatory	USA	Located at the South Pole , studies cosmic neutrinos using deep ice.
JUNO (Jiangmen Underground Neutrino Observatory)	China	To study neutrinos from Earth and the sun, operational by late 2025.
DUNE (Deep Underground Neutrino Experiment)	USA	Operational around 2030 , focuses on neutrino oscillation and supernova bursts .
TRIDENT (Tropical Deep-sea Neutrino Telescope)	China	Positioned in the South China Sea , aims to study deep-sea neutrino activity .

Significance

- This new telescope is part of **China's growing space and scientific research initiatives**, particularly in extreme environments like Antarctica, offering **new insights** into the universe's fundamental processes.

Acute Promyelocytic Leukemia (APL)



Why in News?

- A **CRISPR-based test** has been developed for the **rapid diagnosis** of **Acute Promyelocytic Leukemia (APL)**, a rare but aggressive form of blood cancer.

What is Acute Promyelocytic Leukemia (APL)?

- **Definition:** A rare and aggressive form of leukemia, which is a cancer affecting blood cells.
- **Subtype:** APL is a subtype of **Acute Myeloid Leukemia (AML)**, accounting for about **10-15%** of newly diagnosed AML cases.
- **Cause:** A genetic mutation leads to the abnormal fusion of two genes, **PML** and **RARA**, disrupting normal blood cell formation.
- **Impact:** The fusion leads to a drop in **white blood cells** and **platelets**, impairing the body's ability to fight infections and control bleeding.
- **Risk:** APL can cause **sudden internal bleeding** in vital organs like the lungs and brain, which can be fatal if untreated.

Symptoms and Diagnosis

- **Symptoms:**
 - Sudden **bleeding** from gums and nose
 - **Fatigue**
 - **Unexplained fever**
 - **Bone pain**
- **Diagnosis:**
 - The **median age of diagnosis** in India is **34 years**.
 - **Male-to-female ratio:** 1.5:1.
 - **Histopathological tests** such as **complete blood count (CBC)** and **cell morphology** are crucial for diagnosing APL.

Significance of Early Diagnosis

- **Timely diagnosis and treatment** can **cure most patients**.
- The **CRISPR-based test** offers a **rapid diagnosis**, which is crucial for effective treatment, given the aggressive nature of APL.

De-Extinction



Why in News?

- **Colossal Biosciences**, a US-based bioscience company, has announced the birth of three **genetically modified grey wolf pups**, part of a **de-extinction** project aiming to revive the **dire wolf**.

What is De-Extinction?

- **Definition:** De-extinction refers to the scientific process of bringing back **extinct species** by using their **genetic material**, typically through techniques like **gene editing** and **cloning**.
- The process involves reconstructing the **genome** of an extinct species and modifying the DNA of a closely related living organism to resemble the extinct one.

About The Dire Wolf

- **Scientific Name:** *Aenocyon dirus*
- **Extinction:** The dire wolf went extinct around **13,000 years ago**.
- **Appearance and Behavior:**
 - Similar to modern grey wolves but **larger**, with **thicker white coats**.
 - They hunted large prey, such as **bison**, **horses**, and **mammoths**.
- **Extinction Cause:** Likely linked to the disappearance of their prey species and possibly accelerated by **human hunting**.

Scientific Process:How Was It Done?

1. DNA Extraction:

- o DNA was extracted from **ancient dire wolf specimens**: a **13,000-year-old tooth** and a **72,000-year-old skull**.
- o The **petrous bone** of the skull, known for its DNA preservation, was key to this process.

2. Genome Reconstruction:

- o The extracted DNA was sequenced to recreate the complete **dire wolf genome**.
- o It was compared with the genome of closely related species like **grey wolves**, which share **99.5%** of their DNA with dire wolves.

3. Gene Editing:

- o Using **gene editing tools**, scientists made **20 unique changes** to **14 genes** in the grey wolf genome.
- o The changes aimed to reproduce features such as:
 - * **Light-colored coat**
 - * **Increased hair length**
 - * **Distinct coat patterns**
 - * **Larger body size**
 - * **Enhanced musculature**

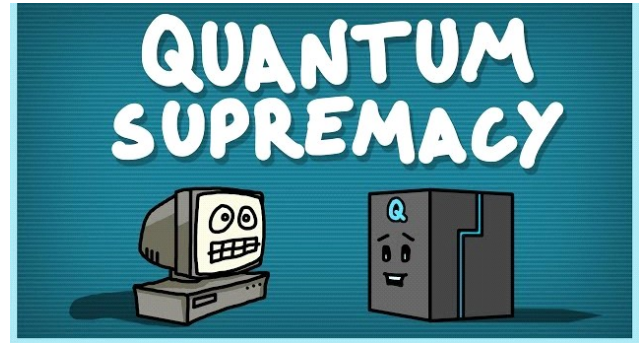
4. Surrogacy and Birth:

- o The modified embryos were implanted into surrogate **dog mothers**, leading to the birth of genetically modified **wolf pups**.

Significance of De-Extinction

- This project by **Colossal Biosciences** showcases advancements in **genetic engineering** and **cloning** technologies.
- It also opens discussions on the **ethical and ecological implications** of bringing back extinct species, especially in the context of modern ecosystems.

Quantum Supremacy



Why in News?

- **Researchers** from the **University of Oxford** and **Universidad de Sevilla** have recently demonstrated **quantum supremacy** through a **simple mathematical game**.
- The results were published in **Physical Review Letters**.

What is Quantum Supremacy?

- **Quantum supremacy** refers to the point at which a **quantum computer** can solve a problem that **classical computers** cannot solve efficiently.
- It marks a significant milestone in **quantum computing**, demonstrating that quantum machines can outperform classical computers for specific tasks.
- **Challenges**: Achieving quantum supremacy has been a challenge due to the complexity of designing problems that can clearly showcase this advantage in a **verifiable** manner.

The Quantum Supremacy Game

- The recent demonstration involved solving a **mathematical game** based on the **odd-cycle graph colouring problem**.
 - o The problem asks if you can colour a circle with an odd number of sections using only **two colours**, ensuring no two adjacent sections share the same colour.
 - o Mathematically, this problem is impossible for any odd-numbered cycle using classical methods.

- This demonstration used **only two entangled qubits**, making the setup much simpler than previous quantum supremacy demonstrations, such as:
 - **Google's 2019 experiment** using **53 superconducting qubits** with random circuit sampling.
 - **China's Jiuzhang quantum computer**, which used **Gaussian boson sampling**, both of which required **massive computational resources**.

Quantum vs Classical Computing

1. Classical Computers:

- Operate on **bits** (0 or 1).
- Rely on classical physics to perform computations.

2. Quantum Computers:

- Operate on **qubits**, which can exist in **superposition** (being 0 and 1 at the same time).
- Qubits also exhibit **entanglement**, meaning the state of one qubit affects another, no matter the distance between them.

Key Concepts

1. Superposition:

- Allows a quantum processor to perform multiple computations **simultaneously**, significantly increasing computational power.

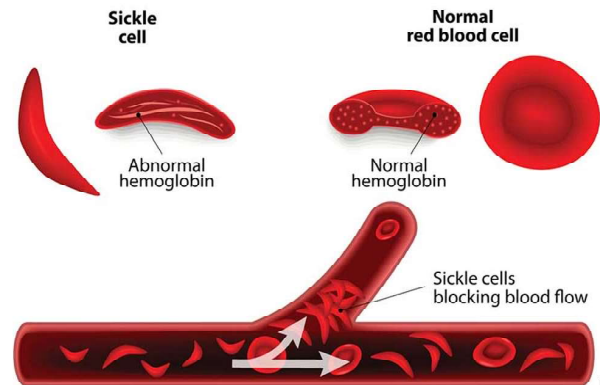
2. Entanglement:

- Creates **non-classical correlations** between qubits, enabling advancements in **quantum communication, cryptography, and computation**.

3. Power of Qubits:

- As the number of qubits increases, the computational capacity of quantum computers grows **exponentially** compared to classical bits.
- For example, a **50-qubit quantum processor** could potentially outperform the **fastest classical supercomputer**.

Sickle Cell Disease (SCD)



Why in News?

- Scientists at the Raman Research Institute (RRI) have developed an affordable electro-fluidic device to assist in the **preliminary screening** of Sickle Cell Disease (SCD)

What is Sickle Cell Disease?

- It is a **hereditary blood disorder** that affects red blood cells (RBCs).
- Caused by the presence of **abnormal hemoglobin S**, which distorts RBCs into a **sickle (crescent) shape**.
- These misshapen cells block blood flow and die early, causing a **shortage of RBCs (anemia)**.

Impact on the Body

- Normal RBCs are disc-shaped and flexible, allowing smooth blood flow.
- Sickle cells are stiff, sticky, and tend to form clumps, leading to:
 - Blocked blood flow
 - Pain crises
 - Increased risk of infection
 - Organ damage
 - Chronic anemia

Causes

- Caused by a **mutation in the hemoglobin-producing gene**.
- Inheritance:
 - **Two sickle genes** (one from each parent) = SCD
 - **One sickle gene** = Sickle cell trait (carrier, generally asymptomatic)

Symptoms

Early stage:

- Tiredness
- Painfully swollen hands and feet
- Jaundice

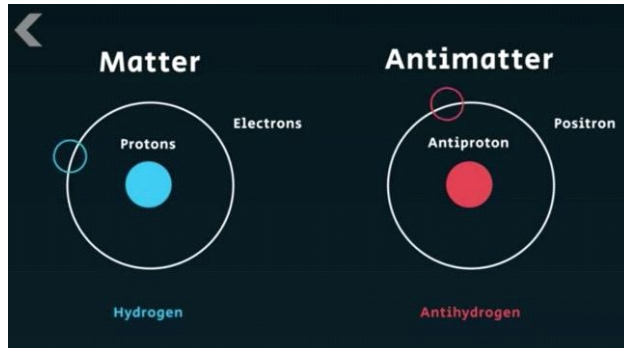
Later stage:

- Frequent pain episodes
- Severe anemia
- Organ damage
- Recurrent infections

Treatment Options

- **Bone marrow transplant** is the only known cure but has limited availability.
- **Supportive treatments** include:
 - Pain management
 - Blood transfusions
 - Antibiotics and vaccinations
- **Gene therapy** is an emerging potential cure.
 - The UK was the first country to approve a gene therapy treatment for SCD in 2023.

Matter and Anti-Matter



Why in News?

- Physicists at **CERN's LHCb experiment** have confirmed **Charge-Parity (CP) violation** in **baryons**—a significant advancement in understanding the imbalance between matter and antimatter in the universe.

What is Matter?

- Anything that has **mass** and occupies **space**, made up of **atoms** and **molecules**.
- **States of Matter:**
 - **Solid:** Fixed shape and volume
 - **Liquid:** Fixed volume, no fixed shape
 - **Gas:** No fixed shape or volume

- **Plasma:** Ionized particles, found in stars

What is Antimatter?

- Composed of **mirror particles** of matter with **opposite charge**
 - Electron → **Positron**
 - Proton → **Antiproton**
 - Neutron → **Antineutron**
- **Creation:** Formed alongside matter during the **Big Bang**
- **Interaction with Matter:**
 - Collision leads to **annihilation**, releasing **gamma rays**
- **Sources:**
 - Naturally from cosmic rays
 - Artificially in **particle accelerators** (e.g., LHC)

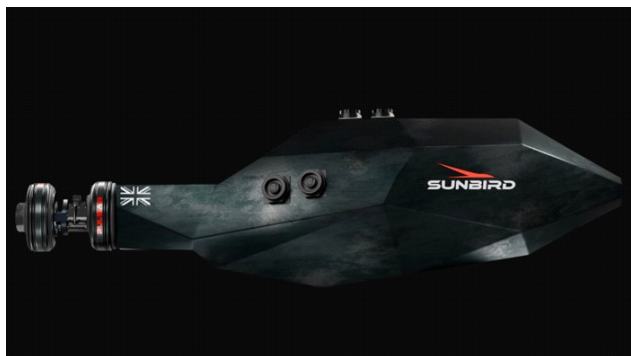
Key Concept

- **CP Violation:**
 - **C (Charge conjugation):** Switches particle with antiparticle
 - **P (Parity transformation):** Mirror image of the physical system
 - **CP Symmetry** means matter and antimatter should behave identically
 - **Violation** indicates asymmetry, crucial to explain why the universe is dominated by matter
- **Baryons and Antibaryons:**
 - **Baryons:** Particles made of **three quarks** (e.g., proton, neutron)
 - **Antibaryons:** Composed of **three antiquarks**

What Did CERN's LHCb Discover?

- Studied **lambda-b (Λ_b)** baryon (made of up, down, and bottom quarks)
- Observed decay into: **proton + kaon + two pions**
- Found a **small but significant difference** in the decay rates of Λ_b and anti- Λ_b
- **First confirmed CP violation** in **baryons** to cross the **5-sigma threshold**, making it a statistically validated discovery

Sunbird



Why in News?

- **Sunbird**, a **nuclear fusion-powered rocket** developed by UK-based startup **Pulsar Fusion**, could become the fastest human-made spacecraft and revolutionize deep space travel.

Key Highlights

- **Speed Potential:** Up to **805,000 km/h** — faster than NASA's **Parker Solar Probe** (692,000 km/h).
- **Impact:**
 - Travel to **Mars** in half the time
 - **Pluto** mission possible in just **4 years**
- **Demo Launch:** Planned for **2027**

What is Nuclear Fusion Propulsion?

- **Fusion** = **combining atomic nuclei** to release massive energy (as in stars).
- **Cleaner and more powerful** than nuclear fission, with minimal radioactive waste.

Types of Nuclear Propulsion

1. Nuclear Thermal Propulsion (NTP)

- **How it works:**
 - Nuclear reactor heats **liquid hydrogen**
 - Hydrogen becomes plasma and exits through nozzles to create thrust
- **Benefits:**
 - High thrust
 - Greater payload capacity
- **History:** Ground-tested since 1955

2. Nuclear Electric Propulsion (NEP)

- **How it works**
 - Reactor generates **electricity**
 - Powers **ion thrusters** that slowly build high velocity

- **Components:**
 - Reactor core
 - Electric generator
 - Heat rejection system (like heat pipes)
 - Thrusters
- **Advantage:** Efficient for long-duration missions
- **Note:** Can also be powered by **solar panels**, but **nuclear source** is better beyond Mars

Neutrino Mass and the KATRIN Experiment



Why in News?

- The **KATRIN experiment** has recently provided a **significant advancement** in the study of neutrino mass.

What are Neutrinos?

- **Type:** Electrically neutral **subatomic particles**
- **Production:** Created in processes like **radioactive decay** and **nuclear reactions** (e.g., in the sun and stars)
- **Mass:** Extremely **light** — less than a **millionth** the mass of an electron
- **Known Info:** They are fundamental particles in the **Standard Model of particle physics**, but their exact mass remains unknown

What is the KATRIN Experiment?

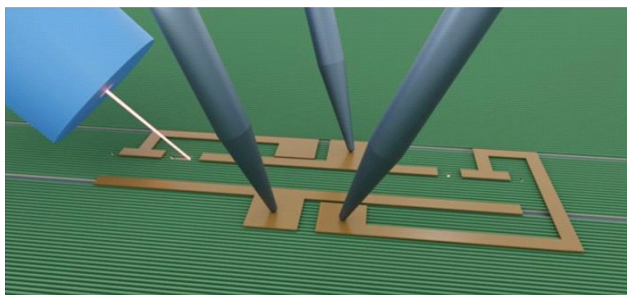
- **Location:** Karlsruhe, Germany
- **Objective:** To measure the mass of the **electron antineutrino**
- **Method:**
 - Focuses on the **decay of tritium**, a radioactive hydrogen isotope

- o During decay, an **electron** and **electron antineutrino** are emitted
- o The **energy of the emitted electron** is impacted by the neutrino's mass, allowing researchers to infer the upper limit of its mass

Recent Findings

- **New Upper Limit:** The mass of the neutrino has been reduced to **less than 0.45 eV**
 - o This is a **50% reduction** from the previous upper limit
- **Data Source:** Based on measurements from **36 million electrons** produced during tritium decay.

Miniature Laser Grown on Silicon Chip



Why in News?

- Scientists from the **US and Europe** have successfully fabricated **miniature lasers directly on silicon wafers**, marking a major advancement in the field of **silicon photonics**.
- This breakthrough was published in a **recent study in Nature**.

About the Miniature Laser Grown on Silicon Chip

- **Technological Challenge:** Integrating a **light source (laser)** directly on a chip has been a long-standing challenge in technology. Traditionally, lasers are manufactured separately and attached to chips, which leads to **slower operation, higher costs, and manufacturing mismatches**.
- **New Breakthrough:** This research overcomes the issue by **growing the laser directly on a silicon chip** using a **scalable process**.
- This process is compatible with **standard CMOS technology**, which is central to current semiconductor manufacturing.

- **Shift from Electrons to Photons:** Early silicon chips relied on **electrons** to carry data. However, modern advancements in **silicon photonics** are replacing electrons with **photons**.
- Photons are ideal because they **carry information faster**, offer **higher bandwidth**, and have **lower energy loss** compared to electrons.
- This makes them perfect for **next-generation computing** in **data centers, sensors, and quantum computing**.
- **Key Components of Photonic Chip:** A photonic silicon chip consists of four key parts:
 1. **Light Source (Laser)**
 2. **Waveguides** (to channel photons)
 3. **Modulators** (to encode/decode data onto light signals)
 4. **Photodetectors** (to convert light into electrical signals)
- **Laser Physics:** The laser operates on the principle of **stimulated emission**, where **electrons** drop to a lower energy level, emitting **coherent photons** to form a laser beam.
- **Material Choice:** **Silicon** typically has an **indirect bandgap**, making it inefficient for light emission. To overcome this, materials like **gallium arsenide (GaAs)** with a **direct bandgap** are used for laser construction.
- **Protective Layer:** The setup includes a protective layer of **indium gallium phosphide** and electrical contacts to power the laser.

Type 5 Diabetes



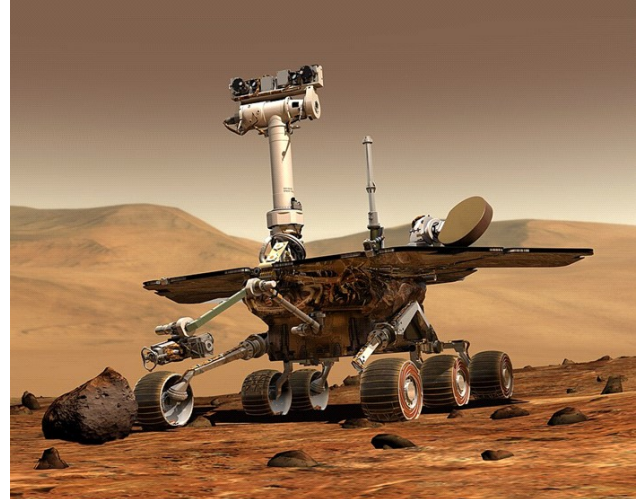
Why in News

- On 17 April 2025, the **International Diabetes Federation (IDF)** officially recognised **Type 5 diabetes** as a distinct form of diabetes, drawing attention to a long-overlooked condition primarily affecting undernourished populations

Key Point

- Definition:**
 - Type 5 diabetes is a form of diabetes caused by **malnutrition-induced insulin deficiency**, primarily found in **lean, undernourished adolescents and young adults in low- and middle-income countries (LMICs)**.
 - Unlike Type 2 diabetes, which involves insulin resistance, Type 5 is marked by **abnormally low insulin production** due to impaired pancreatic beta cell function.
- Clinical Characteristics:**
 - No autoimmune or genetic basis.**
 - Patients exhibit **very low BMI** (<18.5 kg/m²).
 - Insulin levels** are significantly **lower than in Type 2**, but slightly **higher than in Type 1**.
 - Low body fat percentage** and **poor dietary intake** of protein, fibre, and micronutrients.
- Historical Context:**
 - First reported in **Jamaica in 1955** as **J-type diabetes**.
 - WHO classified it as **"malnutrition-related diabetes mellitus"** in 1985, but removed the term in 1999 due to insufficient evidence.
 - Despite this, similar cases continued to emerge in **India, Sri Lanka, Bangladesh, Uganda, Ethiopia, Rwanda, and Korea**.
- Prevalence:**
 - Estimated to affect around **25 million people globally**, mostly in the **Global South**.
 - Often **misdiagnosed or overlooked** in clinical settings due to overlapping features with other diabetes types.

NASA's Curiosity Rover



Why in News

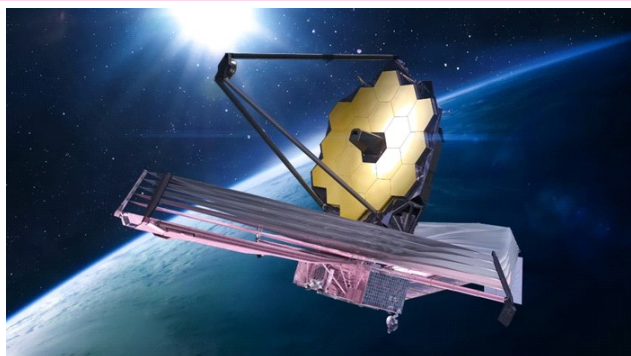
- In April 2025, **NASA's Curiosity Rover** discovered **carbon-bearing minerals** on Mars, providing the **first solid evidence of a carbon cycle** on the Red Planet—an important clue in understanding Mars' geological and atmospheric history.

Key Points

- Mission Overview:**
 - Curiosity** is a **U.S. robotic rover**, part of NASA's **Mars Science Laboratory (MSL)** mission.
 - Launched on **November 26, 2011**, aboard an **Atlas V rocket** and landed on Mars on **August 5, 2012**, using a **sky crane landing system** (first of its kind).
 - Powered by a **radioisotope thermoelectric generator** (not solar panels).
 - Size & Capabilities:** ~3 meters long, ~900 kg, equipped with an **onboard chemistry lab**.
- Scientific Goals:**
 - Determine whether **life ever existed** on Mars.
 - Study **Mars' climate and geology** (past and present).
 - Support **future human exploration** efforts.

- **Recent Discovery:**
 - o Conducted in an **89-meter stretch** within the **Gale Crater**, an ancient lakebed.
 - o Detected the **carbonate mineral siderite** (contains carbon and oxygen) in **sulfate-rich rock layers**—**first detection of siderite on Mars**.
 - o Rocks contained **5–10% siderite by weight**, suggesting **carbon once trapped in Mars’ crust**.
 - o Presence of **iron oxyhydroxides** implies **acidic water may have dissolved siderite**, releasing some **CO**, **back into the atmosphere**—evidence of a **limited and slow carbon cycle**

James Webb Space Telescope (JWST)



Why in News

- In April 2025, scientists using the **James Webb Space Telescope (JWST)** found **tentative but strong evidence** of **possible extraterrestrial life** on the distant exoplanet **K2-18b**, located 124 light years away in the **Leo constellation**.

Key Points

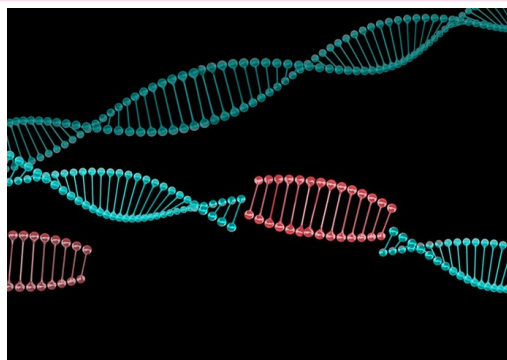
- **JWST Overview:**
 - o Launched in **December 2021**, JWST is the **largest and most powerful space observatory** ever built.
 - o A **collaboration between NASA, European Space Agency (ESA), and the Canadian Space Agency (CSA)**.
 - o Orbits at the **L2 Lagrange Point**, about **1.5 million km** from Earth, providing a stable position for observing deep space.

- o Primarily operates in the **infrared spectrum**.
- o Key components:
 - * **Optical Telescope Element (OTE)** – Gathers light from distant objects.
 - * **Integrated Science Instrument Module (ISIM)** – Houses cameras and scientific instruments.
 - * **Sunshield** – Protects instruments from solar radiation.
 - * **Spacecraft Bus** – Provides operational support.

Scientific Findings on K2-18b:

- o A **Cambridge University research team** analyzed the atmosphere of **K2-18b**.
- o Detected chemical signatures of **dimethyl sulphide (DMS)** and **dimethyl disulphide (DMDS)**.
- o These gases are known on Earth to be produced by **marine phytoplankton** and **certain bacteria**, indicating possible **biological activity**.
- o The **amount of DMS** detected is **thousands of times higher** than on Earth, suggesting the planet could be **teeming with life**.

Jumping Genes



Why in News

- Recent research by **University of Texas (UT) Health San Antonio** has found that **transposon activation** may be a key factor in the progression of **Alzheimer’s disease**.

Key Points

- **What are Jumping Genes?**

- o **Jumping genes**, scientifically known as **transposons**, are **mobile genetic elements** that can move from one location to another within the genome.
- o First discovered by **Barbara McClintock**, who won the **Nobel Prize in 1983** for her work on transposons.
- o In humans, transposons make up nearly **50% of the genome**, though most are inactive. However, some retain the ability to “jump,” causing genomic instability.
- o The most common type of jumping genes is **retrotransposons**, especially **LINE-1 elements**, which replicate via an **RNA intermediate** and use **reverse transcriptase** to reintegrate into DNA.

- **Role of Jumping Genes in Alzheimer's**

- o Under normal circumstances, the body tightly controls the activity of transposons through **epigenetic mechanisms**.
- o In **aging or diseased brains**, particularly in **neurodegenerative conditions** like **Alzheimer's**, these controls weaken, leading to the activation of transposons.
- o Once activated, transposons can insert into **essential genes**, disrupting DNA sequences and causing **cellular damage**, especially in the brain's neurons, which are highly vulnerable as they are **non-dividing**.

- **Research Findings and Clinical Trials**

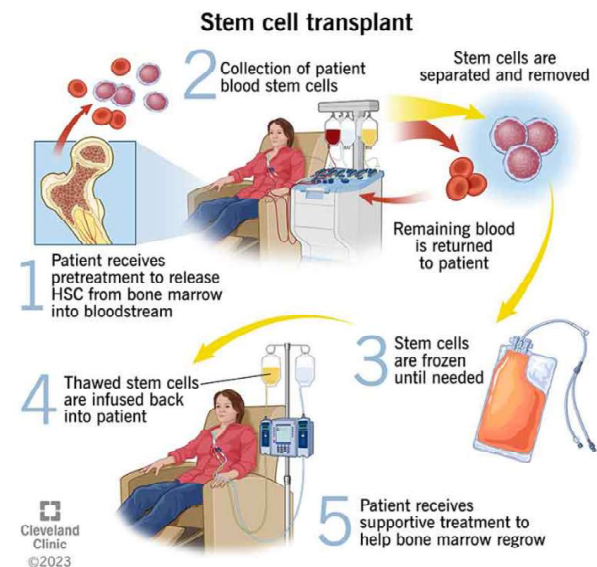
- o Experiments with genetically modified **fruit flies** that mimic Alzheimer's symptoms showed that blocking transposon activity using an **HIV drug (3TC)** improved **neural function**.

- o **3TC** is a **reverse transcriptase inhibitor** that prevents retrotransposons from copying and inserting themselves into new parts of the genome.
- o In a **clinical trial with human patients**, 3TC did not improve **memory** directly but reduced **neurofilament light (NfL)**—a key biomarker of **neurodegeneration**, suggesting protection against neuronal damage.

- **New Hypothesis on Alzheimer's Disease**

- o This supports a **new hypothesis** that Alzheimer's disease may not only be a disorder of **protein aggregation** (like amyloid or tau), but also one of **genomic instability**, driven by the reactivation of jumping genes.

Stem Cell Therapy for Parkinson's Disease



Why in News

- Researchers at **Kyoto University** recently conducted a **Phase I/II clinical trial** to assess the **safety and side effects** of stem cell therapy using **dopaminergic progenitors** derived from **human induced pluripotent stem cells (iPSCs)** for treating **Parkinson's disease**.

Key Points

- **What is Parkinson's Disease?**
 - **Parkinson's disease is a neurodegenerative disorder that**

causes the progressive loss of **dopamine-producing neurons** in the brain.

- o **Dopamine** is a critical neurotransmitter responsible for **regulating motor functions**.
- o Conventional treatments focus on **dopaminergic medications**, but these only help manage symptoms and do not **restore lost neurons**, and can have **long-term side effects**.
- **Induced Pluripotent Stem Cells (iPSCs)**
 - o **iPSCs** are **pluripotent stem cells** generated from adult **somatic cells** (like skin or blood) that are reprogrammed to an **embryonic-like state**, allowing them to develop into any human cell type.
 - o **Applications of iPSCs:**
 - * **Diabetes:** Converted into **beta cells** to produce insulin.
 - * **Leukemia:** Used to generate **new blood cells**.
 - * **Neurological diseases:** Potential for generating neurons to treat conditions like **Parkinson's**.
 - o iPSCs are also valuable in **drug testing**, **disease modelling**, and **transplantation medicine**.
- **Stem Cells and Their Role**
 - o **Stem cells** are **undifferentiated** primitive cells capable of developing into specialized cells like blood, muscle, or liver cells.
 - o Their ability to **self-renew** and **differentiate** makes them vital for **regeneration and repair**.
 - o **Sources of Stem Cells:**
 - * **Bone marrow**
 - * **Gastrointestinal tract** (divides regularly)
 - * Less active in organs like the **pancreas** or **heart** (divide under specific conditions).

• Types of Stem Cells: Embryonic vs Adult

Feature	Embryonic Stem Cells	Adult Stem Cells
Potency	Pluripotent (any body cell)	Multipotent (limited types)
Source	Embryo (blastocyst stage)	Mature tissues (e.g., bone marrow)
Growth in Lab	Can be easily cultured	Difficult to isolate & expand
Ethical Concerns	High	Low

Clinical Trial Details

- The **Kyoto University** trial involved the use of **dopaminergic progenitors** derived from **iPSCs** to address **Parkinson's disease** by replacing the lost dopamine-producing neurons.
- **Goal of the Trial:** To evaluate **safety** and **side effects** of this **stem cell therapy**.

Aryabhata



Why in News

- **2025 marks 50 years** since the launch of **Aryabhata**, India's first indigenously-built satellite, launched on **April 19, 1975**.

Key Points

- **About Aryabhata**
 - o **Aryabhata** was India's **first satellite**, named after the ancient Indian mathematician and astronomer **Aryabhata** (5th century CE).
 - o It was launched on **April 19, 1975**, from **Kapustin Yar**, a Soviet launch site, with the support of the **Soviet Union**.

- o Aryabhata's launch marked India's entry into an **elite club** of countries capable of sending satellites into orbit, alongside nations like the **USA, USSR, UK, France, China**, and others.
- **Scientific Objectives**
 - o Aryabhata was designed to conduct **experiments in solar physics and X-ray astronomy**.
 - o Though the satellite suffered a **power failure** five days after the launch, it still successfully made **initial X-ray observations** and continued transmitting data for several more days.
- **Orbital Lifespan and Re-entry**
 - o Aryabhata continued its mission until it re-entered **Earth's atmosphere** on **February 10, 1992**, after an orbital lifespan of **nearly 17 years**.
- **Naming and Cultural Significance**
 - o The satellite was unnamed until shortly before launch. **Prime Minister Indira Gandhi** selected the name '**Aryabhata**' from a shortlist that included names like '**Mitra**' and '**Jawahar**'
 - o The name reflected both **India's cultural heritage** and **diplomatic values**.
- **Commemorative Stamps**
 - o The **India Posts and Telegraphs Department** issued a **special commemorative postal stamp** shortly after the launch.
 - o The **Soviet Union** also issued its own **commemorative stamp** in 1976, recognizing the **scientific cooperation** between India and the Soviet Union.

Legacy of Aryabhata

Aryabhata's successful launch and mission were pivotal in establishing **India's space capabilities**, laying the groundwork for the **Indian Space Research Organisation (ISRO)**'s future achievements in space exploration and technology.

India's First Prototype Fast Breeder Reactor (PFBR)



Nation

India's First Prototype Fast-Breeder Reactor To Be Commissioned By September 2026

The commissioning of the Prototype Fast Breeder Reactor (PFBR) will mark the second stage of India's three-stage nuclear programme that aims to recycle spent fuel to reduce the inventory of radioactive waste.

Why in News

- India's **first Prototype Fast Breeder Reactor (PFBR)**, located in **Kalpakkam, Tamil Nadu**, is expected to be commissioned next year, marking a significant milestone in India's **three-stage nuclear programme**.

Key Points

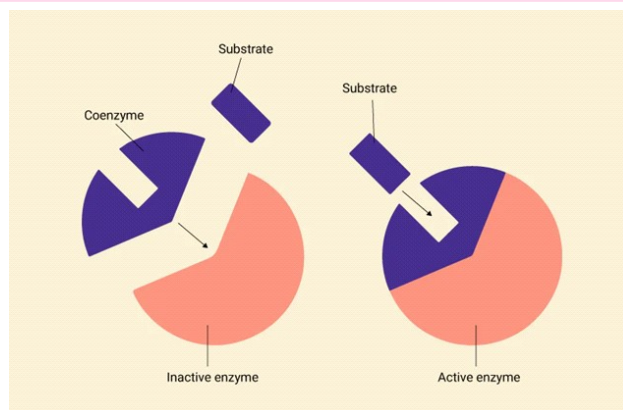
- **About PFBR**
 - o The **PFBR** is a **500 MWe sodium-cooled reactor** situated in **Kalpakkam, Tamil Nadu**.
 - o It was developed by **BHAVINI (Bharatiya Nabhikiya Vidyut Nigam Limited)**, a government enterprise established in **2003** under the **Department of Atomic Energy (DAE)**.
 - o Construction of the reactor began in **2004**, and it was initially expected to be completed by **September 2010** but faced delays.
- **Unique Features of PFBR**
 - o Unlike traditional nuclear reactors, PFBR uses **fast neutrons** for energy generation and **liquid sodium** as a coolant, instead of water.

- o The **fast breeder reactor** design allows it to breed more fuel than it consumes, contributing to a **sustainable energy solution**.
- o The reactor uses **plutonium and uranium-based mixed oxide fuel (MOX)**, ensuring **high efficiency** in power generation.
- o Its **advanced sodium cooling system** operates at higher temperatures, enhancing overall reactor efficiency.
- o The reactor also includes **robust safety features**, such as a strong containment structure and **passive cooling systems**, which prevent overheating.
- **India's Three-Stage Nuclear Programme**
 - o India has a **three-stage nuclear power programme**, with the ultimate goal of deploying a **thorium-based closed nuclear fuel cycle**.
 - * **Stage 1:** Involves the use of **pressurised heavy water reactors (PHWRs)**, fueled by natural uranium, and light water reactors.
 - * **Stage 2:** Focuses on reprocessing used fuel from Stage 1 to recover **plutonium**, which will fuel **fast breeder reactors (FBRs)** like the PFBR.
 - * **Stage 3:** Will deploy **Advanced Heavy Water Reactors (AHWRs)** to use **thorium-plutonium fuels** and breed **uranium-233**.

Significance

The commissioning of the **PFBR** is a crucial step in advancing India's nuclear power capabilities, supporting the country's future energy needs while contributing to the **sustainable development** of the nuclear sector.

Enzymes and Coenzymes



Why in News

- The recent issue of **Nature** featured a significant breakthrough from **CAS, Beijing**, titled **"Gene-edited plants make the jump from farm to factory,"** highlighting biofortified rice varieties.

Key Point

- **What are Enzymes?**
 - o **Enzymes** are **proteins** that catalyze biochemical reactions, increasing the efficiency of **cellular metabolism**.
 - o Many enzymes require additional helper molecules, known as **cofactors**, for proper functioning.
- **What are Coenzymes?**
 - o **Coenzymes** are **organic molecules** that act as helper molecules for enzymes.
 - o They bind to enzymes and **enhance their activity**, playing a vital role in various **metabolic pathways**.
- **Coenzyme Q (Ubiquinone)**
 - o **Coenzyme Q (CoQ)**, also called **ubiquinone**, is an **organic antioxidant molecule** with multiple **isoprene units**.
 - o CoQ exists in **ten forms**, from **CoQ1** to **CoQ10**, and is **lipid-soluble** but **water-insoluble**.
 - o It plays a key role in **mitochondrial function**, aiding **cellular energy production** and is found in every **cell membrane**.

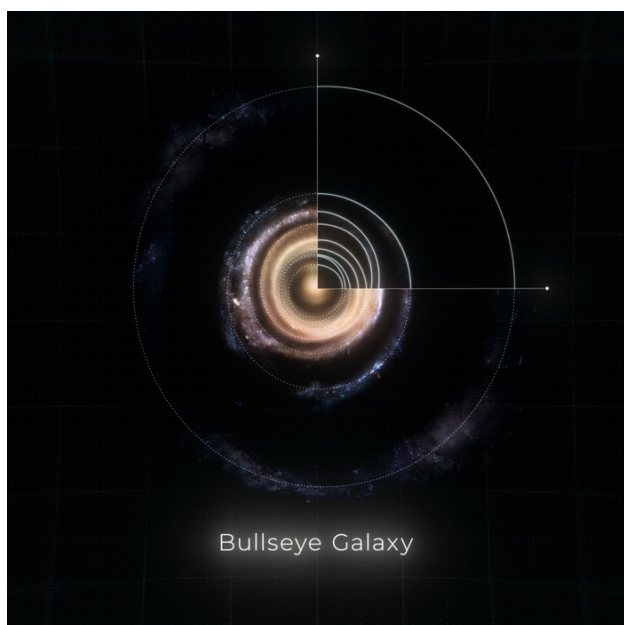
- **Significance of CoQ9 in Plants**
 - **CoQ9**, containing nine isoprene units, is primarily produced in **cereal crops** like **wheat, rice, oats, barley, corn, rye, and millet**.
 - It is also found in **bamboo, barley**, and flowering plants like **cinnamon, avocado, and pepper**.
- **Importance of CoQ10 in Human Health**
 - **CoQ10** is a vital component of the **mitochondrial electron transport chain**, generating most of the body's **cellular energy**.
 - Organs like the **heart**, which have high energy needs, contain high concentrations of **CoQ10**.
 - While **CoQ9** is available in staple foods, humans may need additional **CoQ10** due to factors like **genetics, aging, and neurological disorders**.

Significance

The study and application of coenzymes, particularly **CoQ9** and **CoQ10**, highlight their crucial roles in **energy production** in both **plants** and **humans**, and they are key to understanding **metabolic processes** and **human health**.

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Bullseye Galaxy



Why in News

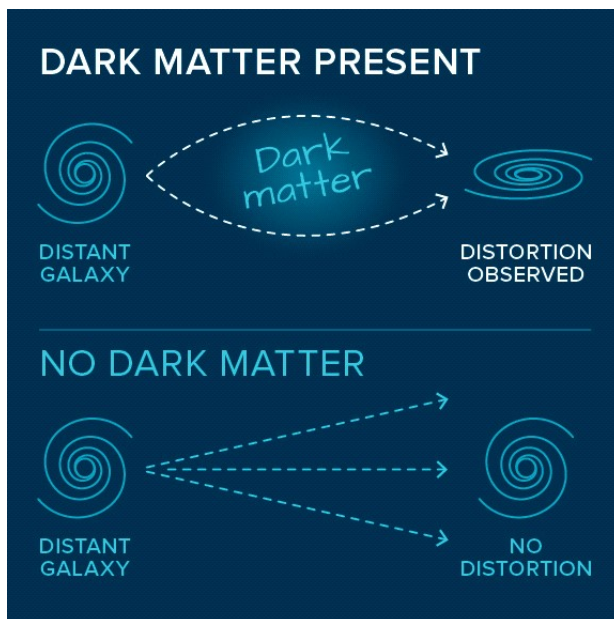
- The **Bullseye Galaxy (LEDA 1313424)** was recently discovered by an international team of researchers using the **Hubble Space Telescope** and **W.M. Keck Observatory**.

Key Points

- **Location and Type**
 - The Bullseye Galaxy is a **collisional ring galaxy (CRG)** located approximately **534 million light-years** away in the **constellation Pisces**.
 - The galaxy's distinct **ringed structure** is the result of a head-on collision with a **blue dwarf galaxy** about **50 million years ago**, triggering the formation of multiple rings of stars.
- **Formation of the Galaxy**
 - The **head-on collision** led to the formation of **rippling gas waves**, which caused the formation of stars in **concentric ring-like patterns**.
 - While ringed galaxies usually have two or three rings, the Bullseye Galaxy was discovered to have **eight rings**, with the **W.M. Keck Observatory** confirming a **ninth ring**.
- **Size and Structure**
 - The Bullseye Galaxy spans an impressive **250,000 light-years** in diameter, making it nearly **2.5 times larger** than the Milky Way.
 - Despite a **current separation of 130,000 light-years** from the colliding dwarf galaxy, a thin trail of **gas** still connects the two galaxies.
- **Potential Evolution into a GLSB Galaxy**
 - The Bullseye Galaxy is thought to have the potential to evolve into a **Giant Low Surface Brightness (GLSB)** Galaxy, a rare and massive galaxy type.
 - GLSB galaxies are known for being **rich in dark matter**, which challenges the current **Standard Model of Cosmology** due to their unusual mass distribution and lack of a dense central core.

- o **GLSB features** include:
 - * **Diffuse, low-density stellar disks.**
 - * **Large amounts of neutral hydrogen with low star formation rates.**
 - * Examples include **Malin 1**, which is **6.5 times wider** than the Milky Way.

Dark Matter



Why in News

- A recent study led by the Indian Institute of Astrophysics (IIA) has focused on the peculiar case of galaxy **NGC 1052-DF2**, which appears to lack dark matter—a component traditionally considered essential for galaxy formation.

Key Points

- **About Dark Matter**
 - o **Definition:** Dark matter is a hypothetical form of matter that **does not emit, absorb, or reflect light**, making it **invisible**. It can only be detected through its **gravitational effects**.
 - o **Constituents of the Universe:** Dark matter accounts for **27%** of the universe's total **mass-energy content**,

while visible matter (everything we can see) constitutes only **5%**.

- **Importance in the Universe**

- o **Galactic Structure:** Dark matter is crucial for **explaining the formation** and structure of galaxies, galaxy clusters, and the overall **large-scale structure** of the universe.
- o **Cosmic “Scaffolding”:** It functions as a **scaffolding** that holds galaxies together, influencing their **rotation** and **movement**.
- o **Non-interaction with Electromagnetic Forces:** Unlike ordinary (baryonic) matter, dark matter does **not interact** with electromagnetic forces (such as light, heat, or radiation), and only interacts through **gravity**.

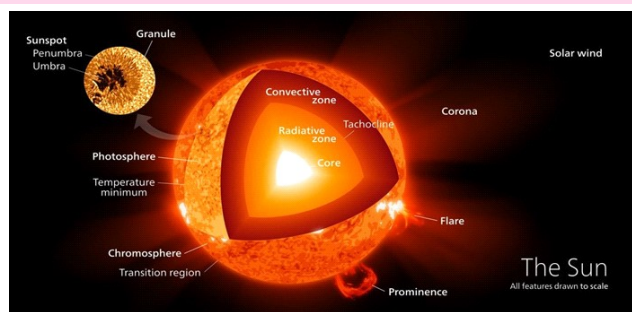
- **Candidates for Dark Matter**

- o **Weakly Interacting Massive Particles (WIMPs):** Hypothetical particles that have mass but interact weakly with other matter.
- o **Axions:** Theorized **ultralight particles** that might be a component of dark matter.
- o **MACHOs (Massive Astrophysical Compact Halo Objects):** These include **black holes**, **white dwarfs**, and **neutron stars** which could contribute to dark matter.

- **Dark Energy**

- o **Constitutes 68%** of the universe and is thought to be linked to the **vacuum of space**.
- o It is evenly distributed throughout the universe, **accelerating its expansion**.
- o **Effect on the Universe:** Dark energy causes a **repulsive force** that accelerates the expansion of the universe, measurable by **observations of the Hubble law**.

New Method to Estimate Helium Abundance in the Sun



Why in News

- Indian scientists from the **Indian Institute of Astrophysics (IIA)** have developed a **novel method** to accurately estimate the abundance of **Helium** in the **Sun's photosphere** using **indirect spectral analysis**.

Key Points

- Background on Helium Abundance in the Sun**
 - Helium** is the second most abundant element in the Sun, but **direct detection** of its presence in the Sun's photosphere is challenging because **Helium spectral lines** are not found in the **visible range**.
 - Traditionally, **Helium abundance** was estimated using:
 - * **Solar wind or corona data.**
 - * Extrapolations from **hotter stars.**
 - * **Helioseismology** (the study of solar interior vibrations).
 - These methods lacked precision as they were not based on **direct photospheric observations**.
- New Method Developed by IIA**
 - Scientists used **spectral lines** of neutral **Magnesium (Mg I)** and neutral **Carbon (C I)**, along with molecular lines of **MgH**, **CH**, and **C**, all observed in the **Sun's photosphere**.
 - The method operates on the principle that the relative abundance of **Helium** influences the availability of **Hydrogen**, which in turn affects the

formation and strength of certain **molecular lines** like **CH** and **MgH**.

- By matching the **atomic and molecular abundances** of **Magnesium** and **Carbon** for different **Helium-to-Hydrogen (He/H) ratios**, the researchers found that only at a **He/H ratio of approximately 0.1** do the atomic and molecular line abundances align. This confirmed the assumed solar value.

About Helium

- Helium (He)** is a **noble gas** with a **closed-shell electronic configuration**, making it **chemically inert**.
- It was first discovered in **1868** by **Jules Janssen** and **Norman Lockyer** during a **solar eclipse** through the detection of a yellow spectral line.
- The name **Helium** is derived from the Greek word '**Helios**', meaning **Sun**.
- Global Reserves:** The largest reserves of Helium are in the **United States**, **Algeria**, and **Russia**.
- India's Rajmahal Volcanic Basin** in **Jharkhand** is a significant helium reservoir, where helium has been trapped for **billions of years**.

'Phenome India' Project



Why in the News?

- The 'Phenome India' Project is in the news because the Department of Biotechnology (DBT) recently called for proposals related to *Translational Research using GenomeIndia data*.

- However, concerns have arisen among researchers due to the lack of crucial information about the available phenotype data.

'Phenome India' Project

- The **Phenome India** project, officially named **Phenome India-CSIR Health Cohort Knowledgebase (PI-CheCK)**, is a major health initiative launched by the *Council of Scientific and Industrial Research (CSIR)*.

Key Points:

1. Background:

- o The project successfully collected blood samples and phenotype data from **over 20,000 individuals** across **83 population groups**, including **30 tribal** and **53 non-tribal** populations from all parts of India.
- o Preliminary findings from the genetic data of **9,772 individuals** were published in *Nature Genetics* on **April 8, 2025**.

2. Types of Data Collected:

- o **Phenotype Data:** Includes measurements such as height, weight, waist/hip circumference, and blood pressure.
- o **Biochemical Data:** Includes complete blood counts, glucose levels, lipid profiles, liver function, and kidney function tests.

3. Main Objectives of the Project:

- o The project's aim is to develop **India-specific risk prediction models** for **cardio-metabolic diseases** such as diabetes, liver diseases, and cardiac disorders.
- o It focuses on India's **ethnic diversity** and **lifestyle patterns**, and how these influence the risk and incidence of these diseases.

4. Significance:

- o **First-ever Pan-India Study:** The project is India's first national health

monitoring study dedicated to **cardio-metabolic health**.

- o It includes around **10,000 participants**, mainly **CSIR employees, pensioners**, and their families from **17 states** and **24 cities**.
- o The data collected also includes clinical questionnaires, dietary habits, lifestyle details, imaging data, and extensive molecular information.

5. Healthcare Model:

- o The project is aligned with the **Predictive, Personalised, Participatory, and Preventive (P4)** healthcare model, which tailors health strategies to India's specific **genetic and phenotypic** profiles.

This initiative is crucial for advancing **personalized healthcare** in India and improving **cardio-metabolic disease management** based on the country's unique population characteristics.

RNA-Based Antiviral for Agricultural Virus



Why in News

- A new RNA-based antiviral method has been developed to protect crops from devastating plant viruses, such as the Cucumber Mosaic Virus (CMV).
- This approach activates a plant's natural immune response without modifying its DNA and is being explored as a cost-effective and sustainable solution to agricultural viral outbreaks.

Context

- According to the Food and Agriculture Organization (FAO) of the United Nations, plant pests and diseases destroy approximately 40 percent of global crop production annually.
- Among these, plant viruses alone cause more than 30 billion US dollars in annual economic losses, highlighting the urgent need for effective plant virus control methods.

What is the Mosaic Virus?

- The Mosaic virus is a type of plant virus that attacks plants at the molecular level, disrupting their growth and productivity.
- Infected plants can transmit the virus to others through physical contact or vectors, leading to widespread crop damage.
- Common crops affected include roses, beans, tobacco, tomatoes, potatoes, cucumbers, pumpkins, squash, melons, and peppers.

Cucumber Mosaic Virus (CMV)

- CMV affects over 1,200 plant species, including cucumbers, melons, tomatoes, eggplants, carrots, lettuce, cereals, and some medicinal plants.
- It was first identified in cucumbers in 1934.
- CMV is primarily transmitted by aphids, with over 90 aphid species capable of spreading the virus.
- Although transmission through human touch is possible, it is extremely rare.
- The virus spreads more rapidly in warm weather with intermittent rainfall, which boosts aphid activity.
- In India, CMV is responsible for 25 to 30 percent yield losses in banana plantations and infects up to 70 percent of crops such as cucumbers, pumpkins, and melons.

RNA-Based Defence Mechanism in Plants

Plants naturally defend themselves against viruses through a process called RNA silencing.

- When a plant detects double-stranded RNA (dsRNA) from a virus, it activates an immune response.

- Enzymes called Dicer-like enzymes (DCLs) cut the dsRNA into small interfering RNAs (siRNAs).
- These siRNAs guide the plant's cellular machinery to identify and degrade the viral RNA, preventing virus replication.

Types of RNA-Based Antiviral Techniques

1. Host-Induced Gene Silencing (HIGS):

- In this method, plants are genetically engineered to produce virus-targeting dsRNA within their own cells.
- This provides continuous internal protection against the virus.
- However, this approach is limited by high development costs, regulatory challenges, and the risk of viruses developing resistance.

2. Spray-Induced Gene Silencing (SIGS):

- This technique involves spraying dsRNA directly onto plant leaves, which activates the plant's natural RNA silencing response.
- SIGS does not involve any genetic modification of the plant, making it more environmentally friendly and publicly acceptable.
- It is more cost-effective than HIGS but less efficient when traditional dsRNA formulations are used, as they often produce a random mix of siRNAs.

National Supercomputing Mission (NSM)



Why in News

- The **National Supercomputing Mission (NSM)** continues to advance India's capabilities in **indigenous high-performance computing (HPC)**.

- With recent developments like the **AIRAWAT AI supercomputer** and the expansion of **PARAM series systems**, NSM is playing a key role in positioning India among the **global leaders in supercomputing**.

About the National Supercomputing Mission (NSM)

- The **National Supercomputing Mission (NSM)** was launched in **2015** by the **Government of India** with the objective of **developing and deploying indigenous supercomputers** across academic and research institutions.
- It aims to make India self-reliant in supercomputing and reduce dependency on foreign technology.
- NSM is **jointly steered** by the **Department of Science and Technology (DST)** and the **Ministry of Electronics and Information Technology (MeitY)**.
- The mission is **implemented by the Centre for Development of Advanced Computing (C-DAC), Pune** and the **Indian Institute of Science (IISc), Bengaluru**.
- NSM supports **advanced scientific research, weather modeling, healthcare, AI innovation, and industrial R&D** through high-performance computing infrastructure.

Objectives of NSM

- To **increase India's supercomputing capacity** and place the country among the **top global players**.
- To build a **robust indigenous HPC ecosystem**, including **hardware, software, and networking infrastructure**.
- To enable **scientific discovery, academic research, and technological development** using computational power.
- To support **startups and industries** in leveraging AI and data-intensive technologies.

Indigenisation Milestones

- **"Rudra" HPC servers** are India's first indigenously developed HPC-class servers that meet international performance standards.
- **PARAM Rudra** supercomputers have been deployed in cities like **Pune, Delhi, and Kolkata**, supporting research in fields like **physics, earth sciences, and cosmology**.
- The **Trinetra high-speed network**, developed under NSM, supports data transmission at speeds up to **200 Gbps**. It is being implemented in phases:
 - **Trinetra PoC**
 - **Trinetra-A (100 Gbps)**
 - **Trinetra-B (200 Gbps)**

AI Supercomputing Initiative: AIRAWAT

- **AIRAWAT** is India's dedicated AI supercomputing platform developed under NSM.
- It is designed to support **start-ups, academic institutions, and innovation hubs** with scalable AI computing infrastructure.
- The **Proof of Concept (PoC) AIRAWAT** system offers **200 petaflops** of processing power and is scalable up to **790 AI petaflops**.
- AIRAWAT secured the **75th rank** in the **Top 500 Global Supercomputing List at ISC 2023 (Germany)**, establishing India's presence among the top AI computing nations.

Key Institutional Supercomputers under NSM

1. **PARAM Shivay (2019)** – Deployed at **IIT-BHU**, it was the **first indigenous supercomputer** built under NSM.
2. **PARAM Pravega (2022)** – Located at **IISc Bengaluru**, it is one of India's **largest academic supercomputers**, with **3.3 petaflops** of computational capacity.

Crux of The Hindu & Indian Express

Science & Technology

US-RUSSIA CREW LAUNCH TO ISS ON SOYUZ SPACECRAFT



Date: April 8, 2025

Location: Baikonur Cosmodrome, Kazakhstan

What Happened?

- A **Soyuz MS-27** spacecraft, decorated to mark the **80th anniversary of the end of World War II**, was successfully launched by Russia.
- The mission carried **3 astronauts—two Russians and one American—to the International Space Station (ISS)**.

Crew Members:

1. **Sergey Ryzhikov** – Russian cosmonaut
2. **Alexey Zubritsky** – Russian cosmonaut
3. **Jonny Kim** – NASA astronaut (USA)

They are scheduled to carry out **50 scientific experiments** during their mission aboard the ISS and are expected to return by **December 9, 2025**.

Launch Details:

- **Spacecraft:** Soyuz MS-27
- **Docking:** Scheduled with the **Russian segment of the ISS**
- Launch **broadcasted live** by Roscosmos (Russian space agency)
- **About 2,500 tourists** witnessed the launch—highlighting public interest and space tourism

Why Is This Important?

1. Despite Political Tensions, Space Ties Continue

- Since Russia's **invasion of Ukraine in 2022**, US-Russia relations have severely deteriorated.

- However, space collaboration, especially through the **International Space Station**, continues.
- This mission shows that **science diplomacy** and **space research** still operate as **neutral, cooperative platforms** even during geopolitical crises.

2. The Role of Baikonur Cosmodrome

- Baikonur is a **historically significant launch site**—used since Soviet times.
- Though located in Kazakhstan, Russia leases it for **\$115 million per year**.
- Lease is valid **until 2050**, showing how important this facility remains for Russian space missions.

3. Scientific Mission Objectives

- Focus on **microgravity experiments, technological testing, biology, and Earth observation**.
- These missions contribute to global research and sometimes even benefit sectors like **medicine, agriculture, and material science**.

Russia's Space Programme – Current Status

- **Past Glory:** First satellite (Sputnik), first human in space (Yuri Gagarin)
- **Present Challenges:**
 - **Funding issues and technical failures**
 - **Corruption scandals**
 - Failure of **Luna-25** moon mission in August 2023
- Still, the **Soyuz programme remains reliable** for ISS crew transport, especially when commercial US options are limited or delayed.

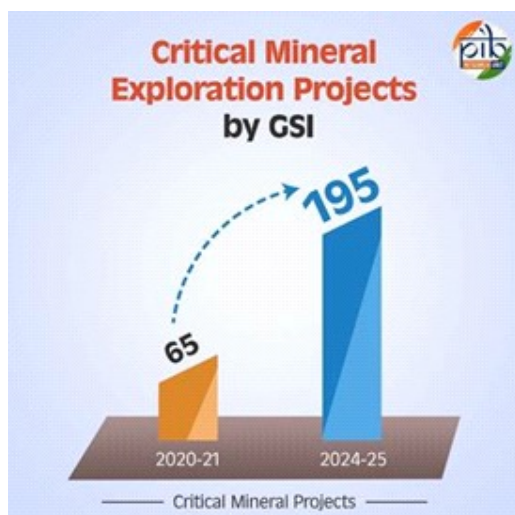
National Critical Mineral Mission (NCMM)

Powering India's Clean Energy Future

1. Introduction

- The **National Critical Mineral Mission (NCMM)** was launched by the Government of India in **2025** to establish a **self-reliant** framework in the critical mineral sector.

- The **Geological Survey of India (GSI)** will oversee **1,200 exploration projects** from **2024–25 to 2030–31**.



- 30 critical minerals** were identified, with **24 included** in **Schedule I of the Mines and Minerals Development and Regulation Act, 1957 (MMDR Act, 1957)**. The government now has **exclusive authority** to auction mining leases for these minerals.
- A **Centre of Excellence on Critical Minerals (CECM)** will be set up to **update the mineral list** and **guide strategies**.

2. What are Critical Minerals?

Critical minerals are essential for **clean energy technologies** such as:

- Solar Panels:** Silicon, tellurium, indium, gallium
- Wind Turbines:** Dysprosium, neodymium (rare earth elements)
- Electric Vehicles (EVs):** Lithium, cobalt, nickel (used in lithium-ion batteries)
- Energy Storage Systems:** Lithium, cobalt, nickel

They are **vital for India's clean energy transition** and economic development. Lack of availability or concentration in specific regions can lead to **supply chain vulnerabilities** and national security risks.

3. Objectives of the NCMM

The **NCMM** aims to:

- Secure the supply chain** for critical minerals from **domestic and foreign sources**.

- Strengthen the **value chains** with:
 - Technological innovation
 - Regulatory and financial support
 - Skill development
 - Global competitiveness
- Minimize import dependency** by enhancing **domestic exploration and mining efforts**.
- Promote recycling and secondary mineral recovery** from waste materials like **scrap, fly ash, and red mud**.
- Strengthen India's mineral processing infrastructure**.

4. Mission Output (Targets 2024–25 to 2030–31)

Objective	Target
Domestic Critical Mineral Exploration	1,200 projects
Foreign Mineral Assets (PSUs)	26 acquisitions
Foreign Mineral Assets (Private Entities)	24 acquisitions
Incentive Scheme for Recycling (kt)	400
Patents in Critical Mineral Value Chain	1,000
Skill Development	10,000 trained
Mineral Processing Parks	4 dedicated zones
Centre of Excellence	3 institutions
Strategic Mineral Stockpiles (Cumulative)	5

5. Components of the National Critical Mineral Mission (NCMM)

India's Exploration Efforts

- The **Geological Survey of India (GSI)** has taken up **195 projects** in **2024-25**, with a focus on critical minerals, including **35 projects** in **Rajasthan**.
- Over **100 mineral blocks** are expected to be auctioned, and exploration will be expanded to **offshore regions** rich in **polymetallic nodules** containing cobalt, rare earth elements (REEs), nickel, and manganese.
- **Fast-track approval systems** will be introduced to speed up exploration activities.

Regulatory Reforms

- **New Exploration License (EL):** Encourages private sector participation.
- **Relaxed rules** and incentives will promote mineral recovery from **secondary sources** like **fly ash** and **tailings**.
- Development of **trace mineral assessments**, **mineral processing parks**, and increased involvement of **state governments** and **PSUs** in the critical mineral value chain.

6. Acquisition of Assets Abroad

India will explore and acquire critical mineral assets in resource-rich countries:

- **Public Sector Undertakings (PSUs)** and **private firms** will receive **funding** and **support** for acquiring overseas assets.
- **Public-private partnerships (PPP)** will be promoted, and **infrastructure support** will be provided with the help of the **MEA**.

Key International Initiatives:

- **KABIL (Khanij Bidesh India Ltd):** Agreement with **Argentina (January 2024)** for **lithium exploration** over **15,703 hectares**.
- **MoU with Australia (2022)** for **lithium** and **cobalt projects**.

7. India's Key Players in the Mineral Sector

- **IREL (India) Limited :**

IREL (India) Limited, formerly known as **Indian Rare Earths Limited**, was incorporated on August 18, 1950. It operates under the Department of Atomic Energy since 1963. IREL began with its Rare Earths Division (RED) in Aluva (Kerala), and later expanded to mining operations in Chavara (Kerala), Manavalakurichi (Tamil Nadu), and its flagship unit, Orissa Sands Complex (OSCOM) in Odisha. Headquartered in Mumbai, it is committed to sustainable practices, ethical governance, and contributing to the global clean energy mission.

Vision: To be a significant contributor to the global clean energy mission by providing high-quality performance-enhancing materials and operating in a socially responsible manner.

Mission: To grow sustainably in heavy minerals and rare earths, adopt advanced technologies, prioritize customer satisfaction, empower employees, and uphold strong ethical standards.

- o **Processing capacity** of **6 lakh tons/year**.
- o Produces **ilmenite, rutile, zircon, sillimanite, garnet**, and more.
- o Operates a **Rare Earth Extraction Plant** in **Odisha** and a **Refining Unit** in **Kerala**.
- o **Consistent profit** since **1997-98** with exports worth **₹ 7,000 million** in **2021-22**.

8. Key Sectors and Technologies Affected by Critical Minerals

- **Solar Energy:**
 - o **Critical minerals** such as **silicon, tellurium, indium, and gallium** are essential for **photovoltaic (PV) cells** used in solar panels.
 - o India's current solar capacity is **64 GW**, which is heavily dependent on these minerals.
- **Wind Energy:**
 - o **Rare earth elements (REEs)** like **dysprosium** and **neodymium** are used in **permanent magnets** for wind turbines.

- o India aims to **increase wind energy capacity** from **42 GW to 140 GW** by **2030**, requiring a stable supply of these minerals.
- **Electric Vehicles (EVs):**
 - o **Lithium, nickel, and cobalt** are key materials used in **lithium-ion batteries**.
 - o India plans to deploy **6–7 million EVs** by **2024**, leading to increased demand for these critical minerals.
- **Energy Storage:**
 - o Lithium-ion batteries used in **advanced energy storage systems** depend on **lithium, cobalt, and nickel**.

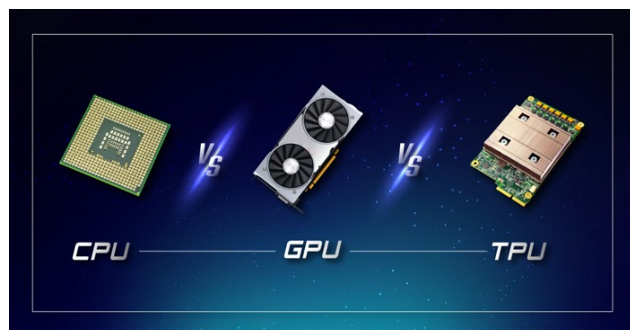
9. India's Strategic Objectives for Mineral Processing

- **Strategic reserves:** The government will create **strategic mineral stockpiles** to ensure an uninterrupted supply of critical minerals for India's energy needs.
- Establishment of **mineral processing parks** to boost domestic capacity for processing critical minerals.

10. Conclusion

India's **National Critical Mineral Mission (NCMM)** is crucial for ensuring the availability of critical minerals required for clean energy technologies. By focusing on **domestic exploration, global acquisitions, and strengthening value chains**, the mission will enable India to **reduce import dependency** and support its **green energy transition**. The development of a **self-reliant** critical mineral sector will enhance **India's energy security** and contribute to sustainable economic growth.

AI & Processing Units – TPU vs CPU vs GPU



Why in News?

- In April 2025, Google announced the launch of **Ironwood**, its **7th-generation Tensor Processing Unit (TPU)**.
- This new TPU has been specifically designed to train and run large artificial intelligence (AI) models with increased speed and efficiency.
- It represents a major leap in AI hardware development and is already being used to power Google's AI systems such as **Search, YouTube, Gemini, and DeepMind**.

What Are Processing Units?

- Processing units are the hardware components inside computers that perform various operations such as calculations, data handling, image processing, and executing instructions.
- They are **considered the “brain” of a computing system**, just as the human brain processes sensory information and makes decisions.

Types of Processing Units

- Let's now understand the 3 key types of processing units relevant to AI and general computing: **CPU, GPU, and TPU**.

1. Central Processing Unit (CPU)

- The **Central Processing Unit (CPU)** is a general-purpose processor and is often referred to as the main or primary processor of a computer.
- It was developed in the 1950s and is responsible for executing a wide range of tasks and instructions.
- Modern CPUs have **multiple cores** (ranging from 2 to 16 or more), and each core can perform one task at a time.
- However, CPUs work in a **sequential manner**, meaning they perform one task after another in a logical order.
- CPUs are very flexible and capable of handling everyday computing tasks such as internet browsing, running applications, and managing files.

- Their performance in multitasking improves as the number of cores increases.

Analogy: A CPU is like a **head chef** who oversees the entire kitchen, managing tasks step-by-step to ensure smooth functioning.

2. Graphics Processing Unit (GPU)

- A **Graphics Processing Unit (GPU)** is a specialized processor originally created to handle the rendering of images, graphics, and animations in gaming and design software.
- However, it has now become widely used in **machine learning (ML)** and **scientific computing** due to its ability to process data in **parallel**.
- Unlike CPUs, which process tasks sequentially, GPUs contain **hundreds or even thousands of smaller cores** that work on multiple operations **simultaneously**.
- This ability to perform **parallel processing** makes GPUs significantly faster for handling large datasets or performing repetitive computations.
- Although GPUs are less flexible than CPUs, they are far more efficient in training AI models and handling tasks that require massive data computation.

Analogy: A GPU is like a **sous-chef with 10 hands**, who can flip 10 burger patties at once, increasing the speed of cooking compared to the head chef who does it one by one.

3. Tensor Processing Unit (TPU)

- A **Tensor Processing Unit (TPU)** is an **application-specific integrated circuit (ASIC)** developed by **Google in 2015**.
- Unlike CPUs and GPUs, TPUs are **designed exclusively for machine learning and AI workloads**, especially those involving neural networks and deep learning models.
- TPUs are built to handle **tensor operations**, which are fundamental to modern machine learning frameworks like TensorFlow.
- A tensor is essentially a multi-dimensional array used to represent data in AI models.
- The major advantage of TPUs lies in their ability to train large AI models much faster than GPUs.

- Tasks that might take weeks on a GPU can often be completed in a few hours using a TPU.
- This makes TPUs ideal for AI applications at a massive scale.
- Google uses TPUs in many of its services, including **Search, YouTube, Google Translate**, and AI research labs like **DeepMind**.

Analogy: A TPU is like a **super-fast robotic chef** trained to cook one specific dish – it cannot do everything, but for that one task, it is faster and more efficient than any human.

Comparison Table: CPU vs GPU vs TPU

Feature	CPU	GPU	TPU
Purpose	General computing tasks	Graphics, parallel processing	AI and ML model training
Execution Style	Sequential	Parallel	Highly parallel (tensor-specific)
Cores	2–16	Hundreds to thousands	Specialized tensor cores
Flexibility	Very high	Moderate	Low (designed for a specific purpose)
Speed (AI Tasks)	Slow	Fast	Very fast
Developer	Intel, AMD, etc.	Nvidia, AMD	Google
Use Case	Browsing, software, multitasking	Gaming, ML, video rendering	Deep learning, large AI models

Quote to Use in Essay or GS Answers

“AI is not just the future of innovation — it is the infrastructure of the future.”

— Use this to conclude essays or Mains answers on emerging technologies or digital economy.

ISRO's SpaDeX Mission: Revolutionising India's Space Capabilities



Introduction

- On **April 21, 2025**, the **Indian Space Research Organisation (ISRO)** successfully completed the **second docking operation** under its **Space Docking Experiment (SpaDeX)** mission.
- This marked another significant milestone in India's journey to mastering **autonomous space docking technology**.
- The mission, which began with the launch of two satellites in December 2024, is a pioneering step toward enabling future missions involving space stations, lunar expeditions, sample return missions, and human spaceflight.

Mission Timeline

Date	Milestone
30 Dec 2024	Launch of SpaDeX on PSLV-C60 from Sriharikota
16 Jan 2025	First successful docking (ISRO's first)
13 Mar 2025	Undocking of the satellites
21 Apr 2025	Second successful docking
Next	More experiments planned over coming weeks

Historical Significance

- The successful docking operation executed on **January 16, 2025**, marked India's **first-ever space docking**.
- With this achievement, **India became the fourth country in the world**, after the **United States, Russia, and China**, to develop and demonstrate such a capability.
- The SpaDeX mission was launched on **December 30, 2024**, using the **Polar Satellite Launch Vehicle (PSLV-C60)** from the **Satish Dhawan Space Centre** in Sriharikota.

Objectives of the SpaDeX Mission

The SpaDeX mission is designed as a **cost-effective, indigenous technology demonstrator** to validate key technologies necessary for future space docking operations. The primary objectives of the mission include:

- Development and demonstration of autonomous spacecraft rendezvous, docking, and undocking** using two small satellites.
- Validation of controllability** while the satellites are in docked condition, operating as a single spacecraft.
- Demonstration of power transfer capabilities** between the docked satellites.
- Testing of autonomous navigation and communication protocols** for in-space operations.
- Laying the technological foundation for future missions** such as satellite servicing, on-orbit assembly, and the **Bharatiya Antariksh Station**.

Technical Details and Capabilities

- The SpaDeX mission involves two small satellites: **SDX01 (Chaser)** and **SDX02 (Target)**.
- Both satellites are **approximately 220 kg each** and are designed with **androgynous docking interfaces**, meaning either satellite can perform the role of the active (chaser) spacecraft.

Each satellite is equipped with:

- Solar panels** and **lithium-ion batteries** for power supply.
- An **Attitude and Orbit Control System (AOCS)**, which includes:
 - Star sensors, sun sensors, magnetometers** for orientation sensing.
 - Reaction wheels, magnetic torquers, and thrusters** for maneuvering.
- High-precision sensors** and **GNSS-based relative navigation systems** to allow autonomous approach and alignment.
- A **docking mechanism** that includes capture, retraction, and rigidisation phases for stability.

- An **Inter-Satellite Link (ISL)** that enables real-time communication and coordination between the two spacecraft.
- A novel **Relative Orbit Determination and Propagation (RODP) processor**, designed to compute the position and velocity of the companion spacecraft.

Docking and Undocking Operations

- The **docking maneuver** involved the chaser spacecraft moving autonomously from a hold point at 15 meters to just 3 meters away from the target satellite.
- It then executed a precise **docking sequence**, followed by **capture**, **retraction**, and **rigidisation**.
- The **first successful docking** was conducted on **January 16, 2025**, followed by **undocking** on **March 13, 2025**.
- The **second docking** was successfully completed on **April 21, 2025**, with further **experiments planned in the coming weeks**.
- During the docked phase, **electrical power was transferred** from one satellite to the other, validating the system's capability to support energy-dependent operations.
- Post-undocking, the satellites will undertake **payload operations** including:
 - High-resolution Earth imaging,
 - Vegetation and natural resource monitoring,
 - Radiation environment measurements in orbit.

Indigenous Technologies Incorporated

Several **cutting-edge indigenous technologies** have been developed and integrated into the SpaDeX mission, including:

- **Bharatiya Docking System** – India's indigenous docking mechanism.
- A **suite of four rendezvous and docking sensors** for visual and laser-based tracking.
- **Autonomous algorithms** for navigation and decision-making.
- **Inter-Satellite Communication Link (ISL)** – for constant, intelligent interaction between the satellites.

- **GNSS-based Relative Navigation** to ensure precision during maneuvering.
- **Simulation test beds** for comprehensive hardware and software validation before launch.

Relevance to Future Indian Space Missions

The technologies tested and validated under SpaDeX are essential building blocks for **India's next generation of space missions**, including:

- **Gaganyaan Human Spaceflight Program** – Enabling astronaut transfer between vehicles or to a space station.
- **Chandrayaan-4 Lunar Mission** – Aimed at **sample return**, requiring autonomous docking and return modules.
- **Bharatiya Antariksh Station (BAS)** – India's planned indigenous space station in 2028
- **On-orbit satellite servicing** – To refuel, repair, or upgrade satellites already in orbit.
- **In-space robotics and modular spacecraft** – For large-scale space operations and exploration.

Strategic and Global Impact

The SpaDeX mission enhances **India's strategic space capabilities** by:

- Establishing **autonomous docking**, which is vital for manned and long-duration missions.
- Reducing dependence on foreign technologies in space operations.
- Placing India among the **elite nations** with such capabilities, boosting its global stature in space technology.

This mission also opens avenues for **international collaboration**, especially in joint space station projects and interplanetary missions requiring modular assembly.

Conclusion

The SpaDeX mission is a **landmark in India's space journey**, demonstrating the nation's ability to carry out **complex in-orbit operations** with indigenous technologies. It lays a robust foundation for **India's future space ambitions**, from sending astronauts to the Moon to building its own **space station**. SpaDeX is a clear testament to ISRO's innovation, precision engineering, and strategic vision, marking a pivotal leap forward for India's global leadership in space exploration.

River Blindness (Onchocerciasis): ZSI Study on Blackflies



Why in News?

- A **Zoological Survey of India (ZSI)** study has used **DNA barcoding** to identify blackfly species responsible for spreading **Onchocerca volvulus**, the parasite causing river blindness.
- Research covered **four species** from **eight locations** in the **central Himalayan region**.
- The technique is expected to improve **vector control** and disease management in vulnerable ecological areas.

What is River Blindness (Onchocerciasis)?

- A **neglected tropical disease (NTD)** caused by the parasitic worm **Onchocerca volvulus**.
- Transmitted through the **bite of infected blackflies** (genus **Simulium**), which breed near **fast-flowing rivers and streams**.

Key Symptoms:

- Severe **skin itching**
- **Disfiguring skin changes**
- **Permanent vision loss or blindness** in advanced cases

Global Impact:

- **Second leading infectious cause of blindness** after trachoma.
- Primarily affects **rural populations** in **sub-Saharan Africa, Yemen, and Latin America**.

Control Measures:

- **Mass drug administration (MDA)** of **ivermectin**
- **At least 80% therapeutic coverage** needed for control
- Designated as a major NTD by **WHO**

Countries Declared Free by WHO:

- **Colombia (2013)**
- **Ecuador (2014)**
- **Mexico (2015)**
- **Guatemala (2016)**
- **Niger (2025)** – *First African country to be declared free*



Ecology & Environment

Fluoride Contamination



1. Excessive Fluoride in Uttar Pradesh:

- The Uttar Pradesh Jal Nigam has confirmed the presence of excessive fluoride in 120 hamlets, affecting nearly 2 lakh people.
- Some villages recorded fluoride levels of 2 mg/L or more, which exceeds the safe limit of 1-1.5 mg/L.

2. What is Fluoride?

- Fluoride is a naturally occurring element found in groundwater.
- The national drinking water limit for fluoride is 1.50 mg/L.
- Excessive fluoride consumption can lead to:
 - **Skeletal Fluorosis:** A condition characterized by the accumulation of fluoride in bones and joints, leading to pain and mobility issues.

- Dental Fluorosis: Accelerated dental decay and discoloration of teeth.
- Health Risks: Particularly severe for children, it can cause serious health issues.

3. Other Groundwater Contaminants in India:

- Arsenic Contamination: Predominantly found in West Bengal, Bihar, Jharkhand, and Uttar Pradesh, covering 90% of arsenic contamination cases in India.
- Uranium Contamination: Present in 12 states, including Punjab.
- Iron Contamination: Severe in states like Rajasthan, Jharkhand, and Assam.
- Other Contaminants: Elements such as antimony, cadmium, copper, and barium pose risks, leading to toxicity, hypertension, and liver and kidney damage.

4. States with High Fluoride Contamination:

- Rajasthan: Has the highest fluoride contamination in India.
- Other Affected States: Telangana, western Andhra Pradesh, and eastern Karnataka.
- Seasonal Variations: Fluoride levels tend to spike during the dry, summer pre-monsoon months, with arid regions in western India showing higher contamination levels compared to humid areas.

Conclusion:

The issue of excessive fluoride in groundwater, particularly in Uttar Pradesh, underscores the urgent need for comprehensive water quality management and public health measures. Addressing this issue requires a multi-faceted approach involving government bodies, scientific research, and community awareness.

Binturong



1. Recent Sighting:

- A rare Binturong was recently captured on a camera trap set up by the Wildlife Trust of India's Garo Green Spine project team in the Narang Wari Village Reserve Forest (VRF), located in the buffer zone of Balpakram National Park.

2. About Binturong:

- Scientific Name: *Arctictis binturong*
- Common Name: Bearcat
- Family: Civet family (Viverridae)
- Description: The largest civet in India, with a head and body length of about 60–95 cm and a tail of 55–90 cm. It weighs between 9 to 14 kg (20 to 31 pounds).
- Features: Long, shaggy hair, tufted ears, and a long, bushy, prehensile tail. The color is generally black with a sprinkling of whitish hairs.
- Behavior: Primarily nocturnal and crepuscular, it is most often found in trees, using its prehensile tail for climbing. It has scent glands under its tail used to mark territory.

3. Distribution:

- Found in dense forests of Southeast Asia.

- Range extends from Nepal, India, and Bhutan southward to the Indonesian islands of Sumatra and Java and eastward to Borneo.

4. Conservation Status:

- IUCN Red List: **Vulnerable**
- Wildlife Protection Act of 1972: **Schedule I**
- CITES: **Appendix III**

5. Balpakram National Park:

- Location: Situated in the West Garo Hills district of Meghalaya, about 134 km from Shillong.
- Nickname: “Land of Perpetual Winds” due to strong winds.
- Geography: Close to the international boundary of Bangladesh, at an altitude of nearly 3,000 ft. above sea level, covering more than 200 sq. km.
- Features: A deep gorge often compared to the Grand Canyon.
- Cultural Significance: According to the Garos, a local tribe, South Garo Hills is believed to be the final resting place of dead spirits.
- Flora: Rare species like Pitcher Plants (*Nepenthes Khasiana*), Orchids, and *Drosera*.
- Fauna: Flagship species include Elephants and Tigers. Other notable animals are Hillock Gibbons (the only ape species in India), Deer, Great Indian Hornbill, Pheasant, Wildcats, Wildcows, Wild buffalo, and Leopards.

Conclusion:

The sighting of a rare Binturong in Balpakram National Park highlights the rich biodiversity of the region. The park’s unique ecosystem, with its diverse flora and fauna, underscores the importance of conservation efforts to protect endangered species like the Binturong and maintain the ecological balance.

Star-Rating System for State Environmental Bodies



1. Introduction of Star-Rating System:

- Event: The Ministry of Environment, Forest and Climate Change (MoEF&CC) introduced a star-rating system for State Environmental Impact Assessment Authorities (SEIAAs) on January 17, 2022.
- Purpose: To evaluate the efficiency of SEIAAs in granting clearances for industrial and infrastructure projects.
- Rating Scale: Star ratings ranged from 0 to 7, with higher ratings indicating:
 - Faster approval times.
 - Stricter adherence to timelines set out in the 2006 Environment Impact Assessment (EIA) Notification.

2. Objective and Purpose:

- Promoting Ease of Doing Business: Streamline the environmental clearance process to foster a more business-friendly environment while maintaining regulatory standards.
- Incentivizing States: Recognize and incentivize states that adhere to timelines and regulatory standards, encouraging expedited clearance processes without compromising environmental protection.

3. Challenges and Legal Dispute:

- Opposition: Significant opposition from environmental advocacy groups.
- **Concerns Raised by Tamil Nadu Fishermen's Association:**
 - Argued that the star-rating system could compromise the scrutiny of environmental clearances.
 - Focused on the risk of speeding up the clearance process diluting thorough assessment.
 - Highlighted the potential weakening of environmental safeguards essential for protecting ecosystems, biodiversity, and community livelihoods.
- **Legal Challenge:**
 - National Green Tribunal (NGT) intervened and issued an order noting that the MoEF&CC had effectively "given up" on the system.
 - Ministry withdrew the original Office Memorandum (OM) dated January 17, 2022.
 - Possibility of issuing a revised memorandum in the future.

Conclusion :

The MoEF&CC introduced a star-rating system to assess the efficiency of SEIAAs in granting environmental clearances. The system aimed to promote ease of doing business while maintaining regulatory standards. However, it faced significant opposition from environmental advocacy groups, particularly the Tamil Nadu Fishermen's Association, who feared it would compromise environmental safeguards. The NGT intervened, leading to the withdrawal of the original memorandum, with the possibility of a revised version in the future.

Massive Fire in Mukundra Hills Tiger Reserve



Why in News:

A massive fire, triggered by stone-crushing sparks, erupted in Mukundra Tiger Reserve recently.

Key Points:

- Location: Situated near Kota in southeastern Rajasthan.
- Geography: Named after two continuous flat-topped, almost parallel hills with narrow central ridges.
- Range: Part of the Vindhyan range.
- Extent: Extends from the Chambal River to Kalisindh.
- Length: Almost 80 km.
- Width: Ranging from 2 to 5 km.
- Establishment: Constituted in the year 2013.
- Areas Covered: Encompasses Mukundra National Park, Dara Sanctuary, Jawahar Sagar Sanctuary, and part of Chambal Sanctuary (from Garadia Mahadev to Jawahar Sagar Dam).
- Core Habitat: Forms the core/critical tiger habitat.
- History: Once a hunting preserve belonging to the Maharaja of Kota.
- Rivers: Traversed by four rivers: Chambal, Kali, Ahu, and Ramzan.
- Vegetation: Dry Deciduous Forest.
- Dominant Flora: *Anogeissus pendula* (Kala Dhok or Kaladhi) is the predominant species.
- Other Flora: Includes Khair (*Acacia catechu*), Ber (*Zizyphus mauritiana*), Kakan (*Flacourtia indica*), Raunj (*Acacia lecofolia*), etc.
- Important Fauna: Includes Leopard, Sloth bear, Nilgai, Chinkara, Spotted Deer, Small Indian Civet, Toddy Cat, Jackal, Hyena, Jungle Cat, Common Langur, etc.

Long-snouted Vine Snake (*Ahaetulla longirostris*) Rediscovery



Why in News

- Rare **Long-snouted Vine Snake** rediscovered during a rhino release in **Palia Kheri Division** of Dudhwa Tiger Reserve.
- **First recorded sighting in Uttar Pradesh, second in India** (after Valmiki Tiger Reserve, Bihar).

About the Snake:

- **Family:** Colubridae (mostly non-venomous snakes)
- **Distinctive Features:**
 - Long, slender body (green/brown for camouflage)
 - **Elongated snout** (rostral extension)
 - **Arboreal**, lives on trees
 - **Mildly venomous**, not dangerous to humans
- **Natural Range:** Mostly Southeast Asia; rare in India

About Dudhwa Tiger Reserve (U.P.) :

- Location: Indo-Nepal border, Lakhimpur Kheri District
- Constituents:
 - Dudhwa National Park
 - Kishanpur Wildlife Sanctuary
 - Katarniaghat Wildlife Sanctuary
 - Forest divisions: North Kheri, South Kheri, Shahjahanpur
- Biogeographic Zone: Tarai-Bhabar zone, Upper Gangetic Plains
- Major Rivers:
 - **Sharda, Geruwa, Suheli, Mohana** (All are tributaries of the Ghaghara River)
- Vegetation: North Indian Moist Deciduous Forests
- **Dominant: Sal (*Shorea robusta*)**

- **Others:** Terminalia alata (Asna), Lagerstroemia parviflora (Asidha), Adina cordifolia (Haldu), Mitragyna parviflora (Faldu), Gmelina arborea (Ghamhar), Holoptelea integrifolia (Kanju)
- Fauna:
 - **Mammals:** Tiger, Leopard, Fishing cat, Langur, Civet, Mongoose
 - **Birds:** Dabchick, Spot-billed Pelican, Grey Heron, White and Black Stork, White Ibis
 - **Reptiles:** Gharial, Mugger crocodile, Python, Banded krait, Russell's viper, Sand boa, Rat snake

Balukhand-Konark Wildlife

Sanctuary : Vegetation Decline Report

Photo: TOI

BALUKHAND STATUS

- **Sandy areas**, which peaked in 2013, have now **shrunk**, indicating either **vegetation recovery** or **erosion control efforts**
- **Water bodies** showed **minor fluctuations** in the area
- **Sparse vegetation** remains the most **dominant feature**, suggesting **slow ecological resilience** but also exposure to further degradation

WHAT CAN BE DONE?

- Integrating **satellite data** with **AI models** can guide conservation strategies. This can enable

authorities to plan for **erosion hotspots**, **monitor post-disaster recovery** and implement **early warning systems**. **Real-time geospatial monitoring** using **high-resolution satellite data** is also essential

- Collaboration between **govts, scientists** and **local communities** is crucial for effective policy and action

Why in News?

- A recent study reported a **decline in dense vegetation** in Balukhand-Konark Wildlife Sanctuary.
- **Vegetation cover shrank from 41.8% in 1993 to 37.1% in 2023**, indicating potential ecological stress in the region.

About Balukhand-Konark Wildlife Sanctuary

Feature	Details
Location	Puri district, Odisha, along the coast between Puri and Konark
Declared as Sanctuary	23 April 1984
Area	87 sq.km
Terrain	Sandy tract with casuarina and cashew plantations
Water Bodies	Traversed by Nuanai, Kusabhadra, Kadua , and Prachi Rivers

Flora

- Casuarina, cashew, **Australian acacia, eucalyptus**
- Along riverbanks: **Jamun, ficus, neem, karanj, polang**

Fauna

- **Spotted deer, blackbucks, monkeys, jungle cats, hyenas, monitor lizards, snakes**
- **Olive Ridley sea turtles** observed nesting on the sanctuary's beach

Bioluminescent Backwaters



Why in News?

Bioluminescent blue waves were recently spotted in the **backwaters of Kochi, Kerala**, drawing tourists but sparking concerns over **ecological health**.

What is Bioluminescence?

- **Definition:** Natural light emission by organisms like **algae, fungi, and bacteria**
- **Key Organism:** *Noctiluca scintillans* (a dinoflagellate), commonly known as “**sea sparkle**”
- **Appearance:** Blue glow, sometimes red/brown depending on bloom density
- **Trigger:** Mechanical disturbances in water (e.g., waves, movement)
- **Seasonality:** Common from **March to May** (locally called “**Kavaru**” in Malayalam)

Scientific Background

- **Main Cause:** **Eutrophication** due to nutrient-rich waste (nitrates/phosphates) from **sewage and industrial discharge**
- **Favourable Conditions:**
 - o Salinity: 30–35 ppt
 - o High water temperature
 - o Reduced rainfall

- **When blooms exceed 500,000 organisms/litre**, they cause **red tides**—toxic algal outbreaks

Impacts

1. Ecological

- **Harmful Algal Blooms (HABs)** lead to **oxygen depletion (hypoxia)**
- Result: **Mass fish deaths**, biodiversity loss
- Release of substances like **ammonium, dimethyl sulphide**

2. Economic

- Fish migrate away '!' **Loss of income** for fishing communities
- Threat to **aquaculture operations**
- **Toxins** like **domoic acid** can cause **shellfish poisoning** in humans

IUCN Releases First Green Status Assessment for the Lion (Panthera Leo)



1. The **International Union for Conservation of Nature (IUCN)** recently released its **first Green Status Assessment** for the lion (*Panthera leo*).
2. The lion has been categorized as “**Largely Depleted**”. It is showing ecological degradation across much of its historic range.

About the IUCN Green Status of Species

Aspect	Description
Purpose	Measures species recovery and the impact of conservation efforts. Complements the Red List by focusing on restoration and ecological function.
Background	Proposed by IUCN at the 2012 World Conservation Congress as part of broader “Green Lists” (for species, ecosystems, protected areas).
Launched	Conceptualized in 2021; officially integrated into the IUCN Red List in 2020.
Difference from Red List	Red List = Focus on extinction risk. Green Status = Focus on species recovery and conservation success.
Recovery Definition	A species is fully recovered if it: <ol style="list-style-type: none"> • Occupies all of its historical range • Is viable across that range • Performs its ecological role
Green Score	Percentage (0–100%) showing how close a species is to full recovery.
Green Status Categories (9)	<ol style="list-style-type: none"> 1. Fully Recovered 2. Non-Depleted 3. Slightly Depleted 4. Moderately Depleted 5. Largely Depleted 6. Critically Depleted 7. Extinct in the Wild 8. Indeterminate
Current Status (2025)	Over 100 species have Green Status assessments on the IUCN Red List.
Importance	Highlights conservation progress, identifies recovery needs, and informs future actions—even for species not at immediate extinction risk.

Key Findings of the Green Status Assessment

1. Despite being classified as “**Vulnerable**” on the **IUCN Red List**, the lion is considered “**Largely Depleted**” under the Green Status.
2. **Major cause:** Human activities have **prevented lions from fulfilling their ecological roles**, especially in regions where they were historically widespread.
3. The lion is now **extinct** from **North Africa & Southwestern Asia**.
4. Conservation actions have **prevented extinctions** in key areas like:
 - a. **West & Southern Central Africa**
 - b. **South Africa**
 - c. **India (Gujarat)**
5. Despite conservation efforts, lions are still **vulnerable** due to increasing **human settlements** across their habitats.
6. **Concerns:**
 - a. Rapid **human settlement expansion** is threatening remaining lion populations.
 - b. Need for **intensified conservation measures** to sustain and restore the species.

Lion Subspecies & Classification

1. Previously, lions were divided into 2 subspecies:
 - a. **African Lion (*Panthera leo leo*)**
 - b. **Asiatic Lion (*Panthera leo persica*)**



- Male Asiatic Lions have a shorter and thinner mane (fur around face) compared to African Lions.
- Asiatic Lions have a unique fold of skin on their belly that African lions usually lack.
- Male Asiatic Lions weigh approximately 160 to 190kg, while females weigh around 110 to 120kg.
- The shoulder height of an Asiatic Lion is about 110cm.


The current classification by the IUCN SSC Cat Specialist Group:

1. **Panthera leo leo**
 - a. Found in **West and Central Africa**, and **Asia (India)**.
 - b. Includes the **Asiatic Lion (Panthera leo persica)**.
2. **Panthera leo melanochaita**
 - a. Found in **East and Southern Africa**.
 - b. Recognized since 2017 as a distinct subspecies (Southern Lion).

Population Estimates

1. **African Lions:** ~23,000 adult & subadult individuals.
2. **Asiatic Lions:** ~670 adult & subadult individuals, limited to **Gujarat, India**.

Asiatic Lion – Key Points for India

Feature	Details
Scientific Name	<i>Panthera leo persica</i>
Distribution	<p>Gir National Park, Gujarat (only wild population)</p> 
Protection Status	<p>- Schedule I of Wildlife Protection Act, 1972</p> <p>- Appendix I of CITES</p> <p>- It was an Endangered on the IUCN Red List. But the IUCN has revised the Asiatic lion status to vulnerable in 2024</p>
Habitat	Dry deciduous forest, scrubland
Unique Traits	Longitudinal skin fold on belly (not seen in African lions)
Historical Significance	Once spread across West Asia and North India

African Lion – Key Points

1. Found across **savannas, shrublands, and semi-arid deserts** of Africa.
2. **Described by Linnaeus** in 1758 (*Systema Naturae*).

3. Genetic divergence:
 - a. **North and West African lions** split from **East and Southern African lions** ~180,000 years ago due to climatic forest barriers.

Background: Barda Dungar Sanctuary is the 2nd habitat of the Asiatic lion.

1. **Asiatic lions are found only in Gir Forest & other protected areas in Gujarat Saurashtra region.**
2. **The Barda Wildlife Sanctuary was once home to Asiatic lions.**
3. **But they vanished from the forest 143 years ago.**
4. **In January 2023 A male Asiatic lion naturally recolonized the Barda Wildlife Sanctuary.**
5. **So it is the return of Asiatic lions to the area after a long time.**
6. **Since then 5 other lions have also shifted their territory from Gir to Barda.**

About Barda Wildlife Sanctuary:

1. Barda Wildlife Sanctuary is situated in Gujarat.
2. It shows 2 rivers the **Bileshvary River & the Joghri River** along with 2 dams **Khambala & Fodara**.
3. Ethnic groups like the **Maldharis, Bharvads, Rabaris, & Gadhvis** live in this area.
4. **In 1979, the state government launched the Gir Barda Project to make Barda a 2nd home for the Asiatic lion.**

Sillahalla Pumped Storage Hydroelectric Project



Why in News?

In **April 2025**, opposition to the **Sillahalla Pumped Storage Hydroelectric Project** in the **Nilgiris** intensified. **Local farmers, tribal groups**, and **environmentalists** staged **protests** and submitted **petitions** to the **Tamil Nadu government**.

About Sillahalla Pumped Storage Hydroelectric Project

- **Proposed by:** Tamil Nadu Green Energy Corporation Limited (**TNGECL**)
- **Location:** Nilgiris district, Tamil Nadu, in the **Kundah region**, near the **Silent Valley** and **Mukurthi National Parks**.
- **Purpose:** To generate **1,000 MW** of electricity to meet **peak power demand** and support **renewable energy integration** in the state.

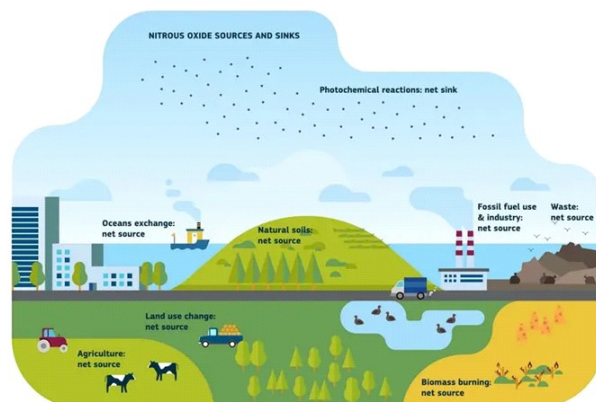
Project Features

- **Dams:** Construction of two dams (upper and lower reservoirs).
- **Tunnels:** 2.8 km head race tunnel and 1.56 km tail race tunnel.
- **Powerhouse:** Underground powerhouse and surface storage points.

Environmental & Social Concerns

1. **Land Submergence:**
 - o Around **1,000 acres** of farmland and **500 acres** of forest land may be submerged.
 - o Approximately **3,000 farmers** will be affected.
2. **Joint Pattas Issue:**
 - o Many of the affected lands are under **joint patta**, making it difficult for farmers to claim proper compensation.
 - o People who have given land for road projects in the district have yet to receive compensation.
3. **Public Response:**
 - o Local communities have raised **concerns over environmental impacts** and **loss of livelihoods**, particularly among farmers and tribal groups.

Nitrogen



Why in News

India, the world's **second-largest emitter** of **N₂O** (Nitrous Oxide) after **China**, faces **climate risks** as **N₂O** has **300 times the global warming potential** of **CO₂**.

Key Point

- **Nitrogen in the Atmosphere**
 - o **Nitrogen** is the most abundant gas in the Earth's atmosphere, making up around **78%** of it.
- **Role of Nitrogen**
 - o Nitrogen is crucial for the formation of:
 - * **DNA and proteins**,
 - * **ATP** (the cellular energy currency),
 - * **Chlorophyll**,
 - * **Neurotransmitters** (via **nitric oxide, NO**).
- **Nitrogen Cycle**
 - o The **natural nitrogen cycle** is essential for maintaining balance in ecosystems.
 - * **Atmospheric nitrogen (N₂)** is inert and unusable by plants or animals.
 - * Plants depend on **diazotrophs** (nitrogen-fixing bacteria) for nitrogen fixation, especially in legumes.

- * **Nitrifying bacteria** convert ammonia into nitrites (NO_2^-) and then into nitrates (NO_3^-), which plants can absorb.
- * **Denitrification** returns excess nitrates to the atmosphere, completing the cycle.
- **Haber-Bosch Process**
 - o Developed in the early **20th century**, the **Haber-Bosch process** enabled industrial nitrogen fixation to produce **ammonia**.
 - o It uses **fossil fuels**, high **heat** and **pressure**, and an **iron catalyst**.
 - o This process led to the **synthetic fertilizer revolution**, supporting the **Green Revolution** and fueling **population growth**.
- **Environmental Risks of Excess Nitrogen**
 - o The overproduction of **reactive nitrogen** (ammonia, nitrate, nitrous oxide) through chemical fertilizers has serious environmental consequences.
 - o **80%** of applied nitrogen is lost to the environment, causing:
 - * **Eutrophication** of water bodies, leading to **algal blooms** and **dead zones** (e.g., **Gulf of Mexico**).
 - * **Soil acidification** and **air pollution** from **NO_x** emissions.
 - * **Ground-level ozone** and **acid rain** formation.
- **Global Warming Potential of Nitrous Oxide (N_2O)**
 - o **N_2O** is the **third most potent greenhouse gas** after **CO_2** and **CH_4** and has **300 times the global warming potential** of **CO_2** .

National Environmental Engineering Research Institute (NEERI)



Why in News

The **Supreme Court of India** recently directed the **National Environmental Engineering Research Institute (NEERI)** to assess the impact of nearby **glass industries** on the **Taj Mahal** in **Agra**, **Uttar Pradesh**.

Key Points

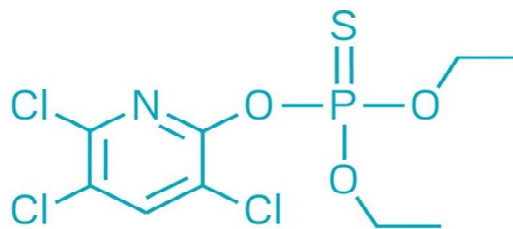
- **About NEERI**
 - o **CSIR-NEERI** stands for **Council of Scientific and Industrial Research - National Environmental Engineering Research Institute**.
 - o **Established:** 1958 in **Nagpur**, **Maharashtra**.
 - o **Funding and Governance:** It is funded and operated by the **Government of India** under the **Ministry of Science and Technology**.
 - o **Role:** NEERI is a premier **research institute** focusing on **environmental management**, **pollution control**, and **sustainable development**.
- **Primary Mission**
 - o NEERI's core objective is to carry out **research and development** in the field of **environmental science and engineering**.
 - o This includes water supply, sewage disposal, waste management, industrial pollution, and the health impacts of environmental issues.

- **Key Areas of Expertise**
 - **Pollution Control:** Studies and solutions for air, water, and soil pollution.
 - **Climate and Environment:** Research on climate change, environmental policies, and standards.
 - **Health:** Research on how environmental factors affect public health.
 - **Technology and Standards:** Development of new technologies for environmental management and setting environmental standards.
- **Zonal Laboratories**
 - NEERI has **five zonal laboratories** in major cities: **Chennai, Delhi, Hyderabad, Kolkata, and Mumbai.**
- **Contribution to Policy and Innovation**
 - The institute contributes to **policy development, monitoring and evaluation, testing** (both lab and field), and **technology R&D** in the field of **environmental protection.**
- **Significance of the Court's Directive**
 - The **Supreme Court** ordered NEERI to assess the **impact of glass industries** on the **Taj Mahal**, which is a UNESCO World Heritage site.
 - This highlights NEERI's critical role in **environmental conservation** and **heritage protection** in India.

Importance of NEERI

NEERI plays a pivotal role in **environmental research** and **sustainable development** in India. Its expertise contributes significantly to the formulation of **policies** that help combat **pollution** and promote **environmental health** across various sectors. The Supreme Court's involvement further underscores its importance in **environmental justice** and **conservation.**

Chlorpyrifos



Chlorpyrifos

Why in News

The **2025 COPs (Conferences of the Parties)** of the **Basel, Rotterdam, and Stockholm Conventions** are being held in **Geneva** from **April 28 to May 9**, focusing on hazardous chemicals like **chlorpyrifos.**

Key Points

- **About Chlorpyrifos**
 - **Classification:** Chlorpyrifos is a **pesticide** classified as '**moderately hazardous**' by the **World Health Organization (WHO).**
 - **Approval in India:** Despite being banned in over **40 countries**, chlorpyrifos remains approved for use in India on **18 crops.**
 - **Health Risks:** It is linked to severe health issues, including:
 - * **Neurotoxicity** (damage to the nervous system)
 - * **Reproductive toxicity**
 - * **Irreversible brain damage** in unborn children
 - * The ability to **contaminate distant ecosystems** due to its **mobility** in the environment.
- **Global and National Advocacy**
 - **Pesticide Action Network (PAN) India:**
 - * **Advocacy for Regulation:** PAN India is advocating for placing chlorpyrifos under **Annex III of the Rotterdam Convention**, requiring **prior informed consent** before trade.
 - * **Global Ban Request:** It also calls for its inclusion under

Annex A of the Stockholm Convention, which demands a **global ban**. However, exemptions are often allowed.

- * **Feasibility of Ban:** PAN India emphasizes that **safer alternatives** are available, making a complete ban both **feasible** and **necessary**.
- o **Unauthorised Use in India:** A 2022 report revealed the **illegal use** of chlorpyrifos and other agrochemicals like **paraquat**, raising concerns over **regulatory and enforcement** issues.
- **What is CIBRC?**
 - o **CIBRC** stands for the **Central Insecticides Board & Registration Committee**. It operates under the **Department of Agriculture & Farmers Welfare**, Ministry of Agriculture & Farmers Welfare.
 - o **Establishment:** It was established in **1970** to regulate insecticides in India and minimize risks to human health, animal safety, and the environment.
 - o **Legal Backing:** CIBRC operates under the **Insecticides Act, 1968**, which governs the import, manufacture, sale, transport, and use of insecticides in India, with the statutory framework coming into effect on **1st August 1971**.

Nilgiri Tahr



Why in News

The **second annual synchronised estimation** of **Nilgiri Tahr** in **Tamil Nadu** and **Kerala** began recently. This year's survey will cover **36 new blocks** in addition to the **140 blocks** surveyed last year.

Key Points

- **About Nilgiri Tahr**
 - o The **Nilgiri Tahr** (*Nilgiritragus hylocrius*) is an **endangered** mountain ungulate endemic to the **southern part of the Western Ghats**.
 - o It is also known as **Nilgiri Ibex** or simply **Ibex**. Locally, it is called '**Varayaadu**'.
 - o The Nilgiri Tahr is the only **mountain ungulate** in southern India and serves as the **state animal** of **Tamil Nadu**.
- **Habitat and Distribution**
 - o The species is found in a **roughly 400 km stretch** in the **Western Ghats**, across **Kerala** and **Tamil Nadu**.
 - o The tahrs inhabit **open montane grasslands** at **elevations ranging from 1200 to 2600 m**, in the southwestern **ghats montane rain forests ecoregion**. These grasslands are interspersed with pockets of **stunted forests** called '**sholas**.'
 - o **Eravikulam National Park** (Kerala) hosts the **highest density** and the **largest surviving population** of Nilgiri Tahr.
- **Physical Features**
 - o Nilgiri Tahrs are **stocky goats** with **short, coarse fur** and a **bristly mane**.
 - o Males are **larger** than females and have **darker color** when mature. Both sexes have **curved horns**, which are larger in males.
 - o Adult males develop a **light grey 'saddle'** on their backs, hence are called '**saddlebacks**'.
 - o Females and immature males have **yellowish-brown to grey** coats, with **paler underparts**.
- **Conservation Status**
 - o **IUCN Red List: Endangered**
 - o Listed under **Schedule I** of the **Wildlife (Protection) Act, 1972**.

What is United Nations High Seas Treaty?



Why in the News?

- The United Nations High Seas Treaty is in the news because, two years after its adoption, countries have gathered for the first session of the Preparatory Commission meeting in New York.
- The aim is to set the rules for implementing the agreement and prepare for the first *Conference of Parties (COP1)*.

United Nations High Seas Treaty (BBNJ)

The United Nations High Seas Treaty, also known as the *Biodiversity Beyond National Jurisdiction (BBNJ)* Agreement, is the first-ever international agreement to protect the oceans that lie outside the boundaries of any country.

Key Points:

1. Purpose:

- o The treaty aims to protect marine life in international waters and ensure sustainable use of ocean resources. It's often called the 'Paris Agreement for the Ocean'.
- o It works under the *United Nations Convention on the Law of the Sea (UNCLOS)*.

2. Main Features:

- o **Marine Protected Areas (MPAs):** The treaty targets protecting 30% of the world's seas by 2030.
- o **Sustainable Use:** It provides a legal framework for using ocean resources responsibly, including preventing harm from activities like deep-sea mining.
- o **Environmental Assessments:** It mandates that environmental impacts of commercial activities must be evaluated.
- o **International Cooperation:** Countries must work together to share ocean resources fairly and prevent exploitation.
- o **Marine Biodiversity:** The treaty focuses on conserving marine ecosystems and biological diversity.

3. Important Details:

- o **75 Articles:** The treaty has 75 articles to manage and protect marine environments.
- o **Legal Framework:** It ensures fair sharing of ocean resources, preventing any country from claiming sovereignty over high seas resources.
- o **Commitments:** Countries pledged to protect marine life, share scientific knowledge, and minimize harm to the ocean.

4. High Seas:

- o High seas start where national waters (exclusive economic zones) end, beyond 200 nautical miles from the coast.
- o These areas cover over 60% of the Earth's oceans and are often unregulated, leaving them open to misuse.

5. Ratification:

- o The treaty will take effect 120 days after 60 countries officially ratify it.

This treaty plays a key role in safeguarding our oceans and supports several United Nations Sustainable Development Goals, especially Goal 14, *Life Below Water*.

Critical Tiger Habitat (CTH)

Critical Tiger Habitat CWH



Why in News

- The Critical Tiger Habitat (CTH) of **Sariska Tiger Reserve (STR)** in Rajasthan is expected to expand by approximately **4,500 hectares**. This expansion follows a **rationalisation exercise mandated by the Central Empowered Committee (CEC)** of the Supreme Court of India.

What is a Critical Tiger Habitat (CTH)?

- Critical Tiger Habitat (CTH), also referred to as **core areas** of tiger reserves, are areas identified under **Section 38V of the Wild Life Protection Act (WLPA), 1972**.
- These areas are designated based on scientific evidence that they must be kept **inviolable**, meaning **free from human interference**, in order to ensure effective tiger conservation.
- CTHs are notified by the **respective State Governments**, but only **in consultation with an expert committee**.
- The process must ensure that the rights of **Scheduled Tribes and other traditional forest dwellers** are not adversely affected.
- The **buffer zones** surrounding the CTH are designated as transition areas, where limited human activity is permitted to support conservation goals and local livelihoods.

Key Characteristics of CTHs

- Identified under the **Wild Life (Protection) Act, 1972**
- Must be based on **scientific and ecological assessments**

- Intended to remain **free from human settlement and activity**
- Rights of forest dwellers are to be respected during the declaration process
- Buffer zones** function as protective barriers and transition spaces between core areas and human settlements

About the Central Empowered Committee (CEC)

- The **Central Empowered Committee (CEC)** was established in **2002** by the **Supreme Court of India** and **reconstituted in 2008**.
- Originally created as an **ad hoc watchdog**, it focused on ensuring compliance with environmental laws and addressing grievances related to forest and wildlife conservation.

Recent Developments:

- In **2023**, the Supreme Court transferred the CEC to the **Ministry of Environment, Forest and Climate Change (MoEFCC)**.
- The CEC has now been **institutionalised as a permanent statutory body**, replacing its earlier ad hoc structure.

Composition of the New CEC

- Chairperson:**
 - Must have **25 years' experience** in environmental or administrative fields.
 - Appointed by the **central government** for a **three-year term**, not exceeding **66 years of age**.
 - Must be of a rank not below **Additional Secretary**.
- Member Secretary:**
 - Must be a **serving government officer** of at least the rank of **Deputy Inspector General (DIG) of Forests**.
 - Should have at least **12 years' experience** and expertise in environment, forests, or wildlife.
- Expert Members (3):**
 - One each from the domains of **environment, forests, and wildlife**, with a minimum of **20 years' experience**.

- o All are nominated by the central government for **three-year tenures**.
- **Notably, Non-Governmental Organisations (NGOs)** have been **excluded** from the new structure, which marks a significant change from the earlier format.

Functions of the CEC

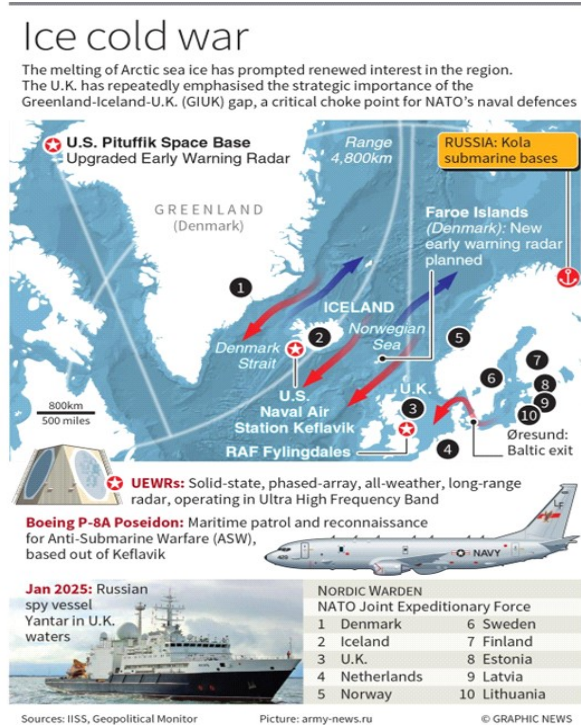
- Monitoring compliance with environmental and forest laws.
- Advising the government and courts on environmental issues.
- Investigating complaints of environmental violations.
- Conducting **site inspections** to assess environmental damage.
- Recommending **remedial and conservation measures**.
- Reporting findings to the **Supreme Court** and other authorities.



Crux of The Hindu & Indian Express

Ecology & Environment

Why Are Tensions High in the Arctic?



Introduction:

- The Arctic, once isolated and difficult to access, is now a center of geopolitical tensions.
- The accelerating melting of ice due to climate change is making it more accessible for exploration.
- This opening creates new opportunities for natural resource extraction, new trade routes, and military positioning.
- The absence of a clear legal framework like Antarctica's Treaty leads to disputes over sovereignty and territorial claims, heightening conflict risks.

Key Factors Driving Tensions

1. Climate Change Impact

- **Melting Ice:** Rapid ice melting is opening up new areas that were previously blocked by sea ice, allowing access to previously inaccessible regions.
- **New Opportunities:**
 - o **Resources:** Countries are eyeing Arctic resources like fossil fuels, rare earth elements, copper, and untouched fishing grounds.
 - o **Trade Routes:** The emerging shipping routes through the Arctic are reducing travel time between Europe and Asia, providing a major advantage for global trade.

2. Legal Frameworks and Governance :

- **UNCLOS (United Nations Convention on the Law of the Sea):** The Arctic is governed by UNCLOS, which allows countries to claim rights over areas within their Exclusive Economic Zones (EEZs) and beyond, if they can prove natural prolongation of their continental shelf.
- **Claims Extension:** Countries such as Canada, Denmark, and Russia are submitting overlapping claims to the Arctic seabed, which are being reviewed by the UN Commission on the Limits of the Continental Shelf (CLCS).

- **Freedom of Navigation:** The waters between the Arctic territories are classified as international waters, leading to disputes over which countries have the right to control them.

3. Control Over Arctic Territory :

- **Arctic Council:** This is an intergovernmental forum made up of eight countries that have sovereignty over parts of the Arctic land. However, territorial disputes arise over the waters and seabed.
 - **Members:** Canada, Denmark (via Greenland), Finland, Iceland, Norway, Russia, Sweden, and the United States.
- **Exclusive Economic Zones (EEZs):** While each country has sovereignty over its own EEZ, disputes occur when countries attempt to extend their claims beyond 200 nautical miles to claim more of the Arctic seabed.

4. Military and Infrastructure :

- **Russian Military Presence:** Russia has the largest infrastructure in the Arctic, including a fleet of nuclear-powered icebreakers, making it the dominant military and logistical power in the region.
- **Arctic Ports:** Russia has been developing key ports like Murmansk to solidify its military presence and strengthen trade routes.

Key Players and Interests :

1. Russia

- **Territorial Claims:** Russia has made extensive claims to the Arctic seabed, including the Lomonosov Ridge, a subsea mountain range under the Arctic Ocean.
- **Military Build-Up:** Russia has greatly increased its military presence, building new bases, holding large military exercises, and expanding its fleet of icebreakers.

- **Strategic Importance:** Russia sees the Arctic as crucial for its national security and access to valuable natural resources, especially amid Western sanctions following the Ukraine conflict.

2. United States

- **Greenland's Importance:** Greenland is strategically valuable for its location and for hosting the U.S. Pituffik military base, a key asset in Arctic defense.
- **Northwest Passage Dispute:** The U.S. insists that the Northwest Passage through Canada's Arctic Archipelago is an international waterway, while Canada claims it as internal waters.
- **Military Presence:** The U.S. maintains military bases in Alaska and operates an icebreaking fleet through the Coast Guard, but it lacks the extensive infrastructure that Russia has.

3. Canada

- **Northwest Passage Dispute:** Canada asserts that the Northwest Passage is part of its internal waters, which is contested by the U.S. as an international waterway.
- **Security and Sovereignty:** To assert control over Arctic resources and protect its interests, Canada has strengthened its military presence in the region.

4. Denmark (Greenland)

- **Strategic Position:** Greenland is of strategic value due to its location between North America and Europe and its rich natural resources.
- **Independence Movement:** Greenland has been pushing for more autonomy from Denmark, and Denmark has responded by strengthening security to prevent Russian or Chinese influence in the region.

5. China

- **Arctic Interests:** In 2018, China declared itself a “Near-Arctic State” and began investing in Arctic resources, particularly rare earth minerals.
- **Polar Silk Road:** China is looking to use the Northeast Passage as part of its Belt and Road Initiative, transforming it into a key trade route between Asia and Europe.
- **Icebreaker Development:** China is also building a nuclear-powered icebreaker to access the Arctic and facilitate its growing presence there.

Tensions and Disputes

1. Greenland and U.S.-Denmark Relations

- **Trump’s Offer to Buy Greenland (2019):** U.S. President Trump’s attempt to buy Greenland for national security reasons caused diplomatic tension with Denmark, which rejected the offer.
- **Security Concerns:** Denmark has increased its focus on Greenland’s security to deter external threats, particularly from Russia and China, both of which are expanding their influence in the region.

2. Canada-U.S. Northwest Passage Tensions

- **Sovereignty vs. International Waters:** Canada claims the Northwest Passage as internal waters, giving it control over navigation, while the U.S. views it as international waters, meaning all countries should have access to it.
- This disagreement is becoming more important as the passage is increasingly navigable due to melting ice.

3. Russia vs. NATO Members

- **Svalbard Dispute:** Russia has suggested that Norway’s Arctic island of Svalbard should fall under its control, a claim Norway, a NATO member, strongly rejects.
- **NATO’s Arctic Presence:** After Russia’s actions in Ukraine, NATO has increased its military presence in the Arctic, especially after

Sweden and Finland joined NATO. This has raised fears of military escalation.

- **Strategic Importance:** The Greenland-Iceland-UK (GIUK) gap, located in the Arctic, is critical for NATO’s naval defense against Russian submarines and is a key strategic area.

Geopolitical and Strategic Importance

1. Resource Richness

- **Oil & Gas:** The Arctic region is estimated to hold around 13% of the world’s undiscovered oil and 30% of its untapped natural gas reserves, mainly under the seabed.
- **Minerals:** Greenland, in particular, is rich in rare earth elements that are essential for electronics and green technologies, making it a highly sought-after resource.
- **Fishing:** As the ice melts, the Arctic’s fish stocks are becoming more accessible, leading to competition for fishing rights.

2. New Shipping Routes

- **Northeast Passage:** This route along Russia’s Arctic coast can save up to 8,000 kilometers on shipping trips between East Asia and Europe, greatly reducing transportation costs.
- **Polar Silk Road:** China’s Belt and Road Initiative aims to establish the Northeast Passage as a key global trade route, furthering China’s influence in Arctic geopolitics.

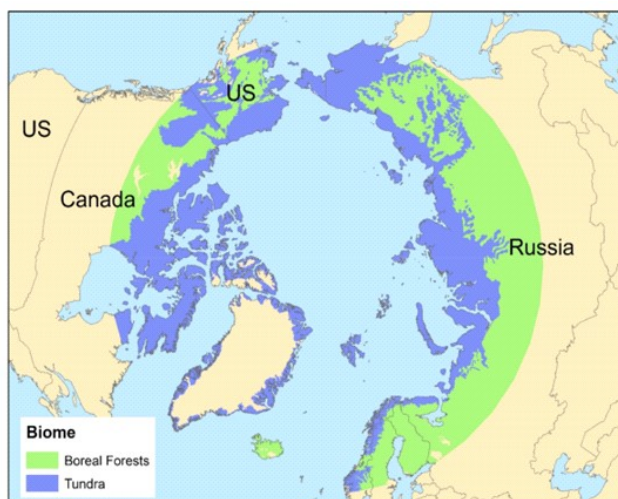
Arctic Biome Rejects More Carbon Amid Rising Global Wildfires

Context:

- According to the **2024 Arctic Report Card** by the **US National Oceanic and Atmospheric Administration (NOAA)** and a study published in *Nature Climate Change (2024)*, parts of the **Arctic Boreal Zone (ABZ)** — once a **major carbon sink** — have now become **net carbon sources**.
- This shift is being driven by:
 - **Frequent and intense wildfires,**
 - **Thawing of permafrost,** and
 - A dangerous **climate feedback loop** that is accelerating global warming.

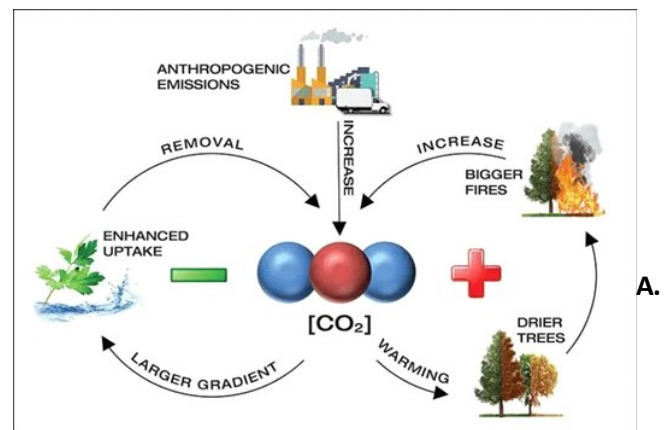
Term	Explanation
Arctic Boreal Zone (ABZ)	Largest land biome, stores huge carbon in vegetation and frozen soil
Carbon Sink	A system that absorbs more carbon than it emits
Carbon Source	A system that emits more carbon than it absorbs
Permafrost	Permanently frozen ground beneath Arctic tundra
Feedback Loop	Self-reinforcing cycle: Warming → Fires → CO ₂ → More warming
Radiative Power	Measure of heat intensity of wildfires
CAMS (Copernicus)	EU's satellite-based atmospheric monitoring service
NOAA	U.S. agency tracking climate, oceans, atmosphere

1. What is the Arctic Boreal Zone (ABZ)?



Attribute	Details
Also Known As	Boreal Forests / Taiga
Geographic Spread	Canada, Alaska (USA), Russia (Siberia), Mongolia, Norway, Sweden, Finland
Biome Type	World's largest terrestrial biome (covers ~1/3rd of Earth's forested area)
Ecosystem Composition	Coniferous forests, Arctic tundra, wetlands, permafrost zones
Climate Role	Acts as a major carbon sink , storing carbon in soil, vegetation, and permafrost layers

2. Why Is the ABZ Becoming a Carbon Source?



Increase in Wildfires

◆ Findings from the *Nature Climate Change* Study:

- Researchers analyzed data from **200 global monitoring sites** (1990–2020).
- Found that since **2001–2020**, over **30%** of the ABZ has **switched from a sink to a source**.

- Fires are **burning carbon-rich vegetation** and soils that once stored CO₂.

◆Region-wise Contribution to Emissions:

Region	% Contribution to Carbon Emissions from ABZ
Alaska	44%
Northern Europe	25%
Siberia (Russia)	13%

- **Non-summer emissions** (Sept–May) now **exceed summer CO₂ absorption** (June–Aug).

B. Thawing of Permafrost

- Permafrost stores **2.5 times more carbon than currently in the atmosphere**.
- Rising Arctic temperatures → **Soil thaws** → Organic matter **decomposes** → Release of **CO₂ and Methane (CH₄)**.
- Contributes to **positive climate feedback** (warming → thawing → more emissions → more warming).

C. Climate Feedback Loop

- Fires → More CO₂ → Global Warming → Drier Conditions → More Fires.
- As **carbon sinks burn**, they **lose their capacity** to regulate climate, worsening the crisis.

3. Global Surge in Wildfires: Recent Trends

A. United States (Jan–Feb 2025)

- **Texas and Oklahoma:**
 - Fires burned **~300 homes**.
- **California:**
 - Fire scorched **16,000 hectares**, destroyed **14,000+ structures**.
 - Claimed **28 lives**, one of **California's most destructive fires**, per Cal Fire.

B. Japan (Feb 26, 2025)

- Wildfire near **Ofunato City**, in mountainous forests.
 - **2,900 hectares** burned.

- **210 buildings** damaged.
- Over **4,200 people** evacuated.
- One of the **largest Japanese wildfires in 50 years**.

C. India (2022–2024)

- **Top Affected States (ISFR 2024):**
 - Uttarakhand: **5,315 fires** (Nov 2022 – Jun 2023)
 - Odisha
 - Chhattisgarh

Fire Hotspot Trend (India State of Forest Report 2024):

Year	Fire Hotspots
2021–22	2.23 lakh
2022–23	2.12 lakh
2023–24	2.03 lakh

Heat & Fire Link:

- Study by **IIT-Kharagpur & IITM, Pune (2023):**
 - **Land temperature increase:**
 - * Pre-monsoon: **0.1–0.3°C/decade**
 - * Post-monsoon: **0.2–0.4°C/decade**
- **Heatwaves:**
 - Arriving earlier.
 - Moving slower.
 - Lasting longer.
 - Leading to **dry spells** and increased fire risk.
- Annual fire emissions in India: **69 million tonnes of CO₂** (Chase India, 2024).

4. Emissions and Satellite Observations

Copernicus Atmosphere Monitoring Service (CAMS), EU:

- Wildfires in **January 2025** alone:
 - Emitted **800,000 tonnes of carbon**.
 - **4x increase** compared to Jan 2015.

- **Radiative Power** (heat output) of fires:
 - Detected by **NASA's Terra & Aqua** satellites.
 - **Exceeded 2003–2024 average by 10 times** (one order of magnitude).

5. Supporting Scientific Reports

Report/Study	Key Findings
Nature Climate Change (2024)	1/3rd of ABZ is now emitting more CO ₂ than it absorbs; the shift began before 1990 ; worsened by Siberia fires (2003) and Canada (2012).
NOAA Arctic Report Card 2024	Arctic is now absorbing pollution and emitting carbon; changes are due to persistent, long-term shifts and not mere climate variability .
CAMS (2025)	January 2025 wildfires set emission records; highlighted global fire intensity trend .

6. Consequences for Climate and Humanity

Global Implications:

- **Loss of natural carbon sinks** will hinder global efforts to meet:
 - **Paris Agreement** goals of limiting global warming to 1.5–2°C.
- **Accelerates global warming**, intensifies **climate disasters**.
- Changes in ABZ will impact:
 - **Global weather patterns**
 - **Biodiversity loss**
 - **Sea level rise** (due to permafrost melt and Arctic warming)

Conclusion

The **Arctic Boreal Zone's transformation** from a carbon sink to a source is a **warning sign**. Combined with rising wildfires in the U.S., Japan, and India, it shows that **climate systems are entering a phase of dangerous instability**.

Blue Washing & CPCB's New Categorisation



1. Context

- The **Central Pollution Control Board (CPCB)** recently introduced a **new category** called the **'Blue Category'** of industries.
- The purpose is to recognize **Essential Environmental Services (EES)** that help to manage pollution caused by human activities.
- However, the inclusion of **Waste-to-Energy (WTE) incinerators** has raised concerns. Because it was previously in the highly polluting **Red Category**.
- Critics argue that this is a case of **"Blue Washing"** — falsely portraying a polluting industry as environmentally friendly.

2. CPCB's Industry Categorisation System

◆Objective:

- Helps in:
 - Location decisions for industries
 - Norms for pollution monitoring and inspection
 - Public health protection
 - Regulation under **Environmental Protection Act, 1986**

◆Pollution Index (PI):

- The **Union Ministry of Environment, Forest and Climate Change (MoEFCC)** introduced a **Pollution Index (PI)** to categorise industries based on pollution levels.
- A scientific measure based on:
 - **Air emissions**
 - **Water effluents**
 - **Hazardous waste**
 - **Resource consumption**

4 Existing Categories:

Category	Pollution Index	Pollution Level	Examples
White	0 – 20	Non-polluting	Chalk, toothpowder, glass toys
Green	21 – 40	Low pollution	Bakery, cotton spinning
Orange	41 – 59	Moderate pollution	Hotels, aluminum utensils
Red	60 – 100	High pollution	Cement, thermal plants, WTE

3. What is the 'Blue Category'?

- Introduced to **classify facilities** providing **Essential Environmental Services (EES)** such as:
 - Composting
 - Biogas production
 - Sewage treatment plants (STPs)
 - Material Recovery Facilities (MRFs)
 - Waste-to-Energy (WTE) incineration
- Benefits of Blue Category:**
 - Less regulatory burden
 - Longer validity** of consent to operate (now 5 years instead of 3)
 - Seen as supporting public services

4. What is Waste-to-Energy (WTE) Incineration?

- A technology where **mixed (unsegregated) municipal solid waste (MSW)** is burned to produce **electricity or heat**.
- Common in urban areas where waste volume is high.

◆Process:

- Mixed waste is collected and incinerated.
- Heat produced converts water into steam.
- Steam runs turbines to generate electricity.

5. Why is the Inclusion of WTE in the Blue Category Controversial?

◆A. Extremely Polluting:

- CPCB's earlier PI value for WTE: **97.6** → firmly in the **Red Category**.

- Releases:
 - SO_x, NO_x, HCl, Dioxins, Furans**
 - Particulate matter (PM 2.5 and PM 10)**
 - Toxic fly ash and bottom ash**

◆B. Higher CO₂ Emissions than Coal:

- WTE plants emit **more CO₂ per unit of electricity** than even coal-based thermal plants.

◆C. Health Hazards:

- Delhi's 3 WTE plants (as per CPCB's own inspection):
 - Released **carcinogenic compounds** above permissible limits.
 - Burned **735,840 tons of plastic** in FY 2022–23 → massive **chlorine and dioxin emissions**.
 - Direct link to **Delhi's poor AQI**.

D. Violates CPCB's Own Guidelines:

- According to CPCB, **Blue Category should include only:**
 - Projects that **do not emit hazardous waste**.
 - Projects that **promote a circular economy**.
- But WTE:
 - Produces hazardous ash
 - Destroys recyclable material**, contradicts **circular economy goals**

E. Expert Opinion (CSIR-NEERI):

- CSIR-NEERI clearly stated: "WTE incineration defeats the purpose of circular economy and violates the **Solid Waste Management Rules, 2016**."

F. Socio-economic Issues:

- Loss of livelihoods for **waste pickers** (as recyclables are burnt).
- Heavy financial burden on **urban local bodies** due to high operating and maintenance costs.
- Poor power generation efficiency and low profitability.

6. What is Blue Washing?

- Adapted from **Greenwashing**.

- **Blue Washing** = Creating a false image of environmental responsibility by **labeling a harmful process as a public service**.
- WTE industries use the “Essential Services” tag to get:
 - **Regulatory relaxation**
 - **Public subsidies**
 - **Approval without scrutiny**

7. Impact on Environment, Policy, and Governance

Short-term:

- Weakens India’s environmental regulations.
- Promotes polluting, centralized waste management models.

Long-term:

- Undermines **SWM Rules, 2016** and **National Circular Economy Framework**.
- Harms India’s commitment to:
 - **Paris Climate Goals**
 - **SDGs** – especially:
 - * **SDG 11** (Sustainable Cities)
 - * **SDG 12** (Responsible Consumption & Production)
 - * **SDG 13** (Climate Action)

8. Way Forward

1. **Remove WTE from Blue Category:** Reclassify back to **Red Category**.
2. **Strengthen enforcement of SWM Rules, 2016:** Ensure **source segregation, composting, and recycling**.
3. **Promote decentralized waste management:** Community composting, MRFs, biogas plants.
4. **Support informal waste workers:** Formal integration, training, safety gear, social security.
5. **Transparency & public participation:**
 - Make pollution data from WTE plants public.
 - Hold public consultations before approving such projects.

India Votes in Favour of the First Global Carbon Tax on Shipping



1. Context and Background

- On **April 11, 2025**, at the **International Maritime Organisation (IMO)** headquarters in **London**, India joined **62 other countries** in voting in favour of the **world’s first global carbon tax** on the shipping industry.
- This decision marks a significant moment in international climate policy as it is the **first time a global carbon pricing mechanism has been imposed on an entire sector**.
- The vote follows a week of intense negotiations and is aimed at **reducing greenhouse gas emissions from the maritime sector**, which currently accounts for **nearly 3% of global emissions**.

2. Details of the Global Carbon Tax on Shipping

Key Features of the Agreement

- The tax will **come into effect in 2028**.
- Ships will be required to either:
 - Shift to **low-emission fuels**, or
 - **Pay a carbon fee** based on their emission levels.
- **Carbon pricing structure:**
 - \$380 per tonne for the most polluting segment of emissions.
 - \$100 per tonne for other emissions exceeding thresholds.
- Revenues from the tax are **ring-fenced exclusively for maritime decarbonisation**.
- The mechanism will be **implemented in stages**, gradually penalising the use of fossil fuels such as **liquefied natural gas (LNG)** and conventional marine fuels.

Projected Impact

- The policy could **generate up to \$40 billion** by 2030.
- Expected to **reduce shipping emissions by approximately 10% by 2030**, though this falls short of the IMO's own **20% reduction target** for the same period.

3. India's Position

- India's decision to **vote in favour of the carbon tax** reflects its growing role in **global climate governance** and its support for **sustainable development** in the transportation sector.
- By aligning with other major developing economies like **China and Brazil**, India demonstrated a willingness to engage in multilateral efforts to combat climate change, while also **balancing developmental concerns**.
- India's vote also positions it as a key stakeholder in the future of **decarbonised global trade**, especially as it expands its **shipping and port infrastructure** under initiatives like **Sagarmala** and **PM Gati Shakti**.

4. Global Support and Opposition

Countries Supporting the Tax (63 in total):

- **India, China, Brazil**, and several EU nations.
- Supported by a coalition of countries aiming for climate progress in maritime sectors.

Countries Opposing or Undermining the Tax:

- **Saudi Arabia, UAE, Russia, Venezuela** – cited economic concerns and reliance on fossil fuel exports.
- The **United States** did not participate in negotiations and was **absent during the vote**, which drew criticism from several quarters.

5. Criticism and Challenges

Despite the historic nature of the agreement, the policy has been met with criticism from **climate-vulnerable countries**, environmental groups, and some negotiators.

Key Concerns:

1. Lack of Climate Finance Allocation:

- o Revenues from the tax will **only be used for maritime decarbonisation**.

- o No funds are allocated for **broader climate finance**, such as adaptation or recovery for vulnerable nations.

2. Insufficient Ambition:

- o The projected **10% emissions reduction by 2030** is considered inadequate.
- o Fails to align with the **1.5°C temperature limit** under the **Paris Agreement**.

3. Equity Concerns:

- o **Pacific and Caribbean island nations**, including **Tuvalu and Vanuatu**, argued that the policy lacks transparency.
- o These countries pushed for a portion of the revenues to be allocated for **loss and damage**, but the demand was rejected.

4. Developing Country Discontent:

- o Countries from **Africa, Central America**, and other climate-vulnerable regions expressed **disappointment** at the outcome.
- o They believe the final agreement does **not promote a meaningful shift to cleaner fuels** for the developing world.

5. Blocked Proposals:

- o According to **Vanuatu's Climate Minister**, fossil fuel-exporting countries, including **the U.S. and Saudi Arabia**, **weakened stronger proposals** that could have advanced the IMO's climate goals.

6. Significance for Global Climate Policy

This carbon tax on shipping is a **landmark policy** because:

- It acknowledges the **"polluter pays" principle** at the international level.
- It introduces **sector-wide pricing** on carbon for the **first time globally**.
- It can serve as a **blueprint for carbon taxes in other hard-to-abate sectors** such as aviation or heavy industry.

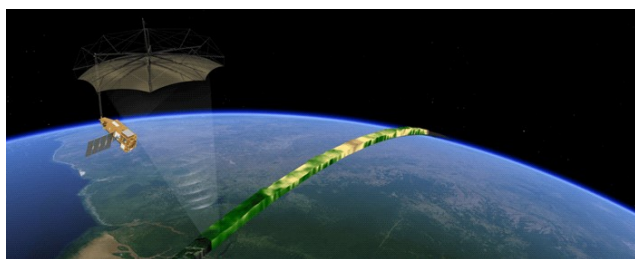
7. Relevance for India

- India's support for the global carbon tax demonstrates its **commitment to climate leadership** and **rules-based multilateralism**.
- As India expands its **blue economy** and enhances **shipping infrastructure**, it must now focus on **green shipping corridors**, **low-emission vessels**, and **port electrification**.
- The decision aligns with India's **Panchamrit commitments**, especially its goal of reaching **net-zero by 2070**.

9. Conclusion

India's support for the **first global carbon tax on shipping** is a significant diplomatic and environmental stance. While the policy is a welcome step towards reducing emissions in the shipping industry, it also highlights the **complex geopolitics of climate finance and justice**. Moving forward, India and other stakeholders must push for more **equitable, transparent, and ambitious climate action** frameworks that ensure both environmental sustainability and developmental equity.

ESA's Biomass Mission : 1st-ever global biomass monitoring system



1. Introduction

- The **European Space Agency (ESA)** is set to launch the **Biomass Mission** in **April 2025** to address a crucial data gap: the lack of comprehensive information about **global forest biomass**.
- This mission will use advanced radar technology to **map, measure, and monitor the world's forests**, thereby improving understanding of the **carbon cycle**, deforestation trends, and climate change dynamics.

2. Key Details of the Mission

Feature	Details
Launch Date	Scheduled for April 29, 2025
Launch Vehicle	Vega C Rocket
Launch Site	Korou Spaceport , French Guiana
Orbit Type	Sun-synchronous orbit at ~666 km
Mission Duration	Initially planned for 5 years
Satellite Payload	12-meter P-band Synthetic Aperture Radar (SAR)
Executing Agency	European Space Agency (ESA)

3. Objectives of the Biomass Mission

Primary Objectives:

- To **quantify forest biomass** on a **global scale**.
- To monitor **changes in forest structure** and **carbon storage** over time.
- To fill critical data gaps in **carbon accounting**.
- To provide essential input to **climate change models** and international reporting frameworks (e.g., IPCC, REDD+).

Secondary Objectives:

- To **map terrain** in regions with dense vegetation.
- To **observe the movement of ice sheets** in polar regions (Antarctica).
- To support policies for **deforestation monitoring, carbon trading, and ecosystem conservation**.

4. The Carbon Cycle & Forests

- Carbon is a fundamental element of life, and Earth's **carbon cycle** describes the continuous movement of carbon among the **atmosphere**,

biosphere, hydrosphere, and geosphere.

- **Forests act as carbon sinks**, absorbing **~16 billion metric tonnes** of CO₂ annually.
- Current carbon stored in forests (vegetation + soil): **~861 gigatonnes**.
- Understanding this storage is vital to:
 - Estimate **global carbon budget**.
 - Monitor the impact of **deforestation and degradation**.
 - Plan **climate mitigation strategies**.

5. Problem: Lack of Biomass Data

- Global-level **biomass data** is currently **incomplete and inconsistent**.
- Traditional methods (ground surveys, optical satellites) have **limited penetration** in dense forests.
- As per the **World Resources Institute**, in **2023**, the world lost:
 - **3.7 million hectares** of tropical forest.
 - Equivalent to **10 football fields per minute**.
 - Resulted in **~6% of global CO₂ emissions** in 2023.

6. How Biomass Mission Will Work

Synthetic Aperture Radar (SAR):

- Active remote sensing technology using microwave radar.
- Works in **all weather conditions**, both day and night.
- Biomass mission uses **P-band radar** (long wavelength: ~70 cm), which:
 - Penetrates **dense vegetation canopies**.
 - Detects structures **from tree tops to roots**.
 - Generates **3D models** of forest structure.

Key Point: Long wavelengths like **P-band** can penetrate deeper into forest biomass compared to shorter wavelengths (like X or C-band used in most satellites).

Data Output:

- High-resolution global maps of:

- **Above-ground biomass (AGB)**
- **Forest height and structure**
- **Carbon stock distribution**

- **Repeat observations** over time to detect **temporal changes** in biomass.

7. Significance of the Mission

Environmental Impact:

- Helps to assess **carbon sequestration capacity** of forests.
- Enables **real-time monitoring** of deforestation and degradation.

Scientific Advancement:

- First-ever **global biomass monitoring system from space**.
- Improves understanding of:
 - **Carbon fluxes**
 - **Climate feedback mechanisms**
 - **Ecosystem services**

Policy and Governance:

- Supports nations in **climate reporting** to the UNFCCC.
- Facilitates **carbon trading** and **valuation of ecosystem services**.
- Enhances **disaster risk management** (e.g., forest fires, droughts).

8. Relevance for India

- India is home to diverse and dense forests, especially in **North-East, Western Ghats, and Central India**.
- ESA's biomass data can **complement ISRO's forest monitoring programs** like:
 - **Forest Survey of India (FSI)**
 - **Bhuvan Geoportal**
- Enhances India's capacity in:
 - **Carbon stock estimation**
 - **Forest health monitoring**
 - **Implementing NDCs** (Nationally Determined Contributions under Paris Agreement)

Mains Practice Questions

GS Paper 3 – Environment, Climate Change

1. *What is the significance of space-based biomass monitoring in the context of global climate change mitigation efforts? Discuss with reference to the ESA's Biomass Mission.*
2. *Forests are crucial carbon sinks. Explain how satellite technology can help in the assessment and conservation of forest ecosystems.*
3. *"Deforestation not only affects biodiversity but also accelerates climate change." Examine the role of global initiatives like the Biomass Mission in addressing this challenge.*

Panel gives nod to shift cheetahs from Kuno park to Gandhi Sagar



Why in News?

- The **Cheetah Project Steering Committee**, constituted under the National Tiger Conservation Authority (NTCA), has approved the **relocation of some cheetahs** from **Kuno National Park** to **Gandhi Sagar Wildlife Sanctuary**, both located in **Madhya Pradesh**.
- The move is part of India's broader vision to establish a **metapopulation** of cheetahs across multiple landscapes for long-term conservation.

Key Decision: Cheetahs to be Shifted from Kuno to Gandhi Sagar

- The committee has agreed that **a few cheetahs** currently at Kuno can be moved to **Gandhi**

Sagar Wildlife Sanctuary, which lies about **300 km** away.

- The move is being considered carefully, keeping in mind **stress factors** such as **heat** during road transport.
- **Gandhi Sagar** has been identified as a **key site** for establishing a **metapopulation** of cheetahs in the **Kuno-Gandhi Sagar landscape**, covering parts of Madhya Pradesh and Rajasthan.

Background: Project Cheetah

- **Project Cheetah** was launched in **2022** with the aim to reintroduce the **African cheetah** into India after it was declared extinct in 1952.
- So far, **8 cheetahs** from **Namibia** and **12** from **South Africa** were brought to **Kuno National Park**.
- The project has faced setbacks, with the death of **8 cheetahs** and **5 cubs** so far.
- A total of **26 cheetahs** remain at Kuno, of which **17** are in the **wild** and **9** are still in **large enclosures**.

Why Gandhi Sagar?

- Gandhi Sagar was being prepared for **over a year** to receive the next batch of African cheetahs.
- Due to **delays in negotiations** with African countries like Kenya, South Africa, and Botswana, the focus shifted to **moving existing cheetahs** from Kuno.
- In the **first phase**, **4–5 cheetahs** will be released into a **fenced area** of **64 sq km** in the western part of Gandhi Sagar.
- **Leopards**, the main competing predator species, have been **relocated** from this fenced zone to reduce potential conflict.

Prey Availability and Habitat Readiness

- Concerns about **prey deficit** at Gandhi Sagar were raised, but officials stated that prey augmentation is in progress.
- Herbivores like **chinkara**, **chousingha**, **nilgai**, and **chital** have been introduced or are present.

- **In-situ breeding enclosures** for prey species have been developed.
- Additional **chital** are being relocated from other Madhya Pradesh forests to strengthen the prey base.

Issues and Operational Concerns

- The committee emphasized the importance of following **standard operating procedures (SOPs)** during the relocation and handling of cheetahs.
- A recent incident involving a **driver offering water** to a cheetah and her cubs drew criticism, highlighting a **lack of training**.
- The panel urged the state forest department to:
 - Step up **training and sensitization**.
 - Increase the role of '**cheetah mitras**', local wildlife volunteers. Ensure **adequate water availability** during the summer months.

About the Cheetah Project Steering Committee

- The **Cheetah Project Steering Committee** was constituted in **May 2023** by the **National Tiger Conservation Authority (NTCA)**.
- It is responsible for:
 - Reviewing and monitoring the implementation of **Project Cheetah**.
 - Providing **technical and ecological advice**.
 - Ensuring **best practices** for long-term cheetah conservation in India.

Future Outlook

- Talks are still ongoing with **African nations** to bring in more cheetahs.
- Once Gandhi Sagar is fully ready, it is expected to support a population that contributes to the **target of 60–70 cheetahs** across the region.
- This strategy aims to develop a **viable metapopulation**, spread across **multiple, genetically and geographically connected sites** to enhance species survival and reduce risks from disease and conflict.

About Cheetahs

- **Cheetahs (*Acinonyx jubatus*)** are the fastest land animals, capable of reaching speeds up to **120 km/h**.
- They can accelerate from **0 to 100 km/h in just 3 seconds**, making them highly adapted for short bursts of speed during hunts.
- Cheetahs are **solitary carnivores**, especially males who form small coalitions, while females prefer to live and hunt alone except when rearing cubs.
- **Reproduction** in cheetahs occurs year-round, with peak breeding often during the **rainy season**.
 - Females reach sexual maturity between **20–24 months**, while males mature later, around **24–30 months**.
 - The **gestation period** is approximately **90–95 days**, and a female typically gives birth to **3–5 cubs**.
- Cheetahs do **not roar** like lions or tigers. Instead, they communicate using **high-pitched chirps, barks, and stutter barks**, particularly to establish territory or communicate with cubs.
- To **mark territory**, cheetahs rely on **urine sprays, cheek rubbing, and scratch marks** on trees or the ground.
- During hunts, cheetahs rely on **vision** rather than smell to spot prey.
- They use a unique **tripping technique** by extending their **semi-retractable claws** to destabilise and knock down prey.
 - Their **hunting success rate** ranges from **40% to 50%**, and they primarily target small to medium-sized ungulates like gazelles and antelopes.

Protection Status of Cheetahs

- Cheetahs are listed as **Vulnerable** on the **IUCN Red List** due to habitat loss, human-wildlife conflict, and declining prey populations.
- In India, cheetahs are protected under **Schedule II** of the **Wild Life (Protection) Act**,

1972, offering protection but allowing regulated control in some cases.

- Globally, they are included in **Appendix I** of the **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)**, which prohibits international trade of the species except in exceptional circumstances

African Cheetah vs Asiatic Cheetah

Feature	African Cheetah (Acinonyx jubatus)	Asiatic Cheetah (Acinonyx jubatus venaticus)
Distribution	Widely distributed across Northwest, East, and Southern Africa	Now restricted to Iran , with only 12 individuals remaining
Physical Traits	Larger, with a robust neck and limbs	More slender and smaller in size
Fur	Golden-brown, with a denser coat	Light fawn or buff-colored, with extra fur on the neck and underbelly
Conservation Status (IUCN)	Vulnerable	Critically Endangered

How Can Vehicle-to-Grid (V2G) Technology Help India's Power Sector?



Introduction

- Recently, the **Kerala State Electricity Board (KSEB)**, in collaboration with the **Indian Institute of Technology Bombay (IIT Bombay)**, launched a **pilot project** to assess the feasibility of implementing **Vehicle-to-Grid (V2G) technology** in Kerala.

- This initiative marks an important step in exploring how **Electric Vehicles (EVs)** can support the power grid, especially during periods of peak demand and renewable energy (RE) shortfall.

What is Vehicle-to-Grid (V2G) Technology?

- Vehicle-to-Grid (V2G) technology enables **two-way electricity flow** between an electric vehicle and the power grid.
- When EVs are **not in use**, their batteries can serve as **decentralized energy storage systems** that feed electricity back into the grid.
- This can help balance electricity demand and supply, particularly during peak consumption hours.

Key Concepts:

- When electricity flows **from the grid to the vehicle (G2V)**, EVs function as loads.
- Smart charging strategies, such as **Time-of-Use (ToU) tariffs**, help to manage this demand efficiently by encouraging charging during off-peak hours or when RE supply is abundant.
- When electricity flows **from the vehicle to the grid (V2G)**, EVs act as **distributed energy resources (DERs)**, supplying stored power to support the grid.

Other related technologies include:

- Vehicle-to-Home (V2H)**: EVs supply power to homes.
- Vehicle-to-Vehicle (V2V)**: EVs share energy with other vehicles.
- Vehicle-to-Load (V2L)**: EVs power specific appliances or loads.

Among these, **V2G is the most advanced and impactful use case** for the power sector.

Global Adoption of V2G Technology :

V2G technology is being widely explored and implemented in **developed countries** with mature EV markets.

- In **Europe and the United States**, numerous pilot projects have demonstrated the viability of V2G using both electric cars and electric buses.

- **In the UK and the Netherlands**, EV owners are **financially compensated** for feeding power back to the grid during peak hours.
- **In California**, where renewable energy penetration is high, EVs are integrated into **ancillary grid services** to improve grid reliability.
- These services include frequency regulation, voltage support, and spinning reserves.
- EVs are also being evaluated as **emergency backup sources** during natural disasters.
- For example, pilot projects in California have tested whether EVs can help communities during crises by providing power in the event of grid failure.

These examples highlight how EVs can serve as **mobile energy storage solutions**, helping to address the variability and intermittency of renewable energy.

V2G in the Indian Context :

In India, V2G integration is **still at a nascent stage**. The focus has primarily been on expanding **EV charging infrastructure** and addressing the potential **load impact** of increasing EV usage.

Current Initiatives:

- A few **Distribution Companies (DISCOMs)** have initiated **pilot projects** focused on **smart charging** and limited V2G capabilities.
- The **Central Electricity Authority (CEA)** has constituted a committee to formulate guidelines for **reverse charging**, i.e., enabling power flow from EV batteries back to the grid.
- The committee has identified **smart charging** as a key solution to ensure sustainable EV growth without stressing the grid.

Challenges in India:

- The current **electricity market structure** is not designed to accommodate **decentralized power sources** like EVs.
- Regulatory gaps exist in terms of **bidirectional charging standards**, **reverse metering policies**, and **tariff mechanisms**.
- Grid management is complicated by the **variable nature of renewable energy** and mismatches between demand and supply.

For V2G to become mainstream in India, there is a pressing need for **supportive regulatory reforms**, **technological standardization**, and **market incentives** for EV owners.

KSEB–IIT Bombay Pilot Project :

Kerala is witnessing a **rapid rise in EV adoption**, along with an **exponential increase in rooftop solar installations**. This has led to concerns regarding:

- **Evening peak electricity demand**, especially when solar generation drops.
- The need to **balance the load** and integrate intermittent RE sources effectively.

The KSEB-IIT Bombay pilot project aims to:

- Test whether **EVs can supply electricity to the grid during peak hours**.
- Explore the feasibility of using **EVs as mobile storage units** to store excess solar power during the day and release it when needed.
- Demonstrate how **smart charging and V2G** can work together to **reduce the strain on the grid**.

How Can V2G Benefit India's Power Sector?

1. Grid Stability and Load Management

- EVs can help **reduce peak load** by discharging power into the grid during high demand periods.
- This reduces the need for expensive peaking power plants and enhances **load balancing**.

2. Better Renewable Energy Integration

- EVs can store **excess solar or wind energy** during periods of high generation and release it during low generation, thus helping to **smooth RE variability**.
- Charging EVs during the day, when solar output is high, helps in **better RE utilization**.

3. Decarbonisation of Transport and Power

- By promoting **RE-based charging** and enabling **energy storage**, V2G can contribute to a cleaner, more sustainable energy system.
- Helps India move toward its **net-zero emissions goals**.

4. Economic Benefits for EV Owners

- Time-of-use pricing and compensation mechanisms can **incentivize EV owners** to participate in V2G programs.
- EV owners can **earn revenue** by providing grid services like frequency regulation, peak shaving, or emergency backup.

5. Disaster Resilience and Emergency Backup

- In disaster-prone regions, EVs can serve as **temporary backup power sources**, providing electricity during outages or grid failures.

Way Forward for India

To realize the full potential of V2G, India must adopt a **multi-pronged approach**:

1. Policy and Regulatory Reforms

- Develop a **national V2G roadmap** with clear standards and regulations.
- Create **tariff structures** that encourage V2G participation.

2. Infrastructure and Technology Development

- Invest in **bi-directional charging stations** and **smart grid infrastructure**.
- Standardize communication protocols between EVs and the grid.

3. DISCOM Engagement

- Encourage DISCOMs to launch **localized V2G pilot projects** in urban and semi-urban areas.
- Provide training and capacity-building programs for grid operators.

4. Awareness and Incentives

- Educate EV users about the benefits of V2G.
- Offer **financial incentives or rebates** for early adopters.

Conclusion

Vehicle-to-Grid (V2G) technology has the potential to transform India's power sector by turning electric vehicles into **mobile, intelligent energy assets**. With growing EV adoption, renewable energy expansion, and peak demand challenges, V2G can help ensure **grid stability, energy efficiency, and decarbonisation**. While there are regulatory and infrastructural hurdles to overcome, pilot projects like the one in Kerala are important first steps toward mainstreaming V2G in India's energy transition journey.

Environment Ministry Must Roll Back Order on Desulphurising Coal Plants: Key Study



Context

- A recent study has recommended that the Union **Ministry of Environment, Forest and Climate Change (MoEFCC)** should **cancel its 2015 mandate**.
- This **mandate** requires all coal-fired power plants to install **Flue Gas Desulphurisation (FGD)** units to curb sulphur dioxide (SO₂) emissions.
- This Study was commissioned by the **Office of the Principal Scientific Adviser (PSA)** to the Government of India, and conducted by the **National Institute of Advanced Studies (NIAS), Bengaluru**.
- The study calls for a more targeted approach that limits FGD installation **only to thermal power plants (TPPs)** using **imported coal or high sulphur content (>0.5%) domestic coal**.

Background of the FGD Mandate (2015)

- In 2015, the Environment Ministry had directed **all 537 coal-fired thermal power plants** in India to install **FGD systems**
 - As part of a broader effort to cut air pollution, specifically **sulphur dioxide (SO₂) emissions**.
- These are a major contributor to **acid rain** and **respiratory diseases**.
- Originally, plants were expected to comply by **2018**, but delays led to **multiple deadline extensions**.
- Currently, compliance is staggered with deadlines ranging from **2027 to 2029**, based on the plant's category and priority.

Status of Implementation (as of 2025)

- Only **8%** of coal power plants in India have installed FGD systems.
- **230 TPPs** are in various stages of FGD installation.
- **260 TPPs** have **not yet placed orders** for FGDs.
- The cost of installing an FGD system is **₹1.2 crore per megawatt (MW)**.
- India's **installed coal capacity** is **218,000 MW** and is expected to grow to **283,000 MW by 2032**, making universal FGD installation **economically burdensome**.

Key Findings of the NIAS Study

1. Low Sulphur Content in Indian Coal

- Around **92% of Indian coal** has **low sulphur content** (0.3% to 0.5%).
- The study argues that SO_2 emissions from such coal are **not a significant threat** to local air quality, especially due to:
 - **Stack height regulations** (minimum 220 meters).
 - **Favorable climatic conditions** in India that aid in dispersion.

2. Minimal Acid Rain Risk

- A referenced study by **IIT-Delhi (2024)** found that **acid rain** is **not a serious issue** in India.
- Therefore, the need for blanket SO_2 reduction is not scientifically justified.

3. Higher CO_2 Emissions Due to FGDs

- Operating FGD systems increases:
 - **Energy consumption**, and
 - **Freshwater usage**.
- Between **2025 and 2030**, universal FGD installation could lead to an **additional 69 million tonnes of CO_2 emissions**, while only reducing **17 million tonnes of SO_2** .

4. Impact on Global Warming

- SO_2 is a **short-lived climate pollutant** that **masks global warming** by reflecting sunlight.
- The study cites an **IPCC assessment** suggesting that SO_2 emissions helped reduce global warming by **0.5°C from 2010–2019**.

- Therefore, indiscriminate SO_2 reduction without considering the CO_2 trade-off could **worsen global warming**.

Alternative Recommendations by the Study

Focus on Particulate Matter (PM) Pollution, Not SO_2

- Indian coal is high in **ash content**, leading to significant **PM emissions**.
- The study recommends prioritizing **electrostatic precipitators (ESPs)**, which are:
 - Cheaper (**₹25 lakh/MW** compared to **₹1.2 crore/MW** for FGDs).
 - More effective in controlling air pollution from coal plants.
 - Capable of reducing PM by **99%**, according to the study.

Promote BHEL-Made ESPs

- Bharat Heavy Electricals Limited (BHEL), a public sector enterprise, has developed efficient ESPs suitable for Indian conditions.

Study Authors and Policy Recommendations

- The report was authored by **R. Srikanth, A.V. Krishnan**, and **Dizna James** from NIAS.
- The authors argue that the 2015 FGD policy was a **misguided approach** based on insufficient scientific analysis.
- They recommend **rolling back the universal mandate** and focusing on **site-specific regulations** based on:
 - Type of coal used (domestic vs imported).
 - Sulphur content in coal.
 - Local environmental conditions.

Implications for Policy and Governance

For the Environment Ministry:

- Reevaluate the **cost-effectiveness** and **scientific rationale** behind the FGD mandate.
- Introduce **differentiated standards** for TPPs based on coal quality.

For Climate and Air Quality Management:

- Balance efforts to curb **local pollutants (like SO_2 and PM)** with the **global climate impact** of increased CO_2 emissions.

- Prioritize **PM pollution control**, especially in urban and densely populated areas.

For India's Energy Transition:

- Recognize the **economic burden** of FGD installation, especially with growing coal capacity.
- Ensure that any pollution-control policy is aligned with **India's development and energy needs**.

Conclusion

The NIAS study presents a strong scientific and economic case against the blanket installation of FGDs across all coal-fired power plants in India. It emphasizes the need for **context-specific regulation, cost-benefit analysis, and scientific prioritization of pollutants**. Instead of pursuing a one-size-fits-all approach, India should focus on **targeted SO₂ reduction**, while investing in more impactful and affordable technologies to reduce **particulate pollution**, thereby achieving better air quality outcomes without compromising climate goals.

India and International Big Cat Alliance Sign Headquarters Agreement



Context

- India has signed an agreement with the **International Big Cat Alliance (IBCA)**.
- This agreement makes **India the official host** of the IBCA headquarters and secretariat.
- The agreement was signed on **April 18, 2025**, by **P. Kumaran (MEA)** and **S.P. Yadav (DG, IBCA)**.

What is IBCA?

- The **International Big Cat Alliance (IBCA)** is a global alliance. It focuses on the **conservation of seven big cat species**:

- o Tiger
- o Lion
- o Leopard
- o Snow Leopard
- o Puma
- o Jaguar
- o Cheetah
- o Out of these, 5 big cats viz., Tiger, Lion, Leopard, Snow Leopard and Cheetah are found in India.

- India took the lead to form this alliance.
- It was launched by **Prime Minister Narendra Modi** in **April 2023**, during the **50th anniversary of Project Tiger**.

When Did IBCA Become a Treaty-Based Body?

- IBCA became a full **treaty-based intergovernmental organisation** in **early 2024**.
- This happened after **five countries** ratified the agreement:
 1. India
 2. Liberia
 3. Eswatini
 4. Somalia
 5. Nicaragua
- India formally joined IBCA in **September 2023**.
- The Indian Cabinet approved the headquarters and funding in **February 2024**.
- The agreement was signed on **March 28, 2025**, and made official in **April 2025**.

Key Features of the Headquarters Agreement

- India will **host the IBCA headquarters and secretariat**.
- India will provide **Rs 150 crore** as **budgetary support**.
- This money will be used for:
 - o Building infrastructure
 - o Creating a financial corpus
 - o Covering expenses for **five years (2023–2029)**

Provisions Included in the Agreement

- Details about **visas, privileges, and immunities** for IBCA staff.
- Provisions for the **use of premises** and entry into force
- Possibility of **supplementary agreements** in the future.
- General legal and administrative terms.

Significance for India

- It strengthens India's **global leadership in wildlife conservation**.
- Hosting the secretariat will boost India's image in **environmental diplomacy**.
- It reflects India's commitment to **preserving biodiversity**.

Conclusion

India has now become the **official headquarters of IBCA**. This step shows India's serious effort to protect **big cats worldwide**. With strong funding and diplomatic support, IBCA will help **coordinate global action** on big cat conservation.

World Earth Day 2025



◆What is Earth Day?

- **World Earth Day** is celebrated every **22nd April** to spread awareness about environmental protection and the need for sustainable living.
- It is one of the world's largest environmental movements, observed in more than **190 countries** by over **1 billion people**.
- This year marks the **55th anniversary** of Earth Day, which was first celebrated in **1970** in the United States.

- It was started to create awareness about environmental degradation, which had gone unchecked at the time due to industrial pollution, deforestation, and poor ecological policies.

◆Theme of 2025: "Our Power, Our Planet"

This year's theme sends a **strong global message** — the **power to protect the Earth is in our hands**. It calls for

- **Tripling renewable energy production by 2030**
- Moving away from **fossil fuels**
- Promoting **clean and sustainable energy** like **solar, wind, hydro, tidal, and geothermal**
- Urging individuals, governments, and industries to act together

◆History of Earth Day

- **1970**: First Earth Day celebrated in the USA, inspired by public concern over pollution and environmental health.
- Over **20 million Americans** participated.
- This led to the creation of the **US Environmental Protection Agency (EPA)** and laws like the **Clean Air Act** and **Clean Water Act**.
- **Rachel Carson's book *Silent Spring* (1962)** played a major role in sparking public environmental awareness.

◆Earth Day Poster 2025

- Designed by **Alexis Rockman**, a well-known environmental artist.
- Depicts **solar panels** in harmony with **green nature**, symbolizing clean energy and ecological balance.

◆Global Celebrations & Activities

Earth Day is not just symbolic—it includes real action. Some of the **main global campaigns** in 2025 include:

1. **The Great Global Cleanup** – Removing over 7.5 million pounds of trash worldwide.
2. **The Canopy Project** – Planting **550,000 trees** in areas affected by deforestation.
3. **Earth Action Day** – Events like climate marches, sustainability workshops, and awareness drives in over **550 cities** and **100+ colleges**.

4. **Climate Education Initiatives** – Involving over **1 million schools** teaching environmental and climate-related subjects.

5. **Local Drives and Pledges**

- Citizens are encouraged to organize **tree planting, waste cleanup, and green lifestyle adoption.**

◆ **Celebrations in India**

- In India, Earth Day is observed by **schools, universities, civil society groups, and government departments.**
- Activities include:
 - **Tree plantation drives**
 - **Awareness rallies and climate talks**
 - **Workshops** on clean energy and waste management
 - **State-wise clean-up programs** and social media pledges
- **Government and NGOs** promote Earth Day through campaigns aligned with India's **climate goals** under the **Paris Agreement** and **Mission LiFE (Lifestyle for Environment)** initiative.

◆ **Objectives of World Earth Day**

- Promote **environmental awareness and responsibility**
- Inspire action against **pollution, deforestation, and climate change**
- Support **renewable energy and green innovation**
- Encourage **eco-friendly habits** like recycling, reducing plastic, and saving water
- Build a sense of **shared responsibility** across nations and generations

◆ **India's Role**

- Earth Day aligns with **India's environmental goals:**
 - **Net Zero by 2070**
 - **Panchamrit targets** announced at COP26
 - **National Solar Mission, Faster Adoption of Electric Vehicles (FAME), and International Solar Alliance (ISA)**

- Candidates should relate Earth Day with:
 - **SDG Goals (especially 7, 12, 13, 15)**
 - **Environmental Acts in India** (EPA, Forest Act, Wildlife Act)
 - **Mission LiFE, Afforestation Programs, and India's INDCs**

Conclusion

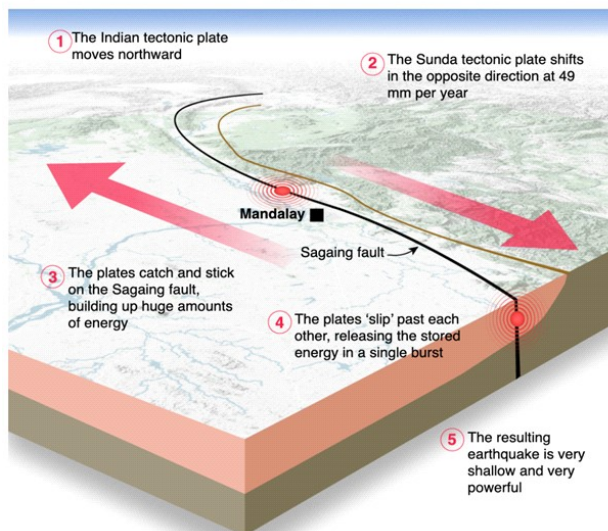
World Earth Day 2025 reminds us that **environmental change starts with people**—each of us has the power to make a difference. This year's theme, **"Our Power, Our Planet"**, highlights our collective responsibility and encourages urgent action. By moving towards **clean energy, sustainable practices, and shared global effort**, we can shape a **healthier and more sustainable future** for generations to come.



Geography

Sagaing Fault

HOW THE MYANMAR EARTHQUAKE HAPPENED



1. Recent Earthquake:

- The recent earthquake in Myanmar was caused by strike-slip faulting along the Sagaing Fault.
- This fault separates the Indian Plate from the Eurasian Plate.

2. About the Sagaing Fault:

- **Description:** The Sagaing Fault is a major active tectonic boundary running north to south through Myanmar.
- **Length and Location:** It is one of the longest and most active strike-slip faults globally, extending 1,500 km from the Andaman Sea in the south to the Eastern Himalayas in the north.
- **Tectonic Activity:** The Indian Plate is moving northward, causing stress buildup along the fault, which leads to large earthquakes over time.

3. Types of Faults and Their Role in Earthquakes:

- **Faults:** Fractures in the Earth's crust where rocks move due to tectonic stress. When stress exceeds a critical limit, energy is released as seismic waves, causing earthquakes.
- **Main Types of Faults:**
 - **Normal Fault:** The hanging wall moves downward relative to the footwall. Common at divergent boundaries (e.g., East African Rift Valley, Basin and Range Province in the U.S.).
 - **Reverse Fault:** The hanging wall moves upward due to compression forces. Occurs at convergent boundaries (e.g., Himalayas, Rocky Mountains).
 - **Strike-Slip Fault:** Horizontal movement of fault blocks with minimal vertical displacement, typical of transform boundaries (e.g., Anatolian Fault in Turkey, Sagaing Fault in Myanmar).
 - **Transform Fault:** A specific type of strike-slip fault where tectonic plates slide past each other (e.g., San Andreas Fault in California).

Conclusion:

The recent earthquake in Myanmar, triggered by the Sagaing Fault, highlights the significant tectonic activity in the region. Understanding the different types of faults and their roles in seismic events is crucial for assessing and mitigating earthquake risks. The Sagaing Fault, being one of the most active strike-slip faults, plays a critical role in the geological dynamics of Myanmar and the surrounding areas.

North Sentinel Island



1. Recent Incident:

- A U.S. national was recently arrested in the Andaman and Nicobar Islands for allegedly entering the prohibited tribal reserve area of North Sentinel Island.

2. About North Sentinel Island:

- **Location:** One of the Andaman Islands, located in the Bay of Bengal, and part of the Indian Union Territory of Andaman and Nicobar Islands.
- **Geography:** Situated west of the central cluster of the Andaman Islands.
- **Size:** The island measures approximately 8 kilometers (5.0 mi) in length and 7 kilometers (4.3 mi) in width, covering an area of about 60 square kilometers (23 sq mi).
- **Environment:** Densely covered in tropical rainforest and circled by a shallow reef.

3. Sentinelese Tribe:

- Isolation: Harbors one of the world's last secluded tribes, the Sentinelese.
- Ancestry: Believed to be direct descendants of the first humans who migrated out of Africa around 60,000 years ago.
- Resistance to Contact: The tribe has lived in voluntary isolation for thousands of years, fiercely resisting contact with the outside world.

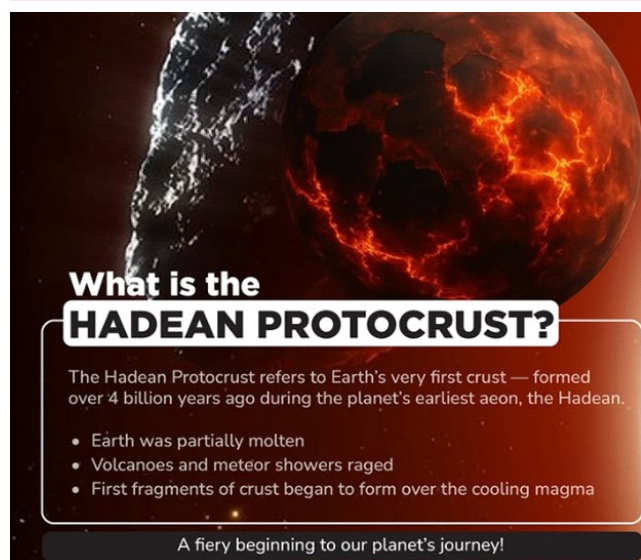
4. Legal Protection:

- Protection Act: The island falls under the Andaman and Nicobar Protection of Aboriginal Tribes Act, 1956, which makes it illegal to approach closer than 5 nautical miles.
- Population Estimates: According to a 2011 census effort and anthropologists' estimates, the population of the Sentinelese is believed to be between 80 and 150 people, although it could range from as few as 15 to as many as 500.

Conclusion:

The recent arrest of a U.S. national for entering North Sentinel Island highlights the importance of respecting the isolation and legal protections of the Sentinelese tribe. The island's unique environment and the Sentinelese people's voluntary isolation underscore the need for stringent measures to preserve their way of life and protect them from external threats.

Hadean Protocrust : New Study on Early Plate Tectonics



Why in News?

- New research suggests that **chemical signatures linked to plate tectonics** were already present in the **Hadean protocrust**, indicating the **early onset of tectonic activity** on Earth.

What is the Hadean Protocrust?

- Refers to Earth's **earliest known crust**, formed during the **Hadean Aeon** (starting ~4.6 billion years ago).
- Named after **Hades**, due to extremely **hot, hostile, and unstable** early Earth conditions.

Geological Conditions in the Hadean Aeon

- Earth's surface was **partially molten**, with intense **volcanism** and **meteorite bombardment**.
- A **magma ocean** gradually cooled, leading to the formation of early **solid crustal fragments**.
- These fragments were **unstable and flaky**, often breaking apart and reforming.
- **Thicker crustal segments** began forming the **first proto-continents**, floating over the **asthenospheric mantle** (semi-fluid layer up to 400 km deep).

Birth of Plate Tectonics

- As these primitive plates **moved and interacted** (colliding, sliding, subducting), they initiated **early tectonic processes**.
- These movements imprinted **chemical signatures** in the crust.
- These signatures help geologists trace the **origin and evolution of plate tectonics**, a major force shaping Earth's surface.

Mount Kanlaon: Recent Eruption



Why in News?

- **Mount Kanlaon**, one of the Philippines' most active volcanoes, recently erupted dramatically, sending a towering ash plume 4,000 meters (2.5 miles) into the sky.

About Mount Kanlaon

- **Location:** North-central part of **Negros Island**, Philippines.
- **Height:** The highest mountain on Negros Island and the **42nd tallest peak** on an island globally.
- **Volcanic Type:** Stratovolcano, part of the **Pacific Ring of Fire**.
- **Physical Features:**
 - Comprises multiple **pyroclastic cones** and **craters**.
 - The summit has a broad, elongated **northern caldera** with a **crater lake** and a smaller, historically active crater to the south.
 - The base of the volcano covers an area of **30 km x 14 km**.
 - Underlain by tropical volcanic materials such as **sheeted lava flows**, **lahar deposits**, **airfall tephra**, and **pyroclastic apron** materials.

Geological and Ecological Significance

- **Volcanic Activity:** Known for **phreatic explosions** (steam-driven eruptions), typically small to moderate in size, leading to minor ashfalls around the volcano.
- **Biological Diversity:** Mount Kanlaon is biologically diverse and is home to several species of flora and fauna.
- **Watershed Importance:** The slopes serve as **headwater catchments** for major river systems on Negros Island.

Historical Eruptions

- **First Recorded Eruption:** Since **1866**, Mount Kanlaon has been erupting periodically, with eruptions generally involving small to moderate explosions.

Thar Desert



Figure: Thar Desert

Why in News?

A new study reveals that the **Thar Desert** has experienced a **38% rise in greening annually** over the last two decades, mainly due to **increased monsoon rainfall** and **agricultural expansion**.

Key Facts about the Thar Desert

- Also known as the **Great Indian Desert**.
- Located mostly in **Rajasthan**, with extensions into **Punjab, Haryana, Gujarat** (India) and **Sindh, Punjab** (Pakistan).
- **Covers:** ~**200,000 sq. km**
- **Rank:** 9th largest **subtropical desert** in the world.

Boundaries

- **Northwest:** Sutlej River
- **East:** Aravalli Hills
- **South:** Rann of Kutch
- **West:** Indus Valley

Landscape and Climate

- **Terrain:** Mostly sand dunes, rocky outcrops, and salt lake bottoms
- **Climate:**
 - **Hot summers:** up to **50°C**
 - **Cold winters:** near **freezing**
 - **Rainfall:** Low (100–500 mm annually), mostly in monsoon
 - **Dust storms:** Frequent in summer

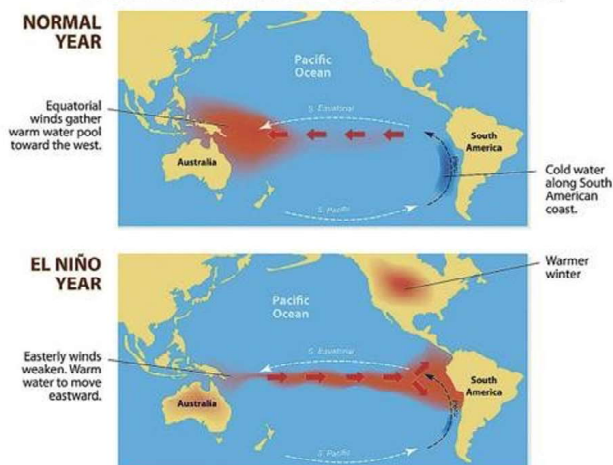
- **River:** Only **Luni River** flows through it
- **Vegetation:** Dominated by **xerophytic (drought-resistant)** plants
- **Unique:** No natural **oasis**, unlike many other large deserts
- **Population:** World's **most densely populated desert** (~83 people/sq.km)

Mineral Wealth

- Rich in **coal, gypsum, bauxite, limestone, salt, and silica**
- Important for **resource extraction and energy development**

El Niño Southern Oscillation (ENSO)

THE EL NIÑO PHENOMENON



Why in News?

The **La Niña** event in the **tropical Pacific Ocean** has officially ended, and the climate system is now transitioning to **ENSO-neutral conditions**, as confirmed by the **National Oceanic and Atmospheric Administration (NOAA)**.

What is ENSO?

- The **El Niño Southern Oscillation (ENSO)** is a major climate phenomenon that involves changes in **sea-surface temperatures (SST)** in the **central and eastern tropical Pacific Ocean**, significantly impacting global weather patterns.
- It influences wind behavior, atmospheric pressure, and rainfall distribution worldwide.

ENSO Phases

1. El Niño

- o **Description:** Warmer-than-usual sea-surface temperatures in the Pacific, leading to unusual global warming patterns and shifts in weather patterns.
- o **Effects:** Typically associated with warmer, drier conditions in some regions and wetter, cooler conditions in others.

2. La Niña

- o **Description:** Cooler-than-usual sea-surface temperatures often linked with colder atmospheric patterns and stronger trade winds.
- o **Effects:** Can lead to cooler, wetter conditions in some areas, with stronger trade winds and more pronounced oceanic cooling.

3. ENSO-Neutral

- o **Description:** Neither **El Niño** nor **La Niña** dominates, and the climate system is in a transition phase between the two extremes.
- o **Effects:** Typically results in more uncertain weather patterns and is considered a neutral phase, marking the end of one event and the beginning of another.

ENSO-Neutral Phase (March 2025 Update)

- In March 2025, **NOAA** observed that **sea-surface temperatures (SST)** in the **Niño-3.4 region** reached **-0.01°C**, which is above the La Niña threshold of **-0.5°C**.
- The cool waters from the previous **La Niña** phase have now dissipated, signaling the end of La Niña and the start of ENSO-neutral conditions.
- Despite **La Niña-like atmospheric conditions** (like strong trade winds) persisting for some time, the absence of cool surface waters meant the system no longer met the criteria for La Niña.

Tuti Island



Why in News?

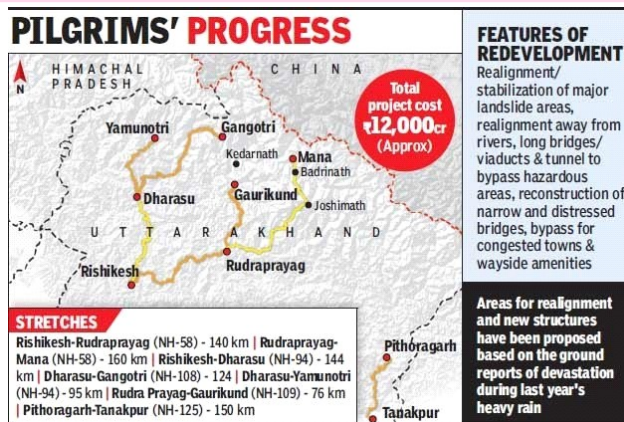
Since the outbreak of civil war on **April 15, 2023**, between the **Sudanese Army** and the **Rapid Support Forces (RSF)**, **Tuti Island** has been devastated by violence and occupation.

About Tuti Island

- **Location:** Tuti Island is situated at the confluence of the **Blue and White Nile rivers** in **Khartoum, Sudan**.
- **Cultural Significance:** It is one of Khartoum's oldest settlements, known for its **lush greenery** and **agriculture**. The island spans **8 square kilometers** and has earned the nickname "**Khartoum's garden**" due to its fertile lands.
- **Indigenous Connection:** The island has deep cultural ties to the **Mahas community**, who have lived there since the **15th century**. The island is a symbol of **indigenous identity** and **sustainability** in the region.
- **Impact of Conflict:** The ongoing war has led to **mass displacement** (13 million people), **tens of thousands of deaths**, and severe **famine conditions** affecting **100,000** people in Khartoum alone.

- **Environmental Threats:** **Climate change** has worsened Tuti Island's vulnerability by disrupting the **Nile's natural flooding cycle**, leading to **flooding, droughts, and desertification**.
- **HEART Project:** In response to these challenges, the **HEART Project** (Heritage Empowered Action for Risk in Tuti) was launched to preserve the **Taya system** (traditional irrigation system) and document the island community's **local knowledge**.

Silkyara Bend–Barkot Tunnel



Why in News

On 17 April 2025, the Union Ministry of Road Transport & Highways termed the breakthrough in the Silkyara Bend–Barkot road tunnel as a historic milestone. The tunnel is expected to reduce travel time by 1 hour and significantly improve year-round connectivity in Uttarakhand.

Key Points

- **Location:** Lies on the Dharasu–Yamunotri section of NH-134 (formerly NH-94), in Uttarakhand.
- **Length:** 4.531 km, two-lane, bi-directional tunnel with a dedicated escape passage.
- **Connectivity:** Connects Silkyara and Barkot; approximately 50 km from Yamunotri.
- **Construction Method:**
 - o Built using the New Austrian Tunnelling Method (NATM), which adapts tunnel support to real-time rock conditions.

- o Approximately 90% of the tunnel is excavated through phyllite rock, a weak geological formation.
- **Execution Model:** Constructed under the Engineering, Procurement, and Construction (EPC) mode.
- **Funding:** Implemented under the National Highway Original [NH(o)] Scheme by the Ministry of Road Transport & Highways.
- **Strategic Importance:**
 - o Part of the Chardham Mahamarg Vikas Pariyojna (Chardham Plan).
 - o Enhances all-weather access to Yamunotri and improves connectivity to pilgrimage sites like Kedarnath and Badrinath.

Mount Lewotobi



Why in News

Mount Lewotobi, located in Indonesia's East Nusa Tenggara province, erupted recently, prompting a **flight warning and safety advisories** due to increased volcanic activity.

Key Point

- **Location:** Situated on **Flores Island** in **East Nusa Tenggara**, Indonesia.
- **Geological Zone:** Lies along the **Pacific Ring of Fire**, known for frequent earthquakes and volcanic eruptions.
- **Volcano Type:** A **twin stratovolcano**, comprising two peaks:
 - o **Lewotobi Lakilaki** (Male) – 1584 m high, with a 400 m wide summit crater open to the north.
 - o **Lewotobi Perempuan** (Female) – 1703 m high, with a 700 m wide summit crater.

- **Name Meaning:** “Lewotobi” means “**husband and wife**”, reflecting the twin peaks arranged along a NW–SE axis, separated by 2 km.
- **Volcanic Activity:**
 - o **Lewotobi Lakilaki** has shown frequent activity in the 19th and 20th centuries.
 - o **Lewotobi Perempuan** has erupted only **twice in recorded history**.
- **Lava Domes:** Small lava domes have formed in the summit craters of both peaks during the 20th century.
- **Flank Feature:** **Iliwokar**, a prominent flank cone, is located on the east flank of Lewotobi Perempuan.

Dal Lake



Why in News

On 18 April 2025, a **shikara carrying tourists overturned** in Srinagar's **Dal Lake** due to **strong winds**, leading to a rescue operation involving a tourist family and a boatman.

Key Points

- **Location:**
 - o **Mid-altitude urban lake** located in **Srinagar**, Jammu and Kashmir.
 - o Surrounded by the **Pir Panjal mountain range**.
- **Significance:**
 - o Major hub for **tourism and recreation** in Kashmir.
 - o Often called the “**Jewel in the crown of Kashmir**” or “**Srinagar's Jewel**”.

- o Also referred to as the **Lake of Flowers**.
- **Geographical Features:**
 - o Covers an area of **18 sq. km**; part of a larger **wetland area** of **21.1 sq. km**, including **floating gardens**.
 - o **Shoreline** is approximately **15.5 km**, lined with **Mughal-era gardens, parks, houseboats, and hotels**.
 - o **Average depth** is ~5 ft; **maximum depth** is ~20 ft.
 - o Divided into four basins: **Gagribal, Lokut Dal, Bod Dal, and Nagin** (often considered a separate lake).
 - o **Islands:**
 - * **Rup Lank (Char Chinari)** in Lokut Dal
 - * **Sona Lank** in Bod Dal
- **Unique Features:**
 - o **Floating gardens**, called “**Raad**” in Kashmiri, bloom with **lotus flowers** in **July–August**.
 - o Known for its **floating market**, where vendors in **shikaras** sell goods directly on the water.

Yellow Sea



Why in News

China is increasing its activities in the **Yellow Sea** after aggressive posturing in the **South China Sea**, following the construction of a massive steel rig.

Key Points

- **About the Yellow Sea**
 - o Also known as **Huang Hai** in China and the **West Sea** in North and South Korea, the Yellow Sea is a marginal sea of the **Western Pacific Ocean**.
 - o It lies **north of the East China Sea** and is bordered by **mainland China** to the **north and west**, and **North Korea** and **South Korea** to the **east**.
 - o The sea gets its name from the yellowish sand particles carried by winds from the **Gobi Desert** that settle on the surface, giving it a **golden-yellow color**.
 - o **Area:** Covers approximately **400,000 sq.km**.
 - o **Dimensions:** About **960 km** from north to south and **700 km** from east to west.
 - o **Depth:** The Yellow Sea is relatively shallow with an average depth of **180 to 394 feet (55 to 120 meters)**.
 - o It is one of the world's largest portions of the **continental shelf** submerged in water.
- **Climate**
 - o The region experiences **cold, dry winters** and **wet, warm summers**.
- **Rivers**
 - o Major rivers that discharge directly into the Yellow Sea include:
 - * **Han River** (South Korea)
 - * **Yangtze River** (China)
 - * **Datung, Yalu, Guang, and Sheyang Rivers**.
- **Islands**
 - o The Yellow Sea is home to several islands, including:
 - * **Jeju Island** (South Korea)
 - * **Shandong Peninsula islands** (China)
 - * **Ganghwa Island** (South Korea).

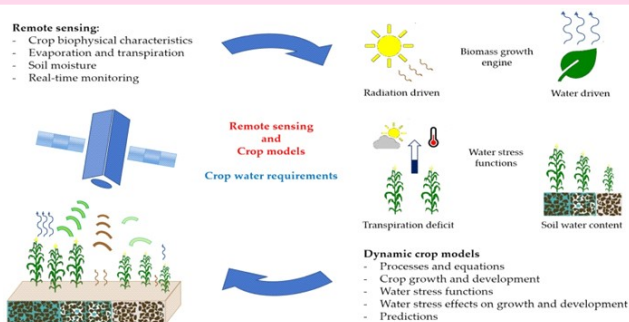
- **Major Port Cities**

- o Leading ports along the Yellow Sea include:
 - * **Qingdao** and **Dalian** in China
 - * **Inch'On** in South Korea
 - * **Namp'o** in North Korea.

Significance

The growing activities of **China** in the Yellow Sea, particularly after its assertiveness in the South China Sea, raise concerns about regional security and maritime claims. The construction of a giant steel rig highlights China's increasing interest in enhancing its control over the waters of the Yellow Sea, further intensifying geopolitical dynamics in the region.

CROP (Comprehensive Remote Sensing Observation on Crop Progress)



Why in News

The **Indian Space Research Organisation (ISRO)** has estimated that India's wheat production from **eight major wheat-producing states** will reach **122.724 million tonnes** by March 31, 2025, using advanced satellite-based remote sensing technologies.

Key Points

- **What is CROP?**
 - o **CROP** stands for **Comprehensive Remote Sensing Observation on Crop Progress**.
 - o It is a **semi-automated and scalable framework** developed by the **National Remote Sensing Centre (NRSC)**, which is part of **ISRO**.
 - o The main objective of **CROP** is to enable **near real-time monitoring** of

crop sowing, growth, and harvesting, especially during India's **Rabi season**.

- **Technological Components**

- o **CROP** integrates data from multiple remote sensing satellites, which include:
 1. **EOS-04 (RISAT-1A)**: Provides **Synthetic Aperture Radar (SAR)** data.
 2. **EOS-06 (Oceansat-3)**: Provides **optical remote sensing data**.
 3. **Resourcesat-2A**: Used for **high-resolution optical imaging** of agricultural areas.
- o The system uses both **optical** and **SAR datasets**, ensuring accurate monitoring of crop progress under varying weather and light conditions.

- **Wheat-Producing States Covered**

- o The ISRO study focuses on **eight major wheat-growing states**:
 1. **Uttar Pradesh**
 2. **Madhya Pradesh**
 3. **Rajasthan**
 4. **Punjab**
 5. **Haryana**
 6. **Bihar**
 7. **Gujarat**
 8. **Maharashtra**
- o These states are vital for ensuring **national food security** and contribute to the bulk of India's **Rabi wheat harvest**.

15th BRICS Agriculture Ministers' Meeting



Why in News

The **Union Agriculture Minister** recently led the **Indian delegation** to the **15th BRICS Agriculture Ministers' Meeting** held in **Brasília, Brazil**.

Key Points

- **Geographical Location**
 - **Brazil** is located in **eastern South America**, spanning the **Northern, Southern, and Western Hemispheres**. It is the **fifth-largest country** in the world.
- **Borders**
 - Brazil shares borders with all South American nations except **Chile** and **Ecuador**.
- **Physiographic Zones**
 - Major zones include the **Brazilian Highlands, Amazon Rainforest, and Pantanal Wetlands**.
- **Water Bodies**
 - **Amazon River**: Originating in the Andes Mountains, it is the **second-longest river** in the world and has the **largest water discharge volume** globally.
 - **São Francisco River**: The longest river entirely within Brazil.
 - **Iguacu River**: Features the **Itaipu Dam**, a major hydroelectric power site.
- **Coastline**
 - Brazil has a **7,491 km long Atlantic coastline**, which includes islands such as **Fernando de Noronha**.
- **Highest Peak**
 - **Pico da Neblina** (2,999 m) is Brazil's tallest mountain.
- **Amazon Basin**
 - It is the world's **largest river basin**, spanning **Brazil, Peru, Colombia, Ecuador, Venezuela, Bolivia, Guyana, and Suriname**.
 - The basin is home to the **Amazon Rainforest**, the largest tropical forest in the world, playing a critical role in the global **carbon cycle**.

Major Highlights of the Visit

- The theme of the **15th BRICS Agriculture Ministers' Meeting** was:
"Promoting inclusive and sustainable agriculture through cooperation, innovation, and equitable trade among BRICS countries."
- Senior officials from **BRICS** nations and newly invited members, including **Saudi Arabia, UAE, Egypt, Ethiopia, Indonesia, and Iran**, attended the meeting.

Hindu Kush Himalaya (HKH)



Why in News

The **Hindu Kush Himalaya (HKH)** region recorded its **lowest snow persistence in 23 years** during the **2024–2025 winter**, according to a new report, signaling potential impacts on climate and water resources in the region.

Key Point

- **Geography of HKH**
 - The **Hindu Kush Himalaya (HKH)** mountain range spans about **3,500 km** across **eight countries**:
 - * Afghanistan, Bangladesh, Bhutan, China, India, Nepal, Myanmar, and Pakistan.
 - It covers an area of approximately **4.2 million sq.km**.
- **Mountain Range and Location**
 - The range runs from **northeast to southwest**, dividing the **Amu Darya** river valley (to the north) from the **Indus River** valley (to the south).
 - It stretches through various regions:
 - * **Eastern Hindu Kush**: near the Pamir range, where borders

of China, Pakistan-administered Kashmir, and Afghanistan meet.

- * **Western Hindu Kush:** merging into smaller ranges in **western Afghanistan**.

- **Highest Peak**
 - o The **highest point** of the HKH is **Tirich Mir** or **Terichmir**, located at **7,708 meters (25,289 ft)** in **Chitral, Pakistan**.
- **Significance as the 'Third Pole'**
 - o The HKH is considered the **Third Pole** (after the North and South Poles) due to its vast ice cover and the region's significance to global climate systems.
 - o It holds the largest area of permanent ice cover outside the poles.
- **Biodiversity**
 - o The region is home to **4 global biodiversity hotspots**.
 - o It contains diverse ecosystems, including glaciers, alpine meadows, forests, wetlands, and grasslands.
- **Water Sources**
 - o The HKH is the source of **ten large Asian river systems**, including:
 - * Amu Darya, Indus, Ganges, Brahmaputra, Irrawaddy, Salween, Mekong, Yangtze, Yellow River, and Tarim.
 - o These rivers provide water to around **1.9 billion people**, constituting nearly **a fourth of the world's population**.
- **Climate Implications**
 - o The HKH is crucial for climate monitoring and plays a vital role in regulating the water cycle for the populations across South Asia and Central Asia.
 - o Changes in snow persistence and glacial melting can significantly impact water resources and local ecosystems.

Strait of Gibraltar



Why in News

Bengal swimmer **Sayoni Das** recently became the **first Asian woman** to successfully swim across the **Strait of Gibraltar**, marking a historic achievement.

Key Points

- **Geography of the Strait**
 - o The **Strait of Gibraltar** is a narrow body of water that separates **Europe** from **Africa**, connecting the **Mediterranean Sea** to the **Atlantic Ocean**.
 - o It is approximately **58 km** long, with the narrowest point measuring **13 km** between **Point Cires** (Morocco) and **Point Marroquí** (Spain).
- **Bordering Countries**
 - o To the **north**, the Strait is bordered by **Spain** and the **British Overseas Territory of Gibraltar**.
 - o To the **south**, it is bordered by **Morocco** and the **Spanish enclave of Ceuta**.
- **Landmarks and Geography**
 - o The **eastern end** of the Strait, between **the Rock of Gibraltar** (north)

- and **Mount Hacho** or **Jebel Moussa** (south), is about **23 km** wide.
 - o The **Pillars of Heracles**, two prominent land features (the Rock of Gibraltar and Mount Hacho), mark the eastern extremity of the Strait.
 - o The **western end** of the Strait, located between **Cape Trafalgar** (Spain) and **Cape Spartel** (Morocco), is about **43 km** wide.
- **Depth and Geological Formation**
 - o The depth of the Strait ranges from **300 to 900 meters**.
 - o The Strait was formed due to the **northward movement of the African Plate** towards the **European Plate**.
- **Waterflow and Currents**
 - o The **Mediterranean Sea** and **Atlantic Ocean** have different salinity levels, which results in a unique water flow pattern:
 - * Highly saline water from the Mediterranean Sea flows **outward and underneath** the less saline Atlantic Ocean currents.
 - * The less saline Atlantic waters flow **inward and on top** of the Mediterranean water.
- **Significance**
 - o The Strait of Gibraltar is the **only natural link** between the **Atlantic Ocean** and the **Mediterranean Sea**.
 - o It is one of the **busiest waterways** in the world and is strategically important for global trade.
 - o **Tanger-Med**, located near **Tangier** in Morocco, is a major port on the Strait of Gibraltar.

Poás Volcano



Why in News

The **Poás Volcano**, one of Costa Rica's most popular tourist attractions, recently erupted.

Key Points

- **Location**
 - o The **Poás Volcano** is situated within the **Poás Volcano National Park** in **Costa Rica**.
- **Volcano Type**
 - o It is a **composite stratovolcano**, known for its **irregular complex form** and large **collapse craters**.
- **Elevation**
 - o The volcano rises to a height of **2,708 meters** (8,885 feet) above sea level.
- **Crater Features**
 - o The **main crater** of Poás is one of the largest active craters in the world.
 - o It spans about **1.5 km** in width and has a depth of **300 meters**.
- **Eruption Activity**
 - o Since **1989**, the volcano has experienced a significant increase in the emission of **gases**, leading to **acid rain** that has negatively impacted the flora in the park and nearby agricultural areas.
 - o Throughout **2024**, the **crater lake** has been **drying up**, triggering **ash-producing eruptions** and increased **gas emissions**.

- o Small explosions and the ejection of rocks have also been reported, with the drying process continuing.
- **Impact on Surroundings**
 - o The increased volcanic activity, including the release of gases, has led to environmental concerns, particularly the damage to local flora and agricultural areas due to acid rain.
- **Tourism Significance**
 - o Poás is one of Costa Rica's **most visited tourist destinations**, attracting visitors to observe the volcanic activity and the dramatic landscape within the national park.

Importance

The eruption of **Poás Volcano** highlights the ongoing geological activity in Costa Rica and the impact of volcanic eruptions on both the environment and tourism. The volcano's significance as a natural landmark and tourist attraction makes it a vital part of Costa Rica's economy and ecosystem, while also raising concerns about the environmental effects of increased volcanic emissions.



EDITORIALS

Crux of The Hindu & Indian Express

Geography

Ramban Rain Causes Destruction: Understanding the Weather Events Affecting the Region



What Happened in Ramban?

- **Date: April 20, 2025**
- **Location: Ramban Tehsil, Jammu and Kashmir**
- **Impact:** Torrential rainfall and hail led to widespread damage in the region.
 - o **Casualties:** Three people lost their lives.
 - o **Infrastructure Damage:** Several buildings collapsed, and transportation was severely disrupted.
 - o **Relocations:** Hundreds of people had to be relocated due to the heavy rain.
- **Rainfall Data:**
 - o Jammu and Kashmir received **16.9 mm of rainfall** in a 24-hour period (ending 8:30 am on April 20).
 - o This represents a **575% departure** from the normal rainfall of **2.5 mm**.

Understanding the Weather Events:

What is a Cloudburst?

- **Definition:** A cloudburst is a **heavy rainfall event** where **10 cm or more of rain falls in an hour** over a roughly **10 km x 10 km area**.
- **Why Do They Happen?**
 - o Cloudbursts are **common in hilly areas** due to **orographic lift** — a process where warm air is forced upwards over mountains.
 - o As the warm air rises, it **expands** due to lower pressure at higher altitudes, causing it to **cool down** and release moisture as rain.
 - o If the warm air keeps rising, it can lead to the accumulation of a large amount of rain, which **suddenly releases** in a cloudburst.
- **Why Are They Difficult to Predict?:**
 - o Cloudbursts happen over small, localized areas and are **hard to predict accurately** due to their sudden nature.

- **Impact:**
 - o The sudden, intense rainfall from a cloudburst can overwhelm drainage systems, leading to **flash floods** and **landslides**.

What is a Flash Flood?

- **Definition:** Flash floods occur when a **large amount of rain** falls suddenly and enters **drainage systems** (e.g., rivers, drains, water bodies), causing **overflow**.
- **Common in Hilly Areas:** Flash floods are more common in **hilly regions** due to **rocky terrain**, which does not absorb water effectively.
- **Difference from River Floods:**
 - o River floods, typically seen in plains, tend to **last longer** and cause more widespread property damage.
 - o Flash floods, however, are more **sudden** and **dangerous**, often resulting in **loss of life** due to the rapid rise in water levels.

What is a Landslide?

- **Definition:** A landslide occurs when a section of land (including **rocks** and **soil**) becomes unstable and slides down a slope or mountain.
- **How Does it Happen?:**
 - o When the **force of gravity** on a slope exceeds the **resisting forces** (the strength of the slope), a landslide can occur.
 - o Adding **water** to the slope material makes landslides more likely because water:
 - * **Adds weight** to the material,
 - * **Reduces the strength** of the material,
 - * **Reduces friction**, making it easier for the material to move downslope.
 - o **Heavy rainfall** or cloudbursts **speed up** this process and increase the likelihood of a landslide.

- **Impact:**
 - o **Destructive Power:** Landslides can **crush people and animals** under debris, **block roads**, and cause severe disruption.
 - o **Flooding:** Landslides can also lead to **flooding** when debris falls into rivers or water bodies.

Why These Events Are Dangerous in Hilly Areas:

- The region of **Ramban** is **hilly and mountainous**, making it particularly vulnerable to these **weather events**:
 - o **Cloudbursts** are more common in such regions due to the **orographic lift** and mountainous terrain.
 - o **Flash floods** and **landslides** are more severe in hilly areas due to **rocky slopes** and poor absorption of rainwater.

These events often lead to **devastating consequences**, including loss of life, infrastructure damage, and displacement of people.

Conclusion:

The **Ramban rainfall disaster** of April 20, 2025, was caused by a combination of **cloudbursts**, **flash floods**, and **landslides** in the region. These weather events, common in hilly areas, cause significant disruption and loss of life. Understanding their causes, impacts, and the challenges posed by **orographic lift** and **sudden rainfall** is essential in preparing for and mitigating such disasters in the future.

Delhi Heatwave Alert – IMD Forecast, Heatwave Criteria, and Air Quality

COLOUR-CODED WARNINGS	
	GREEN ALERT No risk
	YELLOW ALERT Be aware of high heat
	ORANGE ALERT Be prepared to take precautionary action against heat, or avoid exposure
	RED ALERT Be vigilant, step out only if necessary

A. CONTEXT AND CURRENT SITUATION

1. The India Meteorological Department (IMD) has issued a **yellow alert** for a **heatwave in Delhi** for **April 25 and 26, 2025**
2. The maximum temperature is likely to **increase by 2–3°C** heading into the weekend.
3. This spike is due to **clear skies** and **dry westerly winds**, which reduce moisture and increase daytime heat.

B. RECENT TEMPERATURE TRENDS IN DELHI

1. On **April 21, 2025**, Delhi recorded its **highest maximum temperature of the season**, reaching **41.3°C**.
2. The IMD forecasts **sustained high temperatures** between **40°C and 42°C** over the next few days.
3. A **slight drop** in temperature is expected from **Sunday onwards**, influenced by a **western disturbance** and the return of **easterly winds**.
4. **Strong surface winds** are expected on April 25 and 26, contributing to dry and hot conditions.

C. WHAT IS A HEATWAVE? – DEFINITION AND CRITERIA

1. Qualitative Definition

- a. A **heatwave** is a weather condition where the air temperature becomes **fatal to the human body** when exposed for a prolonged time.

2. Quantitative Definition

- a. It is defined based on **temperature thresholds**, either in terms of **actual temperature** or **departure from normal**.
- b. In some countries, it is measured using the **heat index**, which considers both **temperature and humidity**, or based on **extreme percentiles** of temperature distribution.

IMD-Specific Criteria for India

1. A **heatwave is declared** if the **maximum temperature** of a station is:
 - a. **≥ 40°C for plains**
 - b. **≥ 30°C for hilly regions**

- c. In **coastal regions**, a heatwave is considered if the departure from normal is **≥ 4.5°C**, and actual temperature is **≥ 37°C**.

2. A **severe heatwave** is declared if the departure is **≥ 6.4°C**, or if the **actual maximum temperature exceeds 45°C**.

D. SEASONAL PATTERN OF HEATWAVES IN INDIA

1. Heatwaves in India primarily occur from **March to June**.
2. In rare cases, they can extend into **July**, especially in arid regions.
3. The **peak month** for heatwaves in India is **May**.

E. HEATWAVE-PRONE AREAS IN INDIA

1. Heatwaves typically affect:
 - a. The **plains of northwest India**
 - b. **Central India**
 - c. **Eastern India**
 - d. **North Peninsular India**
2. These regions are vulnerable due to **high solar radiation**, **low humidity**, and **pre-monsoon dry conditions**.

F. IMD MONITORING MECHANISMS

1. The IMD operates a **wide network of surface observatories** across the country.
2. These observatories collect data on **temperature, humidity, wind speed and direction, and atmospheric pressure**.
3. Using this data, the IMD prepares **climatology of maximum temperatures** based on the 1981–2010 average.
4. The **normal maximum temperature** for each station and date is calculated.
5. Heatwaves are declared based on how much current temperatures **deviate from these normal values**.

G. DELHI WEATHER FORECAST (APRIL 25–27)

1. Maximum temperatures are forecast to be **40–41°C**, and minimum temperatures will range between **20–22°C**.
2. **Clear skies** and **dry westerly winds** will dominate, creating heatwave-like conditions.

3. **No rainfall** is expected in Delhi during this period.
4. A **western disturbance** may bring **easterly winds** from Sunday, slightly cooling temperatures.

H. PAN-INDIA WEATHER OUTLOOK

1. The IMD predicts **scattered to widespread rainfall** in the **eastern and northeastern states**.
2. These regions may also experience **thunderstorms, lightning, and gusty winds**.
3. **Kerala and Mahe** are forecast to receive **rainfall and thunderstorms**, with similar weather expected in other **southern regions**.

I. DELHI-NCR AIR QUALITY STATUS

1. As of April, Delhi's **Air Quality Index (AQI)** remained in the '**poor**' category, recorded at **238 at 7 am**.
2. The AQI on April 23 at the same time was **217**, showing a slight rise.
3. The **24-hour average AQI** on April 23 was **224**.
4. **Gurugram** reported an AQI of **170**, **Noida** 176, **Greater Noida** 160, and **Ghaziabad** 190.
5. These values fall under the '**moderate**' category, indicating **marginal improvement** in regional air quality.

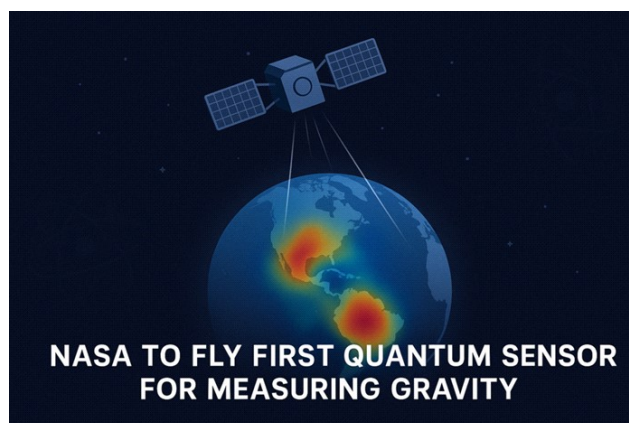
J. IMPACTS AND RISKS OF HEATWAVE CONDITIONS

1. Prolonged exposure to high temperatures can cause **heat exhaustion, heatstroke, and dehydration**.
2. **Children, the elderly, and outdoor workers** are especially vulnerable.
3. Poor air quality can **exacerbate respiratory and cardiovascular issues**, especially during heatwaves.

K. ADVISORIES AND PREVENTIVE MEASURES

1. Citizens are advised to **stay indoors during peak heat hours** (12 PM to 4 PM).
2. People should **stay hydrated**, wear **light cotton clothing**, and use **umbrellas or hats** if venturing out.
3. Local governments should activate **heat action plans**, **ensure water availability**, and create **cooling shelters** in vulnerable zones.

Quantum Gravity Gradiometer (QGG)



Why in News

NASA scientists propose the use of cold atom-based quantum gravity gradiometers (QGGs) to measure Earth's changing mass distribution, particularly in response to climate change.

Key Points

- **About Quantum Gravity Gradiometer (QGG)**
 - o The **Quantum Gravity Gradiometer (QGG)** is a highly sensitive instrument designed to detect minute changes in gravitational force.
 - o NASA scientists propose placing a **QGG** on a **satellite** to monitor the Earth's mass distribution and gravitational changes with **extreme precision**.
 - o **How it Works:**
 - * Atoms of a specific element are **cooled** to near **absolute zero** in a **vacuum**, transforming them into **wave-like states**.
 - * **Lasers** are used to manipulate these atoms, and a **phase shift** occurs in relation to the **gravitational force** acting on them.
 - * This technique allows for detection of gravitational changes as small as **10⁻¹⁰ m/s²** over a **1-meter distance**.

- **Applications**

- o **Measuring Earth's Mass Distribution:**

The QGG can estimate the mass of large formations, such as the **Himalayas**, and monitor the movement of **water, ice**, and **geological materials** with extreme accuracy.

- o **Impact of Climate Change:** This technology will help track changes in mass distribution due to climate change, such as melting glaciers, sea-level rise, and shifting water masses.

- **Gravitational Force Variability**

- o Gravitational force varies depending on the **mass distribution** of the Earth.
 - o For example, gravitational force is stronger near dense areas like **mountain ranges** and weaker in regions with less mass, such as **cities** or **flat plains**.

- **Gravity Gradiometer in Resource Exploration**

- o **Gravity Gradiometers** are used to detect local gravitational variations caused by differences in mass, useful for **resource exploration**.
 - o For example, they can help locate **hydrocarbon deposits** because oil and gas are less dense than surrounding rock.

Vatican City



Why in News

Vatican City mourns the loss of **Pope Francis**, who passed away at the age of 88, a day after his Easter appearance.

Key Point

- **About Vatican City**

1. **Smallest Nation:** Vatican City is the **world's smallest fully independent nation-state**, covering an area of only **0.49 sq. km**.
2. **Location:** Situated in the south-central region of Europe, it lies on the **west banks of the Tiber River** on a hill known as **Vatican Hill**, within **Rome (Italy)**. It is an **enclave** of Italy and is positioned in both the **Northern and Eastern hemispheres** of the Earth.
3. **Government:** Vatican City serves as the residence of the **spiritual leadership** of the Roman Catholic Church. The **Holy See**, led by the pope as the **Bishop of Rome**, governs the Catholic Church and holds authority over Catholics globally. Since **1929**, the Holy See has resided in Vatican City, which was established as an independent state to enable the pope to exercise universal authority.

- **Key Features of Vatican City**

1. **St. Peter's Basilica:** This imposing church, originally built in the **4th century** and **rebuilt in the 16th century**, is the **second-largest religious building** in Christendom, after the **Yamoussoukro Basilica**. It stands over the **tomb of St. Peter** the Apostle.
2. **Vatican Palace:** The **Vatican Palace** is the **residence of the pope** within the city walls.
3. **Vatican Swiss Guard:** The **Vatican Swiss Guard** is the **oldest continuously operating military force** in the world, tasked with the **security of the pope**.

- **Economy:** The Vatican's income is derived from the **voluntary contributions** of over **one billion Catholics** worldwide, along with **investments**, the **sale of stamps**, coins, and publications.

Sea of Marmara



Why in News

A **6.2 magnitude earthquake**, with its epicenter in the **Sea of Marmara**, recently hit **Istanbul**.

Key Points

- **About the Sea of Marmara**
 - o The **Sea of Marmara** is a **small inland sea** completely bordered by **Turkey**, making it a transcontinental body of water.
 - o It covers an area of **11,350 sq. km**, is approximately **280 km long**, and has a maximum width of **80 km** at its widest point.
 - o It serves as a natural boundary separating the **Asian** and **European** parts of Turkey.
- **Geographical Connections**
 - o In the **northeast**, the Sea of Marmara is connected to the **Black Sea** via the **Bosporus Strait**.
 - o In the **southwest**, it is linked to the **Aegean Sea** through the **Dardanelles Strait**.

- o It acts as a **transitional zone** between the **Black Sea** and the **Mediterranean Sea**.

• Salinity

- o The Sea of Marmara's water composition is influenced by the mixing of **cold, fresh water** from the **Black Sea** and **warm, salty water** from the **Mediterranean Sea**.
- o This creates a situation where **fresher water** is found near the surface, while **saltier water** resides at the bottom.

• Climate

- o The sea experiences a **humid subtropical climate**, with **hot summers** and **cold, wet winters**.

• Seismic Activity

- o The **North Anatolian Fault** runs beneath the Sea of Marmara, making the region prone to **earthquakes**. Several significant quakes have been recorded in the area over time.

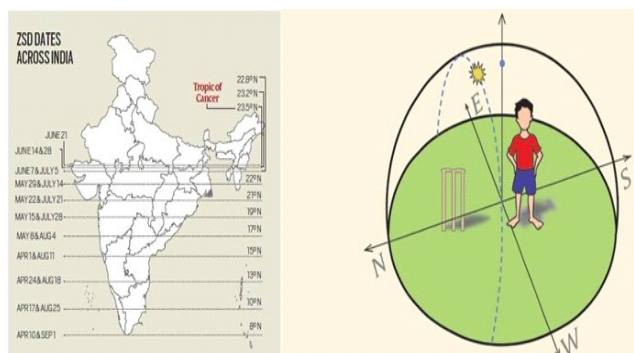
• Major Islands

- o Notable islands in the Sea of Marmara include:
 - * **Marmara Island:** The **second-largest island** in Turkey and the largest in the Sea of Marmara. Known for its **marble deposits**.
 - * **Prince Islands, Avşa, Imrali, Ekinlik, and Paşalimanı Islands.**

• Coastal Cities

- o Key coastal towns and cities along the Sea of Marmara include:
 - * **Istanbul, Izmit, Balıkesir, Yalova, Tekirdag, Bursa, and Çanakkale.**

Zero Shadow Day (ZSD)



Latest Development

- The **Cosmology Education and Research Training Center (COSMOS)**, Mysuru, of the **Indian Institute of Astrophysics** recently observed **Zero Shadow Day (ZSD)**.

About Zero Shadow Day (ZSD):

- **Zero Shadow Day** is an interesting **celestial phenomenon** that occurs twice a year when the **sun is directly overhead**, making the shadow of any vertical object **invisible**.
- This event happens for locations situated **between the Tropic of Cancer** and the **Tropic of Capricorn**.
- The ZSD phenomenon occurs when the **Sun's declination** becomes equal to the **latitude** of the location.
- On this day, as the **sun crosses the local meridian**, its rays fall exactly vertically relative to an object on the ground, making it impossible to observe any shadow of that object.
- This happens due to the **tilt of the Earth's axis** and its rotation around the sun, causing the angle of the sun's rays to change throughout the year. This, in turn, affects the **lengths** and **directions of shadows**.

When Does ZSD Occur?

- There are **two Zero Shadow Days** every year, observed in places that lie between the **Tropic of Cancer** and the **Tropic of Capricorn**.
- One ZSD occurs during **Uttarayan** (when the Sun moves **northwards**) and the other during **Dakshinayan** (when the Sun moves **southwards**).
- The exact timing of ZSD will differ depending on the location on Earth.
- ZSD lasts for a small part of a second, but the **effect can be observed for one to one-and-a-half minutes**.

Regions Experiencing ZSD:

- The **southern part of India**, roughly **below the latitude of Bhopal**, will experience the **ZSD**.
- States that can see this event include:
 - **Andaman and Nicobar Islands**

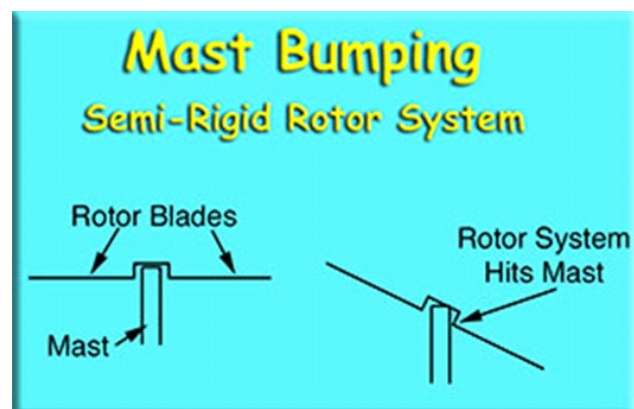
- **Kerala, Tamil Nadu, Puducherry, Karnataka, Andhra Pradesh, Telangana, Goa, Maharashtra, Odisha, Daman & Diu, Dadra & Nagar Haveli**
- Most of **Gujarat** and **Chhattisgarh**
- The southern parts of **Madhya Pradesh, Jharkhand, West Bengal, Tripura, and Mizoram**

Hudson River Helicopter Crash

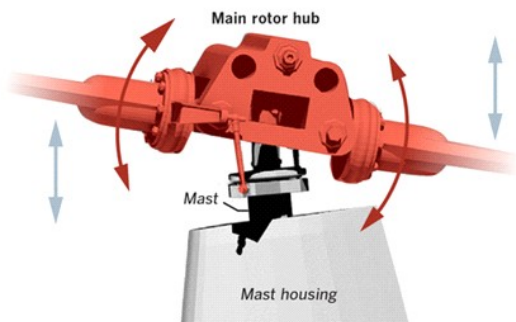


- On **April 10, 2025**, a **Bell 206 helicopter** crashed into the **Hudson River** near **Jersey City, New Jersey**, during a sightseeing tour.
- **NTSB Investigation Ongoing:**
 - Initial reports suggest **"mast bumping"** as a possible cause.

What is Mast Bumping?



- **Definition:** Mast bumping is a dangerous helicopter condition where the rotor hub strikes the main rotor mast. Mast bumping is primarily triggered by low-G conditions, abrupt control inputs, or gusty winds that cause the rotor blades to flap excessively..
- **Common in: 2-bladed, teetering rotor systems** (e.g., Bell 206).



- **Trigger Points:**
 - Low-G maneuvers
 - Abrupt or incorrect control inputs
 - Sudden weather changes or pilot overcorrection

About Hudson River



- **Location:** Primarily in **New York State**, U.S.A.
- **Boundary Role:** Forms a **34 km** border between **New York** and **New Jersey**.
- **Named After:** **Henry Hudson**, English sea explorer (1609 voyage).
- **Source:** Postglacial lakes in the **Adirondack Mountains**, near **Mount Marcy (1,629 m)**.
 - **Main Headstream:** Lake Tear of the Clouds via the **Opalescent River**.
- **Length:** ~507 km (315 miles)
- **Drains into:** Upper **New York Bay**, eventually the **Atlantic Ocean**
- **Drainage Basin:** **34,628 sq.km**

Pakke Tiger Reserve – Arunachal Pradesh



2023-24 Camera Trap Survey

- **9 individual tigers** (including **5 females**, **3 males**, and **1 cub**) were recorded in **Pakke Tiger Reserve**, Arunachal Pradesh, through **camera traps**.
- **Increase from last year:**
 - **2023:** 7 tigers
 - **2024:** 9 tigers
- **Camera Trapping Details:**
 - Conducted across **Seijosa**, **Tippi**, and **Rilloh Wildlife Ranges**.
 - **Seijosa & Tippi** data used for tiger estimation.
 - **Rilloh Range** focused on **Asiatic Black Bear Survey** (in collaboration with **WTI** – Wildlife Trust of India).
 - Sampling zone: **600 sq.km**
 - Cameras: **230 traps** at **150 locations**
 - Total effort: **6,750 trap nights**
 - **45-day closure period** observed to reduce bias and disturbance.

Faunal Diversity Captured

- **Big Cats:**
 - **Tigers**

- o **Leopard** (common & melanistic)
- o **Clouded Leopard**
- o **Marbled Cat, Leopard Cat**
- o **Golden Cat**
- **Other Mammals:**
 - o **Asiatic Black Bear**
 - o **Chinese Pangolin**
 - o **Binturong**
 - o **Wild Dog (Dhole)**
 - o **Ferret Badger** (*first photographic evidence from Rilloh range*)
- **Small Carnivores:**
 - o Large & Small Indian Civet
 - o Yellow-throated Marten
- **Herbivores & Prey:**
 - o Sambar, Barking Deer, Wild Pig, Gaur, Elephant
 - o Capped Langur, Assamese Macaque
 - o Brush-tailed Porcupine
 - o Smooth-clawed Otter
- **Bird Species:**
 - o **Red Jungle Fowl**
 - o **Khalij Pheasant**

About Pakke Tiger Reserve

- **Location:** East Kameng district, Arunachal Pradesh
 - o Borders **Assam** (Sonitpur district)
- **Major River:** **Pakke River** (called **Bardikarai** downstream in Assam)
- **Area:** ~862 sq.km
- **Biogeographic Zone:** Eastern Himalaya – Indo-Burma biodiversity hotspot

History & Conservation Status

- **1966:** Established as **Pakhui Sanctuary**
- **1977:** Declared **Game Sanctuary**
- **2001:** Renamed as **Pakhui Wildlife Sanctuary**
- **2002:** Declared the **26th Tiger Reserve** under **Project Tiger**
- **Management:**
 - o Under **National Tiger Conservation Authority (NTCA)**
 - o **38 anti-poaching camps** active; 24x7 vigilance by forest staff



Internal Security

Katchatheev Islands



Why in News:

The Tamil Nadu Legislative Assembly has once again unanimously adopted a resolution urging the Union government to retrieve Katchatheevu from Sri Lanka.

About Katchatheevu Islands

- **Location:** 285-acre uninhabited island situated in the Palk Strait between India and Sri Lanka
- **Distance:** 33 km northeast of Rameswaram (India) and 62 km southwest of Jaffna (Sri Lanka)

Strategic Importance:

1. Acts as a maritime boundary marker between India and Sri Lanka
2. Fisheries-rich zone, crucial for Tamil Nadu's fishing economy
3. St. Anthony's Church is a place of religious significance for fishermen of both nations

Historical Ownership of Katchatheevu:

1. Formed due to a volcanic eruption in the 14th century
2. Initially ruled by the Jaffna kingdom (Sri Lanka), later controlled by the Ramnad Zamindari under the Nayak dynasty (Madurai)
3. British India and Sri Lanka both claimed the island until the 1974 agreement settled sovereignty in Sri Lanka's favor

International Maritime Boundary Line (IMBL):

1. Delineated in 1974 under the Indo-Sri Lankan maritime boundary agreement
2. Established based on UNCLOS (United Nations Convention on the Law of the Sea)
3. Determines Exclusive Economic Zones (EEZs), Territorial waters, and Other maritime zones
4. The 1974 agreement adjusted the equidistant line, leading to Katchatheevu falling under Sri Lanka's sovereignty

Other Maritime Disputes:

1. India-Pakistan: Sir Creek Dispute: A boundary dispute over the demarcation of a 96 km estuary in Gujarat
2. India-Bangladesh: New Moore Island (South Talpatti dispute): Permanently settled in Bangladesh's favor after a 2014 ruling by the Permanent Court of Arbitration

INS Tarkash



1. Recent Operation:

- The Indian Navy's frigate INS Tarkash, deployed in the Western Indian Ocean for maritime security operations, recently intercepted and seized over 2,500 kg of narcotics.

2. About INS Tarkash:

- Type: A state-of-the-art stealth frigate of the Indian Navy.
- Class: Belongs to the Talwar class of guided missile frigates, which are modified Krivak III-class frigates built by Russia.

- Construction: Built at the Yantar shipyard in Kaliningrad, Russia.
- Commissioning: Commissioned and inducted into the Indian Navy on November 9, 2012, at Kaliningrad, Russia.
- Fleet: Part of the Indian Navy's Western Fleet.

3. Features of INS Tarkash:

- Stealth Technology: Uses advanced stealth technologies and a special hull design to reduce its radar cross-section.
- Dimensions: Length of 124.8 m, beam of 15.2 m, and draught of 4.2 m (13 ft 9 in).
- Speed: Top speed of 32 knots (59 km/h; 37 mph).
- Weaponry and Sensors:
 - Equipped with a weapon sensor system capable of addressing threats in all dimensions.
 - Can carry one Ka-28 Helix-A antisubmarine helicopter or one Ka-31 Helix-B airborne early warning helicopter.
 - Armed with the supersonic BrahMos missile system, an advanced surface-to-air missile system, an upgraded 100mm medium range gun, optically controlled 30mm close-in weapon system, torpedoes, rocket launchers, and an advanced electronic warfare/communication suite.

Conclusion:

The recent narcotics seizure by INS Tarkash underscores the Indian Navy's capability and commitment to maritime security operations. The frigate's advanced features and stealth technology make it a significant asset in maintaining security and stability in the Western Indian Ocean.

Akash Surface-to-Air Missile (SAM)



Why in News?

- India has **offered the Akash air defence missile system** to the **United Arab Emirates (UAE)**, boosting defence exports and strategic ties.

What is the Akash SAM System?

- A **Short-Range Surface-to-Air Missile (SRSAM)** system
- Designed to **protect strategic assets** from aerial threats
- Developed by **DRDO**, manufactured by **Bharat Dynamics Ltd (BDL)**
- Inducted into IAF in 2014** and **Indian Army in 2015**
- Armenia** became the first export customer in **2022**

Key Features

- Length:** 5.8 m | **Diameter:** 350 mm | **Wingspan:** 1,105 mm
- Range:** 4.5 km to 25 km
- Altitude:** 100 m to 20 km
- Guidance:** Command guidance system
- Target Types:** UAVs, helicopters, fighter aircraft
- Operational Modes:**
 - Group Mode** – coordinated targeting
 - Autonomous Mode** – independent targeting
- ECCM Capabilities:** Built-in features to resist jamming
- Mobility:** Fully mobile, platform-mounted
- Adaptability:** Open system architecture for integration with future air defence systems

Radar System

- Rajendra Radar:** High-power, multifunction **3D Passive Electronically Scanned Array (PESA)**
- Capable of scanning, tracking, and guiding missiles simultaneously
- Provides real-time data on **range, azimuth, and altitude** of targets

Taiwan Strait



Why in News?

- China launched aggressive military drills** in the **Taiwan Strait**, escalating regional tensions.

About Taiwan Strait

- Location:** Separates **mainland China** and **Taiwan**
- Width:**
 - 130–180 km wide**
- Depth:**
 - Averages **70 meters**
- Connects:**
 - South China Sea** to the **East China Sea**
- Islands:** Includes the **Pescadores (Penghu) Islands**, controlled by Taiwan
- Historical Name:** Once called **Formosa** by Portuguese navigators

Strategic & Economic Importance

- Global Trade:**
 - ~40% of global container ships** pass through annually

- **Fishing:**
 - Major fishing ground with **100+ commercial fish species**
- **Geopolitics:**
 - A hotspot of **military and political tensions**

Historical Background

- **1949:** Post-Chinese Civil War, Taiwan became a **de facto separate entity**
- **Taiwan Strait Crises:**
 - **1954–55 & 1958:** PRC shelled ROC-held islands
 - **U.S. military support** to Taiwan during both events
- The strait remains a **key flashpoint** in **China–Taiwan–U.S. relations**

Long-Range Glide Bomb (LRGB) 'Gaurav'



Why in News?

- The **Defence Research and Development Organisation (DRDO)** successfully conducted **Release Trials** of the **Long-Range Glide Bomb (LRGB) 'Gaurav'**.

About Long-Range Glide Bomb (LRGB) 'Gaurav'

- **Class:** 1,000-kg class glide bomb
- **Indigenous Development:** Developed by **DRDO**, with contributions from Indian private sector partners like **Adani Defence Systems**, **Bharat Forge**, and **MSMEs**
- **Functionality:**
 - **No Engine:** Relying on momentum after being dropped from high altitudes

- **Aerodynamic Surfaces:** Uses fins/wings for long-distance gliding toward the target
- **Reduced Risk to Pilots:** The bomb allows aircraft to stay outside enemy radar and air defence coverage while still achieving precision strikes

LRGB 'Gaurav' Features

- **Dimensions:**
 - **Length:** 4 metres
 - **Diameter:** 0.6 metres
 - **Wingspan:** 3.4 metres
- **Launch:** Air-launched from altitudes above **40,000 feet**
- **Range:** Over **100 km**
- **Guidance System:**
 - **Dual Guidance:**
 - * **Inertial Navigation System (INS)**
 - * **Satellite-based GPS**

Operation ATALANTA



Why in News

- On 18 April 2025, the **European Union Naval Force (EUNAVFOR)** under **Operation ATALANTA** proposed conducting a **joint naval exercise with the Indian Navy** by the end of May 2025, in response to rising piracy threats and instability in the **Red Sea** and **Western Indian Ocean**.

Key Points

- **Nature of Proposal:**
 - Aims to boost **maritime cooperation** between European and Indian naval forces.
 - Exercise will involve **advanced tactical manoeuvres, counter-piracy operations, and inter-naval communication training**—going beyond routine **PASSEX** (Passage Exercises).
- **Strategic Importance:**
 - The **Horn of Africa** and **Red Sea** region are seeing a **resurgence of piracy**, influenced by **Houthi rebel activity**.
 - The move comes despite a recent decline in piracy incidents, indicating **preventive maritime security coordination**.
- **About Operation ATALANTA:**
 - Launched in **2008**, it is the **EU's naval counter-piracy mission** operating in the **Western Indian Ocean** and **Red Sea**.
 - Initially focused on piracy off the **Somali coast**.
- **Expanded Mandate Includes:**
 - Protection of **World Food Programme (WFP)** vessels.
 - Surveillance of **arms embargo on Somalia**.
 - Monitoring **drug and arms trafficking**.
 - Combating **Illegal, Unreported and Unregulated (IUU) fishing**.
 - Disruption of the **illegal charcoal trade**.

International Maritime Bureau (IMB)



Why in News

- On 18 April 2025, the **International Maritime Bureau (IMB)** reported a **noticeable rise in global maritime piracy and armed robbery incidents** during the first quarter of 2025, raising concerns about the security of global shipping lanes.

Key Points

- **Establishment and Role:**
 - Founded in **1981**, the IMB is a **non-profit division of the International Chamber of Commerce (ICC)**.
 - It acts as a **central authority** to combat **maritime fraud, piracy, and malpractice** globally.
 - Encourages **information sharing and cooperation** among governments, shipping companies, and law enforcement.
- **Headquarters and Operations:**
 - The **Piracy Reporting Centre (PRC)** is based in **Kuala Lumpur, Malaysia**.
 - Provides **real-time reporting and daily status updates** on piracy via **Inmarsat-C SafetyNET**, Internet, Twitter, and email alerts.
- **Key Functions of IMB & PRC:**
 - Tracks and reports **piracy and armed robbery incidents**.
 - Supports **law enforcement efforts** to apprehend pirates and aid shipowners/crew of attacked vessels.
 - Publishes **quarterly and annual piracy reports**.
 - Offers services **free of charge** to ships regardless of ownership or flag.
 - Locates **lost or hijacked ships, recovers stolen cargoes**, and prepares **customised reports** (on a chargeable basis).

- **Legal and International Recognition:**
 - Recognised by the **UN International Maritime Organization (IMO)** under **Resolution A 504 (XII) (9)** (adopted in 1981).
 - Holds **observer status with INTERPOL**.
- **Other Services and Contributions:**
 - Provides **mediation and arbitration** in maritime disputes.
 - Promotes **best practices in maritime security and trade facilitation**.
 - Collaborates with global bodies like the **IMO** to create **security standards and guidelines** for safer shipping.

INS Chennai and INS Kesari



Why in News

- **INS Chennai** and **INS Kesari** successfully conducted manoeuvring exercises and **Visit, Board, Search & Seizure (VBSS)** drills during the sea phase of the **Africa India Key Maritime Engagement (AIKEYME) 2025**.

Key Points

- **About INS Chennai**
 - **INS Chennai** is the third and final ship of the **Kolkata-class stealth-guided missile destroyers** (Project 15A) in the Indian Navy.
 - It was commissioned on **November 21, 2016**, and constructed at **Mazagon Dock Limited (MDL)** in **Mumbai**.
 - The ship operates under the **Western Naval Command**.
 - **INS Chennai Features**

- * Length: **164 meters**, weight: **7,500 tonnes**.
- * Speed: Over **30 knots** (around **55 km/h**).
- * Powered by **four reversible gas turbine engines**.
- * Capacity: **350 to 400 personnel**.
- * Armament: **BrahMos supersonic surface-to-surface missiles, Barak-8 Long Range Surface-to-Air missiles**.
- * Defence: Equipped with **'Kavach'** (chaff decoy system) and **'Mareech'** (torpedo decoy system) – both developed in India.
- * Features: Can carry **up to two multi-role combat helicopters** and fight under **nuclear, biological, and chemical (NBC) warfare conditions**.
- * Surveillance: Fitted with modern **Surveillance Radar** for target data and gunnery control.

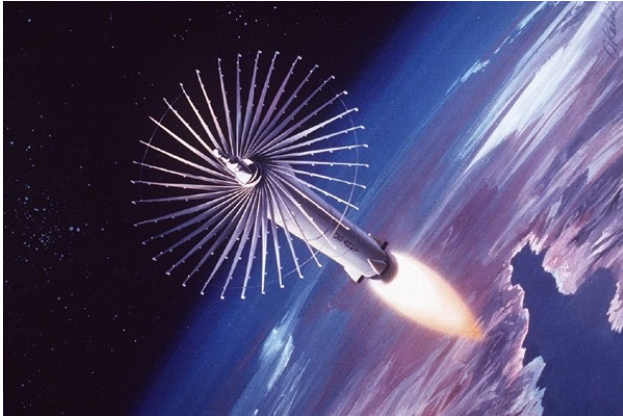
• About INS Kesari

- **INS Kesari (L15)** is a **Shardul Class Landing Ship Tank (LST)** of the Indian Navy, commissioned on **5 April 2008**.
- Built by **Garden Reach Shipbuilders and Engineers (GRSE)**, Kolkata.
- The ship is designed for amphibious operations and **humanitarian assistance and disaster relief (HADR)** missions.
- **INS Kesari Features**
 - * Capable of transporting **troops, tanks, armored vehicles, and military equipment**.
 - * Supports **amphibious operations** and **disaster relief efforts**.

Significance

The participation of **INS Chennai** and **INS Kesari** in the **AIKEYME 2025** exercises highlights India's growing naval capabilities, especially in **multilateral maritime engagements**, **amphibious operations**, and **humanitarian missions**.

Anti-Satellite (ASAT) Weapons



Why in News

- **Marjolijn van Deelen**, the **EU Special Envoy for Space**, recently highlighted **India's role** in shaping global norms for responsible space behaviour at the **Global Technology Summit**, emphasizing India-EU collaboration in space governance.

Key Points

- **About Anti-Satellite (ASAT) Weapons**
 - o **ASAT weapons** are specialized technologies designed to disable, destroy, or interfere with satellites for **strategic or defensive purposes**.
 - o These weapons play a critical role in **space warfare**, particularly to neutralize enemy satellites involved in **surveillance**, **communication**, **navigation**, or **early warning** systems.
 - o ASAT weapons are categorized into two types:
 - * **Kinetic Energy ASATs**: Physical impact through missiles that collide with and destroy satellites. This creates **orbital debris**, posing risks to other space objects.
 - * **Non-Kinetic ASATs**: Use non-

physical means such as **cyber-attacks**, **jamming**, **spoofing**, and **directed energy weapons** (like lasers) to disrupt or blind satellites without physically destroying them.

- o ASAT weapons can be launched from:
 - * **Ground stations**
 - * **Aircraft**
 - * **Satellites**

- **Global ASAT Capabilities**

- o **India**, along with the **United States**, **Russia**, and **China**, is one of the four countries to have demonstrated operational ASAT capabilities through tests.
- o India's ASAT test, **Mission Shakti**, was conducted in **March 2019**, where a live satellite in **Low Earth Orbit (LEO)** was destroyed by a **three-stage interceptor missile** in "**hit-to-kill**" mode at an altitude of around **300 km**.

- **Global Concerns and EU's Stance**

- o The **European Union (EU)** has expressed concerns about the **space debris** generated by ASAT tests and has called for a **UN framework** to regulate or ban destructive ASAT activities to avoid jeopardizing other space missions.

About Rendezvous and Proximity Operations (RPO)

- **RPO** refers to the intentional maneuvering of one spacecraft close to another in space for objectives like **docking**, **inspection**, or other mission-related goals.
 - o **Rendezvous operations**: Adjusting orbital parameters (trajectory, altitude, etc.) to approach another spacecraft for docking or berthing.
 - o **Proximity operations**: Keeping a spacecraft near another object without contact, on a pre-planned path.
- **Use in Espionage or Disruption**

- o While RPOs are common for scientific, repair, or refueling missions, they can also be used for **espionage, disruption**, or even disabling satellites, particularly if performed by hostile or unnotified actors.

Significance

India's successful **ASAT test** and its growing space capabilities underline its increasing role in shaping global space norms, particularly around **space security and debris management**. The growing concerns over **space debris** and **non-kinetic attacks** further underscore the need for robust international cooperation and regulations in space governance.

Next Generation Offshore Patrol Vessel (NGOPVs)



Why in News

- The **keel laying ceremony** of Yard 3040, the fourth **Next Generation Offshore Patrol Vessel (NGOPV)**, being built by **Garden Reach Shipbuilders & Engineers Ltd (GRSE)**, Kolkata, was recently held.

Key Points

- **About NGOPVs**
 - o The **NGOPVs** have an approximate **displacement of 3000 tonnes**.
 - o They are designed for **multi-role maritime operations**, including:
 - * **Coastal defence and surveillance.**
 - * **Search and rescue (SAR) missions.**
 - * **Protection of offshore assets**

such as **oil rigs and platforms**.

- * **Anti-piracy operations** in **India's Exclusive Economic Zone (EEZ)** and beyond.
- o The vessels will be equipped with **modern sensors and armaments**, enhancing the **Indian Navy's maritime domain awareness** and **low-intensity maritime conflict** capabilities.
- **Project Background**
 - o The construction of **NGOPVs** is part of a contract signed on **30 March 2023** for the indigenous design and development of **11 patrol vessels**.
 - o The contract was awarded to:
 - * **Goa Shipyard Ltd (GSL)** as the **Lead Shipyard** for **7 vessels**.
 - * **Garden Reach Shipbuilders & Engineers Ltd (GRSE)** as the **Follow Shipyard** for **4 vessels**.
 - o This project reflects India's commitment to **self-reliance in defence manufacturing** under the national initiatives of '**Aatmanirbhar Bharat**' and '**Make in India**'.

Line of Control (LoC)



Why in the News?

- The **Line of Control (LoC)** is in the news as Pakistan recently violated the ceasefire along the LoC in the Kashmir Valley, resorting to unprovoked firing. In response, the Indian

army took appropriate action to address the situation.

About Line of Control (LoC) :

- The **Line of Control (LoC)** is the military boundary between India and Pakistan in the disputed region of Jammu and Kashmir.

Key Points:

1. What is the LoC?

- o The LoC is not an international border but a ceasefire line established after the 1947-48 India-Pakistan war over Kashmir.
- o The Ceasefire Line (CFL) was renamed the Line of Control following the *Simla Agreement* in 1972, which came after the 1971 Indo-Pakistan war.

2. Length and Geography:

- o The LoC stretches about **740 kilometers** from **Ladakh** in the north to the **Poonch district** in the south.
- o The LoC divides the region into Indian-administered Jammu and Kashmir and Ladakh on one side, and Pakistani-administered areas, including **Pakistan Occupied Kashmir (POK)**, **Gilgit**, and **Baltistan**, on the other.

3. Militarized Zone:

- o The LoC is heavily militarized, with frequent skirmishes and cross-border firing between Indian and Pakistani forces.

4. Difference from International Border (IB):

- o The LoC is different from the **International Border (IB)**, which marks the official boundary between India and Pakistan outside the Kashmir region.

The LoC continues to be a sensitive and highly contested area, with tensions often leading to incidents like the recent ceasefire violation.

Shahid Rajaei Port



Why in the News?

- Iran is in the news due to a massive explosion at **Shahid Rajaei Port**, near the southern city of **Bandar Abbas**, which resulted in **18 deaths** and **800 injuries**.

About Iran

- Iran, with its capital in **Tehran**, is a significant country in **West Asia** with a rich history and strategic geographical importance.

Key Points

1. Location and Borders:

- o Iran shares land boundaries with **Armenia**, **Azerbaijan**, **Turkmenistan** to the north, **Afghanistan** and **Pakistan** to the east, **Iraq** to the west, and **Turkey** to the northwest.
- o It has maritime borders with **Bahrain**, **Kuwait**, **Oman**, **Qatar**, and **Saudi Arabia**.
- o Iran is bordered by the **Caspian Sea** in the north and the **Persian Gulf** and **Gulf of Oman** in the south.

2. Geographical Features:

- o **Terrain:** Iran's landscape is dominated by the **Iranian Plateau**, with vast deserts like **Dasht-e Kavir** and **Dasht-e Lut**.
- o **Mountains:** The **Zagros Mountains** in the west and the **Alborz Mountains** in the north are key geographical features.
- o **Mount Damavand**, located in the Alborz range, is the highest peak in Iran and also the highest volcano in the Middle East.
- o Iran's climate ranges from **arid** and

semi-arid to subtropical, especially along the **Caspian coast**

3. Natural Resources:

- o Iran has vast reserves of **oil and natural gas**, alongside minerals like **coal, chromium, copper, iron ore, lead, manganese, zinc, and sulphur**.

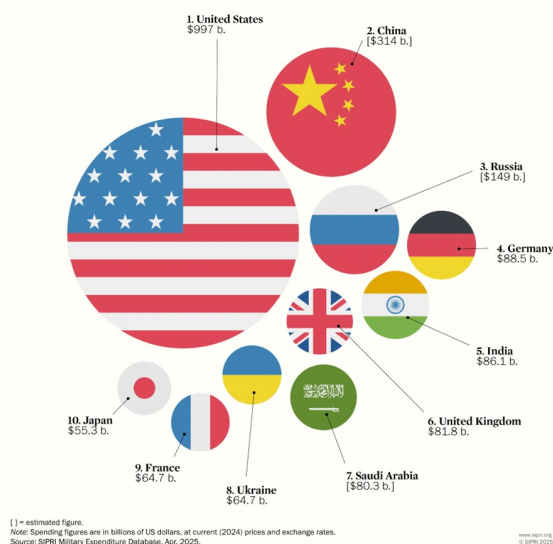
4. Strategic Importance of Shahid Rajaee Port:

- o **Location:** The port is located near the **Strait of Hormuz**, a crucial waterway through which nearly **20% of global oil trade** passes, making it essential for global energy security.
- o **Economic Role:** It is Iran's largest and most technologically advanced **container port**, handling a significant portion of the country's import-export trade.

The recent explosion at Shahid Rajaee Port has raised concerns, especially due to the port's strategic role in both Iran's economy and global energy security.

Trends in World Military Expenditure Report 2024

The 10 largest military spenders in 2024



Why in News

- The **2024** edition of the “**Trends in World Military Expenditure**” report, published by the **Stockholm International Peace Research Institute (SIPRI)**, has revealed that **India’s**

military spending was nearly nine times higher than Pakistan’s in 2024, reaffirming India’s position as the **fifth-largest military spender** in the world.

About the Report

- The **Trends in World Military Expenditure Report** is published **annually** by **SIPRI**, a leading Swedish think tank.
- It provides detailed, country-wise data and analysis of global military spending trends and patterns.
- The report covers **all world regions** and highlights the impact of geopolitical conflicts, alliances, and defence strategies on military budgets.

Key Highlights from the 2024 Report

Global Trends

- **Total global defence expenditure** in 2024 reached **\$2.46 trillion**, up from **\$2.24 trillion** in 2023.
- This represents an average of **1.9% of global GDP**, up from **1.6% in 2022** and **1.8% in 2023**.
- **All world regions** saw increases in military spending, primarily due to escalating global tensions and regional conflicts.

Regional Highlights

- **Europe (including Russia)** saw the **sharpest rise**, with military spending increasing by **17%**, reaching **\$693 billion**, largely driven by the **Ukraine-Russia war**.
- In the **Middle East**, military expenditure grew by **15%**, reaching **\$243 billion**, with **Israel and Lebanon** emerging as major spenders amid the ongoing **Israel-Hamas conflict**.
- **U.S. military spending** rose by **5.7%** to **\$997 billion**, comprising **66% of NATO’s total** and **37% of global defence spending**.
- **China’s spending** rose by **7%**, reaching **\$314 billion**, marking **30 consecutive years of growth** and accounting for **half of all defence spending in Asia and Oceania**.

Top Five Military Spenders (2024)

1. **United States** – \$997 billion (**37% of global total**)
2. **China** – \$314 billion (**12%**)
3. **Russia** – \$138 billion (**5.5%**)
4. **Germany** – \$81 billion (**3.3%**)
5. **India** – \$86.1 billion (**3.2%**)

India-Specific Insights

- India ranked as the **fifth-largest military spender** globally in 2024.
- India's defence budget rose to **\$86.1 billion**, a **1.6% increase** from 2023 and a **42% increase** since 2015.
- India's military expenditure in 2024 was **nearly nine times that of Pakistan**, reflecting the strategic and budgetary gap between the two South Asian neighbours.

INDIA-UZBEKISTAN JOINT MILITARY EXERCISE – DUSTLIK-VI (2025)



Key Points :

- **Name:** Exercise DUSTLIK-VI
- **Venue:** Foreign Training Node, Aundh (Pune), India
- **Schedule:** 16 – 28 April 2025
- **Edition:** 6th (Annual Exercise)
- **Previous Edition:** April 2024, Termez District, Uzbekistan

Participating Forces

- **India:** 60 personnel from **JAT Regiment** + **Indian Air Force (IAF)**
- **Uzbekistan:** Personnel from the **Uzbekistan Army**

Exercise Theme & Focus

- **Theme:** *Joint Multi-Domain Sub-Conventional Operations in Semi-Urban Scenario*
- **Focus Areas:**
 - o Response to terrorist actions involving territory capture
 - o Formation of Joint Operations Centre (JOC) at battalion level
 - o Counter-terrorism ops: raids, search & destroy, population control
 - o Firepower integration including air assets
 - o Use of **drones, counter-UAS, and logistics support**
 - o Heliborne ops (SHBO), reconnaissance, STIE (Small Team Insertion & Extraction)

Special Features

- Involvement of **Special Forces** (Army & Air Force)
- Securing and operating **helipads** for follow-up ops
- Enhancement of tactical inter-operability and joint mission planning

Strategic Importance

- Exchange of **TTPs** (Tactics, Techniques, and Procedures)
- Boosts **inter-operability** and joint combat readiness
- Strengthens **bilateral defence cooperation**
- Enhances **military diplomacy and trust-building**

INDIA-UZBEKISTAN RELATIONS – A MULTI-DIMENSIONAL PARTNERSHIP



1. Economic Relations

- India ranks among **Uzbekistan's Top 10 trading partners (2023–24)**
- Sectors: Pharmaceuticals, engineering goods, textiles, IT, etc.

2. Security & Defence Cooperation

- Regular conduct of **Joint Military Exercise DUSTLIK**
- Engagements in counter-terrorism, defence training, and equipment sharing

3. Multilateral Engagement

- Active cooperation in:
 - **United Nations (UN)**
 - **Shanghai Cooperation Organisation (SCO)**
 - **BRICS**
 - **G20**

4. Energy Security

- Strategic contract signed for supply of **Uranium Ore Concentrates** from Uzbekistan to India

5. People-to-People Ties

- Around **14,000 Indians** reside in Uzbekistan
- Growing academic, cultural and tourism exchanges

US Anti-Ship Missile NMESIS Arrives in the Philippines for Balikatan 2025



1. Introduction

- In a significant development in Indo-Pacific defense cooperation, the United States has deployed the Navy/Marine Expeditionary Ship Interdiction System (NMESIS) to the Philippines ahead of the annual **Balikatan military exercises**.
- This exercise is scheduled from **April 21 to May**

9, 2025.

- This deployment highlights the growing strategic collaboration between the US and the Philippines amid rising tensions in the **South China Sea**.

2. What is NMESIS?

NMESIS stands for **Navy/Marine Expeditionary Ship Interdiction System**. It is a **mobile, ground-based anti-ship missile system** developed by the **United States Marine Corps**.

- It is designed to launch **Naval Strike Missiles (NSMs)**, which are precision-guided weapons capable of targeting and destroying enemy ships from long range.
- The system reflects the US military's evolving strategy of **Littoral Operations in a Contested Environment (LOCE)**.
- It focuses on deploying advanced capabilities in coastal and island areas to deny enemy access to key maritime zones.

3. Purpose of Deployment

The NMESIS was brought to the Philippines specifically for its use in **Balikatan 2025**, marking the first time this advanced missile system will be tested in the region.

- The deployment aims to enhance **interoperability** between the **Armed Forces of the Philippines (AFP)** and the **US Armed Forces**.
- According to US Defense Secretary Pete Hegseth, the deployment of such systems enables joint training on "advanced capabilities to defend the Philippines' sovereignty."
- The missile system is expected to remain in the country for future exercises, suggesting a sustained US military presence in the region.

4. Significance of Balikatan 2025

Balikatan, which means "shoulder-to-shoulder" in Filipino, is a long-standing annual military exercise between the United States and the Philippines.

- In 2025, over **14,000 personnel** will participate: around **9,000 from the US**, **5,000 from the Philippines**, and **200 from Australia**.
- Observers from **over 20 countries** including

India, Japan, the UK, and others will also be present, indicating strong multilateral interest in the Indo-Pacific region.

5. What is New in Balikatan 2025?

The 40th iteration of Balikatan introduces a major innovation: the “full battle test.”

- Traditionally, exercises were split into two components: **Field Training Exercises (FTX)** and **Command Post Exercises (CPX)**.
- In 2025, these two are being **merged** into a single simulation to mimic real combat scenarios.
- The exercise now involves both real troops and simulated forces, allowing **commanders to test actual war plans** and decision-making processes under pressure.
- This approach represents a shift from training to **operational rehearsal**, with direct applications to potential conflict situations.

6. Strategic and Regional Implications

The deployment of NMESIS and the scale of Balikatan reflect a growing US commitment to **counter China’s assertiveness** in the South China Sea.

- It sends a clear message about **freedom of navigation**, rule-based international order, and the defense of **Philippine sovereignty**.
- For the US, this move is part of its **Free and Open Indo-Pacific (FOIP)** strategy.
- For the Philippines, it boosts **deterrence capabilities** and strengthens alliances amid increasing regional threats.

7. Implications for India

India’s participation as an observer signals its increasing engagement with **multilateral defense initiatives** beyond QUAD.

- The Indo-Pacific is a critical focus area for India, especially in the context of maritime security, freedom of navigation, and **countering Chinese influence**.
- Observing exercises like Balikatan provides India with valuable insights into **joint force integration**, interoperability, and modern warfare practices.

Meghayen-25 – Indian Navy’s

Meteorological & Oceanological Symposium



1. Introduction

- The Indian Navy conducted the **third edition of its Meteorological and Oceanological Symposium – Meghayen-25** on **14 April 2025** in New Delhi.
- The event was organized to commemorate **World Meteorological Organization (WMO) Day 2025**, in alignment with the global theme “Closing the Early Warning Gap Together”.

2. Objective and Significance

The symposium aimed to:

- Enhance knowledge exchange in **marine meteorology** and **oceanography**.
- Improve coordination among stakeholders involved in **maritime safety**, **early warning systems**, and **naval operations**.
- Strengthen India’s **maritime domain awareness** and preparedness for climate-related and operational challenges.

3. Key Institutional Participation

The symposium brought together experts and representatives from leading national agencies involved in atmospheric and ocean science, defense, and space technology:

- **India Meteorological Department (IMD)**
- **Indian Institute for Tropical Meteorology (IITM)**
- **Indian National Center for Ocean Information Services (INCOIS)**
- **National Institute of Ocean Technology (NIOT)**
- **Space Applications Center (ISRO)**
- **Indian Air Force**

- **National Maritime Foundation (NMF)**
- **Indian Institute of Technology (IIT-Madras)**

This reflects a whole-of-government and interdisciplinary approach to maritime forecasting and operational readiness.

4. Technical Sessions Overview

Two core sessions structured the technical program:

- **Session I** focused on developments in **Marine Meteorology and Oceanology**, including remote sensing, modeling, and forecasting systems.
- **Session II** covered **Statistical Approaches in Weather Forecasting**, highlighting data-driven methods and emerging tools for enhanced predictability.

Each session concluded with interactive discussions and active engagement from participants.

5. Panel Discussion: Maritime Security and Early Warning

A panel discussion was held on the theme:

"Closing the Early Warning Gap Together: Enhancing Maritime Security and Coordination."

The discussion emphasized:

- The need for **integrated civil-military coordination**.
- Strengthening **real-time data sharing** across maritime and meteorological agencies.
- Improving **early warning dissemination**, especially in coastal and island territories.

6. Institutional Milestones Announced

- Launch of MOSDAC-IN (Meteorological and Oceanographic Satellite Data Archival Centre – Indian Navy)
 - o A web-based platform developed jointly by the Navy's meteorological directorate and ISRO's SAC.
 - o Offers **customized, satellite-derived weather data** for Naval Meteorological Offices.
 - o Enhances **real-time decision-making** for naval operations and disaster response.
- Revival of "Sagarmanthan" Journal

- o The Navy's professional journal on meteorology and oceanography was relaunched after a decade.
- o Promotes research, best practices, and innovation in operational meteorology.

7. Strategic and National Importance

- Enhancing meteorological capabilities directly contributes to **maritime security, search and rescue operations**, and **disaster risk reduction**.
- With the Indian Ocean Region facing frequent cyclones, tsunamis, and monsoonal shifts, reliable ocean-atmosphere data is critical.
- Events like Meghayan support India's role as a **net security provider** in the region.

Resumption of Dhruv Helicopter Operations in Anantnag After Pahalgam Attack



A. CONTEXT

1. The indigenous Dhruv Advanced Light Helicopters (ALH) have resumed operations in the Anantnag area of Jammu and Kashmir.
2. This resumption follows a recent terror attack in Pahalgam.
3. The resumption comes after the entire fleet of ALH helicopters was grounded due to a crash in January 2025.

B. BACKGROUND: GROUNDING OF ALH FLEET

1. On January 5, 2025, a Dhruv ALH Mk-III helicopter of the Indian Coast Guard crashed in Porbandar, Gujarat.
2. The crash resulted in the deaths of three personnel, including two pilots and one aircrew diver.
3. Following this incident, all ALH helicopters

across the Army, Navy, Air Force, and Coast Guard were grounded.

4. The total grounded fleet consisted of over 300 helicopters.
5. The grounding was done for thorough safety checks and inspections.
6. This decision severely affected the operational capabilities of the armed forces.

C. RECENT DEVELOPMENTS POST-PAHALGAM ATTACK

1. In response to the terror attack in Pahalgam, the Ministry of Defence approved selective use of ALH helicopters.
2. The ground commander responsible for operations in the Anantnag area has been authorised to deploy the helicopters as needed.
3. This resumption is aimed at supporting counter-terror operations and troop mobility in the region.

D. SECURITY SITUATION IN KASHMIR

1. Defence sources estimate that around 125 to 130 terrorists are currently active in the Kashmir region.
2. Of these, nearly 115 to 120 are believed to be Pakistani nationals.
3. The objective behind the attack was likely to disturb the peace that has prevailed since the abrogation of Article 370.
4. The region has seen an increase in tourism and pilgrimages in recent years, especially for the Amarnath Yatra.
5. Defence sources believe the attack was meant to target this atmosphere of normalcy.

E. INTELLIGENCE AND SECURITY LAPSES

1. There was a lack of specific intelligence related to a potential attack in Pahalgam.
2. A general alert had been issued two weeks before the incident, warning of a possible terror threat.
3. The focus of the alert was primarily on the upcoming Amarnath Yatra, which has been targeted in the past.
4. There was no clear or specific information

pointing to an imminent threat in the Pahalgam area.

5. At the time of the incident, there were no security personnel deployed in at least ten nearby locations.
6. There was also a lack of electronic surveillance in key tourist areas.
7. These gaps contributed to the attackers being able to strike without early detection.

F. ROLE OF ALH IN COUNTER-TERROR OPERATIONS

1. The ALH Dhruv helicopters are essential in high-altitude and counter-insurgency operations.
2. They are used for transporting troops, conducting reconnaissance, and evacuating casualties (CASEVAC).
3. In regions like Kashmir, where terrain is difficult, these helicopters provide critical mobility and quick response capabilities.
4. The resumption of their flights is expected to strengthen the security response in volatile areas.

G. CHALLENGES AND THE WAY FORWARD

1. There is a need to maintain a balance between flight safety and operational urgency.
2. The armed forces must ensure the helicopters are both safe and available for rapid deployment.
3. Intelligence networks must be improved to detect and prevent such attacks.
4. Electronic surveillance in tourist and pilgrim areas needs to be expanded and upgraded.
5. There must be continuous investment in indigenous defence technology, such as the ALH, with proper quality and safety control.

H. FACTUAL INFORMATION FOR PRELIMS

1. The Dhruv ALH is an indigenous helicopter developed by Hindustan Aeronautics Limited (HAL).
2. It is used by all three armed forces — the Indian Army, Navy, Air Force — and the Indian Coast Guard.
3. The Mk-III variant is equipped with a glass

cockpit, rescue equipment, and maritime features.

4. The helicopter is capable of performing both military and humanitarian tasks, including search and rescue.

India's Decision to Cancel SVES for Pakistan Nationals



- **Reason for Cancellation:**
 - o Following the **Pahalgam terrorist attack** in **April 2025**, India decided to cancel the **SAARC Visa Exemption Scheme** for Pakistani nationals.
 - o This decision was taken after a meeting of the **Cabinet Committee on Security (CCS)**, which reviewed the situation of the attack.
- **Details of the Cancellation:**
 - o Pakistani nationals will no longer be permitted to travel to India under the SVES.
 - o Any **SVES visas previously issued to Pakistani nationals** have been deemed **cancelled**.
 - o Pakistani nationals already in India under the SVES have been given **48 hours** to leave the country.
 - o The **Cabinet Committee on Security** also declared the **defence, Navy, and Air advisors** in the Pakistani High Commission in India as **persona non grata (PNG)**.
 - o They were given a week to leave India.
 - o **India's retaliatory measures** include withdrawing its own defence, Navy, and Air advisers from the Indian High

Commission in Islamabad.

Implications:

- **Diplomatic Strain:** The cancellation of the SVES for Pakistan nationals reflects heightened **diplomatic tensions** between India and Pakistan, exacerbated by recent terrorist attacks.
- **Regional Cooperation Impact:** The move is likely to strain the broader regional cooperation within **SAARC** and could lead to further challenges for people-to-people exchanges between India and Pakistan.
- **Security Measures:** The decision also indicates a shift toward **more stringent security measures** in the aftermath of attacks blamed on cross-border terrorism.

Background:

- The **SAARC Visa Exemption Scheme (SVES)** was launched in **1992** with the aim of facilitating travel for certain categories of individuals within the **South Asian Association for Regional Cooperation (SAARC)** countries.
- The scheme came as a result of a decision made at the **Fourth SAARC Summit in Islamabad in 1988**.
- The scheme allows certain designated individuals from SAARC countries to travel without a visa across the region, promoting better regional cooperation.
- These individuals include **dignitaries, judges, parliamentarians, senior officials, journalists, businessmen, and sportspeople**, among others.

Key Features of SAARC Visa Exemption Scheme:

- **Target Group:** The scheme covers **24 categories** of entitled individuals, including:
 - o Dignitaries (e.g., heads of state)
 - o Judges of higher courts
 - o Parliamentarians
 - o Senior Government Officials
 - o Businessmen
 - o Journalists
 - o Sportspeople
- **Visa Exemption:** Individuals in these

categories are exempted from obtaining a visa when traveling to any of the eight SAARC countries.

- This exemption applies to all SAARC member states.
- **Duration & Validity:** The **visa stickers** issued to eligible individuals are generally valid for **one year** and are intended to simplify travel within the region by reducing administrative barriers such as visa applications, police reporting, and form filling.
- **Member Countries:** The 8 **SAARC** member states are:
 - **Afghanistan**
 - **Bangladesh**
 - **Bhutan**
 - **India**
 - **Maldives**
 - **Nepal**
 - **Pakistan**
 - **Sri Lanka**
- **Visa Stickers:** Each member state issues visa stickers for its nationals who fall under the eligible categories.
- These visa stickers help streamline the travel process within the region.

Purpose of the Scheme:

1. **Promote Regional Cooperation:** The scheme was introduced to ease travel for individuals who contribute significantly to South Asian cooperation in various fields, thus fostering closer ties among the member states.
2. **Support for South Asian Integration:** By facilitating the movement of key professionals, the scheme contributes to strengthening cultural, social, economic, and political integration within the region.
3. **Promote People-to-People Connectivity:** The scheme is aimed at promoting greater interaction between the citizens of SAARC countries, enhancing mutual understanding and cooperation.

Other SAARC Initiatives:

Besides the Visa Exemption Scheme, **SAARC** also has initiatives in areas like:

- **Poverty alleviation**
- **Agriculture**

- **Tourism**
- **Academic engagement** through internships and programs focusing on South Asian affairs.

Conclusion:

The **SAARC Visa Exemption Scheme** was designed to ease travel and enhance regional cooperation. However, recent security concerns, particularly the **Pahalgam attack**, have led India to suspend the scheme for Pakistani nationals, reflecting the challenges of maintaining diplomatic and regional cooperation in the face of ongoing security threats.

Govt. Brings Cybercrime Centre (I4C) Under PMLA



What's the News?

- On **April 25, 2025**, the **Revenue Department** under the **Ministry of Finance** notified that the **Indian Cyber Crime Coordination Centre (I4C)** has been brought under **Section 66 of the Prevention of Money Laundering Act (PMLA), 2002**.
- This allows **I4C** to **share and receive information** with the **Enforcement Directorate (ED)** and other law enforcement agencies to strengthen the fight against **cyber fraud and money laundering**.

Why is This Important?

- **Cybercrime** is increasingly linked to **financial frauds**, often involving money laundering.
- Fraudsters use **fake websites, deceptive ads, phishing links, OTP scams, etc.**, often operating **transnationally**.
- This move will **track the money trail** in

cybercrimes, enabling authorities to **identify and arrest masterminds** behind such crimes.

About Section 66 of PMLA, 2002

- Empowers the **Director of Enforcement** to share information with other agencies if there's evidence of a law being violated.
- This inter-agency cooperation is crucial for complex investigations, especially in **financial and cyber crimes**.

About I4C (Indian Cyber Crime Coordination Centre)

- **Launched:** Inaugurated in **2020** by the Ministry of Home Affairs (MHA).
- **Attached Office of MHA:** Since **July 2024**.
- **Objective:** To build a comprehensive ecosystem for **coordinated response to cybercrime**.
- **Key Components (Verticals):**
 1. **National Cybercrime Reporting Portal (NCRP)** – for public reporting of cybercrimes.
 2. **National Cybercrime Threat Analytics Unit (NCTAU)**.
 3. **National Cybercrime Ecosystem Management Unit (NCEMU)**.
 4. **Joint Cyber Crime Coordination Teams (JCCT)**.
- **Public Helpline:** Toll-free number **1930** and portal **cybercrime.gov.in**.

About Enforcement Directorate (ED)

- **Formed:** Originally in **1956** as the "Enforcement Unit" under the Department of Economic Affairs.
- Renamed to **Enforcement Directorate (ED)** in 1957.
- **Mandated to enforce:**
 1. **Foreign Exchange Management Act (FEMA), 1999** – Civil law for external trade/payments.
 2. **Prevention of Money Laundering Act (PMLA), 2002** – Criminal law to prevent money laundering
 3. **Fugitive Economic Offenders Act (FEOA), 2018** – Targets economic offenders abroad.

What is Cybercrime?

Cybercrime involves illegal activities using computers, networks, or digital tools. It can be:

- **Hacking** – Unauthorized access to systems.
- **Phishing** – Tricking individuals to reveal sensitive info.
- **Malware** – Malicious software to harm or gain control.
- **Identity Theft** – Stealing personal data for fraud.
- **Cyber Espionage** – Gaining confidential data covertly.
- **Cyberbullying** – Harassment using digital platforms.

Impact of Cybercrime

- **Threat to National Security** – Attacks on government or critical infrastructure.
- **Data Breaches** – Exposure of sensitive personal and business data.
- **Service Disruption** – Essential services like power or communication may be targeted.
- **Loss of Trust** – Victims (individuals or companies) face reputational harm.

Key Indian Government Initiatives Against Cybercrime

Initiative	Description
CERT-In	National nodal agency for cybersecurity incident response.
NCIIPC	Protects critical information infrastructure.
CCPWC Scheme	MHA initiative to build cyber forensic labs and train personnel.
Cyber Swachhta Kendra	Provides tools for malware/botnet cleaning and awareness.
National Cyber Crime Reporting Portal	For public to report all types of cybercrimes.
Citizen Financial Cyber Fraud Reporting System	For real-time response to financial frauds.

International Cooperation on Cybercrime

Convention/Forum	Purpose
Budapest Convention on Cybercrime	First global treaty to address internet-related crimes.
Internet Governance Forum (IGF)	UN platform for dialogue on internet governance.
Malabo Convention (AU)	African framework for cyber security and personal data protection.

Conclusion

The inclusion of **I4C under PMLA** is a **strategic step** in India's cybercrime response mechanism. It enhances **information sharing** and **coordinated law enforcement action**, especially vital in tackling **financially motivated cybercrimes** which are often **international in nature**.

EDITORIALS

Crux of The Hindu & Indian Express

Internal Security

Should the Free Movement Regime (FMR) between India and Myanmar remain?



- In February 2024, the Union Home Minister

announced plans to scrap the **Free Movement Regime (FMR)** along the **India-Myanmar** border due to security concerns and allegations.

- These unregulated cross-border movements **were contributing to ethnic conflicts**, particularly in Manipur.
- However, the Ministry of External Affairs has yet to issue a formal notification, and Myanmar has not signed any agreement on this matter.
- The FMR, which has **existed since 1968**, **allows people on both sides of the 1,653 km border** to move freely within a 16 km limit.
- This policy has facilitated deep familial, ethnic, and trade ties between border communities.

What is the Free Movement Regime (FMR)?

- The Free Movement Regime (FMR) allows citizens in India and Myanmar's border regions to cross into each other's countries without a visa, within a specified limit.
- It was **introduced in 2018 as part of India's Act East Policy**.
- The regime allows individuals living near the border to travel up to 16 km into the neighboring country with minimal restrictions, facilitating local trade, educational access, and healthcare.
- Those residing along the border are granted a **one-year border pass that permits stays of up to two weeks in the neighboring country**.

Historical Context:

- Much of India's northeast was under Burmese occupation until the **Treaty of Yandaboo in 1826**, which established the current India-Myanmar boundary.
- The treaty was signed between the **British and the Burmese**, ending the **First Anglo-Burmese War**.
- This border, however, divided communities with shared ethnic and cultural backgrounds, such as the **Nagas in Nagaland and Manipur**, and the **Kuki-Chin-Mizo** communities in

Manipur and Mizoram, without their consent.

- Currently, India and Myanmar share a 1,643 km border through Manipur, Mizoram, Nagaland, and Arunachal Pradesh, of which only 10 km is fenced in Manipur.

Impact of FMR on Border Communities:

- For communities in Mizoram, which shares an international border with Myanmar, the FMR had limited impact.
- Historically, cross-border transactions have been a part of everyday life, with people on both sides maintaining strong business and familial relationships.
- The 16 km restriction imposed in 2004 did not substantially change the nature of these interactions.
- For other border communities, the **FMR is largely unknown**. The regime has only gained attention recently due to issues in Manipur.
- Prior to that, these communities were largely unaware of any formal restrictions on their movement across the border.

Centre's Security Concerns:

The Centre has expressed concerns over the possible negative impact of the FMR, focusing on security issues such as infiltration, drug trafficking, arms smuggling, and insurgency activities.

- **Increased Infiltration:** There are growing concerns about the **influx of illegal immigrants, particularly from the Chin and Naga communities in Myanmar**, along with the movement of Rohingyas.
- This is feared to strain local resources and impact the demographic makeup of border areas.
- **Drug Trafficking and Arms Smuggling:** The porous border allows for the easy movement of drugs and weapons, posing a serious threat to internal security.
- In 2022, Manipur reported 500 cases and 625 arrests under the Narcotic Drugs and Psychotropic Substances (NDPS) Act.
- **Insurgency Activities:** Insurgent groups

operating in India's northeast, such as the Kuki National Organisation (KNO) and Kangleipak Communist Party-Lamphel (KCP-Lamphel), have been able to cross the border easily due to the FMR, evading capture and further destabilizing the region.

Socio-economic and Regional Issues:

The FMR has also raised concerns regarding its socio-economic impact, including potential harm to local cultures and the environment.

- **Cultural Identity:** There are concerns about the preservation of indigenous cultures and traditions in the border areas. The unrestricted movement of people has raised fears that increased migration might dilute local cultural practices.
- **Environmental Degradation:** Unregulated cross-border movement has been linked to illegal resource extraction, including deforestation and mining activities, further exacerbating environmental challenges in the region.
- **Regional Dynamics:** China's growing influence in Myanmar has added complexity to the security situation. The geopolitical situation, coupled with Myanmar's internal instability, makes managing the border increasingly challenging.

Major Aspects of India-Myanmar Relations:

India and Myanmar share long-standing historical and cultural ties, with Buddhism acting as a significant link between the two nations.

- **Treaty of Friendship (1951):** This treaty forms the foundation of their diplomatic relations.
- **Economic Cooperation:** India is Myanmar's fourth-largest trading partner and a major source of investment.
- Collaborative projects include the Kaladan Multimodal Transit Transport Project and the Trilateral Highway Project, which aim to enhance connectivity and trade.
- India has also been involved in the restoration of Ananda Temple in Bagan, Myanmar.
- **Disaster Relief:** India has been prompt in

providing disaster relief to Myanmar during natural calamities, including Cyclone Mora in 2017 and the earthquake in Shan State in 2010.

Should the FMR Stay? What Are the Alternatives?

- **Monitoring and Regulation:** While the FMR could be reformed to better monitor cross-border movement, completely scrapping it may not address the underlying issues of cross-border crime or ethnic conflict.
- Instead, border areas could be more effectively managed by strengthening monitoring mechanisms and fostering better communication between Indian and Myanmar authorities.
- **Legalizing Trade:** Legalizing some forms of cross-border trade could help curb illicit activities and generate revenue for the government.
- By formalizing trade, the government could also ensure proper regulation of goods moving across the border, which would benefit the local economy while minimizing illegal practices.
- **Community Involvement:** Involving local communities in discussions and giving them a sense of ownership and responsibility could also play a crucial role in ensuring the security and economic stability of the region.
- The government must carefully navigate the sentiments of border populations, who share ethnic ties across the border.

Practicality of Fencing the Border:

- The proposal to erect a fence along the 1,700 km India-Myanmar border faces significant practical challenges, including the difficult terrain and the complex nature of the border region.
- Even in countries with advanced infrastructure, such as the U.S., fences have proven ineffective in completely preventing illegal border crossings.
- A fence could also exacerbate tensions with local communities, many of whom share close ethnic and familial ties with people across the

border.

- These communities may see such measures as an infringement on their rights and identity.

Conclusion:

The future of the Free Movement Regime between India and Myanmar is uncertain. While security concerns are valid, scrapping the FMR or erecting a border fence may not be the most effective solutions. A more comprehensive approach that involves better border management, community engagement, and the legalization of cross-border trade could address both security issues and local economic needs. Any decision should prioritize the interests of the people living along the border while safeguarding national security.

Indian Armed Forces Conduct Tri-Services Exercise Prachand Prahar



- From **March 25-27, 2024**, the Indian Armed Forces conducted a tri-service integrated multi-domain exercise, codenamed **Prachand Prahar**, in the high-altitude terrain of the Himalayas along the Northern Borders in **Arunachal Pradesh**.
- The exercise aimed to validate the military's capability to coordinate across all 3 branches—Army, Navy, and Air Force—in a seamless and synchronized manner, especially in a contested electronic environment.

Key Highlights of the Exercise

- **Deployment of Advanced Surveillance Resources:** The exercise began with the deployment of sophisticated surveillance

assets from all three services:

- o **Indian Air Force (IAF):** Long-range surveillance aircraft
- o **Indian Navy:** Maritime domain awareness aircraft
- o Helicopters and **Unmanned Aerial Vehicles (UAVs)** were deployed alongside **space-based resources** to enhance situational awareness and track simulated targets.
- **Target Identification and Destruction:** Once targets were identified, they were swiftly neutralized through synchronized joint firepower, which included:
 - o **Fighter aircraft**
 - o **Long-range rocket systems**
 - o **Medium artillery**
 - o **Armed helicopters**
 - o **Swarm drones**
 - o **Loitering munitions**
 - o **Kamikaze drones**
- The exercise simulated a real-time, high-intensity conflict scenario in an **electronically contested environment**, showcasing the precision and speed at which the services can neutralize threats.
- **Leadership and Review:** Senior military officials reviewed the exercise, including:
 - o **Eastern Army Commander:** Lieutenant General Ram Chander Tiwari
 - o **Eastern Air Commander:** Air Marshal Surat Singh
 - o **Navy Commodore:** Ajay Yadav
- They commended the participants for their high professional standards and effectiveness during the exercise.

Connection with Previous Exercises

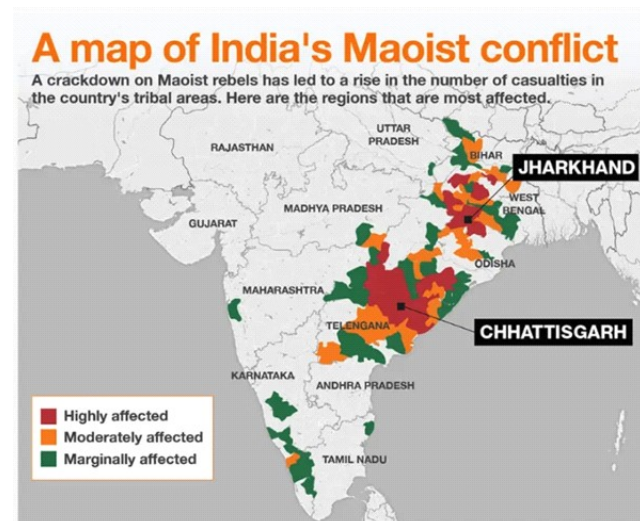
- **Ex Prachand Prahar** is a continuation of **Exercise Poorvi Prahar** held in **November 2024**, which focused on the integrated application of aviation assets.

- Together, these exercises reflect a growing emphasis on joint operational capability and coordination across the Indian Armed Forces.

Conclusion

Ex Prachand Prahar marked a significant step in enhancing the operational synergy and technological readiness of the Indian Armed Forces. Focusing on **joint operations, precision strikes, and advanced surveillance and firepower systems**, the exercise showcased India's ability to tackle multi-domain threats with precision and effectiveness. The exercise demonstrated the Indian military's commitment to maintaining a strategic edge in the face of emerging security challenges and reinforcing India's capability to defend its borders with unparalleled jointness and technological superiority.

Reduction in Left-Wing Extremism-affected Districts and Amit Shah's Goal for 'Naxal-Mukt Bharat'



Background:

- Union Home Minister **Amit Shah** recently announced a significant reduction in the number of districts affected by Left-Wing Extremism (LWE), or **Naxalism**, in India.
- On **March 30, 2025**, He also marked a major achievement in the government's effort to eradicate Naxalism, with a target set for the complete elimination of this insurgency by **March 31, 2026**.

Key Highlights of Amit Shah's Announcement:

1. Reduction in Affected Districts:

- o The number of **districts severely affected by Left-Wing Extremism (LWE)** has dropped from **12** to just **6**.
- o This represents a **50% reduction** in the most affected regions.
- o **Six districts** still considered most impacted by Naxalism are:
 - * **Chhattisgarh:** Bijapur, Kanker, Narayanpur, Sukma
 - * **Jharkhand:** West Singhbhum
 - * **Maharashtra:** Gadchiroli

2. Districts of Concern:

- o The number of **Districts of Concern**, which require additional resources but are not as severely affected as the top six, has decreased from **9** to **6**. These districts include:
 - * **Andhra Pradesh:** Alluri Sitarama Raju
 - * **Madhya Pradesh:** Balaghat
 - * **Odisha:** Kalahandi, Kandhamal, Malkangiri
 - * **Telangana:** Bhadrachalam

3. Financial Assistance:

- o The government has allocated special funding for these districts under a financial scheme:
 - * **₹ 30 crore** for the most affected districts.
 - * **₹ 10 crore** for the districts of concern.

Goal of a 'Naxal-Mukt Bharat':

- Amit Shah reiterated the government's goal to make India **"Naxal-free"** by **March 31, 2026**.
- Shah highlighted that this target is achievable through the **relentless efforts of the Modi government**, combining a **strong security approach** with **developmental initiatives**.
- **Two significant encounters** in **Chhattisgarh** (March 19, 2025), which led to the death of **30**

Maoists and the loss of one Indian soldier, were cited as important steps in this campaign. Shah praised these encounters as a major success in the journey towards a **Naxal-Mukt Bharat**.

Impact of the Modi Government's Efforts:

• Decline in Violent Incidents:

- o From 2004 to 2014, there were **16,463 incidents** of Naxal violence. Under **PM Modi's leadership (2014-2024)**, this number dropped by **53%**, falling to **7,744** incidents.
- o **Casualties** have also significantly reduced, with **security forces' casualties** falling by **73%** (from 1851 to 509) and **civilian casualties** decreasing by **70%** (from 4766 to 1,495).

Left-Wing Extremism (LWE) in India:

• Origins and Ideology:

- o Naxalism traces its roots to the **1967 Naxalbari Uprising in West Bengal**. It is based on the ideology of **violence and armed insurrection** to overthrow the state and establish a Communist government.
- o The Naxal insurgency, which aims to mobilize the tribal population, is primarily concentrated in what is known as **India's Red Corridor**, covering parts of **Chhattisgarh, Jharkhand, Odisha, Madhya Pradesh, Telangana, and Maharashtra**.

• Declining Impact:

- o In **2013**, there were **126 districts** affected by Naxalism, but this number has since decreased to **38** in 2024, signaling a significant improvement.
- o There has also been a **sharp increase** in the number of Naxalites **arrested (17%)**, **surrendered (1.5 times)**, and **killed (5 times)**, showcasing the government's aggressive stance against extremism.

Measures to Tackle Left-Wing Extremism:

1. Policy Measures:

- o In **2015**, the Indian government approved a **National Policy and Action Plan** to address LWE, focusing on both **security** and **developmental strategies**.
- o In **2017**, the **SAMADHAN doctrine** was introduced, a framework outlining the approach to counter LWE, which includes **Strategy**, **Actionable intelligence**, **Mobilization of forces**, **Awareness campaigns**, and **Development** in affected areas.

2. Security Measures:

- o **Fortification of police stations** in vulnerable areas under the **Special Infrastructure Scheme (SIS)**.
- o **Increased funding** for security operations in LWE-affected states, nearly **tripling** the budget to around **₹ 3,000 crore**.
- o High-profile **counter-insurgency operations** like **Operation Green Hunt**, **Operation Octopus**, **Operation Double Bull**, and **Operation Chakrabandha** have been launched to target Naxal hotspots.

3. Developmental Measures:

- o **Infrastructure Development:** Over the last decade, the government has constructed over **14,000 km of roads** in LWE-affected areas to improve connectivity and facilitate security and development efforts.
- o **Education:** The establishment of **216 Eklavya Model Residential Schools (EMRS)** in tribal areas to promote education and reduce Naxalite influence over the younger population.
- o **Aspirational Districts Program:** The **Ministry of Home Affairs** monitors 35 LWE-affected districts under this

program, aiming to uplift socio-economic conditions in these regions.

- o **Rehabilitation for Surrendered Extremists:** Naxals who surrender can receive **legal aid, healthcare, education, and employment opportunities**, fostering their reintegration into society.

Conclusion:

The reduction in the number of LWE-affected districts and the decreasing number of violent incidents in Naxal-impacted areas are clear indicators of the Indian government's success in combating Naxalism. By adopting a combination of **security, development, and rehabilitation measures**, the government aims to create a **"Naxal-Mukt Bharat"** by **2026**. While challenges remain, particularly in the **six most affected districts**, the progress made thus far offers hope for a future free from Left-Wing Extremism.

India, US to Kick Off Tri-Service Exercise in Bay of Bengal : Tiger Triumph 25



Introduction:

India and the United States are set to begin their major tri-service exercise, **'Tiger Triumph'**, in the **Bay of Bengal** on **April 1, 2025**. The exercise, which will focus on **enhancing military interoperability** for **humanitarian assistance and disaster relief (HADR)** as well as **crisis situations**, will involve various branches of the armed forces from both countries and is scheduled to last for two weeks.

Key Details of the Exercise

1. Exercise Phases:

- The exercise will have two main phases:
 - o **Harbour Phase:** Conducted at **Visakhapatnam**, focusing on

preparations and coordination between the forces.

- o **Maritime and Amphibious Operations:** Taking place off **Kakinada**, involving large-scale naval and amphibious drills.

2. Focus Areas:

- **Military Interoperability:** The exercise aims to improve cooperation and coordination between Indian and U.S. forces, focusing on disaster relief, humanitarian assistance, and managing crises.
- **Combined Coordination Centre:** The two sides will establish **standard operating procedures (SOPs)** for a **joint coordination centre** to facilitate smooth communication and rapid responses during exercises and future contingencies.

Participating Forces and Assets

1. Indian Forces:

- **Warships:** The Indian Navy will deploy **INS Jalashwa**, **INS Gharial**, **INS Mumbai**, and **INS Shakti** with **integral helicopters** and **landing crafts**.
- **Aircraft:** The Indian Air Force (IAF) will contribute **C-130J 'Super Hercules'** aircraft, **Mi-17 helicopters**, and a **Rapid Action Medical Team (RAMT)**.
- **Army:** The Indian Army will send troops from the **91 Infantry Brigade** and the **12 Mechanised Infantry Battalion**.

2. U.S. Forces:

- **Warships:** The U.S. Navy will send the **amphibious warship USS Comstock** and the **guided-missile destroyer USS Ralph Johnson**.
- **Marines:** U.S. Marines will participate in the exercise alongside naval forces.
- **Medical Teams:** The U.S. Navy will also provide a **medical team** to support the joint medical camp setup for the exercise.

Joint Operations and Coordination

- During the exercise, a **joint command and control centre** will be set up at the **Kakinada**

Naval Enclave for better coordination between the Indian Army and U.S. Marines.

- A **joint medical camp** will be established by both nations, where the **Indian Air Force**, **RAMT**, and the **U.S. Navy medical team** will provide aid, strengthening medical cooperation during emergencies.

Strategic Significance

1. Strengthening Bilateral Ties:

- The exercise is part of the ongoing effort between India and the U.S. to enhance their **strategic partnership** and **military convergence**.
- This collaboration is seen as a step towards deepening ties in the face of regional security challenges.

2. Expanded Scope of Military Cooperation:

- This is the fourth edition of **'Tiger Triumph'**, and it reflects the increasing complexity, scope, and frequency of joint military exercises between the two countries.
- India and the U.S. also engage in other major military exercises like **'Vajra Prahar'** and **'Yudh Abhyas'** (between their armies), as well as the **Malabar naval wargames**, which include Australia and Japan.

India Set to Operationalise Dedicated Naval Base for Nuclear Submarines



Key Points:

1. Introduction to INS Varsha:

- o **INS Varsha** is a dedicated naval base being developed by India for the support of its nuclear-powered submarines, specifically the **nuclear-powered ballistic missile submarines (SSBNs)**.
- o **Location:** Situated on the eastern coast of India, near **Rambilli**, Andhra Pradesh, about **50 km south of Visakhapatnam**.
- o **Commissioning:** The base is expected to be operational by **2026**.

2. Strategic Importance:

- o **Project Varsha** is a crucial part of India's long-term plan to bolster its **sea-based nuclear deterrent**.
- o The base is designed to ensure the **survivability** and **secrecy** of India's nuclear assets, with underground pens, tunnels, and secure harbor facilities.
- o **Deep-water access** in the Bay of Bengal allows for the covert movement of submarines, helping to evade **enemy surveillance**.

3. Underground Pens and Tunnels:

- o The **underground pens** are designed to **protect** India's SSBNs in case of a **preemptive strike** by an adversary, ensuring that these submarines remain undetected and operational even in the event of a counterforce attack.
- o These facilities are critical in preserving India's **second-strike capability**, which ensures retaliation even after a nuclear attack, a cornerstone of **nuclear deterrence**.

4. Submarine Fleet Expansion:

- o **INS Aridhaman**, India's third SSBN, is scheduled to be commissioned later this year, enhancing India's **nuclear triad** (land, air, and sea-based nuclear weapons).
- o The **K-4 missiles** onboard INS Aridhaman will have a range of **3,500 km**, increasing India's deterrent capabilities.
- o **INS Arihant** and **INS Arighat** are India's existing SSBNs, and **INS Aridhaman** will carry more missiles than its predecessors.

5. Future Developments:

- o **Fourth SSBN:** India launched its fourth SSBN in **November 2024**, which boasts **75% indigenous content**.
- o **Larger SSBNs** are under development, indicating India's growing capabilities in submarine warfare and deterrence.

6. Nuclear-Powered Attack Submarines (SSNs):

- o The **Cabinet Committee on Security** has approved the construction of **two 9,800-tonne SSNs**, with plans to expand the fleet to **six**.
- o SSNs are designed for **strike** and **escort** roles, and differ from SSBNs as they carry conventional weapons.

7. Project Seabird (Western Coast):

- o Alongside Project Varsha, India is expanding its **Karwar naval base** on the western coast under **Project Seabird**.
- o **Karwar** will eventually support **50 warships** and submarines, along with auxiliary vessels, a new dockyard, and an air station, enhancing India's overall naval reach and capabilities.

8. Significance of the Developments:

- o **Naval Infrastructure:** The development of bases like **INS Varsha** and the expansion of **Karwar** signals a massive scaling up of India's naval

infrastructure, contributing to sustained **undersea operations** and long-term **force modernisation**.

- o **Strategic Dispersal:** The projects are seen as part of India's strategy to **disperse** its naval assets across different locations, making them more difficult to target and ensuring operational flexibility.

Conclusion:

The operationalisation of **INS Varsha** and expansion of **Karwar** are part of India's broader strategy to modernize and enhance its naval forces, especially its nuclear deterrent capabilities. These steps are aimed at strengthening India's strategic position in the Indian Ocean region and enhancing its overall defense preparedness against potential threats.

MeitY launches Digital Threat Report 2024 for banking, financial services, insurance sector



Government of India

Ministry of Electronics and Information Technology

Introduction

- The **Digital Threat Report 2024** for the Banking, Financial Services, and Insurance (BFSI) sector is a detailed study by **SISA, CERT-In, and CSIRT-Fin**.
- It explains the growing cyber threats in the financial industry, the impact of new technologies like AI and quantum computing, and the need for strong cybersecurity measures.
- The report highlights the importance of being proactive, following regulations, and working together to protect the digital payment systems.

Key Statistics and Facts

1. Cost of Data Breaches :

- Globally, the average cost of a data breach reached **\$4.88 million** in 2024, up **10%** from 2023.

- In India, the average cost was **\$2.18 million**.
- Digital transactions in India are expected to generate **\$3.1 trillion by 2028**, accounting for **35%** of total banking revenues.
- This digital expansion has also increased the **attack surface**, making financial institutions vulnerable to cyberattacks, fraud, and system-level disruptions.

2. Phishing Attacks

- Phishing attacks in India increased by **175%** in the first half of 2024 compared to the same period in 2023.
- Phishing is responsible for **25%** of initial cyber attacks, tricking people into sharing sensitive information.

3. AI-Driven Threats

- Attackers are using AI to create convincing fake emails, deepfakes, and automated malware.
- **54%** of Business Email Compromise (BEC) cases involved tricking employees with fake scenarios.
- **Deepfakes and AI-Generated Content**
 - i. Attackers will use deepfakes to impersonate individuals for fraud, such as mimicking executives to authorize unauthorized transfers.
 - ii. Deepfake technology makes it difficult to distinguish between real and fake media.

4. Supply Chain Attacks

- Attackers target third-party vendors or software to infiltrate multiple organizations.
- Examples include the **MOVEit** and **GoAnywhere** breaches, which affected thousands of organizations.

5. Quantum Computing Risks

- Quantum computers could break current encryption methods, making them useless.

- Algorithms like **Shor's algorithm** and **Grover's algorithm** can quickly break encryption keys.

6. IoT Vulnerabilities

- The number of IoT devices worldwide is expected to reach **32.1 billion** by 2030.
- 99%** of IoT attacks use known vulnerabilities.

7. Cryptocurrency Threats

- Attackers target cryptocurrency wallets and exchanges for financial gain.
- Cryptocurrencies like **Monero (XMR)** offer better privacy, making them attractive to criminals.

Emerging Threats

1. Social Engineering and Credential Theft

- Social engineering remains a major threat, with attacks like **Business Email Compromise (BEC)** and phishing being very effective.
- Attackers use AI to gather information from social media and create personalized traps.

2. AI-Enhanced Phishing

- AI is used to create fake emails and messages that are hard to distinguish from real ones.
- These attacks are personalized and more convincing, making them harder to detect.

3. Supply Chain and Third-Party Attacks

- Attackers target third-party vendors or software to infiltrate multiple organizations.
- They inject malicious code into widely used software or publish fake libraries on platforms like GitHub.

4. Cloud Vulnerabilities

- Organizations with weak cloud security are prime targets.

- Common issues include poor access controls, lack of multifactor authentication (MFA), and mismanagement of privileged accounts.

5. Hardware Vulnerabilities

- Hardware-level attacks, like fault injection, can bypass security in devices like cryptocurrency wallets.
- Example: A hacker unlocked a **Trezor wallet** containing **\$2 million** in cryptocurrency by exploiting hardware weaknesses.

Case Studies

1. The Reward Heist

- Incident:** Attackers exploited vulnerabilities in a reward points system to inflate points and transfer funds to external accounts.
- Impact:** Financial fraud and manipulation of reward points.
- Solution:** Use Multi-Factor Authentication (MFA), network segmentation, and regular updates.

2. The Silent Infiltration

- Incident:** Ransomware attack through a third-party core banking software provider, leading to data encryption and double extortion.
- Impact:** Operational disruption and reputational damage.
- Solution:** Regular updates, data protection, and advanced security systems.

3. The Wallet Exploit

- Incident:** Attackers exploited vulnerabilities in a payment service entity's wallet flow to conduct unauthorized transactions.
- Impact:** Financial losses and compromised payment systems.
- Solution:** Secure APIs, enforce MFA, and restrict access to sensitive documentation.

4. The Insider Threat

- **Incident:** An employee manipulated dormant accounts to siphon funds undetected.
- **Impact:** Financial pilferage and compromised internal systems.
- **Solution:** Apply the least privilege principle, monitor logs, and conduct regular security audits.

5. Hardware Hacking Milestone

- **Incident:** A hardware hacker unlocked a **Trezor wallet** containing **\$2 million** in cryptocurrency by exploiting hardware vulnerabilities.
- **Impact:** Significant financial loss and exposure of hardware vulnerabilities.
- **Solution:** Strengthen hardware security, enhance fault injection protections, and secure boot processes

Recommendations

1. People

- **Training:** Increase the frequency of cybersecurity training to keep employees aware of evolving threats.
- **Governance:** Strengthen risk management and governance to enhance regulatory compliance and security.
- **Remote Security:** Focus on securing remote and hybrid work technologies, including regular vulnerability assessments and timely patching.

2. Process

- **Vulnerability Assessments:** Conduct daily or weekly vulnerability assessments using automated tools.
- **Incident Response:** Develop comprehensive incident response plans to streamline the handling of cyber attacks.
- **Threat Intelligence:** Use threat intelligence to proactively detect and respond to emerging threats.
- **Zero Trust Architecture (ZTA):** Implement ZTA to enforce continuous authentication and strict access controls.

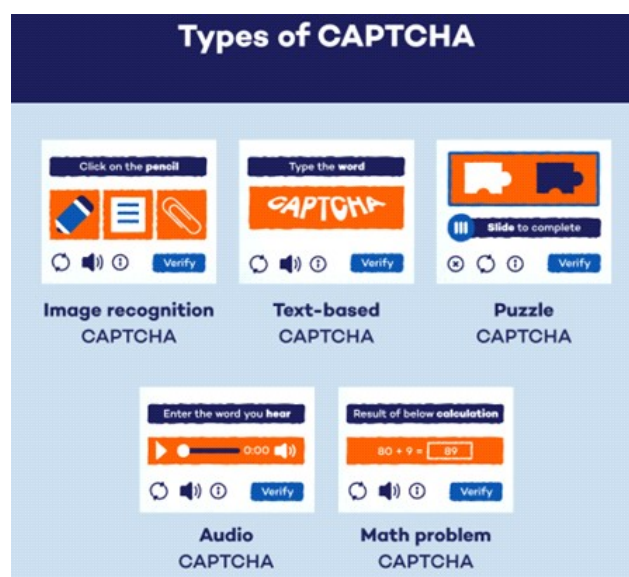
3. Technology

- **Patching:** Regularly update network devices to fix vulnerabilities.
- **AI-Powered Security:** Use AI to detect unusual behavior and monitor the dark web for threats.
- **Authentication and Access Control:** Enforce Multi-Factor Authentication (MFA) and strict access controls.
- **API Security:** Secure APIs with strong authentication and validation.
- **Endpoint Security:** Use robust email and web filters, application whitelisting, and regular antivirus updates.
- **AI-Native Applications:** Test AI-native applications for vulnerabilities early in the development process.

About SISA:

- SISA is a global forensics-driven cybersecurity solutions company for the digital payments industry, trusted by leading organizations for securing their businesses with robust preventive, detective, and corrective cybersecurity solutions.
- SISA's problem-first, human-centric approach helps businesses strengthen their cybersecurity posture.
- SISA applies the power of forensic intelligence and advanced technology to offer true security to over 2,000 customers across over 40 countries

The Evolution and Importance of CAPTCHA in Online Security



1. Introduction to CAPTCHA:

- o **CAPTCHA** (Completely Automated Public Turing test to tell Computers and Humans Apart) is a security system that helps websites verify whether a user is human or a bot.
- o It acts as a digital puzzle that is easy for humans to solve but difficult for automated bots, protecting websites from malicious activities like spam, fake accounts, and data theft.

2. History and Evolution of CAPTCHA:

- o CAPTCHA was introduced in the early **2000s** to combat the rise of automated bots that flooded websites with fake accounts, spam, and other harmful activities.
- o **Luis von Ahn, Manuel Blum, Nicholas J. Hopper, and John Langford** filed the first CAPTCHA patent in **2003**, using distorted characters or text to make it challenging for bots to read but simple for humans to decipher.

3. How CAPTCHA Works:

- o CAPTCHA presents a challenge, like distorted text or image recognition, to verify if the user is a real person.
- o Over time, CAPTCHA has evolved with more complex challenges, such as identifying objects in images (e.g., selecting all pictures with traffic lights), making it harder for bots to bypass.

4. Turing Test Influence:

- o CAPTCHA is inspired by the **Turing Test**, proposed by British mathematician **Alan Turing** in the **1950s**, to determine whether a machine can imitate human behavior.
- o The system verifies human identity by presenting tasks that are simple for people but difficult for machines, ensuring the integrity of online interactions.

5. Evolution of CAPTCHA Systems:

- o **reCAPTCHA** (2009): Introduced by Google, it used scanned words from books that were difficult for machines to read.
- o Users contributed to digitizing books by solving CAPTCHA challenges.
- o **Invisible reCAPTCHA** (2014): Google further improved CAPTCHA by analyzing user behavior, such as mouse movements, to verify human identity without requiring user interaction.

6. Applications of CAPTCHA:

- o CAPTCHA is widely used across websites to prevent bots from spamming comment sections, filling out contact forms, or making fake registrations.
- o It adds a layer of **security** on financial websites during activities like account registration, login, and transactions, preventing **data theft** and **fraud**.
- o CAPTCHA is also used in **account recovery** and **online surveys**, ensuring that only humans can participate and interact.

7. Benefits of CAPTCHA in Internet Security:

- o CAPTCHA has played a significant role in protecting websites and user data from **automated attacks** and **bot-related fraud**.
- o It ensures that only legitimate users can access services, especially in sectors like e-commerce and banking, where sensitive information is at risk.

8. Limitations of CAPTCHA:

- o **Accessibility Issues:** CAPTCHA can be challenging for individuals with disabilities, especially those who are visually or hearing impaired.
- o Despite alternatives like audio CAPTCHA, these may still not be accessible for everyone.

- o **User Frustration:** CAPTCHA can be time-consuming and frustrating, particularly when the tasks are difficult or the images are hard to decipher.
- o This can lead to poor user experience, especially on mobile devices.
- o **Advanced Bots:** As **machine learning** and **AI** technologies improve, some bots are now capable of bypassing even the most complex CAPTCHA systems, requiring more sophisticated verification methods.

9. The Future of CAPTCHA:

- o **Accessibility:** There is a growing need to make CAPTCHA more accessible to people with disabilities, improving the user experience while maintaining security.
- o **Adaptation to Smarter Bots:** CAPTCHA will continue to evolve to counter the increasing sophistication of bots.
- o This may involve more advanced behavioral analysis or multi-layered verification systems that can more effectively distinguish between humans and machines.

Conclusion:

CAPTCHA has transformed the way websites protect user data and accounts. From its initial use of distorted text to the more sophisticated reCAPTCHA systems today, it remains a crucial tool in **online security**.

₹63,000-Crore Rafale-M Jet Deal Approved for Indian Navy



Context:

1. On **April 9, 2025**, the **Cabinet Committee on Security (CCS)**, chaired by **PM Narendra Modi**, approved a **₹63,000-crore government-to-government deal** for the **procurement of 26 Rafale-M fighter jets** from **France** for the **Indian Navy**.

Deal Summary:

Component	Details
Deal Value	₹63,000 crore (~\$7.5 billion)
Aircraft Type	Rafale-M (Marine variant of Rafale)
Units Approved	26 total 22 single-seater (carrier-compatible) 4 twin-seater trainer (non-carrier-compatible)
Type of Deal	Government-to-Government (G2G)
Deal Signing	Expected later in April 2025
Operational Role	Deployment on Indian Navy's aircraft carriers
Delivery Timeline	Starts 3.5 years after signing; completes in 6.5 years

Aircraft Carrier Integration:

- Rafale-Ms will operate from:
 - o **INS Vikrant** (Indigenous carrier, commissioned 2022)
 - o **INS Vikramaditya** (Procured from Russia)

These jets were evaluated by the Navy during the **Varuna Naval Exercise** (March 2025) aboard the **French aircraft carrier Charles de Gaulle**.

Background Timeline :

Date	Event
July 13, 2023	Defence Acquisition Council (DAC) gives initial approval for 26 Rafale-M jets and 3 Scorpene-class submarines
Sept 2016	IAF signed ₹60,000 crore deal for 36 Rafale jets
April 9, 2025	CCS gives final approval for Rafale-M deal
April 2025 (expected)	Formal signing during visit of French Defence Minister

What is Rafale-M?

Feature	Details
Variant	Naval variant of Dassault Rafale (M = Marine)
Carrier Capable	Yes (single-seaters only)
Features	Advanced radar, long-range missiles, electronic warfare suite
Proven in Combat	Deployed by French Navy; carrier-tested and multirole capable

Strategic Importance:

- Enhances **naval aviation strength** and **maritime deterrence**

- Reinforces India's **Blue Water Navy** ambitions
- Reduces dependency on older platforms
- Improves **carrier battle group capabilities**

Other Pending Naval Deal:

- Awaiting CCS approval:
- Deal for **3 additional Scorpene-class diesel-electric submarines**

Conclusion:

The **Rafale-M deal** marks a **major boost** to India's maritime security and naval strike capabilities. It Aligns with **Atmanirbhar Bharat** (self-reliance in defence) with tech transfer opportunities, Enhances India's operational synergy with allies (e.g., **France**), Builds on the **existing Rafale ecosystem** already integrated by the **Indian Air Force**. This deal reflects India's growing strategic focus on the **Indo-Pacific region** and its intent to be a dominant **maritime power**.

DRDO Tests Indigenous Directed Energy Weapon (DEW) System



1. Introduction

- On **April 13, 2025**, the **Defence Research and Development Organisation (DRDO)** announced the **successful trial of a high-powered Laser-Directed Energy Weapon (DEW) system**, known as **Mk-II(A)**.
- This advanced system has been indigenously developed and tested to **disable drones, missiles, and other aerial projectiles** with high precision and minimal collateral damage.
- This progress places **India in an exclusive group of countries** that possess **operational high-energy laser DEWs**, marking a significant leap in indigenous defence capabilities.

2. What is a Directed Energy Weapon (DEW)?

- A **Directed Energy Weapon (DEW)** is a system that emits **focused energy (such as laser, microwave, or particle beams)** to damage or destroy enemy equipment, projectiles, or vehicles.

Characteristics of Laser-DEWs:

- Operate at the **speed of light**.
- Use **high-energy laser beams** to cause structural damage or internal failure.
- Do **not require conventional ammunition**, significantly reducing logistical burden.
- Offer **pinpoint accuracy** with reduced risk of collateral damage.

3. Features of DRDO's Mk-II(A) Laser-DEW System

Key Capabilities Demonstrated During Trial:

- Successfully engaged **fixed-wing drones at long range**.
- Thwarted a **multi-drone swarm attack**.
- Destroyed **enemy surveillance sensors and communication antennae**.
- Delivered **lethal force within seconds** of target acquisition.

Technology and Targeting Mechanism:

- Integrated with **radar systems** and **Electro-Optical (EO) tracking systems**.
- Once a target is detected, the system locks on and fires a concentrated laser beam.
- Can lead to **complete structural failure or detonation of warheads**, depending on the target.

Test Location and Development:

- The trial was conducted at the **National Open Air Range in Kurnool, Andhra Pradesh**.
- Developed by DRDO's **Centre for High Energy Systems and Sciences (CHESS), Hyderabad**, in collaboration with other DRDO labs, academic institutions, and Indian industries.

4. Strategic Significance

Why DEWs Matter:

- Rising threats from **unmanned aerial systems (UAS)** and **drone swarms** require advanced countermeasures.
- Traditional defence systems are **expensive** and **less efficient** against **low-cost, high-volume threats** like drones.
- DEWs offer a **cost-effective, rapid-response** solution for both defensive and offensive operations.

Cost Efficiency:

- DRDO stated that the **cost of firing the DEW for a few seconds is equivalent to just a couple of litres of petrol**.
- This makes DEWs **significantly cheaper** than firing missiles or anti-aircraft projectiles.

Potential to Replace Traditional Systems:

- The Mk-II(A) system could **eventually replace kinetic weapons** such as anti-aircraft guns and surface-to-air missiles in certain scenarios.
- Offers **ease of deployment, silent operation, and near-zero maintenance for ammunition storage**.

5. Comparative Global Context

- India's successful test puts it among a **limited number of countries** with operational Directed Energy Weapon capabilities. This group includes:
 - The **United States** (e.g., HELIOS, Iron Beam-like systems)
 - **China**
 - **Russia**
 - **Israel** (notably with its **Iron Beam** laser-based air defence system)
- The test enhances India's profile in the global defence technology race, aligning with its goal of becoming a **self-reliant defence manufacturing hub** under **Aatmanirbhar Bharat**.

6. Implications for National Security

Enhanced Air Defence Capabilities:

- DEWs can be deployed along **borders and critical infrastructure** to neutralize drones, surveillance systems, and low-flying projectiles.
- Effective against **terrorist drone attacks**, such as those previously seen in **Jammu and Kashmir**.

Boost to Indigenous R&D and Industry:

- The success of the Mk-II(A) system reflects the **collaborative strength of DRDO, Indian academia, and private industries**.
- It enhances India's **defence exports potential** and **reduces dependency on foreign military systems**.

7. Environmental and Ethical Dimensions

- DEWs offer a **cleaner alternative** to traditional explosives, reducing environmental degradation during peacetime testing or combat.
- However, concerns remain about the **rules of engagement**, especially in **civilian areas or non-state conflict zones**.

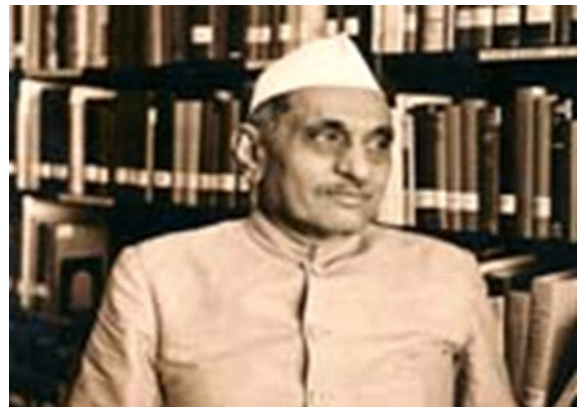
9. Conclusion

The successful test of the **Mk-II(A) Laser-Directed Energy Weapon** by DRDO is a **milestone in India's defence innovation journey**. It reflects India's growing capability to **develop next-generation warfare systems indigenously**. As the nature of threats continues to evolve with the rise of drone warfare and asymmetric tactics, systems like DEWs will play a **critical role in future battlefield dynamics**, offering **cost-effective, rapid, and precise defence solutions**. India's entry into the **global DEW club** not only strengthens its military preparedness but also sends a strong message about its technological competence on the global stage.



History, Art & Culture

Tribhuvandas Patel



Current News

- **Event:** The Lok Sabha recently passed a bill to set up the Tribhuvan Sahkari University in Anand, Gujarat, named after Tribhuvandas Patel.
- He was one of the pioneers of the cooperative movement in India and instrumental in laying the foundation of Amul.

About Tribhuvandas Patel

- **Full Name:** Tribhuvandas Kishibhai Patel.
- **Background:** Indian independence activist, lawyer, and politician.
- **Birth:** Born in 1903 to a farming family in Gujarat.
- **Influence:** Deeply influenced by the philosophy and principles of Mahatma Gandhi.
- **Movements:** Actively participated in various movements led by Mahatma Gandhi, including civil disobedience, rural development, and campaigns against untouchability and alcoholism.

Contributions and Achievements

- **Cooperative Movement:**
 - Regarded as the father of the cooperative movement in India.
 - Founded the Kaira District Co-operative Milk Producers' Union in 1946, which later became Amul.

- Established milk cooperatives in villages, ensuring they were open to all milk producers regardless of caste, creed, or community.
- Invited Dr. Verghese Kurien to KDCMPUL, who later spearheaded the White Revolution in India.
- Key Institutions:**
 - Instrumental in establishing the Gujarat Cooperative Milk Marketing Federation (GCMMF).
 - Founded the National Dairy Development Board (NDDB).
 - Established the Institute of Rural Management Anand (IRMA).
- Leadership Roles:**
 - President of Harijan Sevak Samiti from 1948 to 1983.
 - Held various positions and received numerous recognitions and awards for his leadership and social service.

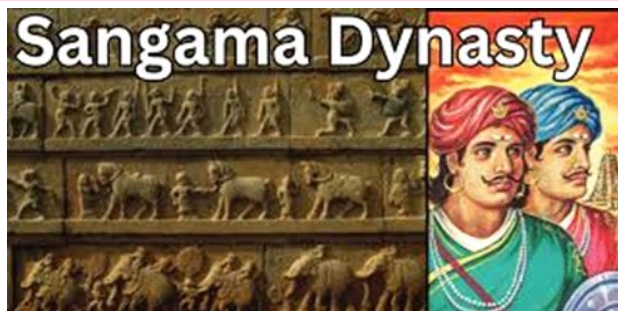
Imprisonment and Dedication

- First Imprisonment:** Jailed in Nasik in 1930 for participating in the salt satyagraha.
- Oath:** Further imprisoned in Visapur in 1930, where he took an oath to dedicate his life to the benefit of the masses.

Awards and Recognitions

- Ramon Magsaysay Award (1963):** Recognized for his community leadership.
- Padma Bhushan (1964):** Awarded by the Government of India for his social service.

Sangama Dynasty



Why in the News?

- A set of rare copper plates dating back to the early 15th century, from the reign of Devaraya I of the Sangama Dynasty, has been unveiled in Bengaluru by Falcon Coins Gallery in collaboration with the Archaeological Survey of India (ASI).

1. About the Copper Plates

- Languages and Script:** The plates are written in Sanskrit and Kannada, using Nāgarī characters.
- Significance:** Issued during the coronation of King Devaraya I.
- Unique Feature:** The seal depicts Vamana instead of the customary Varaha, the traditional royal insignia of the Vijayanagara Empire.
- Date:** The plates are dated Saka 1328 (1406 CE), confirming the coronation date of Devaraya I.
- Genealogy:** Provides a detailed genealogy of the Sangama Dynasty, tracing the lineage from Chandra, Yadu, and Sangama to Harihara, Kampa, Bukka, Mārāpa, and Muddapa.

2. About the Sangama Dynasty

- Founding Dynasty:** The Sangama Dynasty was the founding dynasty of the Vijayanagara Empire, ruling from 1336 to 1485 AD.
- Founders:** Established by Harihara I and Bukka Raya I.
- Significance:** Laid the foundation for one of the most powerful empires in South India, strengthening administration, military power, and territorial expansion.

3. Key Rulers of the Sangama Dynasty

- Harihara I (1336-1356)**
 - Also Known As:** 'Hakka' or 'Vira Harihara.'
 - Background:** Eldest son of Bhavana Sangama, belonging to the Kuruba clan.
 - Achievements:** Ruled the northern regions of the Hoysala Empire, built a fort at Barkuru, established the Nayankara system, and reorganized the administration.

- **Bukka Raya I (1356-1377)**
 - **Expansion:** Conquered the Kingdom of Arcot and the Reddis of Kondavidu.
 - **Capital Shift:** Moved the capital from Anegondi to Vijayanagara.
 - **Military Achievements:** Defeated the Sultanate of Madurai and engaged in wars with the Bahmani Sultanate.
 - **Patronage:** Supported Telugu poet Nachana Soma and scholars Vidyaranya and Sayana.
- **Harihara II (1377-1406)**
 - **Expansion:** Secured territory from Nellore to Kalinga and captured Belgaum and Goa from the Bahmani Sultanate.
 - **Titles:** Earned titles for contributions to Hindu religious and literary traditions.
 - **Patronage:** Supported Kannada poet Madhura.
- **Deva Raya I (1406-1422)**
 - **Military Campaigns:** Engaged in battles with various kingdoms and sultanates.
 - **Infrastructure:** Constructed dams on the Tungabhadra and Haridra Rivers.
 - **Army Modernization:** Employed Turkic archers and imported Arabian and Persian horses.
 - **Secular Approach:** Integrated Muslims into his army.
 - **Foreign Accounts:** Visited by Italian traveler Nicolo Conti and Russian merchant Nikitin.
- **Deva Raya II (1425-1446)**
 - **Greatest Ruler:** Regarded as the greatest ruler of the Sangama dynasty.
 - **Patronage:** Supported Kannada poets Chamarasa and Kumara Vyasa, and Sanskrit and Telugu literary works.
 - **Title:** Earned the title Gajabetegara (Hunter of Elephants).

- **Description:** Persian chronicler Abdur Razzak described Vijayanagara as an extensive empire.

Ionian Islands



1. Recent Archaeological Discovery:

- A significant find in Lefkada, Greece, has revealed the first ancient Greek theater ever discovered in the Ionian Islands.

2. Overview of the Ionian Islands:

- **Location:** Situated off the western coast of Greece in the eastern Ionian Sea.
- **Area and Composition:** The Ionian Islands cover a total of 2,306.94 square kilometers and consist of seven major islands along with several smaller ones.
- **Common Names:** Often referred to as the "Heptanese" or "Seven Islands."
- **Major Islands:**
 - Kerkyra (Corfu)
 - Paxi
 - Lefkada
 - Ithaki

- Kefalonia
- Zakynthos
- Kythira
- Largest Island: Kefalonia, also known as Cephalonia, is the largest of the Ionian Islands.
- Highest Point: Mount Ainos, which reaches an elevation of 1,628 meters, is the highest point in the Ionian Islands.

3. Historical Background:

- Venetian Rule: The islands were under Venetian control during the 15th and 16th centuries.
- Russian and Turkish Occupation: They were taken over by Russian and Turkish forces in 1799.
- British Control: The Treaty of Paris in 1815 placed the islands under British administration.
- Cession to Greece: The British transferred the Ionian Islands to Greece in 1864.

Conclusion:

The discovery of an ancient Greek theater in Lefkada highlights the rich historical and cultural legacy of the Ionian Islands. These islands, known for their strategic location and diverse history, have played significant roles in various periods of European history. The archaeological find emphasizes the importance of ongoing research and conservation efforts to uncover and preserve the region's historical treasures.

Pakistani Citizens Visit Dwarkadhish Temple



Why in News:

- A group of 300 Pakistani citizens of Indian origin, residing in Pakistan's Sindh, recently visited the Dwarkadhish Temple, Devbhumi Dwarka in Gujarat and offered prayers.

Key Points:

- Location: Located in Dwarka, Gujarat, India.
- Name: Also known as the Jagat Mandir.
- Deity: Dedicated to Lord Krishna, referred to as Dwarkadhish (King of Dwarka).
- Significance: One of the destinations along the Char Dham pilgrimage circuit, which includes Badrinath, Rameshwaram, and Puri.
- Archaeological Findings: Original temple built in 200 BCE at the earliest.
- Construction: Believed to have been constructed by Vajranabha, the great-grandson of Lord Krishna, over the hari-griha (Krishna's residential place).
- Rebuilding: Rebuilt and made bigger in the 16th century.
- Architecture: Five-story building supported by 72 pillars made of limestone and sand.
- Style: Bears the imprints of the 16th-century Chalukya style of architecture.
- Carvings: Intricately carved walls with mythical characters and legends.
- Pushtimarg Temple: Follows the teachings and rituals of Vallabhacharya, a 15th-century Hindu saint and philosopher.
- Philosophy: Propounds the philosophy of Shuddhadvaita (pure non-dualism), emphasizing devotion and grace of Krishna.
- Management: Managed by the descendants of Vallabhacharya, known as Vallabha Kul.
- Nathdwara Relationship: Has a special relationship with the Nathdwara temple in Rajasthan, the main seat of the Pushtimarg sect.

- Divya Desam: One of the 108 Divya Desams, holy abodes of Vishnu, glorified by the Alwars.
- Rank: 98th Divya Desam.
- Alwars: Praised by four Alwars: Nammalwar, Thirumangai Alwar, Thirumalisai Alwar, and Periyalwar.
- Mention in Literature: Mentioned in the works of other Hindu saints and scholars, including Adi Shankara, Ramanuja, Madhvacharya, and Narsinh Mehta.

Megalithic Relics Unearthed in Kerala



Why in News

- **2,000-year-old megalithic artefacts** discovered during **Jal Jeevan Mission** trenching work.
- Findings provide further insights into **Iron Age cultures** of the region.

What Are Megaliths?

- **Large stone structures** used in prehistoric times, for **burial** and **ritual purposes**.
- Indian megaliths mostly date to the **Iron Age (1500 BCE – 500 BCE)**; some predate this, going back to **2000 BCE**.

Types of Megalithic Monuments

Burial Types:

- **Dolmenoid cists:** Box-shaped stone burial chambers
- **Cairn circles:** Stone circles marking burial spots
- **Capstones:** Mushroom-shaped, found mainly in Kerala
- **Urns/Sarcophagi:** Terracotta vessels for cremated remains

Non-burial Types:

- **Menhirs:** Upright memorial stones

Major Megalithic Sites in India

Region	Notable Sites
Kerala	Thrissur, Kunnattur, Manimoola, Muniyara
Tamil Nadu	Adichanallur, Kodumanal, Perumbair, Sanur
Karnataka	Brahmagiri, Hallur, Maski, Hire Benkal, Chandravalli
Andhra Pradesh	Nagarjunakonda
Maharashtra	Junapani, Mahurjhari, Khapa, Naikund
Uttar Pradesh	Koldihwa (Belan valley), Banda, Mirzapur, Prayagraj, Varanasi
Jharkhand	Seraikala
Uttarakhand	Deodhoora (Almora district)
Jammu & Kashmir	Burzahom, Waztal, Brah

Artefacts Recovered (Kerala Site):

- **Black ware pot, four-legged jars**
- Clay utensils resembling **vessel lids**
- **Iron stove stand** with three support stones
- Iron tools resembling **penknives**

Nearby Megalithic Structures:

- **Pathaya Kallu** – a local stone monument believed to be a burial site
- Similar chamber structures locally known as: **Pandava Guha, Peerangi Guha, Muniyara, Swamikundu, Kalpatthayam**

Mesopotamia : Discovery of Ancient Irrigation System



Why in News

- Researchers have uncovered an **extensive and well-preserved system of ancient irrigation canals** in the **Eridu region** of southern Mesopotamia, offering fresh insights into early agricultural practices.

About Mesopotamia

- **Location:** Situated in the region now known as the **Middle East**, covering parts of **southwest Asia** and lands around the **eastern Mediterranean Sea**.
- **Modern-Day Countries:** Mesopotamia is now part of **Iraq, Kuwait, Turkey, and Syria**.
- **Geography:** It is located in the fertile plains between the **Tigris** and **Euphrates** rivers, within the **Fertile Crescent**, which is also referred to as the **“Cradle of Civilization”**.

Historical Significance

- **Ancient Civilizations:** Home to the **Sumerians, Assyrians, and Babylonians**, some of the earliest known human civilizations.
- **Agriculture:** One of the first places where humans practiced **settled agriculture**. The region is also famous for **irrigation techniques**, such as the newly discovered canals.
- **Writing System:** The **earliest known writing system, cuneiform**, originated here.

Decline of Mesopotamia

- **539 BC:** **Cyrus the Great** captured **Babylon**, incorporating Mesopotamia into the **Persian Empire**.
- **Subsequent Rule:** The region experienced **Greek and Parthian rule**, and by around **AD**

100, Mesopotamian culture had effectively declined.

Recent Archaeological Discovery

- Researchers have uncovered a **well-preserved system of irrigation canals** in the **Eridu region**, a significant finding that sheds light on the advanced agricultural practices of early Mesopotamian societies.

Mahatma Jyotiba Phule



Why in News ?

- PM Narendra Modi and Home Minister Amit Shah paid tribute to **Mahatma Jyotirao Phule** on his birth anniversary.

Who Was Mahatma Phule?

- **Born:** April 11, 1827, in Pune, Maharashtra
- **Caste:** Mali (considered a backward caste at the time)
- **Died:** 1890
- **Profession:** Social reformer, educator, and writer
- **Inspiration:** Faced caste discrimination at a friend's wedding in 1848 — a life-changing experience

Major Contributions

1. Education for All

- Opened **India's first girls' school** in Pune (1848) with wife **Savitribai Phule**, the country's **first female teacher**
- Established **night schools** for the working class
- Promoted education for **Dalits and marginalised communities**

2. Satyashodhak Samaj (1873)

- Founded the “**Society of Truth Seekers**”
- Fought **Brahmanical dominance** and **caste-based oppression**
- Open to all religions and castes

3. Women's Rights

- Advocated **widow remarriage**
- Opposed **child marriage** and **female infanticide**

Literary Works

- **Gulamgiri (Slavery)** – A powerful critique of the caste system
- **Shetkaryacha Asud (Cultivator's Whip)** – Exposed exploitation of farmers

Legacy

Mahatma Phule laid the foundation for **social justice**, **education reform**, and **anti-caste movements** in India.

Kathak



Why in News?

- **Kumudini Lakhia**, the renowned Kathak dancer, passed away recently at the age of 94.

About Kathak

- **Meaning of Kathak:** Derived from the Sanskrit word 'Katha', meaning 'story'.
- **Nature of Performance:** Initially a **temple performance** enacting stories from scriptures, Kathak evolved into a **court dance** during the **Mughal period**.
- **Major Gharanas (Schools):** Prominent gharanas include **Lucknow**, **Jaipur**, and **Benaras** gharanas.
- **Dance Style:** Features **footwork** (Tatkaar), **pirouettes** (Chakkars), **mudras**, and **facial expressions**. Dancers wear **ghungroos** (ankle bells) and perform graceful yet intricate movements.
- **Musical Association:** Kathak is the only classical dance form linked to **Hindustani (North Indian) music**.
- **Mughal Influence:** Under the **Mughals**, Kathak evolved into a **refined court art**, emphasizing grace and intricate rhythmic patterns.
- **Patronage:** **Wajid Ali Shah**, the last Nawab of Awadh, was a key patron and supporter of Kathak's development.
- **Prominent Exponents:** Famous Kathak dancers include **Birju Maharaj**, **Sitara Devi**, **Shovana Narayan**, and **Aditi Mangaldas**.

Kumudini Lakhia's Contributions

- **Revolutionizing Kathak:** Kumudini Lakhia challenged the traditional notion that Kathak must always revolve around mythological or literary stories (e.g., **Radha-Krishna** or **Shiva-Parvati**).
- She focused on “**art for art's sake**”, prioritizing **movement, rhythm, and form** over narrative content.
- **Transforming the Dance:** She played a pivotal role in shifting Kathak from a solo narrative-based art form to a **group ensemble format**, incorporating **contemporary themes** and **abstract concepts**.
- **Awards and Recognition:** Lakhia received **Padma Shri (1987)**, **Padma Bhushan (2010)**, and **Padma Vibhushan (2024)** for her exceptional contributions to Indian classical dance.

Yimkhiung Tribe



Why in News?

- The **Yimkhiung Tribal Council (YTC)** led a **major protest** in **Pungro Town, Nagaland**, against the Indian government's plan to **fence the Indo-Myanmar border** and the recent **abolition of the Free Movement Regime (FMR)**.

About Yimkhiung Tribe

- Location:** The Yimkhiung are one of the major **Naga tribes**, predominantly living in **eastern Nagaland's Kiphire district** and **adjacent areas in Myanmar**.
- Society:** Their community is organised around **clan-based villages**, with strong traditions of **oral history, festivals, and communal land ownership**.
- Language:** They speak **Yimkhiungrü**, a language from the **Sino-Tibetan language family**, spoken by over **100,000 people** in more than **100 villages**.
- Festivals:** The tribe celebrates several traditional festivals, with **Tsüngkamnyo**, a **post-harvest festival**, being the most significant.

The Border Fencing Controversy

- Background:** In **February 2024**, the Indian government announced the **end of the Free Movement Regime (FMR)** and plans to construct a **border fence** along the **1,643 km Indo-Myanmar border**, including **215 km in Nagaland**.
- Free Movement Regime (FMR):** Under FMR, border residents could travel up to **16 km** (later reduced to **10 km**) into the neighbouring country without a visa for **social, economic, and cultural** reasons.

- Protest:** In response, the Yimkhiung tribe has submitted a **memorandum** calling for the **reversal of the fencing plan**, arguing that the border fence would disrupt their traditional way of life and split families and ancestral lands.



EDITORIALS

Crux of The Hindu & Indian Express

History, Art & Culture

The Fearless Sir Sankaran Nair and the story of the Jallianwala Bagh case



Why is Sir Sankaran Nair in the News?

- On April 13, 2025, India marked the **106th anniversary of the Jallianwala Bagh massacre**.
- Prime Minister Narendra Modi paid tribute to **Sir Chettur Sankaran Nair for his fearless stand against British atrocities** and his legal battle against colonial injustice.
- His legacy is being revived through an upcoming film, **Kesari Chapter 2**, based on the

book *The Case That Shook the Empire* by his great-grandson Raghu Palat and Pushpa Palat.

Early Life and Background :

- Sir Chettur Sankaran Nair was **born in 1857 in Mankara village**, located in the Palakkad district of present-day Kerala.
- He hailed from an **aristocratic Nair family**.
- Nair studied at **Presidency College, Madras**, and later obtained a law degree.
- He began his **legal career in 1880 under the mentorship of Sir Horatio Shepherd**, who would later become the **Chief Justice of the Madras High Court**.
- From the beginning of his legal career, Nair was known for his fearless commitment to truth and justice, often challenging powerful interests.
- This outspokenness made him unpopular among British officials and orthodox social circles, particularly among upper-caste elites.

Legal and Judicial Contributions:

- Nair was appointed to the **Madras Legislative Council** in 1890 and played a role in drafting the **Malabar Marriage Act of 1896**, a progressive law that sought to legitimize customary marriage practices.
- In 1897, he became the **youngest-ever President of the Indian National Congress**.
- By 1908, he was appointed a **permanent judge of the Madras High Court**.
- As a judge, he supported progressive social reforms.
- In the *Budasna v. Fatima (1914)* case, he ruled that reconverts to Hinduism should not be treated as outcasts.
- He also supported **inter-caste and inter-religious marriages**, going against the orthodoxy of the time.

Role in the Nationalist Movement :

- Sir Sankaran Nair believed in India's right to self-governance and constitutional reform.
- He supported the **Montagu-Chelmsford Reforms of 1919**, which introduced dyarchy in provinces.
- However, after the **Jallianwala Bagh massacre** in April 1919, Nair resigned from the **Viceroy's Executive Council** in protest.
- It is making him one of the few Indians to do so at such a senior level.
- His resignation created significant political ripples.
- It forced the British administration to terminate martial law in Punjab, initiated debates in the British Parliament, and led to the appointment of the **Hunter Commission** to investigate the massacre.

Publication: *Gandhi and Anarchy* (1922) :

- In 1922, Nair authored *Gandhi and Anarchy*, where he expressed criticism of Mahatma Gandhi's strategies such as non-cooperation, civil disobedience, and non-violence.
- In the book, he **directly accused Michael O'Dwyer**, the then Lieutenant Governor of Punjab, of pursuing policies that caused the massacre.

The Jallianwala Bagh Defamation Case :

- Michael O'Dwyer sued Sir Sankaran Nair for defamation in an English court.
- The case came up for trial before the **King's Bench in London** and lasted five and a half weeks, becoming the **longest-running civil trial of the time**.
- The jury was composed of 12 Englishmen and was presided over by **Justice Henry McCardie**, who demonstrated clear bias in favour of O'Dwyer.

- The jury ruled in favour of O'Dwyer by a vote of 11-1.
- The **only dissenting voice** came from the Marxist scholar **Harold Laski**. Nair was ordered to pay £500 and legal expenses.
- Despite being offered a waiver on the fine if he issued an apology, Nair **refused to apologise**, standing firm in his beliefs.
- This act further cemented his image as a **principled nationalist** and a man of immense moral courage.

Impact and Legacy :

- Sir Sankaran Nair's stand in the courtroom was a **symbolic challenge to British imperial arrogance**.
- The trial exposed the deep bias in British institutions and revealed how justice was often denied to Indians under colonial rule.
- Though the verdict was in favour of O'Dwyer, it **energised the Indian nationalist movement**, showing the stark contrast between colonial law and Indian aspirations for justice and equality.
- Nair passed away in **1934** at the age of 77. His contribution as a jurist, reformer, and nationalist continues to inspire generations.

Hampi



Why in News?

- A **mantapa** (pavilion) at the **Virupaksha Temple** in **Hampi** recently **collapsed** due to heavy rain,

sparking concerns over the **neglect** of the site's maintenance and preservation.

About Hampi

- **Historical Significance:** Hampi was the **capital city** of the **Vijayanagara Empire**, established in **1336 CE** by **Harihara I** and **Bukka Raya I** of the **Sangama Dynasty**.
- **Location:** Located in **central Karnataka**, Hampi lies on the banks of the **Tungabhadra River**. Traditionally known as **Pampakshetra** of **Kishkindha** (the mythical kingdom of **Hanuman**).
- **Foreign Accounts:** Described by foreign travelers like **Domingo Paes** as “as large and beautiful as Rome,” highlighting the empire's grandeur and prosperity.
- **Decline of Vijayanagara:** The empire fell in **1565 CE** after the **Battle of Talikota**, where the **Deccan Sultanates** defeated **Rama Raya**, leading to widespread destruction. Hampi reportedly **burned for six months** after the battle.
- **Rediscovery:** Hampi remained forgotten until the **late 18th century**, when British antiquarian **Colin Mackenzie** mapped the site in **1799**, creating the first **cartographic records**.
- **Conservation Efforts:** The first major conservation initiative, the **Hampi National Project**, was launched in **1976**.
- **Key Landmarks:** Prominent landmarks include:
 - **Virupaksha Temple**
 - **Lotus Mahal**
 - **Queen's Bath**
 - **Elephant Stables**
 - **Vitthala Temple Bazaar**
 - **Pushkarini (stepped tank)**
 - **Paan-supari Bazaar**

- **UNESCO World Heritage Site:** Hampi was declared a **UNESCO World Heritage Site** in **1986**, recognized as one of India's largest archaeological zones, covering **250 sq. km** and housing over **1,600 monuments**.

UNESCO Memory of the World (MoW) Programme



Why in News

- Recently, **UNESCO** added **manuscripts of the Bhagavad Gita** and **Bharata's Natyashastra** to the **Memory of the World (MoW)** Register in **2025**.

Key Points

- **What is the Memory of the World (MoW) Programme?**
 - o The **MoW Programme** was launched by **UNESCO** in **1992** with the goal of preserving **global documentary heritage** and preventing "collective amnesia."
 - o It aims to **safeguard rare documents** of **global and universal value**, including **manuscripts, oral traditions, audio-visual content, and archival materials**.
 - o The programme ensures that this documentary heritage is **preserved**,

protected, and **permanently accessible** to all, while respecting cultural practices.

- o The **MoW Register** serves as a global compendium of such heritage, and it is updated **biennially** (every two years).
- o As of **2025**, the Register contains **570 entries**, including important documents such as:

- * **The Mahavamsa** (Sri Lanka's ancient chronicle)
- * **Shaiva Siddhanta manuscripts** (India)
- * **Auschwitz trial recordings** (Germany)
- * **The March 7, 1971 speech** of **Bangabandhu Sheikh Mujibur Rahman** (Bangladesh)

• India's Contributions to the MoW Register:

- o India has made **13 contributions** to the MoW Register, including **two joint submissions**:
 - * **Rig Veda** (added in **2005**)
 - * **Works of Abhinavagupta**, the Shaivite philosopher (added in **2023**)
 - * **Archives of the Non-Aligned Movement's first summit** in Belgrade, **1961** (joint submission)
 - * **Dutch East India Company archives** (joint submission)
- o In **2025**, **two new Indian manuscripts** were added, both preserved at the **Bhandarkar Oriental Research Institute, Pune**:
 - * **Natyashastra** by **Bharata Muni**
 - * **Bhagavad Gita**, attributed to **Vyasa**

Bamiyan Buddhas



Why in News

- Taliban's Changing Approach Towards Heritage Sites in Afghanistan.

Key Points

- **About the Bamiyan Buddhas**
 - o The **Bamiyan Buddhas**, carved in the **6th century CE**, were monumental statues of standing Buddhas embedded into the sandstone cliffs of **Bamiyan Valley** in central Afghanistan.
 - o **Height of Statues:**
 - * The larger Buddha, **Salsal**, was 55 meters tall.
 - * The smaller Buddha, **Shamama**, stood 38 meters tall.
 - o These statues are masterpieces of **Gandhara School of Buddhist Art**, reflecting a fusion of **Indian, Persian, and Greco-Roman** artistic influences.
 - o The statues symbolized the **spread of Buddhism** across **Central and South Asia** between the **1st and 13th centuries**.
- **Artistic Significance**
 - o The **Bamiyan Buddhas** represented a blend of **Gupta, Sassanian, and Hellenistic** styles, demonstrating a cultural confluence and the rich history of Buddhism in the region.

- **Background of Destruction**

- o The **Taliban** emerged as a hardline group in the 1990s, enforcing an extremist interpretation of **Islamic law** that included banning artistic expression and education for girls.
- o On **27 February 2001**, the **Taliban** announced their plan to destroy the Bamiyan Buddhas, considering them **un-Islamic**.
- o Over **25 days**, the statues were systematically destroyed with **explosives**, which remains one of the most **egregious acts of cultural vandalism** in modern history.
- o Despite the destruction, **UNESCO** designated the **Bamiyan Valley** as a **World Heritage Site** in **2003**, acknowledging the historical importance of the region.

- **Recent Developments**

- o In **2021**, as part of a broader effort to engage with Afghanistan's lost heritage, a **3D holographic projection** temporarily recreated the **Salsal Buddha**, offering a unique way to engage with the destroyed heritage.



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Persons in News

Dr. K. Kasturirangan



Former ISRO chairman
K Kasturirangan passes
away in Bengaluru

Name: Dr. Krishnaswamy Kasturirangan

Date of Death: April 25, 2025

Age: 84

Field: Space Science, Education Policy

Key Contributions:

- Former Chairman of ISRO (1994-2003); led major advancements in India's space programme.
- Played a pivotal role in launching Chandrayaan-1, India's first lunar mission, which discovered water on the Moon.
- Contributed to national policy as a Rajya Sabha member and Chairman of the New Education Policy 2020 drafting committee.
- Advocated sustainable development, especially for the Western Ghats.

Awards:

- Padma Shri, Padma Bhushan, and Padma Vibhushan for outstanding contributions to science and public service.

Sunita Williams



Name: Sunita Lyn Williams

Event: Announces planned visit to India

Date: April 2025 (NASA Crew-9 Post-Flight News Conference)

Field: NASA Astronaut, Space Exploration

Key Highlights:

- Sunita Williams, an Indian-American astronaut, plans to visit India, her father's home country, and meet with the ISRO team.
- Recently returned from a nine-month stay aboard the International Space Station as part of NASA's SpaceX Crew-9 mission, following delays due to Boeing Starliner issues.
- Spoke admiringly of India's landscape, especially the Himalayas, as seen from space, and praised India's growing role in global space exploration.
- Expressed a desire to inspire future Indian astronauts and collaborate with ISRO in future missions.
- Noted India's diversity, vibrant coastlines, cities lit up at night, and cultural richness visible from space.
- Intends to bring her Crew-9 teammates along to India, humorously mentioning prepping them with spicy Indian food.

Personal Background:

- Father: Dr. Deepak Pandya (from Gujarat, India)
- Mother: Ursuline Bonnie Pandya (of Slovenian-American descent)

Pope Francis



Name: Pope Francis (born Jorge Mario Bergoglio)

Date of Death: April 21, 2025 (Easter Monday)

Age: 88

Position: 266th Pope of the Roman Catholic Church (2013-2025)

Nationality: Argentine (first pope from the Americas)

Key Highlights:

- First Jesuit and first Latin American pope, elected in March 2013 following the resignation of Pope Benedict XVI.
- Died after prolonged health issues, including pneumonia, kidney concerns, hernia and colon surgeries, and long-term knee pain.
- Made a final public appearance on Easter Sunday, just a day before his death.
- Chose to be buried in Santa Maria Maggiore Basilica in Rome, rejecting traditional papal burial practices in favor of simplicity.

Legacy:

- Known for his humble lifestyle, concern for the poor, and efforts to modernize the Church.
- Championed social justice, migrant rights, and climate action.
- Attempted to address clerical sex abuse and overhaul Vatican bureaucracy.
- Authorized blessings for same-sex couples and elevated women to leadership roles in the Vatican.
- Made 47 foreign trips to over 65 countries, created 900+ saints, and held five major bishop synods.
- Often navigated a middle ground, receiving criticism from both conservative and progressive factions within the Church.

Next Steps:

- His death initiates the conclave process, where cardinals will elect his successor within 15-20 days.
- The Vatican's administrative affairs are temporarily managed by Cardinal Kevin Farrell, the camerlengo.

Sadhu Bhadreshdas



Name: Mahamahopadhyaya Sadhu Bhadreshdas

Event: Recipient of Saraswati Samman 2024

Date of Announcement: March 26, 2025

Field: Sanskrit Scholarship, Indian Philosophy

Key Highlights:

- Awarded for his Sanskrit work Swaminarayana Siddhanta Sudha, published in 2022.
- The book presents the Akshara-Purushottama Darshana, interpreting the Prasthanatrayi (Upanishads, Bhagavad Gita, Brahma Sutras) in a modern yet faithful philosophical framework.
- Recognized for proving that Indian philosophical traditions are living, evolving systems, not merely historical relics.

Background:

- Born in 1966 in Nanded, Maharashtra.
- A renowned Sanskrit scholar and ordained monk of BAPS (Bochasanwasi Akshar Purushottam Swaminarayan Sanstha).
- Internationally respected for promoting Vedic knowledge and Indian philosophy.
- Honored with multiple titles and a Lifetime Achievement Award from the Indian Council of Philosophical Research.

About the Award:

- Saraswati Samman, instituted in 1991 by the KK Birla Foundation, is among India's most prestigious literary honors.
- Award includes ₹15 lakh, a plaque, and a citation.
- Selection is made by a high-profile jury, chaired this year by Justice Arjan Kumar Sikri, former Supreme Court judge.

Mark Carney



Name: Mark Carney

Position: New Prime Minister of Canada

Event: Post-election press conference outlining economic transformation plans

Key Highlights:

- Carney, a former central banker, led the Liberal Party to a fourth mandate in the 2025 election,

campaigning on strong opposition to U.S. President Donald Trump's economic and sovereignty threats.

- The Liberals won 168 seats, just short of a majority, but enough to lead a strong minority government.

Economic Vision:

- Promised the biggest economic transformation since WWII, aimed at ensuring Canada's economic independence.
- Plans to abolish internal trade barriers between provinces by July 1, and deepen trade ties with "reliable allies".
- Vowed to maintain tariffs on U.S. products in retaliation to Trump's continued trade restrictions.

Domestic Political Steps:

- New Cabinet to be unveiled the week of May 12.
- Parliament to reconvene on May 26, with King Charles III delivering the opening address—a symbolic gesture of Canadian sovereignty in response to Trump's annexation remarks.

Klaus Schwab



Name: Klaus Schwab

Position: Founder and Former Chairman of the World Economic Forum (WEF)

Event: Resigned after over 50 years of leadership

Date of Announcement: 2025

Key Highlights:

- Klaus Schwab, who founded the WEF in 1971, officially resigned as chairman and Board of Trustees member, marking the end of an era at the influential global organization.
- His resignation follows a period of intense scrutiny, triggered by a whistleblower letter alleging financial misconduct and ethical violations.

Controversy and Investigation:

- The anonymous whistleblower claimed misuse of WEF funds, preferential treatment, and inappropriate workplace behavior.

- In response, the WEF initiated an independent investigation into the allegations to assess the credibility and potential impact.

Leadership Transition:

- Peter Brabeck-Letmathe, former Nestlé CEO, has been appointed as interim chairman.
- A search committee is in place to identify a permanent successor, signaling a leadership and strategic shift at the WEF.

Future of WEF:

- The organization enters a transitional phase, navigating reputational challenges while maintaining its role as a global platform for public-private cooperation.

Alok Joshi



Name: Alok Joshi

Current Position: Chairman, National Security Advisory Board (NSAB)

Date of Appointment: April 2025

Context: Appointed following the Pahalgam terror attack on April 22, which killed 26 people

Key Highlights:

- Alok Joshi, a former chief of the Research and Analysis Wing (R&AW) and a 1976 batch IPS officer from the Haryana cadre, has been appointed as Chairman of the National Security Advisory Board (NSAB).
- His appointment is part of a government-led overhaul of the NSAB in response to heightened security concerns after the Pahalgam attack.

Background and Career:

- Served in key intelligence roles, including Special Secretary in RAW and positions in the Intelligence Bureau and Haryana Police.

- Played a role in intelligence operations concerning Nepal and Pakistan.
- Became RAW chief in 2012, bringing decades of field and strategic intelligence experience.

Revamped NSAB:

- Now a seven-member board comprising senior retired personnel from the armed forces, police, and diplomatic services.
- Other members include:
 - Air Marshal PM Sinha (Retd.)
 - Lt Gen AK Singh (Retd.)
 - Rear Admiral Monty Khanna (Retd.)
 - Rajiv Ranjan Verma and Manmohan Singh (Retd. IPS)
 - B Venkatesh Varma (Retd. IFS)

Justice B.R. Gavai



Name: Justice B.R. Gavai

Current Position: Chief Justice of India (CJI-designate)

Date of Appointment: April 29, 2025

Assumes Office: May 13, 2025

CJI Number: 52nd

Term End: November 23, 2025 (tenure of over 6 months)

Key Highlights:

- Justice B.R. Gavai has been appointed the 52nd Chief Justice of India, succeeding Justice Sanjiv Khanna, who retires on May 13, 2025.
- He will serve a tenure of a little over six months, until November 23, 2025.

Judicial Career:

- Elevated to the Supreme Court on May 29, 2019.
- Began judicial career as an Additional Judge of the Bombay High Court in November 2003; became Permanent Judge in November 2005.
- Prior to his judgeship, he served as:
 - Assistant Government Pleader and Additional Public Prosecutor at the Bombay High Court, Nagpur Bench (Aug 1992 - July 1993)
 - Government Pleader and Public Prosecutor for the Nagpur Bench (Appointed Jan 17, 2000)





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