# VAJIRAO & REDDY IAS

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## Monthly Magazine

**For UPSC | IAS | IPS & State Civil Services Aspirants**

जन जन साक्षर

## Special Features

| | | |
|---|---|---|
| Current Events | Polity & Governance | MCQ'S |
| International Issue | Society & Culture | Editorials |
| Ecology & Environment | Science & Tech | Economics |
| Internal Security | Yojana Analysis | Geography |

# Index

## EDITORIALS

**Crux of The Hindu & Indian Express**

**Indian Polity & Governance**

## Indian Society & Social Justice

## EDITORIALS

**Crus of The Hindu & Indian Express**

**Indian Society & Social Justice**

## Economics

## EDITORIALS

**Crux of The Hindu & Indian Express**

### EConomics

## Science & Technology

## EDITORIALS

**Crux of The Hindu & Indian Express**

### Science & Technology

## Ecology & Environment

## EDITORIALS

**Crux of The Hindu & Indian Express**

### Ecology & Environment

## Geography

## EDITORIALS

**Crux of The Hindu & Indian Express**

### Geography

## Operation Rising Lion: Why Did Israel Hit Iran And Why Now ?



SOURCE: 1155/New Scientist Global Security

**Introduction**

- On June 13, 2025, Israel launched an unprecedented military operation, code-named **"Operation Rising Lion,"** striking deep inside Iran's territory.
- This was not just a tactical raid but a massive, multi-hour aerial offensive targeting Iran's **nuclear facilities (notably Natanz), ballistic missile sites, senior military commanders, and nuclear scientists.**
- Israel claimed this strike was a preemptive act of self-defense against a growing existential threat from Iran's nuclear program.
- The attack had broad and immediate consequences, sparking retaliatory **missile strikes by Iran on June 16, 2025**, and causing a significant escalation of tensions throughout the Middle East and beyond.
- The conflict, once largely fought through proxies, has now shifted to direct military engagement between the two adversaries.

**I. Historical Background and Long-Standing Motivations of Israel**

To understand why Israel launched such a large strike, it is important to look at the history and the deep motivations behind Israel's hostility towards Iran.

1. Historical Hostility Since 1979

- **Before the 1979 Islamic Revolution in Iran**, the country had relatively normal relations with **Israel and was even among the first in the region to recognize it.**

- After the revolution, **Iran's new theocratic government, led by Ayatollah Khomeini, adopted an aggressive anti-Israel stance, calling Israel the "Little Satan."**
- Since then, **Iran has opposed Israel's existence and supported various militant groups such as Hamas** in Gaza and **Hezbollah** in Lebanon that are hostile to Israel.

2. Israel's Perception of an Existential Threat

- Since the early 2000s, Israel has viewed Iran's nuclear program as a **direct existential threat.**
- The fear is that **if Iran develops nuclear weapons, it will destabilize the entire region** and could potentially start a nuclear arms race among other Middle Eastern countries.
- Israel opposed the **2015 JCPOA (Iran Nuclear Deal)** because it **allowed Iran to keep some nuclear infrastructure** and had what Israel considered weak inspection and enforcement measures.
- **Israel feared that the deal would not stop Iran from eventually building nuclear weapons.**

3. Covert and Proxy Warfare

- For many years, Israel has engaged in covert operations against Iran's nuclear ambitions.
- For example, in 2020, Israel assassinated **Mohsen Fakhrizadeh**, **Iran's top nuclear scientist.**
- Israel has also launched cyber-attacks and limited airstrikes against Iranian nuclear and missile sites.
- However, these actions were limited and indirect, aimed at slowing down Iran rather than triggering an all-out war.

4. Precursor Direct Actions

- In April 2024, Israel struck the **Iranian embassy in Damascus**, Syria.
- This was a significant escalation because it **targeted an official Iranian diplomatic mission and indicated Israel's willingness to conduct direct attacks** beyond proxy groups.
- This set the stage for the much larger and direct strikes seen in June 2025.

## II. Changing Regional and International Dynamics That Enabled the Strike

For years, Israel had engaged in covert and proxy conflicts with Iran. So, what changed that allowed Israel to conduct such a large, direct strike?

1. Weakening of Iran's Regional "Axis of Resistance"

- **Since the October 7, 2023 attacks by Hamas,** Israel launched what can be called a **"mini regional war" against Iran's proxies and allies.**
- Key Iranian proxies like **Hamas in Gaza and Hezbollah in Lebanon were severely weakened.**
- **The fall of Assad's regime in Syria in December 2024 was a huge blow to Iran.**
- **Assad's Syria had been the main land bridge between Iran and Hezbollah in Lebanon,** providing strategic support and logistics.
- With the weakening or fall of these proxies, Iran's **"Axis of Resistance"** — the network of allied groups that provided Iran strategic depth and influence — was hollowed out.
- **This left Iran more vulnerable and reduced its ability to retaliate effectively in the region.**

2. Degradation of Iran's Domestic Defenses

- In October 2024, Israel carried out a surprise strike inside Iran that targeted Iran's **ballistic missile defense systems**.
- This strike lasted several hours and seriously damaged Iran's ability to protect its nuclear and military infrastructure.
- Because of this, **Iran's nuclear facilities became exposed and vulnerable to further Israeli attacks.**
- Israel viewed this as a **"historic opportunity" to act decisively and weaken Iran's nuclear program.**

3. Shift in US Policy and Tacit Approval

- Historically, the **United States acted as a restraining influence**, often vetoing or discouraging Israeli plans for direct attacks on Iran.
- However, during Donald Trump's presidency in 2025, the US took a harder line on Iran.
- **Trump initially pushed diplomacy but demanded that Iran completely abandon its nuclear program**, a much tougher position than the 2015 deal.

- Growing frustration with negotiations led the US to signal that military action against Iran might become necessary.
- While officially denying direct involvement in the June 2025 strike, **it is widely believed that Israel acted with at least tacit approval, or a "green light," from the US.**

## III. The Operation: Targets and Damage

Israel's Operation Rising Lion was a large-scale and coordinated set of airstrikes that hit multiple critical targets in Iran.

Key Targets Hit

- **Natanz Enrichment Facility:** This is **Iran's main uranium enrichment site.**
- Israeli strikes damaged several buildings, especially the power supply to the underground halls where centrifuges operate.
- **Isfahan Nuclear Site:** 4 major buildings were hit, including uranium conversion plants and research labs.
- **Ballistic Missile Bases:** Sites in **Kermanshah and Tabriz were attacked,** destroying around **one-third of Iran's missile launchers.**
- **Other Sites:** Additional attacks targeted the **Fordow enrichment facility**, the **Bushehr nuclear power plant**, the **Arak heavy water reactor**, and a gas refinery in **Kangan**, which supports Iran's energy infrastructure.

Casualties

- Iran suffered heavy losses:
  - At least **224 people killed**, including women, children, and senior military figures such as **IRGC Commander Hossein Salami**.
  - Over **1,200 injured**.
- Israel also suffered casualties from Iranian retaliation, with missile strikes causing approximately **18-24 deaths** and over **390 injuries**.

## IV. Iran's Retaliatory Missile Strikes on Israel (June 16, 2025)

In the early hours of Monday, June 16, 2025, Iran launched a major missile attack targeting Israeli cities in direct retaliation for Israel's "Operation Rising Lion."

1. **Scale and Impact of the Strikes:**
   - Iran fired **fewer than 100 missiles** overnight, with at least **7 missiles landing inside Israel**.

- o The attacks struck densely populated areas of **Tel Aviv**, including residential buildings and neighborhoods near the U.S. Embassy branch, and the northern port city of **Haifa**.
- o A popular market area in Tel Aviv, Shuk HaCarmel, was also hit.
- o The missile barrage caused:
  - \* At least **8 initial deaths, all civilians**, in Tel Aviv and Haifa.
  - \* Over **100 people wounded**.
  - \* Destruction of several homes and buildings.
  - \* Fires at a power plant near Haifa.
- o Videos showed multiple missiles over Tel Aviv and explosions heard over Jerusalem. Search and rescue operations were ongoing, with dozens of emergency responders active in Haifa.

2. **Iranian Military Claims:**
- o Iran's Revolutionary Guards claimed their attack used a **new method to confuse Israel's multi-layered missile defense system**, causing it to target itself and allowing more Iranian missiles to get through.

3. **Israel's Response and Warnings to Iran:**
- o Israel's Defence Minister, Israel Katz, condemned the missile attacks, calling Tehran's leadership **"cowardly murderers" for targeting civilians.**
- o Katz warned that residents of Tehran would **"pay the price and soon,"** though he later clarified that **Israel didn't intend to harm ordinary Tehran residents deliberately but would target regime and security infrastructure.**
- o Israeli military actions continue, with an announcement that the military campaign against Iran would escalate further in the coming days.

## V. International Reactions
- **United States:** Denied involvement but supported Israel's right to self-defense. Urged Iran to return to the negotiating table.

- **Saudi Arabia:** Condemned the Israeli airstrikes as violations of international law and called for restraint.
- **India:** Urged calm and peaceful resolution, emphasizing the need to restore stability.
- **United Kingdom:** Deployed military assets to the region as a precaution.
- **China:** Criticized Israel's strikes as violations of Iranian sovereignty and offered diplomatic help to de-escalate tensions.
- **European Union:** Called for renewed diplomatic efforts and warned Iran against nuclear weapon ambitions.

## VI. Broader Consequences and Outlook
Short-Term Effects
- The strikes led to a spike in **oil prices** due to fears of instability in the Middle East.
- Shipping lanes, especially in the Red Sea, became more dangerous.
- Both Iran and Israel appeared ready to target each other's homeland, increasing the risk of wider regional war.

Long-Term Outlook
- Iran's loss of proxies and regional influence weakens its position, but its missile and drone capabilities remain a serious threat.
- Iran's internal situation — **economic sanctions, political dissent, and military losses — could lead it either to escalate the conflict or seek de-escalation.**
- International pressure on Iran will increase, but there are few signs of immediate peace.
- The conflict may push other Middle Eastern countries to rethink their alliances and strategies.

## Conclusion
The June 2025 Israel-Iran flare-up represents a major turning point in Middle Eastern geopolitics. For the first time in many years, Israel moved beyond covert and proxy warfare to conduct a direct, large-scale military strike inside Iran. This shift was made possible by changes in the regional balance of power, degradation of Iran's defenses, and a shift in US policy.

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## Samoa



**Why in News**

India's External Affairs Minister recently sent greetings to the Government and people of Samoa on their **Independence Day**, which is celebrated on **June 1st** every year.

**About Samoa**

- **Location:** Samoa is a **Polynesian island nation** located in the central **South Pacific Ocean**. It lies roughly halfway between New Zealand and Hawaii.
- **Archipelago:** It's made up of nine islands, with four of them being inhabited.
- **Area:** Covers about 2,842 sq km.
- **Main Islands:** The two largest islands are **Savai'i and Upolu**. About three-quarters of Samoa's population lives on Upolu.
- **Capital:** Its capital and main commercial hub is **Apia**, located on Upolu island.
- **Geography:**
  o Formed by volcanic activity, making it mountainous with many lakes and rivers.
  o The islands are surrounded by coral reefs and shallow lagoons.
  o The terrain of the larger islands features narrow coastal plains and volcanic, rugged mountains inland.
- **Independence:** Samoa gained its independence from **New Zealand on January 1, 1962**. It was the **first Pacific island country to achieve independence**. Although it gained independence on January 1st, the celebration is moved to June 1st to avoid New Year's Day festivities.

- **Government:** It is a **parliamentary democracy**.
- **Languages: Samoan** is the country's official language. Legislative activities are conducted in both Samoan and English.
- **Economy:** The economy largely depends on **fishing and agriculture**.
- **Vulnerability:** Its economy, particularly agriculture, is vulnerable to **cyclones and diseases**. Samoa is highly vulnerable to climate change impacts, with much of its population and infrastructure located in low-lying coastal areas.

**India-Samoa Relations**

- India and Samoa share friendly and cordial relations.
- Diplomatic relations were established in **June 1970**, making India the second country to do so after New Zealand.
- Both countries are members of the **Commonwealth** and cooperate in various international forums.
- India's High Commission in Wellington, New Zealand, also covers Samoa.
- Bilateral relations have been boosted by initiatives like the **Forum for India–Pacific Islands Cooperation (FIPIC)**, established by India in 2014.
- India has provided assistance to Samoa, particularly in the health sector, with Samoan patients being sent to India for treatment due to lower costs and quality medical care.

## International Air Transport Association (IATA)

**Why in News**

Recently, the Prime Minister of India addressed the **81st Annual General Meeting (AGM)** of the International Air Transport Association (IATA) and the plenary session of the World Air Transport Summit (WATS) at Bharat Mandapam in New Delhi. This event returning to India after 42 years (last held in 1983) highlights India's growing importance in global aviation.

**About International Air Transport Association (IATA)**

- **Founding:** Established in Havana, Cuba, on **April 19, 1945**.
- **Purpose:** It is the primary organization for cooperation among airlines worldwide. Its main goal is to promote **safe, reliable, secure, and economical air services** for consumers globally. IATA represents, leads, and serves the airline industry.
- **Members:** Started with 57 members from 31 nations. Today, it has about **350 member airlines** from 120 nations, accounting for over 80% of global air traffic.
- **Predecessor:** The modern IATA is the successor to the **International Air Traffic Association**, which was founded in The Hague in 1919.
- **Head Office: Montreal, Canada**, which is close to the International Civil Aviation Organization (ICAO).

**Objectives of IATA**

- **Promote Growth:** To encourage the development and growth of international air transportation.
- **Collaboration:** To promote and ensure cooperation between different international air transport companies.
- **Safety:** To strengthen safety standards across all areas of air transportation. IATA's Operational Safety Audit (IOSA) is a key instrument for this.
- **Rules and Regulations:** To create international rules and regulations for air traffic, simplifying operations and ensuring consistency across the industry (e.g., electronic tickets, barcoded boarding passes, baggage standards).

- **Efficiency:** To help airlines reduce costs and improve efficiency.
- **Sustainability:** Members have agreed on environmental goals, including improving fuel efficiency and achieving carbon-neutral growth from 2020.
- **Advocacy:** Represents the airline industry's interests globally, challenging unfair regulations and advocating for policies that support aviation.

**Significance of the 81st AGM in India**

- **India's Aviation Growth:** Hosting the AGM after over four decades underscores India's rapidly expanding and modernizing aviation sector. India is the world's third-largest domestic aviation market.
- **Global Platform:** The summit provided a platform for top leaders from airlines, the aviation industry, and governments to discuss key issues facing the sector.
- **Showcasing India:** Allowed international aviation leaders and media to see India's transformation in aviation, including record aircraft orders, impressive growth, and world-class infrastructure.
- **Discussions:** Topics included the economics of the airline industry, air connectivity, energy security, sustainable aviation fuel production, financing decarbonization, and innovations like "Digi Yatra" (India's facial recognition-based boarding system).
- **Diversity & Inclusion:** India's aviation sector was highlighted for its inclusive model, with a higher percentage of women pilots and cabin crew compared to global averages.

## Kerch Strait
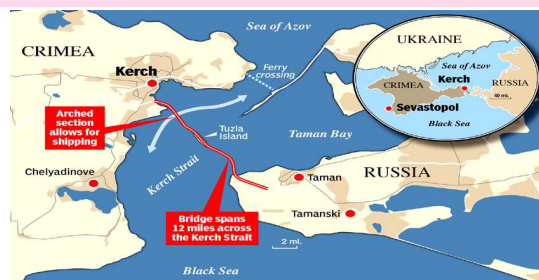
**Why in News**

Recently, **Ukraine claimed responsibility for a powerful underwater explosion that targeted the Kerch Bridge**, a vital link connecting the Russian mainland and occupied Crimea. This marks another significant attack on the strategically important bridge amidst the ongoing conflict.

**About Kerch Strait**

- **Location:** The Kerch Strait is a narrow waterway located in Eastern Europe. It is the **only water body that connects the Black Sea with the Sea of Azov**.
- **Separates:** It geographically separates the **Kerch Peninsula** (part of the Crimean Peninsula, which Russia annexed) to the west from the **Taman Peninsula** (part of Russia's Krasnodar Krai) to the east.
- **Dimensions:** At its narrowest point, located at the northern end of the Chushka Landspit, it is only **three to five kilometers wide**. The overall strait is approximately 35 km long and varies in width from 3.1 km to 15 km, with an average depth of about 18 meters.
- **Key City:** The city of **Kerch** lies near the middle of the strait, on the Crimean side, and gives its name to the strait.
- **Point of Conflict:** The Kerch Strait has been a major point of conflict and contention between Russia and Ukraine ever since Russia's annexation of the Crimean Peninsula from Ukraine in 2014.

**Significance of the Kerch Strait**

- **Global Shipping Route:** It is an **important global shipping route**, providing the only maritime passage from the Sea of Azov to the Black Sea. This makes it crucial for trade and strategic navigation, especially for Ukrainian ports on the Sea of Azov like Mariupol and Berdyansk.
- **Strategic Access for Russia:** For Russia, it provides direct access to the Sea of Azov and is vital for its naval operations and logistical support for Crimea and its military activities in southern Ukraine.

- **Geopolitical Importance:** Due to its strategic location and the surrounding political context, it has become a flashpoint in the Russia-Ukraine conflict.

**Key Facts about the Kerch Strait Bridge**

- **Other Name:** It is also widely known as the **Crimean Bridge**.
- **Purpose:** This massive infrastructure project physically links **mainland Russia with the Crimean Peninsula**.
- **Completion and Length:** Completed in **2018**, it includes both a **road and a rail connection**. At approximately **19 kilometers (12 miles)**, it is the **longest bridge in Europe**. The highway portion opened in May 2018, and the railway line in December 2019.
- **Symbolic Significance:** The Kerch Bridge is a powerful **symbol of Russia's annexation of Crimea in 2014**, asserting its claim over the peninsula. For Ukraine, its destruction is a military objective to sever Russia's supply lines and challenge its control over occupied territories.
- **Past Attacks:** The bridge has been targeted multiple times by Ukraine since Russia's full-scale invasion in 2022, including a truck bomb explosion in October 2022 and drone attacks in July 2023.

**International Institute of Administrative Sciences (IIAS)**

**Why in News**

India has secured the **Presidency of the International Institute of Administrative Sciences (IIAS) for the 2025–2028 term**. This marks a historic achievement as it is the first time India has won this prestigious position, and it was secured through the first-ever ballot-based election in the IIAS's nearly 100-year history. The Secretary of the Department of Administrative Reforms and Public Grievances (DARPG), V. Srinivas, was elected to this role.

**About International Institute of Administrative Sciences (IIAS)**

- **Establishment:** Founded in **1930** in Madrid, Spain.

- **Nature:** It is an **international non-profit organization with scientific purposes**, operating as a federation of member States, national sections, and academic research centers.

- **Mission:** Its core mission is to jointly elaborate **public administration solutions to the policy challenges of the day**, promoting the science and practice of public administration globally.

- **Headquarters: Brussels, Belgium**.

- **Membership:** It is a global federation comprising:
  - **31 Member Countries** (including India, Japan, China, Germany, Italy, Korea, Saudi Arabia, South Africa, Switzerland, Mexico, Spain, Qatar, Morocco, Indonesia, etc.)
  - **20 National Sections** (groups of professionals and academics)
  - **15 Academic Research Centres**

- **India's Association:** The **Department of Administrative Reforms and Public Grievances (DARPG)** has represented India as a Member State of the IIAS since **1998**.

**Objectives of IIAS**

- **Collaboration:** To enable collaborative and strategic projects with its members and partners, fostering international cooperation in public administration.

- **Accreditation:** To accredit both academic and professional training programs, ensuring they align with standards of best practices in public management globally. This helps in enhancing the quality of public administration education.

- **Knowledge Dissemination:** To produce and promote comprehensive content on public governance research and practice, disseminating it to diverse audiences including academics, practitioners, and policymakers.

- **Promote Comparative Studies:** To facilitate intercultural dialogue and comparative studies in public administration across different systems and cultures.

- **Advance Reform Models:** To advance reform models aligned with contemporary governance challenges.

**Relationship with the United Nations**

- The IIAS maintains a close working relationship with the **United Nations**.

- It actively participates in the UN's **Committee of Experts on Public Administration (CEPA)** and the **UN Public Administration Network (UNPAN)**.

- While the IIAS is **not a formally affiliated body of the UN**, it plays a significant role in contributing to the UN's work in the field of public administration, especially concerning good governance and sustainable development goals.

**Significance of India's Presidency**

- **Global Recognition:** India's win signifies global recognition of its administrative evolution, governance reforms, and its rising stature in international governance circles.

- **Promoting "Maximum Governance, Minimum Government":** The Indian presidency aims to further the vision of "Maximum Governance – Minimum Government," focusing on documenting "Next Generation Administrative Reforms" with an emphasis on digital empowerment of citizens and digital transformation of institutions.

- **Bridging North-South Divide:** India's leadership will seek to bridge the "North-South divide" in governance models, promoting unity and inclusivity, and sharing its experiences, especially in areas like Digital Public Infrastructure (DPI) for inclusive service delivery.
- **Thought Leadership:** It provides India with a unique platform to shape global discourse on public administration reforms, aligning them with sustainable development, digital governance, and equity in service delivery.
- **Knowledge Exchange:** It will facilitate greater exchange of best practices, research, and training programs between India and other member countries, benefiting India's administrative reforms.

## Thitu Island (Pag-asa Island)



Thitu Island (Pag-Asa Island)
Spratly Islands

**Context:** A Chinese ship recently ran aground in severe weather in shallow seas off Philippine-occupied Thitu Island in the disputed South China Sea. This incident put Filipino soldiers on high alert and underscores the ongoing territorial tensions in the region.

**1. About Thitu Island (Pag-asa Island):**

- **Location:** Located in the **South China Sea**, specifically within the **Spratly Islands archipelago**.
- **Alternative Name:** Known as **Pag-asa Island** in the Philippines, meaning "Island of Hope."

- **Significance in Spratlys:**
  - It is the **second largest of the naturally occurring Spratly Islands**.
  - It is the **largest of the nine islands currently occupied and administered by the Philippines** in the archipelago.
- **Administration:** Has been administered by the **Philippines since 1971**. Civilian settlement was initiated in the mid-1990s.
- **Population:** Home to a **permanent civilian population**, including a fishing village, along with Filipino military forces. It serves as the administrative center (Poblacion) of the Kalayaan municipality in Palawan province.
- **Infrastructure:** Possesses significant infrastructure, including:
  - A school
  - An airport (known as **Rancudo Airfield**)
  - A large harbor
  - A lighthouse for navigation
- **Strategic Proximity:** Located only about **24–27 km from China's Subi Reef**, which has been extensively militarized by China and hosts a large military base, including a long runway. This close proximity makes Thitu a critical point of contention.
- **Surrounding Features:** Bordered by North Danger Reef to the north, Subi Reef to the southwest, and Loaita and Tizard Banks to the south.

**2. The Spratly Islands Dispute - Key Aspects:**

- **Archipelago Overview:** The Spratly Islands consist of more than **100 small islands, islets, reefs, and cays** scattered across the South China Sea.
- **Multiple Claimants:** The Spratly Islands are a focal point of complex and overlapping territorial claims:
  - **China, Taiwan, and Vietnam claim the entire archipelago.**
  - **Portions are also claimed by Malaysia and the Philippines.**

o   Brunei also has claims to maritime areas in the South China Sea, though not directly to land features in the Spratlys.

- **Strategic Importance of South China Sea:**
    o   **Major Global Trade Route:** One of the busiest maritime trade routes in the world, with an estimated one-third of global shipping passing through its waters annually.
    o   **Rich in Resources:** Believed to hold significant reserves of **oil and natural gas**, as well as abundant **fisheries**.
    o   **Geopolitical Significance:** The competing claims and militarization by various parties make it a major geopolitical flashpoint in the Indo-Pacific region.

- **Militarization:** Several claimants, particularly China, have engaged in extensive land reclamation and construction of artificial islands on various features in the Spratlys, turning them into military outposts with runways, harbors, and other facilities. This has significantly escalated tensions.

- **International Law & PCA Ruling:**
    o   The **2016 ruling by the Permanent Court of Arbitration (PCA) in The Hague**, initiated by the Philippines, largely rejected China's expansive claims (the "nine-dash line") as having no basis under international law (specifically, the UN Convention on the Law of the Sea - UNCLOS).
    o   The ruling clarified that certain features, like Subi Reef, are low-tide elevations and do not generate entitlement to a territorial sea, exclusive economic zone, or continental shelf.
    o   **China rejected the ruling**, reiterating its historical claims and continuing its activities in the disputed areas.

The UN High Seas Treaty

**Context:** During the ongoing U.N. Ocean Conference (UNOC) in Nice, France, experts and officials have indicated that **India is unlikely to ratify the High Seas Treaty immediately**, despite pressure from host nation France and other global stakeholders. India signed the treaty in 2024, but its ratification is pending, requiring domestic legal amendments and parliamentary approval.

**1. About the UN High Seas Treaty:**

- **Formal Name:** Formally known as the **Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement)**.

- **Legal Status:** It is the **first legally binding international instrument** specifically aimed at protecting and sustainably managing marine biodiversity in **international waters**, also known as the "high seas." These are areas that lie beyond the jurisdiction of any single country.

- **Foundation:** The treaty is built upon the existing legal framework of the **UN Convention on the Law of the Sea (UNCLOS)**, which was signed in 1982 (and entered into force in 1994). UNCLOS established various maritime zones, including the high seas, but lacked a comprehensive framework for biodiversity conservation in these areas. The High Seas Treaty is considered the "third implementing agreement" under UNCLOS.

- **Scope:** The treaty addresses the **high seas**, which cover approximately **two-thirds of the world's oceans** and nearly half of the planet's surface. These vast areas are often referred to as the "global commons" as they belong to no one nation but are a shared resource for all humanity.
- **Objective:** To establish a comprehensive legal framework for the conservation and sustainable use of marine biological diversity in international waters, addressing existing regulatory gaps, promoting global cooperation, and ensuring equitable sharing of benefits.
- **Adoption and Entry into Force:** The treaty text was agreed upon in March 2023 and formally adopted by the UN General Assembly in June 2023. It opened for signature in September 2023. For the treaty to enter into force, at least **60 countries must ratify it**. As of June 2025, 49 countries have ratified it.

**2. UN High Seas Treaty Key Provisions (The "Four Pillars"):**

The treaty's provisions aim to fill the governance gaps in areas beyond national jurisdiction and ensure a more holistic approach to ocean management:

1. **Marine Protected Areas (MPAs):**
   o Empowers the creation and management of **large-scale Marine Protected Areas (MPAs)** and other area-based management tools (ABMTs) in the high seas.
   o This is a critical step towards achieving the global "30x30" target (from the Kunming-Montreal Global Biodiversity Framework) to **protect 30% of the world's land and ocean by 2030**. Currently, only a tiny fraction of the high seas is protected.
   o Establishes a mechanism for proposing, establishing, and managing these MPAs based on scientific evidence and inclusive consultations.

2. **Environmental Impact Assessments (EIAs):**
   o Mandates comprehensive **Environmental Impact Assessments (EIAs)** for proposed activities in the high seas that could potentially have significant adverse impacts on the marine environment, even if the impact is anticipated in international waters.
   o This provision aims to prevent environmental harm proactively before activities like deep-sea mining, shipping, or scientific research commence.
   o It requires monitoring, reporting, and review mechanisms for authorized activities.

3. **Marine Genetic Resources (MGRs) and Benefit Sharing:**
   o Addresses the complex issue of **Marine Genetic Resources (MGRs)** – genetic material from marine organisms (e.g., bacteria, fungi, deep-sea sponges) that could have commercial value in pharmaceuticals, cosmetics, or biotechnology.
   o Ensures the **fair and equitable sharing of monetary and non-monetary benefits** derived from the utilization of these resources, including digital sequence information, particularly with developing countries. This was a major point of contention during negotiations.

4. **Capacity Building and Technology Transfer (CB&TT):**
   o Supports **developing countries** in building their capacity and accessing marine technology, scientific knowledge, and technical expertise for marine conservation and sustainable use in the high seas.

## 3. Why is the High Seas Treaty Important?

- **Addressing Governance Gaps:** Fills critical legal and governance gaps for areas beyond national jurisdiction, which historically have been largely unregulated or subject to fragmented management.

- **Protecting Global Commons:** Provides a framework to protect nearly two-thirds of the ocean from increasing threats such as overfishing, pollution, climate change impacts (ocean acidification, warming), and emerging industries like deep-sea mining.

- **Biodiversity Conservation:** Essential for conserving marine biodiversity, safeguarding vulnerable ecosystems, and maintaining the health and resilience of the entire global ocean. It is crucial for achieving the 30x30 target.

- **Equity and Justice:** Addresses issues of equity by ensuring fair sharing of benefits from marine genetic resources and providing capacity-building for developing countries to participate effectively in ocean management.

- **Climate Change Mitigation:** A healthy high seas ecosystem plays a vital role in regulating the global climate by absorbing heat and carbon dioxide. Protecting these areas contributes to climate change mitigation and adaptation.

## 4. India's Position:

- India **signed the High Seas Treaty in 2024**, signaling its intent to be a party to the agreement.

- However, ratification involves a domestic process, including **amendments to existing laws (e.g., the Biological Diversity Act) and parliamentary approval.**

- At the UN Ocean Conference in June 2025, India indicated that while it is in the process of ratification and committed to marine biodiversity conservation, it is **unlikely to ratify the treaty during the ongoing session**. This is primarily due to the need for thorough legal and policy revisions at the national level. India is likely to take it up after the Monsoon Session (July–August 2025).

- A key challenge for India, and many developing nations, remains the **sharing of marine genetic resources** and consensus over fair access and benefit-sharing mechanisms, which are crucial for the treaty's effective implementation.

- Despite the delay in ratification, India emphasizes its commitment to ocean conservation through initiatives like the **Deep Ocean Mission** and efforts to reduce marine pollution.

# Grand Cross of the Order of Makarios III



**Context:** The Prime Minister of India was recently awarded the **Grand Cross of the Order of Makarios III** by Cyprus. This is the highest civilian honor bestowed by the Republic of Cyprus.

## 1. About Grand Cross of the Order of Makarios III:

- **Awarding Nation:** It is the **highest civilian honor of Cyprus**.

- **Naming:** The award is named after **Archbishop Makarios III**, who was the first President of the Republic of Cyprus (serving from 1960 to 1977)

- Aims to bridge the gap between developed and developing nations in terms of their ability to research, monitor, and benefit from high seas resources, ensuring inclusive and equitable participation in ocean governance.

and also the head of the Cypriot Orthodox Church. He is considered the founding father of modern Cyprus.

- **Establishment:** The broader "Order of Makarios III" was established in **1991**.
- **Purpose:** It recognizes **outstanding contributions and achievements** by individuals, particularly for exceptional service to Cyprus or the international community, and for promoting diplomacy, peace, and human values. It symbolizes Cyprus's appreciation for such impactful service or leadership.
- **Grades:** The Order of Makarios III comprises multiple grades (or ranks). The **Grand Cross** is one of the highest honors within this order, possibly second only to the "Grand Collar." The grades are typically: Grand Collar, Grand Cross, Grand Commander, Commander, Officer, and Knight.
- **Conferral:** The **President of Cyprus** typically bestows this award in a formal diplomatic setting, highlighting the recipient's achievements and contributions.

**2. Key Facts about Cyprus:**

- **Location:** Cyprus is an **island country** located in the **extreme northeastern corner of the Mediterranean Sea**. It lies south of the Anatolian peninsula (modern-day Turkey), west of Syria, and southeast of mainland Greece.
- **Size:** It is the **third largest Mediterranean island**, after Sicily and Sardinia.
- **Capital:** Its capital city is **Nicosia**.
- **Major Cities:** Other important cities include Limassol, Larnaca, Famagusta, and Paphos.
- **Highest Point:** The highest point in Cyprus is **Mount Olympus**, reaching an elevation of 1,952 meters.
- **Political Status:** Cyprus is a member of the European Union. However, it has a complex political situation, with the island effectively divided into the Republic of Cyprus (recognized internationally) and the self-declared Turkish Republic of Northern Cyprus (recognized only by Turkey).

**3. Significance of the Award (for India/Recipient):**

- **Diplomatic Recognition:** Receiving such a high honor from Cyprus reflects strong diplomatic ties and mutual respect between India and Cyprus.
- **Recognition of Contributions:** It signifies global acknowledgement of the recipient's efforts in international relations, peace, and cooperation.
- **Historical Ties:** The award also serves to highlight the historical friendship between India and Cyprus, which has roots in shared values and the Non-Aligned Movement.

## Pakistan's "Crypto Somersault" – A Geopolitical Play



**Context:**

- In May 2025, Pakistan announced the creation of its first government-backed **Strategic Bitcoin Reserve**.
- This is a major shift in Pakistan's approach to cryptocurrencies and is viewed as a strategic move to **build closer ties with the US, especially under the influence of President Donald Trump's administration.**

**I. What is Pakistan's New Crypto Move?**

- Pakistan is setting up a **Strategic Bitcoin Reserve**, which means it will officially hold Bitcoin as part of its national reserves.
- Traditionally, **countries hold gold or foreign currencies for such reserves.**
- The announcement was made by Bilal Bin Saqib, **CEO of the Pakistan Crypto Council**, at the Bitcoin Vegas 2025 conference in **Las Vegas on May 28, 2025.**

- The event was attended by **important US figures like Vice President JD Vance and Donald Trump's sons, Eric and Donald Jr.**, highlighting the political importance of the announcement.
- Pakistan aims to present itself as a **modern digital innovation hub**, driven by its young population and new technology leaders.

## II. Why is Pakistan Suddenly Interested in Crypto?

- Pakistan's move is mainly to build stronger political and business ties with Donald Trump and his family.
- It is widely seen as trying to get closer to the possible next US government under Trump.
- Bilal Saqib said Pakistan was **inspired by the US** in this crypto move.
- **Trump, despite earlier criticizing cryptocurrencies**, has recently supported the idea of a US Strategic Bitcoin Reserve.
- The US under Trump had recently announced a plan to create its own Strategic Bitcoin Reserve in March 2025.
- Pakistan is following this idea, copying the US playbook.
- Pakistan has taken several other steps to support crypto:
  - Partnering with **World Liberty Financial**, a crypto company linked to the Trump family, to promote blockchain technology.
  - Planning to allocate **2000 megawatts of electricity** specifically for Bitcoin mining, which is an energy-heavy process.
  - Declaring that Pakistan will hold onto Bitcoin in a **national wallet long-term** and will not sell it anytime soon.

## III. The Geopolitical Side of the Crypto Move

- Pakistan's crypto activities may be connected to broader political goals, including influencing US statements on **India-Pakistan peace talks**.
- Trump claimed that he helped broker a ceasefire between India and Pakistan after a terrorist attack in Kashmir in April 2025.

- Pakistan supported Trump's version, but India denied any US role.
- Experts say that Pakistan's crypto move is **not about economic benefits**, but about politics — specifically, gaining favor with the Trump administration.
- Hussain Nadeem, a Pakistani policy expert, points out that Pakistan's government often controls the internet and social media tightly, which goes against the open and decentralized nature of cryptocurrencies.
- Nadeem argues that Pakistan's ruling elite is only interested in crypto to **get access to the Trump White House**, not to help ordinary people or improve the economy.

## IV. Concerns About Terror Financing and Misuse

- Pakistan's history of terror financing and being on the **FATF grey list** (2018-2022) raises worries about how crypto could be misused.
- Cryptocurrencies like Bitcoin are:
  - **Borderless and decentralized**, meaning no central authority controls them and they can easily be used to transfer money across countries without banks.
  - Offer some level of **anonymity or pseudonymity**, making it hard to trace the real owners behind transactions.
- Because of these features, **crypto can be exploited to fund terrorism, move money through fake NGOs, or operate via the dark web.**
- Experts fear that terror groups, such as those led by Hafiz Saeed or Masood Azhar, could use Bitcoin for secret money transfers, especially during religious festivals when monitoring might be weaker.
- There is concern that the Bitcoin reserve meant for "strategic" purposes might be diverted to finance terrorist activities.

## V. International Scrutiny and India's Position

- Pakistan was on the **FATF grey list** due to weak **anti-money laundering (AML)** and anti-terror financing (CFT) systems but was removed in 2022.

- However, doubts remain about its financial transparency.
- India is expected to raise concerns at international forums, calling for strict monitoring of Pakistan's crypto transactions.
- India argues that Pakistan's crypto use should be watched as closely as its banking system because of the risks involved.
- The connection between Pakistan's crypto push and Trump's peace claims has raised suspicion that Pakistan's crypto policy is mainly a political move for international influence, not a genuine step toward technological progress.

### *What is Cryptocurrency?*

Cryptocurrency is a type of digital or virtual currency that uses cryptography for security. The most well-known examples are Bitcoin, Ethereum, and Solana.

**Key Features:**

- Decentralized: Operates on blockchain networks without a central authority.
- Permissionless: Anyone can join or use the network.
- Limited supply: Most have a cap (e.g., Bitcoin has a max of 21 million coins).
- Volatile: Prices fluctuate based on market supply and demand.

**Examples:**

- Bitcoin (BTC) – The first and most well-known.
- Ethereum (ETH) – Adds programmable contracts.
- Solana (SOL), Cardano (ADA) – Compete on speed, cost, and features.

**What is Central Bank Digital Currency (CBDC)?**

A Central Bank Digital Currency (CBDC) is a digital form of fiat money (like USD, EUR, INR), issued and regulated by a country's central bank.

**Key Features:**

- Centralized: Controlled by the government or central bank.
- Legal tender: Official status as money.
- Stable: Pegged to the national currency (e.g., 1 Digital Dollar = 1 USD).

- Traceable and monitored: Governments can track usage to prevent fraud and crime.
- Not speculative: Intended for everyday use, not investing.

**Examples:**

- CBDC (India)
- Digital Yuan (China)
- eNaira (Nigeria)
- Sand Dollar (Bahamas)

**Key Differences at a Glance:**

| Feature | Cryptocurrency | Central Bank Digital Currency (CBDC) |
|---|---|---|
| Issuer | Private (or none) | Central Bank |
| Control | Decentralized | Centralized |
| Regulation | Light or none | Heavily regulated |
| Supply | Often capped | Controlled by central bank |
| Use Case | Investment, payments | Government-backed payments |
| Anonymity | Some level of privacy | Usually traceable |
| Legal status | Varies by country | Legal tender |

## Exercise NOMADIC ELEPHANT - India-Mongolia Joint Military Drill



**Context:**

- The Indian Army contingent recently left for Mongolia to take part in the **17th edition of the India-Mongolia Joint Military Exercise NOMADIC ELEPHANT**.
- This annual exercise, happening from **May 31st to June 13th, 2025, in Ulaanbaatar, Mongolia,** highlights the strong defense cooperation between the two nations.

**I. About Exercise NOMADIC ELEPHANT:**

- **What it is:** It is an **annual joint military exercise** conducted between the **Indian Army** and the **Mongolian Armed Forces**.

- **Frequency and Location:** It's an annual event, meaning it happens every year. The location alternates between India and Mongolia.
  - The previous (16th) edition was held in **July 2024 at Umroi, Meghalaya, India.**
  - The current (17th) edition (2025) is being held in **Ulaanbaatar, Mongolia**.
- **Participants:**
  - **Indian Contingent:** Comprises **45 personnel**, mainly from a battalion of the **ARUNACHAL SCOUTS**.
  - **Mongolian Contingent:** Also has a similar strength, represented by their **150 Special Forces unit**.

## II. Aims and Scope of the Exercise:

- **Primary Aim:** To **improve how well the two forces can work together (interoperability)**. This is done by practicing as a joint task force in specific types of operations.
- **Operational Focus:** The exercise simulates **semi-conventional operations** in **semi-urban and mountainous terrain**.
- **Mandate:** The operations are conducted under a **United Nations (UN) mandate**, meaning they practice scenarios that might occur during UN peacekeeping missions.
- **Training Activities (Scope):** The exercise involves training at the **Platoon level Field Training Exercise** and includes a variety of activities:
  - Endurance training (physical stamina).
  - Reflex shooting.
  - Room intervention (clearing buildings).
  - Small team tactics.
  - Rock craft training (skills for moving in rocky terrain).
- **New Addition:** For the first time, aspects related to **Cyber Warfare** are being included in this edition to make the exercise more complex and relevant to modern threats.
- **Learning from Each Other:** Soldiers from both sides will share and learn from each other's experiences in real-world operations.

## CDS Gen. Chauhan at Shangri-La Dialogue 2025 – India's Voice on Global Security



**Context:**

- General Anil Chauhan, India's Chief of Defence Staff (CDS), visited Singapore from May 30 to June 1, 2025, to attend the **22nd Shangri-La Dialogue**.
- His participation shows India's growing role in global security discussions and its commitment to strategic partnerships in the Indo-Pacific region.

## I. About the Shangri-La Dialogue:

- **Asia's Premier Summit:** The Shangri-La Dialogue is widely recognized as **Asia's premier defense and security summit**.
- **Host:** It is hosted annually by the **International Institute for Strategic Studies (IISS)**, a renowned global think tank.
- **Participants:** The event brings together a high-level gathering of:
  - Defense Ministers
  - Military Chiefs
  - Policymakers
  - Strategic Experts
  - Leaders from over **40 nations** (as stated for the 2025 edition).
- **Purpose:** It serves as a crucial platform for discussing and addressing **Indo-Pacific security challenges** and broader global defense and security issues.
- **Location:** It is held annually in **Singapore**.

## II. CDS Gen. Engagement at the Dialogue:

- **Bilateral Meetings:** During his visit, General Anil Chauhan will hold important **bilateral meetings** with Chiefs of Defence Forces and senior military leadership from a wide range of countries and regions, including:
  - **Major Global Powers:** U.S., U.K., France, Germany, Australia.
  - **Indo-Pacific Partners:** Japan, Singapore, Indonesia, New Zealand, Philippines.
  - **European Union** and **Netherlands**.
  - These meetings are crucial for strengthening defense cooperation and discussing mutual security interests.

## III. Significance of India's Participation:

- **Strengthening Defence Cooperation:** The engagements provide a important platform to deepen defense ties with key strategic partners and foster new relationships.
- **Discussing Mutual Security Interests:** It allows India to articulate its security concerns and perspectives, and also understand those of other nations, especially regarding the Indo-Pacific.
- **Enhancing Strategic Partnerships:** India's presence and active participation help to enhance its strategic partnerships in the crucial and increasingly contested **Indo-Pacific region**.
- **Showcasing India's Vision:** CDS Chauhan's addresses on "Future Wars and Warfare" and "Defence Innovation Solutions" position India as a thoughtful and forward-looking contributor to global security discussions.
- **Role in Indo-Pacific Security:** India's consistent engagement at such a high-level forum underscores its growing commitment and proactive role in ensuring a free, open, and inclusive Indo-Pacific.

**Conclusion:** CDS General Anil Chauhan's participation at the Shangri-La Dialogue 2025 is a clear demonstration of India's active and growing engagement in shaping the global and regional security landscape. Through high-level bilateral meetings and addresses on critical defense topics, India is reinforcing its strategic partnerships and asserting its vision for a secure and stable Indo-Pacific in the face of evolving security challenges.

# The Zangezur Corridor – India's Stakes in the South Caucasus Geopolitics



**Context:**

- The **South Caucasus** (also called Transcaucasia) is a vital region bridging Eastern Europe and West Asia, home to modern **Armenia, Georgia, and Azerbaijan**.
- Recently, diplomatic moves like **Armenia's Security Council Secretary visiting India** and **India's "Operation Sindoor" show rising tensions here**.
- At the heart of these tensions is the proposed **Zangezur Corridor**, a project important to Turkey and Azerbaijan, which has big consequences for India's strategic and trade interests.

## I. The Core Conflict: Azerbaijan's Demand vs. Armenia's Sovereignty

- **What is the Zangezur Corridor?**



- It's a proposed land route meant to connect **Azerbaijan** to its separate part called **Nakhichevan** (which borders Turkey).

- This route would run through **Armenian territory**.
- **Azerbaijan's Goal:** To get direct land access to Turkey and Europe.
- **The Disagreement:**
  - The **2020 peace agreement** between Armenia and Azerbaijan did give Azerbaijan access to Nakhichevan.
  - **Armenia's View:** This means opening a road, but with Armenian customs and border controls.
  - **Azerbaijan's View:** Wants it to be a "corridor" *without* any Armenian customs or border control. This proposed route would cut through Armenia's southernmost province of **Syunik**, which shares a border with Iran.
- **Azerbaijan's Push:** After winning the Karabakh war, Azerbaijan has been strongly pushing for this corridor, even threatening to take it by force if needed.

## II. The Regional Power Play: Turkey-Azerbaijan vs. India-Iran-Armenia

### A. The Turkey-Azerbaijan Axis:

- **Strong Partnership:** Recent events, including India's "Operation Sindoor," have revealed a strong partnership between **Islamabad (Pakistan), Baku (Azerbaijan), and Ankara (Turkey)**.
- **Azerbaijan's Military Might:** Azerbaijan won the Karabakh war (2020) largely with Turkish weapons and military advice.
- It continues to boost its military, with a **budget 3 times Armenia's, buying weapons from Turkey, Pakistan, and Israel.**
- **Turkey's Strategic Ambition (via Zangezur):**
  - Turkish President Erdogan calls the Zangezur Corridor a **"strategic issue" vital for Turkey-Azerbaijan ties.**
  - It would give Turkey direct land access to Azerbaijan, Iran, the Caspian Sea, and Central Asian countries, linking to the **Middle Corridor** (an important East-West trade route).
  - This would greatly boost Turkey's regional power and influence.
  - **Opposition to IMEC:** Importantly, Turkey opposes the **India-Middle East-Europe Economic Corridor (IMEC)**, viewing itself as the primary energy and transport hub in the region.

### B. India's Counter-Strategy: Partnership with Iran and Armenia:

- **Necessity of Partnership:** To counter the Turkey-Azerbaijan-Pakistan axis, New Delhi needs a strong partnership with **Tehran (Iran)** and **Yerevan (Armenia)**. This trilateral cooperation is seen as vital.
- **India-Armenia Defence Ties:** India and Armenia have a defence partnership since 2020.
  - Azerbaijan has openly expressed displeasure about India supplying weapons to Armenia.
  - Crucially, some of these Indian weapons are believed to have been sent to Armenia *through Iran*.
- **Existing Cooperation:** This flow of weapons through Iran confirms that practical trilateral cooperation (India-Iran-Armenia) is already happening, further strengthened by a new system for trilateral discussions.

## III. Iran's Firm Opposition to the Zangezur Corridor

- **Strong Stance:** Iran is strongly against the Zangezur Corridor.
- **Reason 1: Loss of Access:** If built as Azerbaijan wants, it would cut off Iran's direct land access to Armenia, and thus to Europe. This is a critical trade and geopolitical link for Iran.
- **Reason 2: Border Security Concerns:** Iran worries that it could encourage Azerbaijani claims on Iran's own region of Azerbaijan (called irredentist claims), potentially destabilizing its border.
- **Clear Statement:** Iran's Defence Minister recently declared that the shared border between Iran and Armenia is a historical route, and Iran "will not allow any encroachment on this border."

**IV. What's at Stake for India: Strategic and Economic Interests**

- **Crucial Trade Routes:** The India-Iran-Armenia partnership is essential for keeping vital trade and transport routes open, particularly India's investment in the **Chabahar Port (Iran)**.
- **India's Preferred Route to Europe:** The Chabahar Port combined with the route through Armenia offers India the **shortest multimodal route to the Black Sea and Europe**.
- **Bypassing Conflict Zones:** This route allows India to avoid the Suez Canal, which is often affected by conflicts and disruptions.
- **Direct Threat:** The Zangezur Corridor, if implemented as Azerbaijan wishes, could **severely disrupt** this vital Indian trade route.
- **Countering Regional Influence:** Turkey and Azerbaijan are actively expanding their presence, including in South Asia. India needs to counter this by strengthening its own influence and presence in the South Caucasus.
- **Policy Imperative: Upholding Territorial Integrity:** To achieve its goals in the region, India must **support the territorial integrity of countries in the South Caucasus**, especially Armenia's stand against a corridor that bypasses its sovereignty. This means supporting Armenia's right to control its borders and customs.

## India-Paraguay Relations – Expanding Trade and Global South Cooperation



**Context:**

- On **Monday, June 2, 2025**, Prime Minister Narendra Modi met with the visiting President of Paraguay, Santiago Peña Palacios.
- The discussions highlighted opportunities to deepen economic ties, especially by expanding India's trade agreement with the **MERCOSUR bloc**, and reinforced cooperation on shared challenges as part of the Global South.

**I. Key Outcomes of the Meeting**

- **Expanding Trade with MERCOSUR:**
  - PM Modi proposed that India and Paraguay work together to **further expand the Preferential Trade Agreement (PTA)** that India already has with **MERCOSUR**.
  - **MERCOSUR is** A Latin American **trade bloc** aiming for a common market with free movement of goods, services, capital, and people.
  - **Founding:** Formed in **1991**.
  - **Members:** Includes **Brazil, Bolivia, Argentina, Paraguay, and Uruguay**.
  - **MERCOSUR-India PTA:** Signed in **2004**.
- **New Cooperation Opportunities:** Both leaders identified new areas for collaboration, including:
  - Digital technology
  - Critical minerals
  - Energy
  - Agriculture
  - Healthcare
  - Defence
  - Railways
  - Space
  - Overall economic partnership
- **Fight Against Terrorism & Shared Challenges:**
  - PM Modi emphasized that "India and Paraguay stand united in the fight against terrorism."
  - Highlighted potential cooperation against cybercrime, organized crime, and drug trafficking.

- **Global South Solidarity:**
  - Both nations are "integral parts of the Global South," sharing similar hopes, aspirations, and challenges.
  - Stressed mutual learning from experiences to deal with these challenges effectively.
- **COVID-19 Vaccine Support:** PM Modi recalled India's support to Paraguay by sharing vaccines during the COVID-19 pandemic.
- **Strengthening India-Latin America Relations:** The visit is expected to add new dimensions to India-Latin America relations, building on India's engagement with other regional blocs like CARICOM (Caribbean Community) Summit in Guyana.

## VI. Significance of Recent High-Level Engagements
- The recent visit of Paraguay's President (his first to India, and only the second by any Paraguayan President) is crucial.
- It is expected to "add new strength to the pillars of trust, trade, and close cooperation" in bilateral relations.
- Crucially, it will "add new dimensions to **India-Latin America relations**," aligning with India's broader outreach to the region (e.g., PM Modi's attendance at the CARICOM Summit in Guyana).

## India-Paraguay Relations
- India and Paraguay share cordial bilateral relations, established decades ago, based on mutual principles of democracy, human rights, and peace.
- **Establishment:** Bilateral diplomatic ties between India and Paraguay were established in **1961**.
- **Shared Values:** Both countries share common principles and values, including:
  - Democracy
  - Human Rights
  - Rule of Law
  - Freedom of Expression
  - Peace
  - Respect for Sovereignty and Territorial Integrity

## Economic and Trade Cooperation
- **Bilateral Trade Volume:** Stood at **USD 477 million in FY23**.
- **India's Imports from Paraguay:**
  - Soya oil and related products
  - Iron and steel
  - Aluminium
  - Animal products
- **India's Exports to Paraguay:**
  - Motor vehicles
  - Agrochemicals
  - Auto parts
  - Pharmaceutical products
- **Potential for Expanded Cooperation:** The two countries have significant scope to expand cooperation in areas such as:
  - **Digital Technology:** Especially **Digital Public Infrastructure (DPI)**, where India can share its expertise (e.g., UPI, Aadhaar, DigiLocker).
  - **Critical Minerals:** Paraguay is rich in natural resources and minerals, making it a reliable potential regional partner for India.
  - Energy
  - Agriculture (**AgriStack** – India's digital ecosystem for agriculture)
  - Healthcare
  - Defence
  - Railways
  - Space

## Shared Global South Challenges and Cooperation
- **Global South Identity:** Both India and Paraguay are integral parts of the **Global South**, sharing similar hopes, aspirations, and challenges.
- **Common Challenges:** They can collaborate to fight shared challenges such as:
  - Cybercrime
  - Organised crime
  - Drug trafficking

**Geographical Location of Paraguay**



- **Landlocked Country:** Paraguay is a **landlocked country** located in south-central South America.
- **Bordering Countries:** It shares its borders with three countries:
  o **Bolivia** (to the north)
  o **Argentina** (to the south and southwest)
  o **Brazil** (to the east)

## EDITORIALS

### Crux of The Hindu & Indian Express

### International Issues

**ECOWAS at 50 – Africa's Model for Regional Unity**



**Context:**

- On May 28, 2025, the **Economic Community of West African States (ECOWAS)** celebrated its 50th anniversary with a big conference in Lagos, Nigeria.
- Leaders from ECOWAS, the African Union (AU), Nigeria, and the United Nations (UN) praised ECOWAS as a top example of regional cooperation in Africa.

**Key Highlights of the ECOWAS@50 Roundtable Conference**

- **Event:** A "ROUNDTABLE CONFERENCE ON ECOWAS, AN AFRICAN MODEL @ 50: RESILIENCE AND FUTURE PROSPECTS" was held on **May 28, 2025**, at the Nigerian Institute of International Affairs (NIIA) in Lagos.
- **Discussion Topics:** Experts talked about key issues such as:
  o **Regional security** (safety in the region)
  o **Economic integration** (bringing economies together)
  o **Democratic consolidation** (making democracies stronger)
  o **Youth empowerment** (giving young people opportunities)
  o The future of international cooperation in West Africa.
- **Key Message:** Speakers highlighted the need for new political commitment, fair governance, and a fresh vision for integration that truly reflects what West African citizens want.
- **Tribute:** The event also honored ECOWAS's work in **mediation and peacebuilding** in places like Liberia, Sierra Leone, Mali, and The Gambia. Nigeria's vital role as a founding and leading member was also acknowledged.

**Leaders' Perspectives on ECOWAS's Achievements and Future**

- **President of ECOWAS Commission :**
  o Highlighted the urgent need for **unity to fight insecurity** in the region, saying, "No single nation can combat insecurity alone.

- We can only do this through collaboration."
- Called ECOWAS a "model of Regional Economic Community on the African continent" despite its challenges.
- Also , Announced plans for a **Special Summit on the Future of ECOWAS** to review achievements and set a clear path forward.

- **Nigeria's Minister of State for Foreign Affairs :**
  - Praised ECOWAS's significant contributions to **peacekeeping, economic integration, aligning policies across sectors, and promoting democratic governance**.
  - Noted that the forum allowed for assessing ECOWAS's role while facing new challenges like political instability and economic differences.

- **Deputy Chairperson, African Union Commission:**
  - Hailed ECOWAS as **Africa's benchmark (standard) for regional integration**.
  - Stated that ECOWAS has achieved what the African Union's founders hoped for, especially in **free movement of people, customs union, and monetary union**.
  - Mentioned that ECOWAS is "very frequently used as our reference" in AU discussions on regional economic groups, especially regarding how to fund the Union through a "Community levy," which ECOWAS has already put in place.

- **Other Key Remarks:**
  - Nigeria's former Minister of Foreign Affairs highlighted ECOWAS's strong stand **against unconstitutional changes in government**, its support for democracy, and its economic reforms through free trade and a common external tariff.

- Aminata Touré, former Prime Minister of Senegal, stressed the urgent need to address **youth unemployment, poverty, and the neglect of women** for inclusive regional development.

**About the Economic Community of West African States (ECOWAS)**



- **Formation:** ECOWAS was established by signing the **Lagos Treaty on May 28, 1975**, in Lagos, Nigeria.

- **Aim:**
  - To promote cooperation and integration, leading to an **economic union in West Africa**.
  - To raise the **living standards** of its people.
  - To maintain and improve **economic stability**.
  - To foster **relations** among member states.
  - To contribute to the progress and development of the African continent.
  - To have a **single common currency** and create a large trading bloc in areas like industry, transport, telecommunications, energy, finance, and social/cultural matters.

- **Members:** The current member states of ECOWAS are Benin, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone, Sénégal, and Togo.

- **Recent Withdrawals:** On **January 29, 2025, Burkina Faso, Mali, and Niger officially withdrew** from ECOWAS.

- **Beyond Economic Goals:** Besides economic cooperation, ECOWAS has also worked to **stop military conflicts** in the region.
- **Peacekeeping Operations:** It ran a regional peacekeeping operation called **ECOMOG**, which was led by Nigeria in the 1990s and early 2000s.
- **Headquarters:** Abuja, Nigeria.

**Conclusion**

As ECOWAS reaches its 50th year, leaders from within the region and globally widely agree: **ECOWAS remains a vital cornerstone for African unity, economic transformation, and peace.** Despite facing challenges, its journey continues to inspire both the African continent and the rest of the world.

## Opening Remarks by EAM Dr. S. Jaishankar at the India-Central Asia Dialogue



**Context:**

- On June 6, 2025, External Affairs Minister (EAM) Dr. S. Jaishankar delivered opening remarks at the **4th edition of the India-Central Asia Dialogue held in India.**
- His address highlighted the **deepening ties between India and the Central Asian nations,** emphasizing shared history, economic cooperation, and strategic partnership.

**Key Highlights from EAM's Remarks**

- **Condemnation of Terrorism:** EAM expressed appreciation for Central Asian countries **standing with India and condemning the "heinous terrorist attack" in Pahalgam in April 2025**, showing a shared commitment to counter-terrorism.

- **Addressing Pakistan:** By promoting a unified stance with Central Asian nations against terrorism, New Delhi aims to send a stern message to Pakistan regarding its support for such activities.
- This highlights broader international acknowledgment of India's stance on counter-terrorism.
- **Addressing Azerbaijan:**
  - **Azerbaijan frequently positions itself as a "bridge" to the Central Asian region.**
  - However, ties between New Delhi and Baku have **strained due to Azerbaijan's open support for Pakistan during its recent standoff with India.**
  - By actively engaging Central Asia and securing their condemnation of the Pahalgam attack, India strategically highlights its diplomatic influence even among nations neighboring Azerbaijan, implicitly challenging Azerbaijan's self-proclaimed role and its alignment with Pakistan.
  - This move aims to demonstrate a wider regional consensus against terrorism, with nations even from Azerbaijan's neighborhood on board with India's perspective.
- **Historical & Cultural Bonds:**
  - He Emphasized **India's "millennia old civilizational and cultural ties"** forged through trade, exchange of ideas, and people-to-people contacts.
  - He also Noted that **these bonds have evolved into a partnership based on "shared aspirations, shared opportunities and common challenges."**
- **Contemporary Diplomatic Ties:** Marked **3 decades of contemporary diplomatic ties with Central Asian partners in 2022**, signifying a strong foundational legal and institutional framework for cooperation.

- **Boost in Cooperation:**
  - He Attributed a **"quantum boost" to Prime Minister Modi's back-to-back visits to all five Central Asian capitals in July 2015.**
  - He also Highlighted significant strengthening of trade, economic, and investment ties over the last decade.
- **Enhanced Connectivity:** Noted **multiple direct flights facilitating greater 2-way tourist flows** and business, along with a large number of Indian students pursuing higher education in Central Asian countries.
- **India as a Development Partner:**
  - Reiterated India's role as a **"trusted development partner."**
  - Mentioned well-known partnerships like **ITEC training slots** and **ICCR scholarships**.
  - Highlighted the initiation of **High Impact Community Development Projects** as Indian grants for socio-economic development (e.g., equipping schools, providing medical equipment to hospitals).
- **Elevating the Partnership:**
  - Recognized the mutual importance of India-Central Asia cooperation by raising it to the **Leaders' level for the first time as a Virtual Summit in January 2022**.
  - This has added new dimensions, including exchanges among Trade Ministers, Culture Ministers, National Security Advisors (NSAs), Youth Delegations, and special training courses for diplomats.
- **Economic Cooperation Focus:**
  - Referred to a "fruitful discussion" at the **India-Central Asia Business Council** to remove impediments and expand cooperation.
  - New areas of focus identified include **digital technologies, fintech, and inter-bank relations**, alongside existing areas, to realize full economic potential.
- **Commitment to Diverse Sectors:** Both sides are committed to advancing mutually beneficial cooperation across various sectors, specifically enumerating:
  - Trade and Investment
  - Defence
  - Agro-processing
  - Textiles
  - Pharmaceuticals
  - Regional Connectivity
  - Security
  - Education
  - Culture
  - People-to-people exchanges
  - New and Emerging Technologies

**About 4th India-Central Asia Dialogue**



- **What It Is?**
  - A multilateral platform for foreign ministers of India and Central Asian countries to engage in structured dialogue.
- **Launched:** Initiated in **2019 in Samarkand** to deepen strategic, political, and economic cooperation.
- **Members:** India, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, Uzbekistan.
- **Objectives:**
  - To enhance cooperation in trade, transport, security, energy, IT, health, and people-to-people ties.

- o To serve as a mechanism for regional stability and sustainable development.

**Strategic Significance**

- **Strategic Location of Central Asia:** The five Central Asian republics are strategically located, bordering Afghanistan and China, and are rich in natural resources (oil, gas, minerals).

- **"Connect Central Asia" Policy:** India's engagement is part of its broader **"Connect Central Asia" policy**, aiming to expand strategic, economic, and cultural linkages.

- **Geopolitical Significance:**
  - o **Connectivity:** Overcoming geographical barriers to enhance trade and transit (e.g., through Chabahar Port, **INSTC**).
  - o This dialogue specifically stresses **"regional connectivity."**
  - o **Energy Security:** Central Asia is a potential source of energy resources for India.

- **Economic Potential:**
  - o Diversification of trade baskets beyond traditional goods.
  - o Investment opportunities in various sectors, as highlighted by EAM **(agro-processing, textiles, pharmaceuticals, digital technologies).**
  - o Need to address impediments to economic cooperation, as discussed in the Business Council meeting.

## BRICS Parliamentary Forum Condemns Pahalgam Terror Attack, Vows Collective Action Against Terrorism



**Context:**

- The BRICS Parliamentary Forum, held on **June 4-5, 2025, in Brasilia, Brazil**, issued a strong condemnation of the recent terrorist attack in Pahalgam, Jammu and Kashmir.

- The forum, representing a growing bloc of nations, also reached a broad consensus on critical global issues, underscoring a commitment to collective action against terrorism and cooperation on various challenges.

**About the BRICS Parliamentary Forum (BRICS PF 2025)**

- **Dates & Venue:** June 4-5, 2025, in Brasilia, Brazil.

- **Purpose:** The BRICS Parliamentary Forum is a **vital platform for dialogue among parliaments of BRICS member countries**, fostering inter-parliamentary cooperation and consensus on global issues.

- **Historical Context:** The **1st BRICS Parliamentary Forum** was held during Russia's Chairship on **June 8, 2015, in Moscow**. **India previously hosted the forum in October 2016.**

- **Chairmanship Rotation:** The forum's Chairmanship rotates among its members annually.

- **Participants:** Representatives from **10 countries** attended the forum:
  - o **Original BRICS Members:** India, Brazil, Russia, China, South Africa.
  - o **New Members (from 2024):** Iran, the United Arab Emirates (UAE), Egypt, Ethiopia.
  - o **Invited Nation:** Indonesia (indicating potential future expansion or engagement; Indonesia joined as a full BRICS member on January 6, 2025).

- **Key Outcomes - Broad Consensus on Global Issues:** After intensive discussions, the forum achieved consensus on:
  - o The responsible use of Artificial Intelligence (AI).

- o Global trade and economy.
- o Inter-parliamentary cooperation.
- o Global peace and security.
- **Joint Declaration:** A joint declaration was issued, specifically condemning the Pahalgam terror attack and reaffirming collective commitment against terrorism.

**India's Role and Stance on Terrorism**

- **Strong Condemnation:** India unequivocally condemned all terrorist attacks and emphatically advocated for the adoption of a **zero-tolerance policy towards terrorism**.
- **Acknowledgement of India's Policy:** India's firm policy on countering terrorism was strongly acknowledged by other member countries during the meeting.
- **Key Proposals by Lok Sabha Speaker Om Birla:** During his address, Lok Sabha Speaker Om Birla emphasized the need for joint efforts to:
  - o Curb **financial support to terrorist organizations**.
  - o Enhance **intelligence sharing**.
  - o Prevent the **misuse of emerging technologies** by terrorist groups.
  - o Promote **cooperation in investigation and judicial processes** related to terrorism.
- **Condemnation of Pahalgam Attack:** The joint declaration specifically and strongly condemned the recent terrorist attack in Pahalgam, India, highlighting solidarity with India.

**India's Leadership in the BRICS Parliamentary Forum**

- **Chairmanship Assumed:** India has **assumed the chairmanship of the BRICS Parliamentary Forum**.
- **Next Meeting:** India will host the **12th meeting** of the BRICS Parliamentary Forum in **2026**.
- **Handover:** Lok Sabha Speaker Om Birla was formally handed over the chairmanship at the 11th BRICS Parliamentary Forum held in Brasilia.

**Key Facts About BRICS Grouping**

- **Acronym Origin:** BRICS is an acronym initially coined in **2001 by Goldman Sachs economist Jim O'Neill** to refer to Brazil, Russia, India, and China (BRIC), as rapidly growing emerging economies.
- **South Africa's Inclusion: South Africa joined in 2010**, leading to the expanded acronym "BRICS."
- **Objective:** The group was designed to bring together the world's most important developing countries to **challenge the political and economic power of the wealthier nations of North America and Western Europe**.

**Conclusion**

The BRICS Parliamentary Forum's decisive condemnation of the Pahalgam terror attack and its unified pledge for collective action against terrorism underscore the growing convergence among member states on crucial global security challenges. With India assuming the chairmanship for 2026, it gains a significant platform to drive discussions and initiatives on critical issues such as countering terror financing, enhancing intelligence cooperation, and shaping policies on the responsible use of emerging technologies, further solidifying its leadership within the expanded BRICS framework.

## Pakistan's UNSC Posts: A Diplomatic Challenge for India's Fight Against Terror



**1. Background and Context**

- On **June 5, 2025**, Pakistan announced its appointments to key United Nations Security Council (UNSC) positions for 2025:
  - o **Chair of the Taliban Sanctions Committee (Resolution 1988):**

* Responsible for enforcing sanctions—asset freezes, travel bans, and arms embargoes—on individuals and entities linked to the Taliban threatening peace and security in Afghanistan.

   o **Vice-Chair of the Counter-Terrorism Committee (Resolution 1373) 2001:**

      * Oversees implementation of international counter-terrorism frameworks, including combating terrorist financing and enhancing global cooperation.

* Pakistan also became **co-chair** of two UNSC Informal Working Groups:

   o One on documentation and procedural issues (with Denmark).

   o Another newly formed group with Greece to evaluate the effectiveness of UN sanctions.

* Moreover, Pakistan is set to **preside over the UNSC in July 2025** over the 15-member Council when it assumes its presidency according to alphabetical rotation of the member states' official names.

* This will allow Islamabad to set the Security Council's agenda.

* This is Pakistan's **8th term as a non-permanent member** of the UNSC, with tenure from January 1, 2025, to December 31, 2026.

   Pakistan's UN Ambassador, **Asim Iftikhar Ahmad**, declared the intention to use the platform to highlight the Kashmir issue and spotlight terrorism concerns, with a clear anti-India agenda.

## 2. UNSC Structure and Membership

* The UNSC comprises:

   o **5 permanent members:** China, France, Russia, UK, USA.

   o **10 non-permanent members:** Elected for two-year terms; Pakistan is one for 2025-26.

* Other key chairs in 2025 include:

   o Algeria (Chair, Counter-Terrorism Committee)

   o Denmark (Chair, ISIL and Al-Qaida Sanctions Committee)

   o Guyana and Russia (Vice-Chairs, Taliban Sanctions Committee)

* **India previously chaired the Counter-Terrorism Committee in 2022** during its 2021-22 UNSC term.

* India consistently highlights Pakistan as a sanctuary for UN-proscribed terrorist groups.

* **Historic example:** Osama bin Laden's presence in Abbottabad, Pakistan, until his death in 2011, demonstrates Pakistan's role in harboring terrorists.

## 3. Recent Developments in UNSC Membership

* On **June 3, 2025**, 5 new non-permanent UNSC members were elected for 2026-27:

   o Bahrain, Democratic Republic of Congo, Liberia, Latvia, Colombia.

* These elections keep UNSC membership dynamic and affect global security agendas.

## 4. Implications and Challenges for India

### (a) Pakistan's Diplomatic Platform to Push Its Narrative

* By chairing key terrorism-related committees, Pakistan can:

   o Project its narrative on Kashmir.

   o Deny or minimize accusations of supporting terrorism.

   o Shift blame onto India, accusing it of supporting insurgencies such as Baloch militants and Tehrik-i-Taliban Pakistan (TTP).

### (b) Dilution of International Support for India

* UNSC statements condemning terror attacks in India (e.g., Pahalgam attack) have been weakened under Pakistan's influence.

* This hinders India's efforts to obtain unequivocal global condemnation of terrorism against it.

**(c) Influence on UNSC Proceedings**

- May 2025 marked the first UNSC closed-door consultation on the "India-Pakistan Question" since 2019.
- Pakistan's roles enable it to influence framing and discussions, possibly hindering India's narrative.

**(d) China-Pakistan Strategic Axis**

- China's close strategic partnership with Pakistan results in coordinated stances at UNSC and international forums.
- This cooperation complicates India's attempts to diplomatically isolate Pakistan.

**(e) Pakistan-Afghanistan Diplomatic Ties**

- Pakistan and Afghanistan agreed to elevate ties to ambassadorial level, facilitated by China.
- The Taliban's ambiguous position, coupled with China's growing influence in Kabul, adds complexity to India's regional diplomacy.

**(f) Opposition to India's UNSC Permanent Membership**

- Pakistan is expected to strongly oppose India's bid for permanent UNSC membership, mobilizing support against it.

**5. India's Diplomatic Response**

- India has actively engaged with UNSC members **(excluding Pakistan, China, Somalia) to highlight Pakistan's role in terrorism.**
- **Pressured global financial institutions (IMF, World Bank) to reconsider aid to Pakistan amid fears of funds fueling terrorism.**
- Renewed efforts to reinstate Pakistan on the **FATF grey list to cut off terror financing.**
- Indian delegations visited capitals like **Washington, Moscow, Brussels, and London for support.**
- Despite these efforts, India faces a challenging diplomatic environment due to Pakistan's entrenched position and China's backing.

**6. Regional and Global Significance**

- Pakistan chairing terrorism-related UNSC committees is paradoxical given its documented support for terror groups targeting India.

- The situation highlights India's difficulties in controlling the global counter-terrorism narrative.
- Close China-Pakistan coordination in the UNSC and increasing Pakistan-Afghanistan ties intensify regional geopolitical complexities.

**7. Implications for Global Counter-Terrorism and India**

- **Diplomatic Challenge:** Pakistan's UNSC roles give it a platform to influence global terrorism discourse and possibly obstruct sanctions against terror groups.
- **Conflict of Interest:** As chair of the Taliban Sanctions Committee, Pakistan's enforcement of sanctions may be biased due to its strategic ties with the Taliban.
- **Consensus-Based Decisions:** UNSC committees operate on consensus, allowing Pakistan to stall or dilute resolutions unfavorable to it or its allies.
- **International Scrutiny:** Countries including India and permanent UNSC members will closely monitor Pakistan's actions to ensure genuine counter-terrorism efforts.

**Conclusion**

Pakistan's leadership in critical UNSC committees related to terrorism poses a significant diplomatic challenge for India's fight against terror. Pakistan's ability to shape UNSC discourse, defend its own interests, and weaken India's international support necessitates a more robust Indian diplomatic strategy. India must deepen engagement with global partners, expose Pakistan's terror sponsorship, and strengthen multilateral cooperation to safeguard its security interests and global counter-terrorism efforts.

**India's Growing Role in Global Maritime Safety: Participation in IALA Council as Vice President**

**Context:**

- India, currently serving as the **Vice President of the International Association of Lighthouse Authorities** (IALA), actively participated in the **2nd Session of the IALA Council in Nice, France (June 2025).**
- This engagement highlights India's long-standing commitment and increasing influence in shaping global marine aids to navigation and maritime safety standards.

## I. What is IALA and India's Association?

- **IALA was founded in 1957 as a non-governmental organization (NGO).**
- It officially became an Intergovernmental Organization **(IGO) in August 2024, after 34 countries, including India, ratified its new status.**
- **IALA's motto, "Successful Voyages, Sustainable Planet,"** reflects its goals of harmonizing navigation systems, reducing marine accidents, and promoting environmental protection.
- Structure : The **General Assembly meets every 4 years to set priorities**, while the Council (**24 members, including India**) meets twice a year to make decisions.
- Membership : IALA includes **80 national authorities and 60 commercial firms among its 200 members.**
- **India has been a member since 1957 and a Council member since 1980**, represented by the Directorate General of Lighthouses and Lightships (DGLL).
- **India's Current Role:**
  - Elected as **Vice President of IALA** during the **1st General Assembly in Singapore.**
  - This election reflects India's growing global influence and strategic maritime vision.

## II. India's Participation in the 2nd IALA Council Session (Nice, France, June 2025)

1. **Indian Delegation:**
   - Led by Secretary, Ministry of Ports, Shipping and Waterways.
   - Included (Joint Secretary) and (Director).
2. **Keynote Address by Secretary (PSW):**
   - Highlighted India's longstanding association with IALA.
   - Showcased significant progress in marine aids to navigation and vessel traffic services.
   - **Specific Initiatives Mentioned:**
     - **Integration of vessel traffic services** across **12 major ports in India.**
     - Planned **international training programs** at the Marine Navigation Training Institute in Kolkata.
3. **Hosting Upcoming IALA Events:**
   - Secretary (PSW) formally invited all member states to attend:
     - The **3rd IALA General Assembly in December 2025** (Mumbai).
     - The **21st IALA Conference in 2027** (Mumbai).
   - India's proactive role and upcoming leadership in hosting major IALA events were appreciated by Council members.

## IV. Significance of India's Active Engagement

India's prominent role in IALA, especially as Vice President and future host of major events, signifies:

- **Commitment to Maritime Safety:** Reinforces India's dedication to ensuring safe and secure navigation in its waters and contributing to global maritime safety.
- **Innovation in Maritime Sector:** Showcases India's adoption of advanced technologies (like integrated VTS, IoT) in marine navigation.
- **Heritage Preservation:** Reflects India's interest in conserving its rich maritime heritage, particularly lighthouses.

- **Growing Global Influence:** Marks India's increasing stature and leadership in international maritime governance and standard-setting bodies.
- **Capacity Building:** India's initiative to host international training programs at the Marine Navigation Training Institute in Kolkata demonstrates its commitment to building global capacity in maritime aids to navigation.

## Joint Declaration on India-Cyprus Comprehensive Partnership



**Why in News**

- **Prime Minister Narendra Modi** visited **Cyprus** from **June 15 to 16, 2025**.
- **First visit by an Indian PM to Cyprus in over 20 years.**
- A **Joint Declaration** was signed with **President Nikos Christodoulides** to build a **Comprehensive Strategic Partnership**.

**1. Overview of the Partnership**

- Reaffirmation of **bilateral relations** based on **mutual trust**, **respect**, and a **shared strategic vision**.
- Discussions covered **bilateral**, **regional**, and **global cooperation**.
- Agreement to strengthen cooperation for **peace**, **stability**, and **prosperity**.

**2. Shared Values and Global Commitments**

- Shared values include **democracy**, **rule of law**, **peace**, **multilateralism**, and **sustainable development**
- Support for a **rules-based international order** anchored in the **UN Charter** and **international law**.
- Emphasis on **UNCLOS** for maritime rights and **freedom of navigation**.

- Reaffirmed support for **sovereignty** and **territorial integrity** of all states.
- Discussed global issues including the **Ukraine conflict** and the **Middle East**.
- Cyprus supported India's bid for **Nuclear Suppliers Group (NSG)**.
- Agreed to increase coordination at the **UN** and **Commonwealth**.
- Supported implementation of the **2024 Apia Commonwealth Ocean Declaration** and the **Blue Charter Centre of Excellence** in Cyprus.
- Called for **UN Security Council (UNSC) reform**, supported progress in **Intergovernmental Negotiations (IGN)**.
- **Cyprus reiterated support for India's permanent membership** in an expanded UNSC.
- Agreed on **mutual support** for candidacies in **multilateral organizations**.

**3. Political Dialogue**

- Commitment to hold **regular political consultations**.
- Use of **existing bilateral mechanisms** for follow-up.
- Ministries of Foreign Affairs (Cyprus) and External Affairs (India) to oversee the **2025–2029 Action Plan**.

**4. Support for Sovereignty and the Cyprus Issue**

- Reaffirmed commitment to resolve the **Cyprus Question** under the **UN framework**.
- Supported a **bizonal, bicommunal federation** with **political equality**, as per **UNSC resolutions**.
- India reaffirmed support for **Cyprus's independence, sovereignty, and territorial integrity**.
- Both sides stressed avoiding **unilateral actions** to enable negotiations.

**5. Security, Defence, and Crisis Cooperation**

- Strong condemnation of **terrorism in all forms**, including **cross-border terrorism**.
- Cyprus expressed **solidarity with India**, including on **Pahalgam (Jammu & Kashmir) terrorist attack**.

- Agreed on:
  - **Zero tolerance** approach to terrorism
  - Respect for **state sovereignty**
  - Action against **terror financing**, **safe havens**, and **infrastructure**
  - **Accountability** for perpetrators
- Called for early adoption of the **Comprehensive Convention on International Terrorism (CCIT)** at the **UN**.
- Emphasis on implementation of **UNSC 1267 Sanctions** and **EU-designated lists**.
- Commitment to enhance **defence cooperation**, including:
  - **Strategic autonomy**
  - **Defence industry collaboration**
  - Focus on **cybersecurity** and **emerging technologies**
- Discussed strengthening **maritime security**:
  - **Port calls** by Indian naval vessels
  - **Joint maritime training** and **domain awareness**
- Agreement to cooperate in **crisis response**, **evacuation**, and **Search and Rescue (SAR)** operations.

## 6. Connectivity and Regional Cooperation

- Aim to act as **regional connectors**.
- Highlighted importance of **India–Middle East–Europe Economic Corridor (IMEC)**.
- IMEC seen as a **multi-modal** project for **economic integration** and **sustainable development**.
- Recognized **Cyprus as a gateway to Europe**.
- Encouraged:
  - **Indian shipping companies** to establish presence in Cyprus
  - **Joint maritime ventures** between Indian and Cyprus-based companies

## 7. EU–India Strategic Engagement

- Cyprus will hold the **Presidency of the Council of the European Union in 2026**.
- Commitment to support **EU–India Strategic Partnership**.

- Welcomed progress in:
  - **Strategic Dialogue**
  - **Defence and maritime security**
  - **Clean energy**, **digital infrastructure**, and **space cooperation**
- Cyprus pledged support for finalizing the **India–EU Free Trade Agreement (FTA)** by end of **2025**.
- Support for the **India–EU Trade and Technology Council**.
- Agreement to pursue a **forward-looking agenda** beyond the **2025 Strategic Roadmap**.

## 8. Trade, Innovation, and Economic Opportunities

- Agreed to expand:
  - **Trade and investment**
  - **Scientific research**
  - **Technological innovation**
- Cyprus to send a **high-level business delegation** to India.
- Plan to organize a **Cyprus–India Business Forum** and a **Business Round Table**.
- Agreed to strengthen cooperation among:
  - **Startups**
  - **Academic institutions**
  - **Industries**
- Intend to sign an **MoU** on cooperation in **artificial intelligence**, **digital infrastructure**, and **research**.

## 9. Mobility, Tourism, and People-to-People Ties

- Acknowledged people-to-people ties as a **strategic asset**.
- Agreed to finalize a **Mobility Pilot Program Arrangement** by **end of 2025**.
- Emphasis on increasing **cultural exchanges** and mutual understanding.
- Discussed enhancing **tourism** and establishing **direct air connectivity**.
- Supported more accessible travel through **shared air partners**.

## 10. Future Action Plan (2025–2029)

- Agreement to draft and implement a **five-year bilateral Action Plan (2025–2029)**.
- **Ministry of Foreign Affairs (Cyprus)** and **Ministry of External Affairs (India)** to supervise and monitor implementation.

# India's Participation in the G7 Summit



**Why in News?**

- Prime Minister Narendra Modi is set to attend the G7 Summit in Kananaskis, Canada, on June 16-17, 2025, following an invitation from Canadian Prime Minister Mark Carney.

- **This marks PM Modi's sixth consecutive participation in the G7 Summit,** despite India not being a permanent member.

- India's repeated invitations highlight its growing global influence and its role as a voice for the Global South, especially on critical global issues.

## 1. PM Modi's Participation in G7 Summit (Canada 2025)

- **Dates:** June 16-17, 2025.
- **Location:** Kananaskis, Canada.
- **Invitation:** Invited by Canadian Prime Minister Mark Carney.
- **Significance for PM Modi:** This marks his **sixth consecutive participation** in the G7 Summit.
- **PM's Statement:** Stated the summit will provide a platform for exchanging views on global issues and the priorities of the Global South. Also looks forward to engaging with partner country leaders.

## 2. What is G7?

- **Members:** Britain, Canada, France, Germany, Italy, Japan, and the United States.
- **Nature:** Informal forum of seven of the world's most advanced and industrialized democracies.
- **Formation:**
  - o Formed as **G6 in 1975** to coordinate global economic policy.
  - o Became **G7 in 1976** with Canada joining.
  - o Became G8 in 1997 when Russia joined, but Russia was suspended in 2014 after annexing Crimea, returning it to G7.
- **Scope:** Over the years, its scope expanded to include climate change, security, development, and technology.

## 3. What is the G7 Summit?

- **Annual Meeting:** Annual gathering of the heads of state or government of the G7 countries.
- **Purpose:** High-level forum to discuss global challenges and coordinate policies on international issues.
- **Discussions:** Leaders hold closed-door talks on economy, climate change, global health, conflicts, and AI.
- **Outcomes:** Negotiate joint declarations, known as **communiqués**, summarizing shared commitments.
- **Hosting:** One member country hosts the summit each year, setting the agenda and inviting guest countries (like India, Brazil, South Africa, Australia).

## 4. India's Invitations to G7 Summits

- **Frequency:** India has been invited to the G7 Summit **more than ten times**.
- **First Invitation:** 2003, when then Prime Minister Atal Bihari Vajpayee attended in France as a special guest.
- **Regular Participation:**
  - o 2005-2009: Then PM Manmohan Singh participated annually.
  - o Since 2019: PM Modi has attended every year (France 2019, US 2020 (cancelled), UK 2021 (virtual), Germany 2022, Japan 2023, Canada 2025).
- **Role:** India attends as an "**outreach partner**" or "special invitee," not a formal member.

## 5. Reasons for India's Invitation

- **Major Global Player:** India is a key global player and a significant voice in the Global South.
- **Economic Clout:** World's 5th largest economy.
- **Key Pillar in Global Supply Chains:** Important for critical minerals, climate initiatives, and digital transformation.

- **Input for Global Solutions:** Hosting countries seek India's input for balanced global solutions.
- **Bridging Representation Gaps:** Inviting PM Modi helps include perspectives from the Global South on issues like food security, energy access, climate justice, and pandemic resilience.
- **External Affairs Minister's View:** Stated that India's presence brings benefits to the G7 and allows the Global South to voice its concerns about international order inequities.
- **Canada's Rationale (PM Mark Carney):** Highlighted that inviting Modi "made sense" to:
    - Support rebuilding ties.
    - Explore cooperation on intelligence sharing and trade corridors (like **IMEC - India-Middle East-Europe Economic Corridor**).
    - Reassert mutual strategic importance.
- **Consistent Participation:** India has regularly participated in outreach sessions since 2019, focusing on climate, digital transformation, biodiversity, and health.

**6. Importance for India-Canada Relations**

- **First Meeting:** This will be PM Modi's first meeting with Canadian PM Carney on the sidelines of the G7 Summit.
- **Opportunity to Reset:** The External Affairs Ministry views this as an opportunity to reset India-Canada relations.
    - Aims to rebuild relations based on mutual respect, shared interests, and addressing each other's concerns.
- **PM Modi's Canada Visit:** This is **PM Modi's first visit to Canada in a decade.**
- **Recent Strained Relations:**
    - Relations were strained after former Canadian PM Justin Trudeau's allegation in September 2023 about Indian agents' involvement in the killing of Khalistani separatist Hardeep Singh Nijjar.

- India strongly denied the allegation as "absurd" and counter-accused Canada of harboring separatist and radical elements.
- This led to diplomatic expulsions and downgraded ties.
- **Crucial Step:** The Modi-Carney meeting is considered a crucial step towards mending the relationship that has been at a historic low.

## New Zealand Halts Cook Islands Funding Amidst China Row



**Why in News?**

- On June 19, 2025, **New Zealand suspended NZ$18.2 million ($11.0 million) in core sector support funding to the Cook Islands for 2025-26.**
- This decision reflects deteriorating relations, primarily due to the **Cook Islands' deepening ties with China and New Zealand's concerns** over lack of consultation.

**I. Background of the Dispute**

- **Special Relationship:** The Cook Islands is a **self-governing nation in free association with New Zealand, sharing citizenship and New Zealand's defence commitment** if requested.
- The 2001 Joint Centenary Declaration mandates consultation on security, defence, and foreign policy.
- **New Zealand has been the Cook Islands' primary development partner,** providing significant **financial support (NZ$194.2 million over 3 years).**
- **China's Pacific Influence:** New Zealand (and Australia) are increasingly cautious about China's growing presence in the Pacific, perceiving it as a potential national security threat.

- New Zealand previously halted development funding to Kiribati in January, indicating broader concerns.
- **China-Cook Islands Strategic Partnership:** In February 2025, Cook Islands PM Mark Brown signed a strategic partnership with China covering **deep-sea mining, education, and economic cooperation,** *excluding* security ties.
- New Zealand's grievance is the lack of proper consultation *before* this signing, breaching their established arrangement.

## II. New Zealand's Action & Stance

- **Funding Suspension:** New Zealand halted core sector funding, citing reliance on a **"high trust bilateral relationship."**
- **Conditions for Resumption:** New Zealand will resume significant funding only when the Cook Islands takes "**concrete steps to repair the relationship and restore trust."**
- **Diplomatic Message:** This move aims to emphasize the importance of consultation and adherence to the free association principles.
- **Broader Context:** The announcement coincided with New Zealand PM Christopher Luxon's visit to China, where he intended to raise concerns about China's Pacific engagements.

## III. Cook Islands' Response

- **Commitment to Repair:** The Cook Islands Ministry of Foreign Affairs and Immigration (MFAI) expressed commitment to restoring the high-trust relationship and appreciated New Zealand's past support.
- **Security Stance:** The **Cook Islands reiterated that New Zealand remains its "closest partner for security and defence."**

**About the Cook Islands :**



## I. Geographical Profile

- **Location:** 15 small islands in the South Pacific Ocean, spread over 2 million sq. km. Positioned in the center of the **Polynesian Triangle,** roughly halfway **between Hawaii and New Zealand.**
- **Neighbors:** East of Niue, Tonga, and Samoa; northeast of New Zealand; south of Kiribati; west of French Polynesia.
- **Total Land Area:** 240 sq. km.
- **Island Groups:** Divided into **two main groups separated by a vast distance:**
  - o **Northern Group (6 islands):** Mostly low-lying, sparsely populated coral atolls (e.g., Manihiki, Penrhyn, Pukapuka). Known for light vegetation and white sand beaches.
  - o **Southern Group (9 islands):** Generally larger, higher islands of volcanic origin, more densely populated (e.g., Rarotonga, Aitutaki, Mangaia).
- **Highest Point:** Te Manga (652 m) on Rarotonga Island.
- **Capital & Population Centre:** Avarua, located on Rarotonga Island, which hosts most of the population.

## II. Political Status & Governance

- **Self-Governing:** A self-governing island country.
- **Free Association with New Zealand:** An arrangement dating from August 1965. This unique relationship implies:
  - o **Citizenship:** Cook Islanders hold New Zealand citizenship.
  - o **Free Access:** They enjoy the right of free access to New Zealand and, by extension, Australia.
  - o **Defence & Foreign Policy:** New Zealand commits to defend the Cook Islands if asked, and the two countries consult on security, defence, and foreign policy.
- **System of Government:** Parliamentary democracy under a constitutional monarchy.
- **Currency:** New Zealand Dollars (NZD).

## III. Historical Context

- **Naming:** Named after Captain Cook, who explored them in 1773.
- **Ancestry:** Historically autonomous, home to tribes of mixed Polynesian ancestry.

## India and Croatia to Deepen Defence Cooperation : PM Modi



**Why in News?**

- On June 18, 2025, Prime Minister Narendra Modi, during his visit to **Zagreb, announced that India and Croatia will establish long-term plans for deepening defence partnership.**
- This marks a significant step in bolstering bilateral ties across various sectors.

**I. Key Outcomes of PM Modi's Visit to Croatia**

- **Defence Cooperation:**
  - Commitment to formulate a **long-term Defence Cooperation Plan.**
  - Focus areas include **defence production, joint training, military exchanges, and cybersecurity.**
  - Aims to enhance collaboration between national defence industries.

- **Economic & Investment Opportunities:**
  - India will **enhance investment** in Croatia's critical industries: **pharmaceuticals, agriculture, IT, clean technology, digital technology, renewable energy, and semiconductors.**
  - Croatia invited to participate in India's **Sagarmala project** (port modernization, coastal zone development, multimodal connectivity), with emphasis on **shipbuilding.**
  - Identified areas where economies can complement each other to boost bilateral trade and create reliable supply chains.

- **Space Cooperation:**
  - India and Croatia will **jointly work on space ventures.**
  - India committed to **sharing its space expertise** and experience with Croatia.

- **People-to-People & Cultural Ties:**
  - Academic institutes from both countries will undertake **joint research projects.**
  - A **5-year Cultural Exchange Programme** (2026-2030) was finalized.
  - The MoU for the **Hindi Chair at Zagreb University** has been extended until 2030, appreciating the Indology department there.
  - A **mobility agreement** to facilitate the movement of people between the two countries will be signed "soon."

- **International Issues & Cooperation:**
  - PM Modi reiterated India's stance on resolving international conflicts through **dialogue and diplomacy**, asserting that solutions **cannot be found on battlefields.**
  - India expressed appreciation for Croatia's **solidarity following the April 22 Pahalgam terror attack**, condemning terrorism as an enemy of humanity and democracy.
  - Croatia's support is deemed significant for strengthening India's strategic partnership with the **European Union**.

**II. Significance of the Engagement**

- **Expanding European Outreach:** PM Modi's visit, the **first by an Indian Prime Minister to Croatia, reflects India's expanding engagement with Europe beyond traditional Western partners,** focusing on newer EU members like Croatia that influence EU decision-making.

- **Croatia's Strategic Importance:**
  - **Geostrategic Gateway:** Croatia, located on the eastern Adriatic coast, serves as a maritime gateway to Central Europe and a potential hub in the **India-Middle East-Europe Economic Corridor (IMEC)**.
  - **Alternative to Chinese Influence:** Croatia's limited participation in **China's Belt and Road Initiative** (BRI) positions it as a favorable partner for India in promoting a democratic, rules-based alternative in the Balkans.
  - **Influence in EU and NATO: Croatia's full membership in both the EU and NATO provides India indirect access to European regulatory systems** and policy debates, and support for India's EU Free Trade Agreement (FTA).
- **Shared Values:** The partnership is rooted in shared values of democracy, rule of law, pluralism, and equality.
- **Strengthening Bilateral Trade:** The identified areas for cooperation are expected to significantly boost bilateral trade, which has shown consistent growth.

**About Croatia**



- **Geography:** Southeastern Europe, northwestern Balkan Peninsula.
  - **Borders:** Slovenia (NW), Hungary (NE), Serbia (E), Bosnia & Herzegovina and Montenegro (SE). Bounded by the Adriatic Sea (W), sharing a maritime border with Italy.
  - **Terrain:** Fertile, flat plains in the north; low mountains and highlands along the coast.
  - **Mountain Ranges:** Dinaric Alps, Velebit, Velika Kapela.
  - **Climate:** Mediterranean.
  - **Rivers:** Drava, Krka, Sava.
  - **Capital:** Zagreb (largest city, administrative, cultural, industrial, economic, and transport hub).
  - **Population:** 3.86 million (2023, World Bank).
- **Political Status:** Member of both the European Union and NATO.

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## UMEED Portal



**Why in News**

The central government launched the **UMEED portal** for the registration of Waqf properties on **June 6, 2025**. This is a significant step towards digitizing and streamlining the management of Waqf assets across India.

**About UMEED Portal**

- **Full Form:** UMEED stands for **Unified Waqf Management, Empowerment, Efficiency, and Development**.

- **Purpose:** It is a **centralized digital platform** designed to register and manage Waqf properties across the entire country.

- **Aims:**
  - To promote **better management** of Waqf properties.
  - To enhance **transparency** and accountability in Waqf administration.
  - To ensure the effective and fair utilization of community-owned Waqf assets, especially for the poor and marginalized in the Muslim community.

- **Legal Backdrop:** The portal's launch comes in the context of the recently enacted **Waqf (Amendment) Bill, 2025**, which received Presidential assent on April 5, 2025. This amendment aims to bring in reforms, transparency, and efficiency in Waqf management.

- **Implementation:** Registrations and data uploads on the portal will be facilitated by the **respective State Waqf Boards**.

**Key Features of UMEED Portal**

- **Mandatory Registration:** All Waqf properties must be registered on the portal within **six months of its launch**.

- **Detailed Information:** Each registration needs to include comprehensive details, such as **measurements (length and width)** and **geotagged locations** for accurate identification and mapping.

- **Women's Ownership Clause:** Properties that are registered under **women's names will not be eligible to be classified as Waqf properties**. This specific clause has been a point of contention and has drawn criticism from some quarters, leading to legal challenges.
  - **Context of Women's Rights in Waqf:** It's important to note that while the UMEED portal has this exclusion for properties *registered under women's names*, the Waqf (Amendment) Act, 2025, itself aims to empower Muslim women by:
    - Protecting their **inheritance rights** in family Waqf (Waqf-alal-aulad), ensuring they receive their rightful share before property is dedicated.
    - Expanding the purpose of Waqf-alal-aulad to provide financial support to widows, divorced women, and orphans.
    - Mandating the inclusion of **at least two Muslim women** in the composition of State Waqf Boards and the Central Waqf Council, aiming to ensure their participation in governance and decision-making regarding Waqf funds and assets.

- **Beneficiaries:** Despite the registration clause, **women, children, and people from**

economically weaker sections will continue to be key beneficiaries of Waqf assets and the welfare schemes run through them.

- **Extension for Registration:** Properties not registered within the stipulated six-month timeframe due to technical or other significant reasons may be granted a limited extension of one to two months.
- **Disputed Properties:** Properties that remain unregistered beyond the permitted extended period will be considered **disputed** and automatically referred to the **Waqf Tribunal** for resolution.

**Waqf Tribunal**

- Waqf Tribunals are specialized judicial bodies established under the Waqf Act to adjudicate disputes related to Waqf properties.
- They are deemed civil courts and have powers to determine any dispute, question, or other matter relating to a Waqf or Waqf property, including eviction of tenants.
- The Waqf (Amendment) Act, 2025 has also made some reforms to the Tribunal structure, including providing for appeals against Tribunal orders to the High Court within a specified period.

## National Automated Fingerprint Identification System (NAFIS)



**Context:** The Centre recently revised the procedure for the **Foreigners Identification Portal (FIP)** of NAFIS. It has directed states/UTs to use fingerprint scanners available in districts under the **District Police Module (DPM)** of the **Immigration Visa Foreigner Registration Tracking system (IVFRT)**, instead of NAFIS devices directly for this purpose. This aims to address technical issues faced in digitizing fingerprints of illegal migrants.

**1. About National Automated Fingerprint Identification System (NAFIS):**

- **Definition:** NAFIS is a **pan-India searchable database of crime and criminal-related fingerprints**. It acts as a centralized information repository.
- **Objective:** To **collect and consolidate fingerprint data of all criminals** from all states and Union Territories across India.
- **Functionality:** Enables law enforcement agencies to **upload, trace, and retrieve information** from the database **24x7 in real-time**.
- **Management:** Managed by the **National Crime Records Bureau (NCRB)** at the Central Fingerprint Bureau, located in New Delhi. The NCRB operates under the **Ministry of Home Affairs (MHA)**.
- **Impact:** Significantly enhances the capability of law enforcement to:
  - Locate individuals of interest quickly.
  - Connect an individual's identity to active warrants, warnings, or information about related criminal conduct stored in other police information reference systems.
  - Aid in solving complex cases by matching chance prints found at crime scenes with the central database.

**2. Working of NAFIS:**

- **Unique ID Assignment:** NAFIS assigns a **unique 10-digit National Fingerprint Number (NFN)** for each criminal, based on their biometrics (fingerprints).
- **Lifetime ID:** This unique NFN is assigned for the **lifetime of an offender**. Even if multiple crimes are registered under different FIRs, all incidents will be logged and linked to the same NFN, creating a comprehensive criminal history.
- **ID Structure:**
  - The **first two digits** of the NFN represent the **state code** where the criminal is first registered.

- This is followed by a **sequence number**, making the ID unique across the country.
- **State Partition:** The system includes state-wise partitions, where IDs belonging to a particular state are stored.
- **Digital Record:** Beyond just identification, NAFIS maintains a **digital record** to facilitate future fingerprint matching and analysis.

**3. Related Systems and Recent Developments:**

- **Foreigners Identification Portal (FIP):**
    - Launched in 2018 under the MHA (Bureau of Immigration) to collect biometric and biographic details of **illegally staying foreigners** in India.
    - The aim is to streamline and fast-track the **deportation process** by digitizing and standardizing data collection.
    - **Revised Procedure:** Previously, FIP intended to use NAFIS machines for biometric data capture. However, due to technical challenges (e.g., issues with digitizing manually taken fingerprints and data mismatches), the procedure has been revised.
    - Now, states/UTs are directed to use **fingerprint scanners available under the District Police Module (DPM) of IVFRT** for capturing biometrics of illegal migrants on the FIP portal.
    - Crucially, the new directive specifies that this data from FIP **will not be transferred to the NAFIS criminal repository**, ensuring a distinction between criminal records and illegal migrant data.
- **Immigration Visa Foreigner Registration Tracking System (IVFRT):**
    - A **Mission Mode Project** under the National e-Governance Plan (NeGP) of the Ministry of Home Affairs.

- **Objective:** To modernize and upgrade functions related to **immigration, visa issuance, registration of foreigners**, and tracking their activities within the country. It aims to create a **secure and integrated service delivery framework** for legitimate travelers while enhancing national security.
- **District Police Module (DPM):** A component of IVFRT designed to **equip state police up to the district level with authentic foreigner information** in their jurisdiction. It helps track overstaying or non-reporting foreigners and facilitates biometric verification. The recent update leverages the existing DPM infrastructure for FIP.

**4. Significance:**

- **Enhanced Law Enforcement:** NAFIS significantly boosts the capabilities of police and other law enforcement agencies in identifying criminals, tracking repeat offenders, and solving crimes more efficiently.
- **National Security:** By centralizing fingerprint data, NAFIS aids in internal security, preventing and detecting criminal activities more effectively. The FIP and its integration with IVFRT contribute to tracking illegal migrants, which is crucial for border management and national security.
- **Modernization of Policing:** Represents a major step towards the digitization and modernization of police functions in India.
- **Improved Inter-Agency Coordination:** Facilitates seamless sharing of crucial criminal identification data across different states and central law enforcement agencies.
- **Streamlined Processes:** The revised FIP procedure aims to streamline the process of identifying illegal migrants and eventually, their deportation, by addressing technical bottlenecks and leveraging existing infrastructure.

## Kerala High Court Allows Transgender Couple as "Parents" on Birth Certificates



**Date of Judgment:** 2 June 2025

I. Background of the Case

- The case involves **Zahhad (a trans man)** and **Ziya Paval (a trans woman),** believed to be Kerala's first openly transgender couple to have a biological child.
- In February 2023, **Zahhad gave birth,** marking a historic moment for India's transgender community.
- The Kozhikode municipal authorities initially **issued a birth certificate naming Zahhad as "mother" and Ziya as "father," ignoring their gender identity.**
- The couple requested that the birth certificate list them **simply as "parents,"** without gender specification, but this **was denied by the municipal authorities.**
- Following this denial, the couple approached the Kerala High Court seeking legal remedy.

II. Legal Arguments and Court's Decision

- The couple was represented by **Padma Lakshmi, Kerala's first transgender lawyer.**
- It was argued that denying their request violated their fundamental right to equality under **Article 14** of the Indian Constitution.
- The legal submission noted that the word "person" in Article 14 includes transgender persons and guarantees them equal protection of laws.
- The argument was based on the Supreme Court's **NALSA judgment (2014)**, which affirmed the right of transgender individuals to self-identify their gender.

- **Kerala High Court Verdict:** Justice Ziyad Rahman AA ordered the Kozhikode municipal authorities to issue a new birth certificate, **removing the terms "father" and "mother" and listing the couple simply as "parents."**
- This marked a significant legal precedent, affirming gender-neutral parental recognition.

III. Reasons for the Couple's Request

- Zahhad identifies as male despite giving birth; labeling him as "mother" contradicts his gender identity.
- The couple was concerned that gendered terms on official documents might cause discrimination and confusion for their child, especially in school admissions and official documents like Aadhaar, PAN, and passport.
- The petition highlighted a "scientific contradiction" of a male (Zahhad) giving birth, supporting the use of the neutral term "parent."

IV. Significance of the Ruling

- This ruling is the first in India to legally recognize transgender parents on birth certificates with gender-neutral terminology.
- It upholds the right of transgender individuals to self-identify and be respected in official documents.
- It safeguards the fundamental rights of both the child and the parents, preventing discrimination and fostering inclusivity.
- The judgment marks an important step towards legal recognition of diverse family structures in India.

V. Understanding Transgender Identities

- **Definition:** Transgender individuals have a gender identity or expression different from the sex assigned at birth.
- Includes trans-men, trans-women, persons with intersex variations, and gender-queer individuals.
- In India, transgender persons are also identified by cultural identities such as **Hijras, Kinnars, Aravanis, Jogappas, and Shiv-Shaktis.**
- The global transgender population is estimated to be around 250 million.

## VI. Sex vs. Gender

- **Sex:** Biological attributes such as chromosomes and genitalia defining males and females.
- **Gender:** Socially constructed roles and behaviors considered appropriate for men and women (as per WHO).

## VII. Historical and Global Context

- Countries like Germany have gradually moved from **civil partnerships (2001) to full marriage equality over 16 years,** reflecting global progress toward inclusivity.
- India's journey similarly shows increasing recognition of transgender rights.

## VIII. Status of Transgender Persons in India

- Traditionally, transgender persons lacked legal recognition as a separate gender category.
- **States like Tamil Nadu, Kerala, and Odisha** were pioneers in recognizing the "third gender."
- **Census 2011:** Approximately 4.87 lakh (487,803) transgender persons in India, with **Uttar Pradesh having the highest population share (~28.18%).**

## IX. Legal and Policy Developments for Transgender Rights in India

### 1. NALSA v. Union of India (2014)

- Landmark Supreme Court judgment recognizing the right to self-identify gender as part of **Article 21 (Right to Life).**
- Declared that no medical examination is required for gender self-identification.
- Directed the government to include "**third gender" in official documents.**
- Suggested reservation under OBC quota and establishment of a protective commission.

### 2. Transgender Persons (Protection of Rights) Act, 2019

- Defines transgender persons broadly, including socio-cultural identities like Hijra and Kinnar.
- Allows transgender persons to obtain a certificate of identity based on self-perception, without mandatory medical exams.
- Prohibits discrimination in education, employment, healthcare, public services, and housing.
- Mandates welfare schemes, vocational training, rehabilitation, and medical insurance.
- Establishes the National Council for Transgender Persons (NCT) to advise government policies.
- Recognizes offences against transgender persons, prescribing imprisonment (6 months to 2 years) and fines.

## Conclusion

The Kerala High Court's ruling allowing transgender parents to be recorded simply as "parents" on birth certificates is a historic step in the recognition of transgender rights in India. It reinforces constitutional guarantees of equality, dignity, and non-discrimination and aligns with India's progressive legal framework protecting transgender persons. This decision also paves the way for greater acceptance and inclusion of diverse family forms within the country.

## Government Seeks All-Party Support for Justice Varma's Impeachment



Justice Yashwant Varma
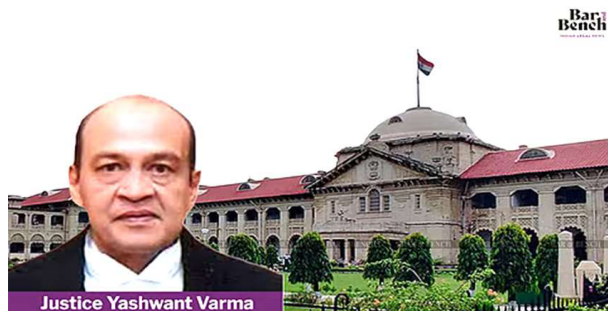
## Context

- In June 2025, **Union Parliamentary Affairs Minister Kiren Rijiju announced the government's plan to seek support from all political parties** for an impeachment motion against Justice Yashwant Varma.
- Justice Varma, a judge of the Allahabad High Court, is accused of corruption.
- The corruption charges were upheld by a Supreme Court-appointed committee.
- The government intends the impeachment process to be bipartisan and non-political.
- The goal is to initiate the impeachment motion during the **Monsoon Session of Parliament (July 21 to August 12, 2025).**

I. Government's Push for Impeachment of Justice Varma

- **Who:** Justice Yashwant Varma, formerly at Delhi High Court, currently Allahabad High Court.
- **Why:** Found **guilty of corruption through an independent SC-appointed inquiry committee.**
- **Government Stance:**
  o Parliamentary Affairs Minister Kiren Rijiju emphasized that corruption in the judiciary transcends political divisions.
  o Calls for a united parliamentary approach.
  o Engaged in talks with major and smaller political parties to secure consensus.
- **Significance:** A rare and serious step reinforcing the message that judiciary integrity is paramount.

II. Impeachment Process of Judges under Judges (Inquiry) Act, 1968

**1. Initiation of Motion**

- A motion to remove a judge can be introduced in either House of Parliament.
- Requires support of at least:
  o **100 Lok Sabha** members or
  o **50 Rajya Sabha** members.
- The **Speaker** (Lok Sabha) or **Chairman** (Rajya Sabha) **decides whether to admit the motion based on preliminary scrutiny.**

**2. Formation of Inquiry Committee**

- Upon admission of motion, a **three-member committee** is formed by the Speaker/Chairman to investigate allegations.
- The committee consists of:
  o Chief Justice of India (CJI) or a Supreme Court judge,
  o Chief Justice of one of the High Courts,
  o A distinguished jurist (a reputed legal expert).
- The committee investigates charges, records evidence, and examines witnesses.

**3. Committee Report and Parliamentary Debate**

- The committee submits its findings to the presiding officer.

- If the committee finds the judge guilty, the motion for removal is debated in both Houses.
- The motion requires a **special majority** for approval:
  o Majority of total membership of the House, and
  o At least two-thirds of the members present and voting.

**4. Presidential Approval and Removal**

- Once both Houses pass the impeachment motion, it is presented to the President.
- The President orders removal of the judge accordingly.

III. Special Circumstances in Justice Varma's Case

- An **in-house committee** (internal SC inquiry led by then CJI Sanjiv Khanna) had already investigated Justice Varma and submitted a report.
- This differs from usual cases where the parliamentary committee investigates from scratch.
- The government is deliberating how to incorporate this existing report into the formal impeachment inquiry.
- The Speaker of Lok Sabha will decide the procedural aspects.
- Minister Rijiju called the reconciliation of reports a secondary issue compared to the goal of moving the motion swiftly.
- The government aims to complete the impeachment process during the upcoming Monsoon Session.

IV. Background and Facts of the Case

- **In March 2025, a fire incident at Justice Varma's residence in Delhi revealed burnt sacks** containing cash in an outhouse.
- Justice Varma denied knowledge of the cash.
- **A Supreme Court-appointed committee conducted an inquiry,** recording witness statements and Justice Varma's responses.
- The committee found Justice Varma guilty of corruption.

- **CJI Sanjiv Khanna reportedly asked Justice Varma to resign, but he refused.**
- Consequently, Justice Varma was **transferred to the Allahabad High Court but has not been assigned any judicial duties there.**
- **CJI Khanna also wrote to the President and Prime Minister recommending impeachment**, the constitutional mechanism for removing High Court judges.

V. Constitutional and Legal Framework of Judicial Impeachment

A. Constitutional Provisions

- **Article 124(4) of the Constitution:** Applies to removal of Supreme Court judges.
- **Article 218:** Extends same procedure to High Court judges.
- Grounds for removal are restricted to:
  - **Proved misbehaviour**, or
  - **Incapacity** (physical or mental inability to perform judicial duties).

B. Importance of the Process

- Ensures **judicial accountability** while maintaining **judicial independence**.
- Acts as a check against misconduct without allowing frivolous or politically motivated removals.

C. Steps Summarized

| Step | Details |
|---|---|
| Initiation of motion | Requires support of 100 Lok Sabha or 50 Rajya Sabha members |
| Admission of motion | Decided by Speaker/Chairman |
| Inquiry Committee formation | CJI or SC judge + Chief Justice of HC + distinguished jurist |
| Committee investigation | Gather evidence, examine witnesses |
| Report submission | To the presiding officer |
| Parliamentary debate | Motion debated and voted on in both Houses |
| Special majority required | Majority of total members + 2/3 of present and voting members |
| Presidential sanction | Final removal ordered by President |

VI. Checks and Balances in Impeachment Process

- **High thresholds** for motion admission and voting prevent misuse.
- **Expert inquiry committee** ensures fairness and objectivity.
- **Bicameral parliamentary involvement** strengthens democratic scrutiny.
- Ensures removal only in **serious proven cases**.

VII. Historical Instances of Impeachment Attempts

| Judge | Year | Allegations | Outcome |
|---|---|---|---|
| Justice V. Ramaswami | 1993 | Corruption and misconduct | Impeachment motion failed |
| Justice Soumitra Sen | 2011 | Misbehaviour | Resigned before motion vote |
| Justice Dipak Misra | 2018 | Alleged misbehaviour | Motion rejected by Speaker |

- No successful impeachment to date.
- Shows the **rigor and political sensitivity** of the process.

VIII. Guidelines on Judges' Public Statements and Conduct

- Judges have freedom of speech (Article 19(1)(a)) but with **restrictions** to:
  - Preserve **judicial dignity**,
  - Avoid **bias or partiality**,
  - Maintain **public confidence** in the judiciary.
- **Bangalore Principles of Judicial Conduct (2002)** and **Restatement of Values of Judicial Life (1997)**:
  - Stress impartiality, integrity, propriety, and independence.
- Judges must avoid:
  - Public comments on ongoing cases,
  - Political or partisan statements,
  - Participation in controversial forums/ events.
- The Supreme Court has taken a stern view of judges who violate these norms (e.g., Justice C.S. Karnan case).

## Conclusion

The government's move to impeach Justice Varma marks a significant step in upholding judicial integrity. The impeachment process, safeguarded by constitutional provisions and parliamentary oversight, ensures accountability while protecting judicial independence. Effective checks, balanced by high thresholds and expert inquiry, deter judicial misconduct. Maintaining impartiality and public confidence is vital for the judiciary, especially in India's diverse socio-political context. This case exemplifies the complex interplay of law, ethics, politics, and governance in maintaining the rule of law.

## CAG Conducts First Audit of Jal Jeevan Mission

**Context:**

- The **Comptroller and Auditor General of India (CAG)** is currently carrying out a detailed performance audit of the Jal Jeevan Mission (JJM), the government's program to provide tap water to all rural homes. Reports from this audit are expected soon.

**About the CAG Audit of Jal Jeevan Mission (JJM)**

- **What is it?** An extensive performance audit of the Jal Jeevan Mission.
- **When did it start?** The process began **approximately one and a half years ago, after the CAG included it in its audit plan.**
- **Period Covered:** The audit examines JJM implementation in states from the financial year **2019-20 to 2023-24**.
- **Scope:** It is a **"horizontal audit,"** meaning it is being conducted across all states by CAG's local offices (Principal Accountant Generals/ Accountants General).
- **Status:** Fieldwork is mostly complete, and in some states, reports are being drafted. Reports from two states have already reached the CAG headquarters.

- **Next Step:** Once finalized, the reports will be presented in the Legislative Assembly of the respective states.
- **Focus:** The audit is at the **state level (not national)** because states primarily lead the JJM's implementation. It covers all aspects of JJM, including planning, expenditure, and reasons for cost increases.
- **Why Audit Now After 5 Years?**
  - **Expenditure Level:** The CAG typically selects a scheme for audit after **70-80% of its budget has been spent**.
  - **JJM's Growth:** JJM started in 2019-20 with lower initial spending. The audit began after its first phase concluded in 2023-24, when spending had significantly increased.
  - **First Major Audit:** This marks the 1st comprehensive audit of JJM since its inception in 2019.
  - The last similar audit was for its predecessor, the **National Rural Drinking Water Programme (NRDWP), in 2018.**

**Related Concerns and Other Audits**

- **JJM's Estimated Cost Increase:** The estimated cost of the Jal Jeevan Mission has more than doubled from its original plan of Rs 3.6 lakh crore to about **Rs 8.29 lakh crore**.
- **Funding Approval Issues:** The Jal Shakti Ministry requested Rs 2.79 lakh crore in extra central funds, but only **Rs 1.51 lakh crore (46% less than requested)** was approved by the Expenditure Finance Committee.
- **Tender Rule Changes:** A report by The Indian Express (May 21) indicated that a change in tender rules three years ago removed expenditure checks, leading to cost increases of **Rs 16,839 crore for 14,586 schemes**.
- **Other CAG Audits:** The CAG is also conducting similar audits for other central schemes, with reports expected soon, including:

- o MGNREGS (last audited nationwide in 2013).
- o Rashtriya Uchchatar Shiksha Abhiyan.
- o Welfare of Building and other Construction Workers.
- o Green India Mission.
- o Smart City Mission.

**About Jal Jeevan Mission (JJM)**

- **Extension:** The Union Budget 2025-26 has extended the Jal Jeevan Mission (JJM) until **2028**, with an increased focus on improving infrastructure quality and ensuring sustainable water supply through community involvement, known as "Jan Bhagidhari."

- **Launch:** Prime Minister Narendra Modi launched JJM on **August 15, 2019**, by restructuring and subsuming the National Rural Drinking Water Programme (NRDWP).

- **Initial Goal:** To provide tap water supply to **every rural household by 2024**, targeting **55 liters per person per day (lpcd)**.

- **Nodal Ministry:** Department of Drinking Water and Sanitation, **Ministry of Jal Shakti**.

- **Funding Pattern (Centrally Sponsored Scheme):**
  - o **90:10** for Himalayan and North-Eastern States.
  - o **100%** for UTs.
  - o **50:50** for rest of the States.

- **Progress (as of August 14, 2024):**
  - o **15.07 Crore (77.98%)** of rural households now have tap water connection.
  - o **188 districts, 1,838 blocks, 1,09,996 Gram Panchayats, and 2,33,209 villages** have achieved 'Har Ghar Jal' status.
  - o Over **2.35 Crore households (79.21%)** in Japanese Encephalitis (JE)-Acute Encephalitis Syndrome (AES) affected Districts are getting clean tap water.

- o **11 States/UTs** (Goa, A&N Islands, Dadra Nagar Haveli & Daman Diu, Haryana, Telangana, Puducherry, Gujarat, Himachal Pradesh, Punjab, Mizoram, and Arunachal Pradesh) have achieved **100% tap water connection**.

- o **9,27,421 schools and 9,63,955 Anganwadi centers** have tap water supply.

**Objectives of JJM**

The broad objectives of the Jal Jeevan Mission include:

- Providing Functional Household Tap Connection (FHTC) to every rural household.

- Prioritizing FHTC provision in quality-affected areas, drought-prone regions, desert areas, and Sansad Adarsh Gram Yojana (SAGY) villages.

- Ensuring functional tap connections in schools, Anganwadi centers, gram panchayat buildings, health and wellness centers, and community buildings.

- Monitoring the functionality of tap connections.

- Promoting voluntary ownership among the local community through contributions (cash, kind, or labor/shramdaan).

- Ensuring the sustainability of water supply systems (including water sources, infrastructure, and funding for regular operations and maintenance).

- Empowering and developing human resources in the water sector (covering construction, plumbing, electrical work, water quality management, water treatment, catchment protection, etc.).

- Raising awareness about the significance of safe drinking water and involving stakeholders to make water everyone's responsibility.

**Components Supported Under JJM**

- Development of in-village piped water supply infrastructure.

- Development and augmentation of reliable drinking water sources.

- Bulk water transfer, treatment plants, and distribution networks.

- Technological interventions for contaminant removal.
- Retrofitting of ongoing and completed schemes to provide FHTCs at a minimum service level of 55 lpcd.
- **Greywater management:** Management of wastewater without faecal contamination (e.g., from showers, basins, washing machines), which has high potential for reuse.
- Support activities like Information, Education, and Communication (IEC), Human Resource Development (HRD), training, utility development, water quality laboratories, research and development, and community capacity building.

**Impact of JJM**

- **Time Savings (WHO):** WHO estimates over **5.5 crore hours daily** saved, primarily for women, from water collection.
- **Health Benefits (WHO):** Could prevent nearly **400,000 deaths** from diarrheal diseases and save approximately **14 million Disability Adjusted Life Years (DALYs)**.
- **Child Mortality Reduction:** Research by Prof. Michael Kremer suggests a nearly **30% reduction in child mortality** (saving 136,000 lives annually).
- **Employment Generation (IIM Bangalore & ILO):**
  - **59.9 lakh person-years** of direct employment during capital expenditure phase.
  - **2.2 crore person-years** of indirect employment during capital expenditure phase.
  - **13.3 lakh person-years** of direct employment during operation and maintenance phase.

**Quality Assurance and Monitoring of JJM**

- Emphasizes **quality construction and materials**, with third-party inspections.
- Incorporates advanced technologies like **sensor-based IoT solutions**, **Aadhaar linking**, and **geo-tagging** of assets.

- Transparency through **online 'JJM dashboard' and mobile app**.

**Challenges and Solutions for JJM**

- **Challenges:** Lack of dependable water sources, groundwater contamination, uneven terrain, scattered habitations, and delays in statutory clearances.
- **Solutions:** Financial assistance, nodal officers for coordination, State and District Programme Management Units, and 'Nal Jal Mitra Programme' for skilled personnel.

**Jal Shakti Abhiyan: Catch the Rain (JSA: CTR)**

- **Launched:** 2019, focusing on water conservation through public participation.
- **2023 Theme:** 'Source Sustainability for Drinking Water'.
- **2024 Theme:** 'Nari Shakti se Jal Shakti', highlighting women's role in water conservation.

**About the Comptroller and Auditor General of India (CAG)**

- **Constitutional Office:** Independent office established under **Chapter V, Part V** of the Indian Constitution (**Articles 148 – 151**).
- **Head of Audit:** Head of the Indian Audit and Accounts Department.
- **Guardian of Public Funds:** Controls the entire financial system of the country at both Central and State levels.
- **Duty:** To uphold the Constitution and Parliamentary laws in financial administration.
- **Appointment and Term:**
  - Appointed by the **President of India** by warrant under hand and seal.
  - Holds office for **6 years or up to 65 years**, whichever is earlier.
- **Duties of the CAG:** Audits all expenditure from:
  - Consolidated Fund of India, and of each state and UT with a legislative assembly.
  - Contingency Fund and Public Account of India and of each state.

- o Trading, manufacturing, profit and loss accounts, balance sheets, and other accounts of Central and State government departments.
- o Receipts and expenditure of bodies substantially financed by Central/State revenues, government companies, and other corporations/bodies as required by law.
- o Ascertains and certifies the net proceeds of any tax or duty (certificate is final).
- **Reports of the CAG:**
  - o Submits audit reports for Centre to the **President**, and for States to the **Governor**.
  - o President/Governor then places reports before Parliament/state legislature.
  - o Submits 3 main reports to the President: on Appropriation Accounts, Finance Accounts, and Public Undertakings.
- **CAG and Public Accounts Committee (PAC):** Acts as a **guide, friend, and philosopher** to the PAC. Performs both regulatory/compliance audits and performance/efficiency audits to identify improper expenditure and waste of public money.
- **Constitutional Safeguards for CAG's Independence:**
  - o **Security of Tenure:** Removed by President only via constitutional procedure (like SC judge), not at President's pleasure.
  - o **Not Eligible for Further Office:** Cannot take up further employment under Central or State government after leaving office.
  - o **Salary and Conditions:** Determined by Parliament; salary equal to SC judge; cannot be altered to disadvantage after appointment.
  - o **Expenses Charged on Consolidated Fund of India:** Administrative expenses (including salaries, allowances, pensions) of CAG's office are charged upon Consolidated Fund of India, thus **not subject to Parliamentary vote**, ensuring financial autonomy.

## Union Minister to Inaugurate NeVA Project in Puducherry



**One Nation One Application**

**Context:**

- On Monday, June 9, 2025, Union Minister of State for Information, Broadcasting and Parliamentary Affairs, L. Murugan, inaugurated the **National e-Vidhan Application (NeVA) project** in the Puducherry Assembly.
- This initiative marks a significant step towards digitizing legislative procedures and aligning with the vision of 'One Nation-One Application'.

**About the National e-Vidhan Application (NeVA) Project**

- **Core Objective:** NeVA is a digital platform that aims to make **India's legislatures paperless** and streamline legislative processes across all States and Union Territories.
- **Vision:** It embodies the vision of **'One Nation – One Application'**, bringing all the legislatures of the country together on a unified digital platform.
- **Nodal Ministry:** It is an initiative by the **Ministry of Parliamentary Affairs (MoPA)**.
- **Launch & Budget:** The project was launched with a budget allocation of ₹ **673.94 crore in 2020**.

- **Current Status:**
  - Till now, **28 State Legislatures have signed Memorandums of Understanding (MoU)** for NeVA implementation.
  - **18 Legislative Houses** have already transformed themselves into fully Digital Legislatures.

**NeVA Implementation in Puducherry**

- **Inauguration:** Union Minister of State L. Murugan inaugurated the project in the Puducherry Assembly.
- **Trial Run:** Following the completion of digitisation work, the Puducherry Assembly had already conducted a trial run of NeVA during its recent Budget session.
- **Digital Access during Trial:** During the Budget session, the customary address of the Lt. Governor, the Chief Minister's Budget speech, the List of Business, and replies to questions were all provided to the MLAs in digital format through the NeVA platform.

**Key Features of the National e-Vidhan Application**

- **Member-Centric and User-Friendly:** Designed to be intuitive and align with existing legislative processes.
- **Mobile Accessibility:** The application allows all parliamentary members to access all House business information directly on their phones and tablets, facilitating better handling of legislative tasks.
- **Digital Department Management:** NeVA also assists government departments in managing operations by creating an inclusive digital environment.
- **Secure and Reliable Hosting:** The NeVA Project is hosted by **Meghraj National Cloud**, ensuring secure, disaster-proof, and reliable functioning for all legislatures.
- **Comprehensive Parliamentary Work Management:** Enables Ministers and Members to manage various parliamentary tasks, including accessing House proceedings, receiving replies to questions, etc., directly through the app.
- **Linguistic Inclusivity & Advanced Tech:** NeVA is partnering with **BHASHINI, an initiative by MeitY (Ministry of Electronics and Information Technology)**. This integration enables **AI/ML-based real-time translation services**, significantly boosting linguistic inclusivity within legislative proceedings.

**Conclusion**

The inauguration of the NeVA project in Puducherry marks another significant step in India's journey towards digital transformation of its governance structures. By streamlining legislative processes, promoting paperless operations, and leveraging advanced technologies like AI-based translation, NeVA not only enhances efficiency and transparency in legislative bodies but also empowers elected representatives with digital tools, ultimately contributing to a more effective and inclusive democratic process.

## Ladakh's Demand for 6th Schedule & Article 240



**Context:** The Centre has issued regulations for Ladakh under Article 240 to address demands for job reservations, language recognition, and political representation, rather than granting the widely requested Sixth Schedule status. This has sparked debate on constitutional protections for the region.

**I. Ladakh's Key Demands & Government's Response (Post-Article 370 Abrogation)**

- **Background:** After the abrogation of Article 370 (August 2019) and the Jammu and Kashmir Reorganisation Act, 2019, Ladakh became a Union Territory without a legislature.

- **Key Demands of Leh Apex Body (LAB) and Kargil Democratic Alliance (KDA):**
    - Inclusion under the **Sixth Schedule** for constitutional protection of land, jobs, and cultural identity.
    - **Land ownership restrictions** to prevent outsider influx.
    - Demand for a **Legislative Assembly** for representative governance.
    - (Alternative proposed by Centre: Article 371-like protections).
- **Centre's Notified Regulations (under Article 240):**
    - **Domicile-Based Job Reservations:** Introduced for the first time for all government jobs.
    Criteria: 15 years residency, 7 years education, appearance in Class 10 or 12 from Ladakh.
    - **Reservations:** Total cap at **85%** for SCs, STs, OBCs, and other backward groups. 10% EWS reservation maintained. Extended to professional colleges (medical, engineering).
    - **Preservation of Local Languages:** English, Hindi, Urdu, Bhoti, and Purgi designated as official languages. Shina, Brokskat, Balti, and Ladakhi promoted.
    - **Women's Representation:** Ladakh Autonomous Hill Development Councils (LAHDC) Act, 1997, amended to reserve **one-third of seats for women** in Leh and Kargil LAHDCs (through rotation).

## II. Why Ladakh Demands Sixth Schedule Status:

1. **Constitutional Protection:**
    - Regulations under Article 240 can be **unilaterally revoked or amended by the Centre**.
    - Sixth Schedule is **constitutionally protected**, ensuring greater autonomy and security for local governance, making it harder for the Centre to alter.

2. **Safeguards for Land Rights:**
    - Crucial to **restrict non-domiciles from buying land** in Ladakh.
    - Fragile ecosystem threatened by unchecked tourism and infrastructure development.
    - Over **97% tribal population** dependent on land for cultural and economic survival.

3. **Legislative Autonomy:**
    - Sixth Schedule provides for **Autonomous District Councils (ADCs)** with legislative powers over **land, forests, water resources, customary laws, and education**.
    - LAHDCs remain **administrative bodies**, largely dependent on the Centre for major decisions, limiting true self-governance.

4. **Symbolic & Cultural Recognition:**
    - Ensures preservation of indigenous languages (Bhoti, Purgi, etc.) by mandating education in local languages and their use in official communication.
    - ADCs have constitutional authority over primary education and cultural preservation.

## III. Understanding the Sixth Schedule of the Indian Constitution:

- **Provision:** Articles 244(2) and 275(1) provide for the administration of tribal areas.
- **Applicability:** Applies to tribal areas in **four Northeastern states:** Assam, Meghalaya, Tripura, and Mizoram, where tribes have largely preserved traditional ways.
- **Key Features:**
    - **Autonomous Districts and Regions:** Tribal areas constituted as autonomous districts (under state executive authority). Governor can organize/reorganize boundaries.

- o **Autonomous District Councils (ADCs) and Regional Councils (ARCs):**
  - \* Governor empowered to create these councils.
  - \* Each ADC has **30 members** (26 elected, 4 nominated by Governor). Councils hold office for 5 years.
  - \* Currently, **10 ADCs** exist across the four states.
- o **Legislative Powers:** ADCs and ARCs can make laws on specified matters (land, forests, water, shifting cultivation, village administration, marriage, inheritance, social customs), subject to Governor's assent.
- o **Judicial Powers:** Can constitute village councils/courts for tribal disputes; High Court's jurisdiction defined by Governor.
- o **Administrative Powers:** Manage primary schools, dispensaries, markets, roads, fisheries, and regulate money lending/trading by non-tribals (with Governor's approval). Can assess/collect land revenue and impose taxes.
- o **Autonomy from State and Central Laws:** Acts of Parliament or state legislature may apply with modifications or not at all to these autonomous districts/regions.
- o **Governor's Oversight:** Governor can appoint commissions to review administration and recommend dissolution of councils.

## IV. Article 240: Power of the President:

- **Provision:** Empowers the President to make **regulations for the peace, progress, and good governance of certain Union Territories.**
- **Scope:** These regulations have the **same force as Acts of Parliament** and can **amend or repeal existing laws**.
- **Application:** Applies to UTs without their own legislatures (e.g., Andaman & Nicobar Islands, Lakshadweep, Dadra & Nagar Haveli and Daman & Diu, Ladakh).

- **Key Difference from 6th Schedule:** While providing direct central control for efficient governance, regulations under Article 240 are **executive in nature** and lack the entrenched constitutional protection and legislative autonomy granted by the Sixth Schedule.

## V. Measures to Address Ladakh's Unique Needs:

1. **Customized Constitutional Safeguards:** If full Sixth Schedule inclusion is not viable, a tailored framework under the 6th Schedule (via parliamentary enactment) or an amendment to the Sixth Schedule to include Ladakh-specific provisions, considering its geopolitical and ecological sensitivity.
2. **Robust Land Safeguards:** Enact a special Land Regulation Law similar to J&K, Sikkim, or Himachal Pradesh to prevent outsider acquisition, safeguard traditional livelihoods, and protect the fragile ecosystem. Mandatory government approval for non-resident land purchases.
3. **Strengthening LAHDCs:** Grant legislative powers akin to ADCs under the Sixth Schedule (on land, water, forests, education, culture). Provide financial autonomy for managing local resources (tourism revenue, mining royalties) to strengthen self-governance and regional development.
4. **Environmental and Tourism Regulation:** Enforce strict ecotourism policies, carrying capacity limits, and environmental impact assessments. Promote community-led conservation and restrict commercial construction in ecologically fragile zones.

## Conclusion:

The Centre's new regulations under Article 240 address some of Ladakh's concerns but fall short of the comprehensive protections offered by the Sixth Schedule, particularly regarding land rights and true legislative autonomy. A balanced approach incorporating customized constitutional safeguards, robust land protection, and empowered local governance bodies (LAHDCs) is essential for balancing development, tribal rights, and ecological sustainability in this strategically vital region.

## Debate Over 'Socialist' and 'Secular' in the Preamble
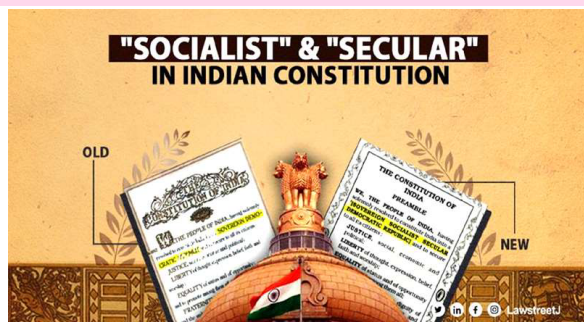


**Why in News**

A renewed debate has emerged over the constitutional legitimacy and relevance of the words "socialist" and "secular" in the Preamble of the Indian Constitution. These terms were added during the Emergency through the 42nd Amendment Act of 1976. Critics argue that these words were inserted without sufficient public consultation and may not align with India's civilisational ethos.

**The Preamble of the Indian Constitution**

- The Preamble is the introductory statement of the Constitution, which outlines its core values and guiding principles.
- It reflects the ideals adopted in the Objectives Resolution, passed by the Constituent Assembly on 22nd January 1947.
- When the Constitution came into effect on 26th January 1950, the Preamble declared India to be a "Sovereign Democratic Republic".
- It aimed to secure for all citizens: Justice (social, economic and political), Liberty (of thought, expression, belief, faith and worship), Equality (of status and opportunity), and Fraternity (assuring dignity of the individual and unity of the nation).

**42nd Amendment Act, 1976**

- Enacted during the Emergency (1975–77), the 42nd Amendment added the words "Socialist" and "Secular" to the Preamble.
- The word "Integrity" was also added alongside "Unity" in the expression "Unity and Integrity of the Nation".

- The term "Socialist" signified the State's commitment to distributive justice and reduction of inequality through a mixed economy.
- The term "Secular" reaffirmed that the State respects all religions equally and maintains a principled distance from all religious institutions.
- While many provisions added during the Emergency were repealed by the 44th Amendment Act, 1978, the additions to the Preamble were retained.

**Understanding 'Secularism' in the Indian Context**

**Indian Secularism**

- Indian secularism is distinct from the Western model and is based on equal respect for all religions rather than strict separation of religion and State.
- It aims to prevent both inter-religious and intra-religious domination.
- It upholds religious freedom, tolerance, and pluralism.

**Three-Fold Strategy of Indian Secularism**

1. **Principled Distance**: The State maintains neutrality towards all religions without favouring any one faith. For example, there is no religious instruction in government schools and no religious symbols in public offices.
2. **Non-Interference**: The State generally does not interfere in religious practices unless they contradict constitutional values.
3. **Selective Intervention**: The State intervenes when religious practices are in violation of fundamental rights, such as in the abolition of untouchability or reform of personal laws to ensure gender equality.

**Was India Secular Before 1976?**

- Yes, the Constitution contained secular principles even before the word "secular" was added in 1976.
- Articles such as Article 14 (Equality before law), Articles 15 and 16 (prohibition of discrimination on grounds of religion), and Articles 25 to 28 (freedom of religion) embodied secular ideals.

- Article 44 (Uniform Civil Code) under the Directive Principles of State Policy also reflected secular objectives.

**Indian Secularism *Vs*. Western Secularism**

| Aspect | Indian Secularism | Western (e.g., U.S.) Secularism |
|---|---|---|
| State-Religion Relationship | Principled distance, equal respect to all faiths | Strict separation of church and state |
| Role of Religion in Public Life | Religion allowed in public life with restrictions | Religion confined to private sphere |
| Nature of Secularism | Inclusive, accommodative | Exclusively non-religious in governance |

**Key Concerns in Including 'Secular' in the Constitution**

1. **Constitutional Role *Vs*. Ideological Proclamation**: Dr. B.R. Ambedkar stated that the Constitution should serve as a framework of governance, and not as a platform to fix ideological commitments.
2. **Fear of Symbolism**: Leaders like Jawaharlal Nehru felt that secularism should be practiced and not merely stated, warning against symbolic declarations without substance.
3. **Risk of Misinterpretation**: There was concern that explicitly using the term "secular" could be misconstrued as being anti-religious in a deeply spiritual society.
4. **Legislative Rigidity**: Some feared that such a constitutional proclamation might restrict future legislative efforts to reform religion-based personal laws in favour of equality and justice.

**Arguments in Favour of Inclusion**

1. **Secularism and Socialism Were Already Implied**: Even before the amendment, these values were reflected in the Constitution through various Fundamental Rights and Directive Principles.
2. **Reaffirmation During a Critical Period**: The inclusion during the Emergency reaffirmed the ideological direction of the State, which was later retained by the 44th Amendment.

3. **Judicial Recognition**:
   - In **Kesavananda Bharati v. State of Kerala (1973)**, the Supreme Court held that secularism and socialism are part of the basic structure of the Constitution.
   - In **S. R. Bommai v. Union of India (1994)**, the Court ruled that secularism is a basic feature of Indian democracy.
   - In **Minerva Mills v. Union of India (1980)**, the Court emphasised that socialist objectives are fundamental to governance and certain Directive Principles (like Article 39(b) and 39(c)) may take precedence over Fundamental Rights in specific cases.
   - In **Dr. Balram Singh v. Union of India (2024)**, the Supreme Court upheld the validity of inserting "socialist" and "secular" in the Preamble, affirming that these additions align with the Constitution.

**Arguments Against Inclusion**

1. **Against the Original Intent**: The framers, including Ambedkar, believed the Constitution already reflected these values and saw no need for explicit inclusion.
2. **Made During the Emergency**: The 42nd Amendment was passed during a period of curtailed democratic freedoms, raising questions about the legitimacy of changes made during that time.
3. **Imposition of Western Ideas**: Critics argue that both socialism and secularism are Western concepts and that Indian traditions inherently accommodate spiritual diversity and religious pluralism.
4. **Procedural Concerns**: As the Preamble represents the foundational vision of the Constitution, critics argue that amending it retrospectively undermines its sanctity.

**Constitutional and Judicial References**

- **42nd Amendment Act, 1976**: Added "Socialist" and "Secular" to the Preamble.

- **44th Amendment Act, 1978**: Repealed many Emergency-era provisions but retained the Preamble additions.
- **Kesavananda Bharati Case (1973)**: Introduced the Basic Structure doctrine.
- **S. R. Bommai Case (1994)**: Reinforced secularism as a basic feature.
- **Minerva Mills Case (1980)**: Upheld socialist goals as foundational.
- **Dr. Balram Singh Case (2024)**: Rejected the plea to remove the terms from the Preamble.

**Conclusion**

The inclusion of the words "socialist" and "secular" in the Preamble continues to be a subject of constitutional and ideological debate. While the Supreme Court has upheld these terms as part of the basic structure of the Constitution, concerns about procedural legitimacy and ideological imposition persist. The Indian model of secularism, rooted in pluralism and constitutional morality, continues to evolve. The key challenge lies in ensuring that the Constitution remains a living document that upholds the values of justice, liberty, equality, and fraternity while respecting India's civilisational ethos.

## Dynamics of India's Fiscal Decentralization



**Understanding Fiscal Decentralisation in India: Meaning, Benefits, and Challenges**

LOCAL SELF GOVERNANCE & DEVELOPMENT

**Context:** As India aims for 'Viksit Bharat by 2047,' the dynamics of fiscal decentralization are critical. This involves assessing states' fiscal capacity, autonomy, and spending quality to drive inclusive development and promote competitive decentralization.

**I. Constitutional and Policy Provisions Governing Fiscal Decentralization**

- **Seventh Schedule & Article 246 (Tax Base Division):** Delineates distinct taxation powers between Union and States, providing legislative and fiscal clarity.
- **101st CAA & Article 246A (GST & Concurrent Taxation):** Enables concurrent taxation on Goods and Services Tax (GST). Union levies CGST & IGST; States impose SGST.
- **Article 270 (Revenue Devolution):** Mandates sharing of Union tax revenues (income tax, CGST, corporation tax) with States based on **Finance Commission** recommendations, ensuring vertical equity.
- **Article 275 (Grants-in-Aid):** Centre provides grants to States with specific developmental needs, addressing fiscal disparities and ensuring minimum public services.
- **Article 280 (Finance Commission):** Periodic commission assesses and recommends inter-governmental resource sharing, addressing vertical and horizontal fiscal imbalances.
- **Article 282 (Discretionary Grants):** Union and States can make grants for any public purpose, offering flexibility but raising concerns about transparency and State autonomy erosion.
- **Article 293 (Borrowing Powers):** States can borrow domestically, but Union consent is required if previous Union debt exists, restricting independent fiscal planning.
- **Local Fiscal Devolution (Panchayats & Municipalities):** Empower States to devolve fiscal authority to local bodies. **State Finance Commissions (SFCs)** recommend resource-sharing.
- **Exclusion from Divisible Pool (Article 270):** Cesses and surcharges are excluded, limiting States' access to growing revenue streams and aggravating vertical imbalances.
- **Centrally Sponsored Schemes (CSSs) & Conditionality:** Part-funded by States with central design control. Undermines fiscal subsidiarity and local adaptation.
- **Horizontal Criteria (Finance Commission):** Allocates shares using income distance, population, area, forest cover, and tax effort, balancing efficiency and equity.

## II. Major Challenges Facing Fiscal Decentralization

1. **Vertical Imbalance:** Union controls 63% of fiscal resources but bears only 38% of expenditure, while States handle 62% expenditure with only 37% resources.

2. **Loss of Tax Autonomy:** GST subsumed crucial State taxes, limiting flexibility in fiscal policy innovation for States.

3. **Falling Revenue Share:** States' actual share in Union gross tax revenue declined from 35% (2015–16) to 30% (2023–24), deviating from the 15th FC's 41% recommendation.

4. **Cess and Surcharge:** Increased by 133% (2017–18 to 2022–23), forming nearly 25% of Union tax revenue. Being outside the divisible pool, they bypass FC recommendations.

5. **Borrowing Limits:** Capped at 3% of GSDP (including off-budget borrowings), hampering counter-cyclical strategies and capital investments.

6. **GST Compensation Delays:** Caused liquidity crises and disrupted fiscal planning in States, highlighting fragility of cooperative fiscal mechanisms.

7. **Dependence on CSS:** Increased expenditure with strict guidelines, requiring matching funds from States and limiting local adaptation.

8. **Decline in Grants:** Grants-in-aid declined, increasing reliance on conditional transfers and restricting development autonomy.

9. **Horizontal Imbalance:** Poorer/populous States receive more, leading to grievances from efficient States (e.g., Karnataka, Kerala) that perceive penalization.

10. **Uneven Development:** Disparities persist across States (e.g., Bihar, Jharkhand in infrastructure and financial inclusion), challenging balanced regional development.

11. **Off-Budget Borrowing:** Inclusion of off-budget liabilities in net borrowing ceilings limits fiscal maneuverability; lack of transparent norms.

12. **Centralized Expenditure:** Tied transfers dominate public spending, restricting States' ability to respond to region-specific priorities.

13. **Weak Panchayat Devolution:** Inconsistent transfer of 29 subjects (Eleventh Schedule). Most States restrict Panchayat autonomy, hindering local decision-making (**Status of Devolution to Panchayats in States 2024 Report**).

14. **Institutional Gaps in PRIs:** Dysfunctional District Planning Committees, frequent seat rotation, weakening accountability and governance.

15. **Poor Financial Autonomy at Local Level:** Non-implementation of SFC recommendations and GST centralization limit Panchayats' fiscal independence.

## III. Measures to Strengthen Fiscal Decentralization

1. **Increase Devolution: 16th Finance Commission** should raise States' share beyond 41% to restore fiscal balance and empower States' planning.

2. **Rationalise Cess & Surcharge:** Union must rationalize or include them in the divisible pool for equity, transparency, and predictability.

3. **Reform GST:** GST Council must ensure timely compensation and consider including petroleum and alcohol for revenue buoyancy.

4. **Benchmark States with Composite Indices:** Use weighted indices across fiscal, social, environmental pillars for fair performance benchmarking, promoting multi-dimensional development.

5. **Relax Borrowing Limits:** Provide temporary leeway during economic downturns and natural disasters for capital investment and emergency response.

6. **Strengthen Local Bodies:** Fully implement Articles 243G, 243H, and 243X by devolving clear functions, funds, and functionaries to PRIs, as per the **Status of Devolution to Panchayats in States 2024 Report**.

7. **Boost Capacity of Panchayats:** Expand schemes like **Rashtriya Gram Swaraj Abhiyan** for training local leaders; enhance digital infrastructure.

8. **Restructure CSS:** Consolidate into few impactful umbrella schemes with flexible designs to avoid duplication and respect State priorities.

9. **Institutionalise Dialogue:** Revive the **Inter-State Council** and strengthen NITI Aayog's consultative role. Improve coordination with GST Council and Finance Commission.

10. **Use HDI Criteria:** 16th Finance Commission should include **Human Development Index** as a parameter for resource sharing to prioritize social outcomes over population alone.

11. **Ensure Borrowing Transparency:** Disclose all off-budget liabilities and manage within transparent fiscal responsibility frameworks.

12. **Align Fiscal Rules:** Synchronize **FRBM Acts** of Centre and States with flexibility for regional economic diversity.

13. **Fiscal Health Index Insights:** States should use this index to guide reforms in capital expenditure and debt management, focusing on quality spending.

**Conclusion:**

A resilient and equitable fiscal decentralization framework is essential for India's journey towards inclusive, sustainable, and competitive growth in the 'Amrit Kaal'. Strengthening devolution, empowering local bodies, and aligning fiscal incentives with development goals are crucial for harmonizing national priorities with state-specific aspirations.

## Compulsory Inclusion of NOTA in Elections



**Context:** A Public Interest Litigation (PIL) has been filed in the Supreme Court (SC) by Vidhi Centre for Legal Policy, seeking to make the NOTA (None of the Above) option compulsory in all elections, including those with a single candidate. This debate highlights the ongoing efforts to enhance voter choice and political accountability in Indian democracy.

**I. What is NOTA in Indian Elections?**

- **About:** "None of the Above" (NOTA) on Electronic Voting Machines (EVMs) allows voters to **reject all contesting candidates** while maintaining the secrecy of their choice.

- **Significance:** While NOTA technically does **not affect the election outcome** (the candidate with the highest votes still wins), it empowers citizens to express dissatisfaction with candidates without abstaining from the electoral process.

- **Background:**
   o **Law Commission (170th Report, 1999):** Explored negative voting and a 50%+1 system, but no final recommendations due to practical challenges.
   o **People's Union for Civil Liberties (PUCL) Petition (2004):** Challenged **Conduct of Elections Rules, 1961** for violating voter secrecy by recording identities of non-voters.
   o **Supreme Court Directive (PUCL vs. Union of India Case, 2013):** Directed the **Election Commission of India (ECI)** to introduce NOTA to safeguard voter secrecy and deepen democratic participation.

- **Usage:**
   o Available in Lok Sabha, State Assembly, and Panchayat elections (though not uniformly in all local bodies).
   o **First used** in 2013 Assembly elections (Chhattisgarh, Mizoram, Rajasthan, Delhi, Madhya Pradesh).

- o Lok Sabha NOTA vote share has been consistently low (1.1% in 2014, 1.04% in 2019, similar in 2024).
- o State elections: Bihar recorded highest (2.48% in 2015), followed by Gujarat (1.8% in 2017).

## II. Rule 49-O vs. NOTA

| Feature | Rule 49-O (pre-2013) | NOTA (post-2013) |
|---------|----------------------|------------------|
| Mechanism | Allowed voters to formally abstain by informing the presiding officer at the polling booth. | Allows voters to reject all candidates anonymously by pressing a designated button on EVMs. |
| Secrecy | **Not anonymous**; voter's choice to abstain was publicly recorded, violating ballot secrecy. | **Preserves secrecy** of the ballot, empowering voters to express dissent without fear or exposure. |
| Legal Status | Rule 49-O of the Conduct of Elections Rules, 1961. Largely superseded after the SC's 2013 directive for NOTA to protect secrecy. | Introduced following a Supreme Court directive (PUCL vs. Union of India, 2013) to ensure a secret "right to not vote." |
| Impact | Voter deemed to have abstained; no direct impact on election outcome beyond formal record. | Votes are counted, but candidate with highest valid votes still wins, irrespective of NOTA count. No direct impact on election outcome currently. |

## III. Judicial Pronouncements Related to NOTA

- **Lily Thomas v. Speaker, Lok Sabha, 1993:** SC held that the **right to vote includes the right to express one's will** (support or opposition) and the **right to remain neutral**.
- **People's Union for Civil Liberties v. Union of India, 2013:** SC directed ECI to introduce NOTA button in EVMs to maintain voter secrecy and deepen democratic participation.
- **Shailesh Manubhai Parmar v. Election Commission of India, 2018:** SC ruled NOTA unsuitable for **Rajya Sabha (Upper House) elections**, as it could distort the electoral process and promote corruption/defections. NOTA was consequently removed from indirect elections.

## IV. International Practices Similar to NOTA

- **European Nations:** Finland, Spain, Sweden, France, Belgium, Greece permit a NOTA-equivalent vote.

- **US:** No formal NOTA button, but some states allow "write-in votes," enabling voters to write "None of the Above."
- **Other Countries:** Colombia, Ukraine, Brazil, Bangladesh also provide NOTA-like options.

## V. Arguments Related to Compulsory Inclusion of NOTA in All Elections

| Arguments IN FAVOUR of Compulsory NOTA | Arguments AGAINST Compulsory Inclusion of NOTA |
|-----------------------------------------|------------------------------------------------|
| **1. Expands Voter Choice:** Empowers voters to reject all candidates and express disapproval without abstaining, enhancing autonomy. | **1. Rare Use, No Electoral Impact:** NOTA does not affect outcomes; highest vote-getter wins. Uncontested elections are rare (only 6 Lok Sabha candidates elected unopposed since 1971), making compulsory NOTA rules redundant for such scenarios. |
| **2. Upholds Voter Choice in Uncontested Polls:** Ensures voters can express dissent even when there's only a single candidate, preserving democratic choice. | **2. Caste-Based Bias:** In reserved constituencies, high NOTA votes can sometimes reflect caste prejudice, distorting its intended purpose. |
| **3. Promotes Political Accountability:** Encourages political parties to nominate better, more competent, and ethical candidates to avoid losing votes to NOTA. | **3. Promotes Voter Apathy & Disillusionment:** May lead to casual rejection of all candidates without meaningful evaluation, reducing critical voter engagement. If NOTA gets significant votes but has no consequence, it can erode public trust and legitimacy of elected government. |
| **4. Signals Voter Dissatisfaction:** NOTA counts indicate public discontent to the ECI and parties, prompting corrective measures. Can pave the way for reforms like mandatory re-election if NOTA crosses a threshold, and minimum winning thresholds for candidates. | **4. Weakens Representative Democracy:** Since NOTA doesn't affect the mandate, it may undermine the principle of representative democracy by not ensuring clear voter endorsement, potentially leading to questions about the legitimacy of winning candidates even if they get fewer votes than NOTA. |
| | **5. Operational Complexities & Legal Hurdles:** Implementing a binding NOTA would require significant amendments to the Representation of the People Act, 1951, and the Conduct of Elections Rules, 1961, which is a complex legislative process. It could also lead to frequent re-elections, increasing costs and logistical challenges. |

## VI. Way Forward

1. **Legislative Action (Minimum Vote Threshold & Re-election):**
   - o Introduce a minimum vote threshold for candidates (e.g., if NOTA secures over 10% of votes, mandate re-election).
   - o Maharashtra and Haryana State Election Commissions have set precedents, treating NOTA as a 'fictional candidate' and mandating fresh polls/disqualifying candidates who poll fewer votes than NOTA.

2. **Candidate & Financial Accountability:**
   o Candidates receiving fewer votes than NOTA should be barred from re-contesting.
   o Political parties with losing candidates must bear re-election costs.
   o NOTA could be disabled in such re-polls to prevent repeated cycles.
3. **Voter Education and Awareness:** Conduct widespread campaigns to inform voters about NOTA's purpose and ensure its responsible use beyond mere protest votes.
4. **Transparency & Integration with Electoral Reforms:**
   o ECI should publish detailed NOTA voting data regularly.
   o NOTA reforms should align with broader electoral reforms (e.g., decriminalizing politics, promoting party transparency) to enhance overall democratic accountability.

**Conclusion:**

The debate surrounding the compulsory inclusion of NOTA reflects a crucial effort to deepen voter engagement and ensure political accountability in India's democracy. While its current impact is symbolic, strengthening NOTA through legislative reforms, enhanced accountability measures, and widespread voter education can transform it into a more potent tool for democratic expression and ultimately lead to a more representative electoral system.

# EDITORIALS

## Crux of The Hindu & Indian Express

### ↓ Indian Polity & Governance ↓

**Lok Sabha Speaker Om Birla Inaugurates National Conference Marking 75 Years of Parliamentary Estimates Committee**


Types of Parliamentary Committees
Source: Lok Sabha website
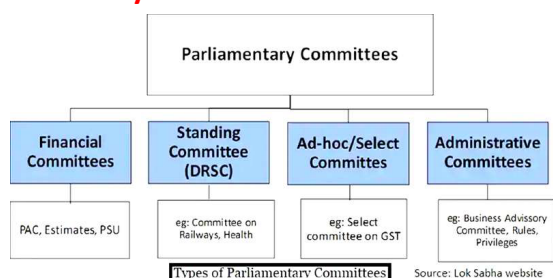
**Why in News?**

- On June 23, 2025, Lok Sabha Speaker Om Birla **inaugurated a national conference in Mumbai marking the platinum jubilee (75 years) of the Parliamentary Estimates Committee.**
- He called for enhanced use of technology, data analysis, and citizen engagement to strengthen legislative financial oversight.

**I. Estimates Committee: Role and Significance**

- **Fiscal Watchdog:** The Estimates Committee serves as a crucial parliamentary committee responsible **for scrutinizing the budget estimates of the Union Government and promoting economy and efficiency in public expenditure.**
- **75 Years of Impact:**
   o Constituted for the first time in **1950**, the committee has completed 75 years of its formation.
   o It has submitted over **1,000 reports** since its inception, significantly influencing national policies across vital sectors like health, education, infrastructure, and defence.
   o **Real-world Impact Example:** Speaker Birla cited the committee's report on Electric Vehicle policy **during the 17th Lok Sabha,** which led to tangible outcomes like tax rebates and state-level road tax waivers.
   o **"Continuous Economy Committee":** Often referred to by this name due to its ongoing efforts to identify ways to achieve economy in government expenditure and improve administrative efficiency.
- **Beyond Fiscal Oversight:**
   o Maharashtra Chief Minister highlighted its role as a **"democratic tool that shapes government functioning,"** noting that 65-70% of the committee's recommendations are implemented in Maharashtra.

- Maharashtra Assembly Speaker **linked its work to social justice and fiscal responsibility,** stating that its recommendations reflect the constitutional obligation to promote inclusive and balanced development.

## II. Composition and Functioning of the Estimates Committee

- **Composition:**
  - A parliamentary committee consisting of **30 members**.
  - All members are **elected every year by the Lok Sabha** (lower house of Parliament) from amongst its members, using the principle of proportional representation by means of a single transferable vote.
  - **No Rajya Sabha Representation:** Unlike some other parliamentary committees, the Estimates Committee does not have members from the Rajya Sabha.
  - **Chairperson:** Appointed by the Lok Sabha Speaker from amongst its members.
  - **Ministerial Prohibition:** A **Minister cannot be elected as a member of the Committee**.
    If a member is appointed a Minister after selection to the Committee, they cease to be a member from the date of such appointment.
  - **Term:** The term of office for the Committee is **one year**.
- **Functions:** Its primary objective is to examine budget estimates and:
  - **Economy & Efficiency:** Report on economies, organizational improvements, efficiency gains, or administrative reforms consistent with the policy underlying the estimates.
  - **Alternative Policies:** Suggest alternative policies to enhance efficiency and economy in administration.
  - **Prudent Spending:** Examine whether money is well spent within the limits of the policy implied in the estimates.
  - **Presentation Format:** Suggest the form in which estimates should be presented to Parliament for clarity and transparency.
  - **Continuous Examination:** The Committee can continue examining estimates throughout the financial year and report its findings as the examination proceeds.
  - **No Mandate to Examine Entire Budget:** It is not mandatory for the Committee to examine the entire estimates of any single year.
  - **Non-Binding Recommendations:** Its recommendations are advisory in nature and not binding on the Parliament or the government.
  - **Exclusion from Public Undertakings:** The Committee does not examine Public Undertakings; this function is allotted to the Committee on Public Undertakings.
- **Working Process:**
  - **Selection of Subjects:** After its constitution, the Committee selects specific budget estimates pertaining to Ministries/Departments or statutory/other central government bodies for examination.
  - It also examines matters of special interest referred by the House or the Speaker.
  - **Information Gathering:** Calls for preliminary materials from concerned Ministries/Departments and memoranda from non-officials.
  - **Sub-Committees/Study Groups:** Appoints sub-committees or study groups for detailed examinations.

o **Study Visits:** Conducts on-the-spot studies with Speaker's approval, holding informal sittings during visits.

o **Evidence Sessions:** Invites official and non-official witnesses to give evidence at formal sittings in Parliament.

o **Reporting:** Observations and recommendations are embodied in Reports presented to the Lok Sabha.

o **Government Action:** The concerned Ministry/Department must take action on recommendations within six months or as directed.

o **Action Taken Reports (ATRs):** Government replies are examined by the Committee, and an Action Taken Report is presented to the Lok Sabha. Replies to ATRs are then laid on the Table of the Lok Sabha as Statements.

## III. Call for Stronger Fiscal Oversight

- **Modernization:** Speaker Om Birla emphasized the need to enhance fiscal oversight through:
    o **Technology Integration:** Increased use of digital tools.
    o **Data Analysis:** Leveraging data analytics platforms.
    o **Artificial Intelligence (AI):** Incorporating AI for in-depth scrutiny and evidence-based recommendations.
    o **Citizen Engagement:** Greater involvement of citizens to make oversight more effective and future-ready.

- **Institutional Synergy:** Birla stressed that the Estimates Committee's role extends beyond mere expenditure monitoring to ensuring that welfare schemes are relevant, accessible, and effective for the common citizen, focusing on social justice and welfare.

## Alcohol Regulation in India



**1. Why in News?**

- **Context:** India is witnessing a **steady rise in alcohol consumption**, leading to significant public health and societal challenges.

- **Consequences:** Documented links to health risks (NCDs, cancer), violence, crime, suicides, and financial distress.

- **The Gap:** Despite severe impacts, there's **no unified national strategy** for alcohol regulation.

- **Urgent Need:** A **comprehensive National Alcohol Control Policy and Programme** is critically required.

**2. Current Landscape of Alcohol Consumption in India**

- **Prevalence (NFHS-5):**
    o **14.6%** of people aged 10–75 (approx. 16 crore) consume alcohol.
    o **Gender Disparity:** 23% of men vs. 1% of women.

- **Global Standing:** India ranks among the **highest globally in heavy episodic drinking**.

- **Burden:**
    o **DALYs (Disability-Adjusted Life Years):** 2.6 million attributable to alcohol.
    o **Societal Cost (2021):** ₹ 6.24 trillion.

- **High Consumption States:** Chhattisgarh, Tripura, Punjab, Arunachal Pradesh, Goa.

- **High Disorder Prevalence (>10%):** Tripura, Andhra Pradesh, Punjab, Chhattisgarh, Arunachal Pradesh.

**3. Key Driving Factors for Alcohol Consumption (Multi-faceted)**

- **Biopsychosocial Determinants:**
    o **Psychological:** Used for coping (stress, anxiety), seeking euphoria.

- o **Social:** Urbanization, peer pressure, glamorized media portrayals (normalization).
- o **Biological/Genetic:** Activates brain's reward system, leading to addiction.
- **Commercial Determinants:**
  - o **Marketing:** Surrogate advertising, influencer marketing, OTT content promotion.
  - o **Product Strategy:** Pre-mixed drinks, flavoured spirits attract youth.
  - o **Accessibility:** Easy availability via retail outlets, online delivery, attractive packaging.
  - o **Affordability:** Low-cost IMIL (Indian Made Indian Liquor) targets rural poor; rising urban incomes increase overall affordability.
- **Policy Gaps:**
  - o Regulatory loopholes exploited.
  - o State dependence on **excise revenue** (disincentive for strict regulation).
  - o Lack of a **unified national policy**.

**4. Regulatory Framework: Provisions & Latest Updates**

**A. Constitutional & Legal Basis:**

- **State Subject (Seventh Schedule):** Alcohol falls under the **State List (Entry 51)**.
  - o States have **exclusive authority** over production, manufacture, possession, transport, purchase, and sale.
  - o Results in significant **inter-State legal variations** (e.g., legal drinking age 18-25, varying pricing regulations).
- **DPSP - Article 47:** Directs the State to endeavor to **prohibit the consumption of intoxicating drinks and drugs injurious to health** and to improve public health and nutrition.
- **Excise Act, 1944:** Regulates alcohol production and distribution, including penalties for illegal manufacturing.

- **Supreme Court Ruling (Oct 2024):** A 9-judge bench, in an 8:1 majority, upheld **States' power to regulate and tax industrial alcohol (denatured spirit)**, expanding the interpretation of "intoxicating liquor" to include substances that can be misused for human consumption. This overturned a 1990 judgment and reaffirms state authority in this domain.

**B. National Level Policies & Plans:**

- **National Action Plan for Drug Demand Reduction (NAPDDR) 2021-22:** Under Nasha Mukta Bharat Abhiyan; addresses alcohol regulation.
- **National Mental Health Policy (2014):** Links alcohol to mental illness.
- **National Health Policy (2017):** Recommends alcohol control measures.
- **National Suicide Prevention Strategy (NSPS) 2022:** Identifies alcohol use as a key driver of suicides and recommends control measures.
- **National Action Plan and Monitoring Framework for Prevention and Control of Noncommunicable Diseases (NMAP) 2017-2022:** Advocates for a national alcohol policy.

**C. State-Level Implementations & Recent Trends:**

- **Prohibition States:** Bihar, Gujarat, Nagaland, Mizoram.
- **Online Delivery:** Some states exploring/allowing online alcohol delivery (e.g., via Swiggy, Zomato), creating contradictions with access restrictions.
- **Delhi Excise Policy (June 2025):** Delhi government has extended its existing excise policy for FY 2025-26 while a new policy aimed at transparency, quality, and revenue generation is being drafted. This highlights ongoing state-level policy flux.
- **Madhya Pradesh New Excise Policy (Feb 2025):** Includes closure of liquor shops in declared holy areas from April 1, 2025, introduction of "Low Alcoholic Beverage Bar" category (max 10% V/V alcohol), and promotion of heritage liquor and fruit/honey wine.

- **Ladakh Draft Excise Policy 2024-25 (March 2024):** Aims to encourage transition to low-alcohol content beverages, check bootlegging, and enhance revenue collection.

**D. Latest Regulatory Amendments (FSSAI - June 2025, effective Jan 2026):**

- **Food Safety and Standards (Alcoholic Beverages) First Amendment Regulations, 2025:**
    - **Formal Definition of "Alcoholic Ready-to-Drink Beverages":** Flavored beverages with >0.5% and up to 15.0% abv.
    - **Updated Definitions:** Clearer definitions for "Country Liquors" / "Indian Liquors" (Plain & Blended).
    - **Expanded Wine Category:** Includes "Honey Wine" or "Mead."
    - **Introduction of "Nitro Craft Beer."**
    - **Comprehensive Lists of Indian Liquors:** New Annexure-1 categorizes various traditional Indian alcoholic products.
    - **CBIC Guidelines (June 2025):** Central Board of Indirect Taxes and Customs (CBIC) revised guidelines for alcohol imports, extending NOC validity for imported alcoholic beverages (>10% alcohol) to 365 days.

**5. Key Challenges to Effective Alcohol Regulation**

- **1. Fragmented & Inconsistent Policies:**
    - "State subject" status leads to **divergent laws**, lack of a unified national framework.
    - Results in regulatory confusion, conflicting approaches, and weak inter-state/ministry coordination.
    - Poor monitoring enables illicit liquor trade, underage drinking, and non-compliance.

- **2. Revenue Dependency of States:**
    - High reliance on alcohol excise duty (outside GST ambit) makes it a **major revenue source**.
    - Incentivizes states to prioritize sales over stricter regulation/prohibition.
    - Creates a **conflict between fiscal interests and public health objectives**.

- **3. Regulatory Gaps & Evasion:**
    - **Surrogate advertising, celebrity endorsements, digital influencers** exploit loopholes in advertising laws.
    - **Online delivery** increases access despite restrictions.

- **4. Political-Bureaucratic Nexus:**
    - Political protection and bureaucratic complicity in the **illegal liquor trade**.
    - Corruption and bribery weaken enforcement, allowing bootleggers to operate with impunity.

- **5. Low Public Awareness & Health Literacy:**
    - Limited public understanding of alcohol's link to mental illness, NCDs, cancer, and socioeconomic harms (poverty, domestic violence).
    - Hampers public demand for regulation and behaviour change.

**6. Way Forward: Measures to Address India's Alcohol Crisis**

A **"5As + AI + National Policy"** framework:

- **1. Affordability:**
    - **Raise Excise Duties:** To discourage excessive consumption.
    - **Safeguards:** Against a shift to illicit liquor (especially among the poor).

- **2. Allocation:**
    - **Earmark Alcohol Tax Revenues:** Specifically for public health, de-addiction, and rehabilitation programmes.
    - **Transparency:** Ensure transparent utilization to prevent diversion and undue corporate influence.

- **3. Accessibility:**
  - o **Limit Physical & Digital Access:** Restrict sales in residential areas, malls, food courts.
  - o **Curb Online Delivery:** Via platforms like Swiggy, Zomato, Blinkit to denormalize casual consumption.
- **4. Advertisement:**
  - o **Ban Surrogate & Influencer-led Promotions:**
  - o **Regulate Algorithm-driven Amplification:** Of alcohol-related content across social media and OTT platforms.
- **5. Attractiveness:**
  - o **Enforce Plain Packaging & Prominent Health Warnings.**
  - o **Ban In-store Promotional Displays:** To reduce alcohol's glamorized and aspirational appeal.
- **6. Awareness:**
  - o **Launch Nationwide Public Awareness Campaigns:** Drawing lessons from tobacco control successes.
  - o **Highlight Links:** Between alcohol and cancer, mental illness, domestic violence, poverty, especially targeting youth and vulnerable communities.
- **7. Artificial Intelligence (AI):**
  - o **Use AI Tools:** To detect and curb digital misinformation, promotional content, and underage targeting.
  - o **Aid in Monitoring:** Policy violations and enforcement.
- **8. National Level Policy:**
  - o Formulate a **National Alcohol Control Policy and Programme**.
  - o Ensure a **coordinated, public health-oriented approach** that prioritizes:
    - * **People over profit.**
    - * **Prevention over revenue.**
    - * **Long-term societal well-being over short-term fiscal gains.**

**Conclusion**

India's escalating alcohol crisis necessitates **urgent, coordinated action** transcending fragmented state policies. A robust, comprehensive **National Alcohol Control Policy**, firmly rooted in public health principles and social equity, is indispensable to curb rising consumption and mitigate associated harms. Prioritizing prevention, public awareness, and stringent regulation over immediate revenue interests will be paramount for ensuring sustainable governance and the long-term well-being of the nation.

## Reforming Electoral Practices

**Context:** There are concerns over alleged voter roll discrepancies, turnout irregularities, and limited access to CCTV footage in the 2024 Maharashtra Assembly elections, emphasizing the need for improved transparency in the electoral process.

**Introduction**

- **Bedrock of Democracy:** Elections are fundamental to India's democratic polity, allowing citizens to choose representatives and shape governance.
- **Largest Democratic Exercise:** With over 96.88 crore registered electors, India conducts the world's largest democratic exercise, governed by a robust constitutional and legal framework.
- **Persistent Challenges:** Despite landmark reforms and judicial interventions, issues like money power, criminalisation of politics, voter fraud, and campaign irregularities continue to strain the electoral process.

**Key Provisions Regulating the Conduct of Elections in India**

- **Constitutional Empowerment of ECI:**
  - o **Article 324:** Empowers the Election Commission of India to supervise, direct, and control elections.
  - o Establishes ECI's institutional authority for conducting free and fair Parliamentary and State elections.
- **Electoral Roll Preparation:**
  - o **The Representation of the People Act, 1950:** Governs preparation and revision of electoral rolls.

- o Includes appointment of electoral officers and management of constituency-wise voter lists.
- **Regulatory Role of RPA, 1951:**
  - o **The Representation of the People Act, 1951:** Regulates the pre-election process and conduct of elections.
  - o Lays down qualifications, disqualifications, and election dispute procedures, including offences and penalties.
- **Rules for Electoral Roll Management:**
  - o **The Registration of Electors Rules, 1960:** Operationalizes the 1950 Act concerning roll corrections and deletions.
  - o Ensures procedural uniformity across states and strengthens voter database accuracy and integrity.
- **Delimitation:**
  - o **The Delimitation Act, 2002:** Empowers commissions to redraw parliamentary and assembly boundaries post-Census.
  - o Ensures fair and proportionate representation based on demographic changes.
- **Model Code of Conduct (MCC):**
  - o Though **not legally enforceable**, guides ethical election conduct, with many provisions backed by laws under the Bharatiya Nyaya Sanhita (BNS) and RPA 1951.
  - o Introduced in 1960 and strengthened over decades to ensure electoral discipline and decorum.
- **Judicial Oversight and Accountability:**
  - o The Supreme Court has upheld electoral rules and aided in the progressive interpretation of election laws.
  - o Judicial intervention remains vital in ensuring the democratic integrity of the electoral process.

- **Digital Platform Integration:**
  - o **ERONET (Electoral Roll Management) system:** Provides centralized digital platform management for electoral rolls across states.
  - o Addresses earlier decentralization issues that caused duplicate EPIC number problems.

**Major Issues Related to the Electoral Process**
- **Limited Scope of VVPAT Matching:**
  - o Current VVPAT verification covers only five EVMs per Assembly segment, irrespective of dispute levels.
  - o In 2024, the Supreme Court rejected full VVPAT matching; however, candidates can get 5% machines verified by manufacturer engineers.
  - o **Criticism:** Undermines public trust and election transparency, demanding broader cross-verification.
- **Electoral Roll Manipulation Allegations:**
  - o Concerns regarding voter list manipulation surface periodically.
  - o ECI explained duplication due to previous decentralized EPIC system, now standardized with ERONET.
- **Duplicate EPIC Numbers Across States:**
  - o Voters with identical EPIC numbers in different states raise fears of multiple voting fraud.
  - o ECI states voters can only vote at assigned polling stations.
- **Violation of MCC by Campaigners:**
  - o Star campaigners often use hate speech and communal rhetoric, violating MCC.
  - o Lack of penal consequence enables repeated campaign violations without deterrence.
- **Unregulated Political Party Expenditure:**
  - o No official limit on political party election expenditure, while candidates face caps.

- o Estimates suggest ₹ 1.35 lakh crore spent in 2024 general election by parties alone.
- **Criminalisation of Politics Remains Persistent:**
  - o In 2024, 46% of elected MPs had criminal cases, including serious offences.
  - o Erodes democratic legitimacy and reflects failure of candidate screening mechanisms.
- **Misuse of Technology and Fake News:**
  - o Digital platforms exploited to spread misinformation and manipulate voter behavior.
  - o Enforcement against deepfakes and false propaganda remains weak and delayed.
- **Issue of Contesting Multiple Seats:**
  - o Sitting MPs and MLAs contesting multiple seats lead to costly and avoidable bye-elections.
  - o Disrupts governance and reflects political expediency over voter accountability.
  - o Resignations after winning multiple seats cause voter fatigue and disinterest.
- **Growing Electoral Costs and Burden:**
  - o ECI spent nearly ₹ 6,931 crore in 2024 general elections, excluding party and candidate expenditure.
  - o High electoral costs strain public finances and reduce campaign fairness.
- **Weak Internal Democracy in Parties:**
  - o Most parties lack transparent internal elections or leadership term limits, weakening accountability.
  - o Undemocratic party structures hinder inclusive political participation and candidate diversity.

- **Underrepresentation Through FPTP System:**
  - o Winning candidates often secure less than 50% votes, raising questions on representative legitimacy.
  - o The First Past the Post (FPTP) system may not reflect voter plurality in highly diverse electorates.
- **Regional Disparities in Representation:**
  - o Concerns about delimitation favoring populous states over southern or smaller states.
  - o Could potentially alter federal balance and political equity.

**Electoral Reforms Essential to Strengthen Democracy**

- **Scientific VVPAT Matching Mechanism:**
  - o Create regions for sample-based VVPAT verification using a scientific approach.
  - o If mismatches arise, complete manual VVPAT counting for that region should be mandated.
- **Introduction of Totaliser Machines:**
  - o To safeguard voter anonymity, totaliser machines (ECI's 2016 proposal) can mix votes from multiple booths.
  - o Reduces booth-wise result analysis and deters post-poll intimidation or discrimination.
- **Eliminating Duplicate EPIC Numbers:**
  - o Linking Aadhaar to EPIC numbers can help remove duplicate or fake voter entries.
  - o Privacy concerns must be addressed through data protection safeguards and legislative oversight.
- **Revoking Star Campaigner Privileges:**
  - o ECI should revoke star campaigner status for repeated MCC violations.
  - o Removes expenditure exemptions and increases compliance with ethical campaign norms.

- **Amending RPA for Expenditure Ceiling:**
  - Amendments should cap political party spending, not just candidate-level expenditure.
  - Checks unchecked campaign finance and ensures a level-playing field.
  - **One Nation, One Election** can reduce electoral expenditure by streamlining the process.
- **Mandatory Disclosure of Criminal Background:**
  - The 2018 Supreme Court ruling mandating declaration of criminal records three times must be strictly enforced with ECI oversight and media circulation to inform voters.
  - **1993 Vohra Committee:** Highlighted links between criminals, politicians, bureaucrats; proposed nodal agency to curb nexus and black money.
  - **2nd Administrative Reforms Commission (ARC) on Ethics in Governance:** Recommended fast-track courts for criminal candidates.
  - **Law Commission's 244th Report:** Recommended disqualifying candidates once charges are framed, increasing penalties for false affidavits, advocating stricter disqualification rules.
- **Fast-Tracking Political Crime Cases:**
  - Supreme Court has directed high courts to establish special benches to monitor criminal cases against lawmakers and prioritize serious cases involving politicians before elections.
  - Aims to enhance public confidence and deter criminals from entering politics.
- **Resignation Rule for Multiple Seats:**
  - Sitting legislators must resign before filing nominations for a new seat.
  - Prevents avoidable bye-elections and reduces campaign resource wastage.

  - Candidates creating vacancies should cover part of the by-election costs.
- **Regulating Candidate Switching and Parachuting:**
  - Constitutional amendments can restrict switching between seats and constituencies.
  - Implementing cooling-off periods after elections would prevent quick switching.
  - Preserves local representation and reduces erosion of public trust.
- **Internal Party Democracy Mandate:**
  - Political parties must conduct internal elections and enforce term limits for leadership roles.
  - Enhances political pluralism and nurtures fresh, competent leadership.
  - **2nd ARC on Ethics in Governance:** Recommended internal democracy in parties.
- **Electoral Transparency:**
  - Bringing political parties under the RTI Act will ensure transparency in funding.
  - Implementing income tax regulations on political parties will help curb illicit funding.
- **Strengthening Voter Education:**
  - SVEEP programme should be expanded to include ethical voting and fake news literacy.
  - Empowers voters for informed and participatory democracy.
- **Regulating Digital Campaigning and Misinformation:**
  - Social media codes should be strictly enforced against hate speech and deepfakes.
  - Collaboration with platforms is necessary for pre-emptive moderation and content tracing.

- **State Funding:**
  - **T.S. Krishnamurthy (former CEC):** Recommended establishing a National Election Fund to streamline public funding of campaigns, reducing opaque private donations.
  - **Indrajit Gupta Committee (1998):** Proposed partial state funding to ensure fair competition.

**Conclusion**

Electoral reforms are indispensable to strengthen India's democratic legitimacy, citizen trust, and institutional integrity. By addressing systemic flaws, embracing transparency, and empowering independent institutions, India can ensure that its elections remain truly representative and fair. A committed, multi-stakeholder approach is essential to realise the promise of electoral justice.

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## Indian Society & Social Justice

**ULLAS – Nav Bharat Saaksharta Karyakram**



**Why in News**

Recently, the State of **Goa** announced it has achieved full literacy under the **ULLAS - Nav Bharat Saaksharta Karyakram (New India Literacy Programme)**. This is a significant step towards India's goal of achieving full literacy by 2030. Goa is the second state to declare full functional literacy under ULLAS, after Mizoram.

**About ULLAS - Nav Bharat Saaksharta Karyakram**

- **Full Form:** ULLAS stands for "Understanding Lifelong Learning for All in Society".
- **Type of Scheme:** It is a **centrally sponsored scheme**, meaning both the central and state governments contribute funds.
- **Duration:** Implemented for five years, from **2022 to 2027**.
- **Target Group:** It focuses on **adults aged 15 years and above** who missed out on formal schooling.
- **Aim:**
  - To empower these adults with foundational literacy (reading, writing, numeracy) and essential life skills.
  - To help them integrate into society and contribute to the country's growth.
  - To make India "Jan Jan Saakshar" (every person literate).
- **Alignment with NEP 2020:** The scheme is designed in line with the recommendations of the **National Education Policy (NEP) 2020**, which emphasizes lifelong learning and holistic adult education.
- **Key Components:** The scheme covers five main areas:
  - **Foundational Literacy and Numeracy:** Basic reading, writing, and arithmetic skills.
  - **Critical Life Skills:** Includes financial literacy, digital literacy, health awareness, childcare, and family welfare.
  - **Basic Education:** Equivalent to elementary, middle, and secondary school levels.
  - **Vocational Skills:** Skill development to help learners find local employment.
  - **Continuing Education:** Opportunities for ongoing learning in various fields like arts, sciences, technology, culture, and recreation.

- **Implementation Model:**
  - o It is largely based on **volunteerism** and the spirit of "Kartavya Bodh" (sense of duty), encouraging community participation.
  - o Learners and volunteers can register through the **ULLAS mobile app** or portal.
  - o Learning resources, including primers in 22 languages, are available through the ULLAS app and the **DIKSHA portal** of NCERT.
  - o Schools often serve as implementation units and "Samajik Chetna Kendras" (community awareness centers).
- **Assessment:** Learners undergo a **Foundational Literacy and Numeracy Assessment Test (FLNAT)** to certify their skills. A state is considered fully functionally literate if its literacy rate exceeds 95% among individuals aged 15 and above.

**Significance of Goa's Achievement**

- **Milestone for India:** Goa becoming fully literate under ULLAS is a major step towards India achieving its national literacy goal by 2030.
- **Role Model:** It demonstrates how strong government will, inter-departmental coordination, and community involvement can lead to high literacy rates.
- **Empowerment:** It means more individuals in Goa now have essential literacy and life skills, enabling them to participate more effectively in daily life, work, and community.
- **Viksit Bharat Vision:** Contributes to the vision of a "Developed India" by creating a more empowered and educated populace.

## PM Surya Ghar : Muft Bijli Yojana (Formerly Grid Connected Rooftop Solar Scheme)



- The **PM Surya Ghar: Muft Bijli Yojana** was launched with the primary aim of empowering households to generate their own electricity, thereby **controlling pollution, reducing the reliance on non-renewable fossil fuels (like coal and petroleum), and significantly cutting down carbon emissions.**
- This scheme focuses on installing solar panels on residential rooftops, offering the dual advantage of generating electricity at a lower cost for consumers while contributing to a cleaner, more sustainable environment.

**Solar Rooftop System :**

A Solar Rooftop System involves installing solar panels on the roofs of buildings, which can include residential, industrial, commercial, and institutional structures. These systems can be broadly categorized into two types:

1. **Solar Rooftop Systems with Battery Storage (Off-Grid):** These systems are equipped with batteries to store the generated solar power for later use, making them suitable for locations with unreliable grid supply or those aiming for greater energy independence.
2. **Grid-Connected Solar Rooftop System (SPV System):** Also known as a Solar Photovoltaic (SPV) System, this setup generates Direct Current (DC) power from the solar panels. This DC power is then converted to Alternating Current (AC) by a power conversion unit

(inverter) and fed directly into the electricity grid, often via 33kV/11kV three-phase lines.

- o In a grid-connected system, the electricity generated during the day is primarily used to power the building's internal loads. Any surplus energy is automatically fed back into the grid, typically through a **net-metering** arrangement.
- o Conversely, if the solar energy generation is insufficient (e.g., due to cloud cover or at night), the grid seamlessly supplies the necessary power to meet the building's demand. Net-metering allows consumers to pay only for the net electricity consumed from the grid or even get compensated for surplus power fed into it.
- o The performance and economic viability of such installations are influenced by factors like the building type (residential, commercial, etc.) and the prevailing state-level regulatory environment.

**PM Surya Ghar: Muft Bijli Yojana Objectives**

The PM Surya Ghar: Muft Bijli Yojana, launched by Prime Minister Narendra Modi on February 15, 2024, aims to significantly boost residential rooftop solar adoption with the following key objectives:

- **Target of 1 Crore Households:** To enable **1 crore (10 million) households** across India to get up to **300 units of free electricity every month** by installing rooftop solar panels. This is a transformation from the earlier broader target of 40,000 MW by 2022, now focusing specifically on the residential sector.
- **Central Financial Assistance (CFA)/Subsidy:** To provide substantial financial support directly to consumers to reduce the upfront cost of installation. The subsidy structure is:
  - o **Up to 2 kW capacity:** ₹ 30,000 per kilowatt (kW).
  - o **For additional capacity between 2 kW and 3 kW:** ₹ 18,000 per kW.
  - o **Total subsidy for systems larger than 3 kW:** Capped at a maximum of ₹ 78,000.
  - o This subsidy is directly credited to the consumer's bank account after successful installation and verification.
- **Facilitate Low-Interest Loans:** To enable households to access collateral-free, low-interest loan products (around 7% current interest rate) for systems up to 3 kW, ensuring affordability for low- and middle-income families.
- **Increase DISCOM Involvement:** To enhance the involvement of Electricity Distribution Companies (DISCOMs) in facilitating installations, ensuring timely availability of net meters, and efficient inspection and commissioning of systems. DISCOMs will also receive incentives based on their achievement in additional grid-connected rooftop solar capacity.
- **Outlay:** The scheme has a total financial outlay of ₹ **75,021 crore** and is planned for implementation until FY 2026-27.
- **Promote Energy Savings:** To help households save significantly on their electricity bills, with an estimated collective annual saving of ₹ 15,000–₹ 18,000 crore for the nation.
- **Green Energy Promotion:** To significantly increase the share of clean, renewable energy in India's energy mix, contributing to reduced carbon emissions (estimated 720 million tonnes over 25 years) and promoting sustainable development.
- **Job Creation:** To create large-scale employment opportunities for solar technicians, manufacturers, and related service providers in the renewable energy sector (estimated 17 lakh direct jobs).

**Grid-Connected Rooftop Solar System Advantages**

The advantages of the Grid-Connected Rooftop Solar System, particularly under the PM Surya Ghar: Muft Bijli Yojana, are multi-faceted:

- **Substantial Savings on Electricity Bills:** Consumers can drastically reduce or even eliminate their monthly electricity expenses, and earn additional income by selling surplus power back to the grid via net-metering.

- **Efficient Space Utilization:** Solar panels are installed on existing rooftops, making optimal use of available, often unused, space without requiring additional land.

- **Reduced Transmission and Distribution (T&D) Losses:** By generating electricity at the point of consumption, the scheme minimizes energy losses that occur during transmission and distribution from large power plants, leading to a more efficient grid.

- **Environmental Benefits:** Directly contributes to the reduction of fossil fuel consumption and **carbon emissions**, fostering a cleaner environment and enhancing long-term energy and ecological security.

- **Grid Stability and Voltage Improvement:** Distributed generation from rooftop solar can help reduce congestion on the grid and improve voltage stability, especially at tail-end lines.

- **Energy Independence and Security:** Reduces the nation's reliance on imported fossil fuels, enhancing energy self-sufficiency and national energy security.

- **Economic Relief for Households:** Provides financial relief to low and middle-income families by lowering their recurring utility costs.

- **Entrepreneurship Opportunities:** Fosters local entrepreneurship and skill development in the solar energy sector.

**Grid Connected Rooftop Solar Scheme Implementation**

The **Ministry of New and Renewable Energy (MNRE)** is the nodal ministry responsible for the implementation of the PM Surya Ghar: Muft Bijli Yojana.

The MNRE, led by a Union Cabinet Minister, plays a pivotal role in:

- **Policy Formulation and Oversight:** Developing and continuously refining policies and guidelines for the promotion and deployment of renewable energy technologies across the country.

- **Financial Support Disbursal:** Managing and disbursing the Central Financial Assistance (CFA)/subsidy directly to beneficiaries.

- **Technological Advancement:** Fostering research, innovation, and intellectual property rights in clean energy sectors like solar, wind, hydropower, and biogas.

- **Capacity Building:** Supporting training programs for solar technicians and promoting awareness among the general public.

- **Collaboration:** Collaborating with state governments, DISCOMs, financial institutions, and private sector players to ensure smooth implementation.

- **Monitoring and Evaluation:** Tracking the progress of installations, energy generation, and overall impact of the scheme.

The scheme's implementation involves a structured process:

1. **Online Application:** Households register and apply through a national portal (pmsuryaghar.gov.in).

2. **Feasibility Check:** DISCOMs assess the technical feasibility of the installation.

3. **Vendor Selection and Installation:** Consumers select a registered vendor and proceed with installation.

4. **Net-Metering and Commissioning:** Post-installation, application for net-metering is made, followed by inspection and commissioning by the DISCOM.

5. **Subsidy Disbursement:** The approved subsidy amount is credited directly to the consumer's bank account within a specified timeframe (e.g., 30 days).

## Challenges associated with Solar Rooftop System Installation

Despite the ambitious targets and robust framework, the implementation of the PM Surya Ghar: Muft Bijli Yojana faces several challenges:

- **Intermittent Power Supply:** Solar power generation is inherently dependent on sunlight, making it inconsistent. This means solar cells cannot generate electricity at night or during prolonged cloudy periods, necessitating reliance on grid power or expensive battery storage.

- **High Cost of Energy Storage:** While battery storage offers a solution to intermittency, current storage technologies remain prohibitively expensive for widespread residential adoption, especially for low-income households. This limits the true "free electricity" benefit during non-solar hours if grid supply is still needed.

- **Grid Integration and Stability:** Large-scale integration of distributed rooftop solar can pose technical challenges for DISCOMs, including managing voltage fluctuations, power flow reversals, and ensuring overall grid stability.

- **DISCOM Financial Strain:** The net-metering policy, while beneficial for consumers, can lead to revenue loss for DISCOMs, particularly from high-paying consumers who adopt solar. This can disincentivize DISCOMs from actively promoting rooftop solar, as they effectively act as unpaid storage facilities for excess daytime generation.

- **Policy and Regulatory Gaps/Inconsistencies:** Despite central guidelines, variations and complexities in state-level net-metering policies, approval processes, and interconnection standards can create bottlenecks and confusion for consumers and installers.

- **Lack of Awareness and Technical Literacy:** A significant portion of the population, especially in rural areas, may lack adequate awareness about the scheme's benefits, application process, and the technical aspects of solar installation.

- **Quality Control and After-Sales Service:** Ensuring the quality of installed systems, the longevity of components, and reliable after-sales maintenance from a rapidly expanding vendor base remains a concern.

- **Upfront Investment Barrier:** Even with subsidies, the initial capital expenditure for installing rooftop solar panels can still be a significant barrier for some households, despite the provision for low-interest loans.

- **Roof Suitability and Safety:** Not all rooftops are suitable for solar installations due to structural limitations, shading from adjacent buildings/ trees, or unfavorable orientation. Ensuring safety standards during installation and long-term operation also requires strict adherence.

## Prime Minister's Employment Generation Programme (PMEGP)



### Why in News

The **Khadi and Village Industries Commission (KVIC)**, operating under the Ministry of Micro, Small and Medium Enterprises (MSME), recently disbursed over ₹ **300 crore in margin money subsidy to 11,480 service sector beneficiaries** across the country under the Prime Minister's Employment Generation Programme (PMEGP). This disbursement, against a loan sanction of ₹ 906 crore, highlights the scheme's ongoing efforts to promote self-employment and entrepreneurship. Since its inception, PMEGP has supported over 10.18 lakh micro enterprises, generating direct and indirect employment for more than 90 lakh people.

## About Prime Minister's Employment Generation Programme (PMEGP)

- **Launch and Nature:** Launched in **August 2008**, PMEGP is a **credit-linked subsidy scheme** administered by the **Ministry of Micro, Small and Medium Enterprises (MSME)**. It is a **central sector scheme**, meaning it is fully funded by the Central Government.

- **Merger of Schemes:** PMEGP was formed by merging two earlier schemes: the Prime Minister's Rojgar Yojana (PMRY) and the Rural Employment Generation Programme (REGP).

- **Aim:** The core objective of PMEGP is to **generate employment opportunities** through the establishment of **new micro-enterprises** in the **non-farm sector** for individuals in both **rural and urban areas**. It seeks to bring together traditional artisans and unemployed youth, providing them with self-employment opportunities.

- **Continuation:** The scheme has been approved for continuation over the 15th Finance Commission cycle, from 2021-22 to 2025-26, with an outlay of ₹ 13,554.42 crore.

## Prime Minister's Employment Generation Programme Implementing Agency

The implementation of PMEGP involves a multi-tiered structure:

- **National Level:** The **Khadi and Village Industries Commission (KVIC)** functions as the **nodal agency** at the national level, overseeing the overall planning, promotion, and implementation of the scheme.

- **State Level:** At the state level, the scheme is implemented through:
  - State KVIC Directorates
  - State Khadi and Village Industries Boards (KVIBs)
  - District Industries Centres (DICs)
  - Banks (Public Sector Banks, Regional Rural Banks, Cooperative Banks, and Private Sector Scheduled Commercial Banks)

  - The Coir Board also implements the scheme for coir-related activities.

## Prime Minister's Employment Generation Programme Benefits

PMEGP is a bank-financed subsidy program designed to facilitate the setting up of new micro-enterprises:

- **Margin Money Subsidy:** Beneficiaries receive a **margin money subsidy** on the bank loan, which varies based on category and location:
  - **General Category:**
    * Urban Areas: 15% of the project cost.
    * Rural Areas: 25% of the project cost.
  - **Special Categories:** (including SC/ST/OBC/Women/Physically Handicapped/Minorities/Ex-Servicemen/Beneficiaries from North Eastern Region, Hill and Border Areas, Aspirational Districts)
    * Urban Areas: 25% of the project cost.
    * Rural Areas: 35% of the project cost.

- **Project Cost Ceiling:**
  - Maximum project cost for the **manufacturing sector** is ₹ **50 lakh**.
  - Maximum project cost for the **service sector** is ₹ **20 lakh**.

- **Loan Structure:** The remaining portion of the project cost (after adjusting the margin money subsidy and the beneficiary's own contribution) is provided by the lending institution (bank) as a regular loan, covering both term loan for capital expenditure and working capital. No collateral security is required for loans up to ₹ 10 lakh.

- **Beneficiary Contribution:** General category beneficiaries are required to contribute 10% of the project cost, while special category beneficiaries contribute 5%.

**Prime Minister's Employment Generation Programme Eligibility**

To be eligible for assistance under PMEGP, applicants must meet specific criteria:

- **Age:** Any individual above **18 years of age** is eligible.
- **Income Ceiling:** There is **no income ceiling** for assistance under PMEGP.
- **Educational Qualification:**
  o For projects costing **above ₹ 10 lakh in the manufacturing sector**.
  o For projects costing **above ₹ 5 lakh in the business/service sector**.
  o The beneficiary should possess at least an **VIII standard pass** educational qualification.
- **Institutional Eligibility:** In addition to individuals, the following entities are also eligible:
  o **Self Help Groups (SHGs)** (including those belonging to Below Poverty Line (BPL) families, provided they have not availed benefits under any other government scheme).
  o Institutions registered under the **Societies Registration Act, 1860**.
  o **Production Co-operative Societies**.
  o **Charitable Trusts**.
- **Exclusion:** Existing units that have already availed government subsidy under any other scheme of the Government of India or State Government are **not eligible** for PMEGP. The scheme is for setting up *new* projects.
- **Negative List:** Certain activities are excluded from the scheme, such as those related to meat processing (slaughtered meat), intoxicating items (like beedi/pan/cigarette), hotels/dhabas serving liquor, and cultivation of crops/plantation (though value addition under these is allowed).

**About Khadi and Village Industries Commission (KVIC)**

- **Statutory Body:** KVIC is a **statutory body** established under the **Khadi and Village Industries Commission Act of 1956**.
- **Apex Organization:** It serves as the **apex organization** under the **Ministry of Micro, Small and Medium Enterprises (MSME)**, specifically focusing on Khadi and Village Industries across India.
- **Mandate:** KVIC is charged with the comprehensive responsibility of **planning, promoting, organizing, and implementing programmes** for the development of Khadi and other village industries, particularly in rural areas. It coordinates with other agencies involved in rural development whenever necessary to achieve its objectives.
- **Objectives:** KVIC's objectives include providing employment in rural areas, producing marketable articles, fostering self-reliance, and building strong rural communities.
- **Role in PMEGP:** As the national nodal agency for PMEGP, KVIC plays a crucial role in processing applications, routing the government subsidy through banks, monitoring project implementation, and ensuring the scheme's reach to eligible beneficiaries.

**United Nations Population Fund (UNFPA)**



**Context:** The United Nations Population Fund (UNFPA)'s recently released **2025 State of World Population (SOWP) Report**, titled, **'The Real Fertility Crisis: The pursuit of reproductive agency in a changing world'**, highlights a critical issue: in India, one in three adult Indians face unintended pregnancies, while 30% experience an unfulfilled desire for having either more or fewer children. This report shifts the focus from

simple population numbers to the crucial concept of "reproductive agency."

## 1. About United Nations Population Fund (UNFPA):

- **Formation and Mandate:** UNFPA is an **international development agency** that was created in **1968** (and became operational in 1969). Its core mandate is to support the execution of projects and programs in the area of **population and sexual and reproductive health (SRH)**.

- **Mission:** Its overarching mission is to deliver a world where:
    - **Every pregnancy is wanted**
    - **Every childbirth is safe**
    - **Every young person's potential is fulfilled**

- **Name Evolution:** Initially established as the "United Nations Fund for Population Activities," it was officially renamed the **United Nations Population Fund in 1987**. However, the original abbreviation **UNFPA** was retained.

- **Data Role:** While UNFPA is **not directly responsible for the collection of primary statistics** (like conducting censuses itself), it plays a crucial role in providing **technical and financial support** for statistical activities in countries. This includes supporting **population censuses, thematic surveys**, and strengthening national data systems to collect disaggregated data for policy formulation.

- **Funding:** UNFPA is unique among many UN agencies as it is **entirely supported by voluntary contributions**. Its funding comes from:
    - Donor governments
    - Intergovernmental organizations
    - The private sector
    - Foundations and individuals It **does not receive funds from the United Nations regular budget**. This reliance on voluntary contributions makes donor support critical to its operations.

- **Headquarters: New York City, USA**.

- **Partnerships:** Works with governments, other UN agencies, civil society organizations (CSOs), and NGOs in over 150 countries to advance its mission.

## 2. Key Areas of Work/Programs:

UNFPA funds assistance, research, and advocacy programs across three major interconnected areas, often referred to as its "three transformative results" to be achieved by 2030:

1. **Reproductive Health:**
    - This includes ensuring universal access to a full range of sexual and reproductive health services, such as:
        * **Family planning:** Providing access to modern contraceptive methods and information. UNFPA is the world's single-largest provider of donated contraceptives to developing countries.
        * **Safe motherhood:** Working to end preventable maternal deaths by strengthening health systems, training healthcare workers (especially midwives), and improving access to quality maternal care, including emergency obstetric care.
        * **Prevention and treatment of sexually transmitted diseases (STDs),** including HIV/AIDS.
        * **Ending unmet need for family planning.**

2. **Population and Development Issues:**
    - Addressing the **population problems and demographic dynamics** of both developed and developing countries.
    - Developing and supporting strategies for sustainable development that take into account population changes, including issues like urbanization, migration, and aging populations.

o Promoting the understanding of population dynamics and their effect on human, social, and economic progress.

3. **Gender Equality and Women's Empowerment:**

o Focusing on issues related to the **status of women**, including closing the gender gap in education.

o Working to **end gender-based violence (GBV)** and harmful practices such as child marriage and female genital mutilation (FGM).

o Promoting the rights of women and girls to make informed, voluntary decisions about their bodies and futures (reproductive agency).

- **Government-Led Implementation:** UNFPA assistance programs are undertaken **only in response to government requests**, ensuring country ownership and alignment with national priorities.

**3. State of World Population (SOWP) Report 2025 – 'The Real Fertility Crisis':**

- **Flagship Publication:** The State of World Population Report is UNFPA's **annual flagship publication**, published since 1978.

- **Core Message:** The 2025 report shifts the global population discourse from concerns about overpopulation or underpopulation to the **"real fertility crisis,"** which is defined as the **inability of individuals to achieve their desired number of children due to systemic barriers.** It emphasizes **"reproductive agency"** – a person's ability to make free and informed choices about sex, contraception, and family size.

- **Key Findings for India:**

o **Unintended Pregnancies:** A significant finding for India is that **one in three adult Indians (36%) have experienced unintended pregnancies.**

o **Unfulfilled Desires:** Approximately **30% of adult Indians reported an unfulfilled desire for having either more or fewer children** than they currently have or want.

o **Dual Challenge:** A staggering **23% of Indians surveyed experienced both unintended pregnancies and an unfulfilled desire for children**, one of the highest rates among the 14 countries surveyed for the report.

o **Barriers to Reproductive Autonomy:** The report identifies key barriers in India, including:

* **Economic factors:** Financial insecurity, job instability, inadequate housing, and limited access to affordable childcare.

* **Lack of agency and unequal relationship dynamics:** Family influence on fertility decisions, partners wanting fewer children, and unequal sharing of household/ childcare work.

* **Lack of workplace policies:** Insufficient paid parental leave, flexible hours, and childcare facilities, especially in the informal and private sectors.

* **Gaps in healthcare:** Limited access to affordable infertility treatment (despite high prevalence), stigma surrounding infertility, and lack of access to a full range of reproductive health services.

o **Adolescent Fertility:** India's adolescent fertility rate (14.1 per 1,000 women aged 15-19) remains a concern, higher than many comparable countries, impacting maternal and child health, as well as educational and employment outcomes.

- **Recommendations for India (from the report):** UNFPA advocates for a rights-based approach focused on reproductive agency. Key recommendations include:
  - Expanding access to comprehensive sexual and reproductive health services, including voluntary contraception, safe abortion, and affordable infertility treatments.
  - Addressing youth fertility through improved contraception access, post-pregnancy support, and comprehensive sexuality education.
  - Removing structural barriers like lack of affordable housing, job security, and childcare support.
  - Making services inclusive for all, including unmarried individuals, LGBTQIA+ communities, and persons with disabilities.
  - Improving data systems to track unmet needs and reproductive satisfaction, not just fertility rates.
  - Driving social change through community-led awareness programs, particularly engaging men and boys to challenge discriminatory norms.

The report underscores that true demographic resilience lies in empowering individuals to make informed choices about their reproductive lives, rather than focusing solely on population control or growth targets.

## World Day Against Child Labour



**Context:** World Day Against Child Labour is observed annually on **June 12th**, serving as a critical reminder of the ongoing challenge of child exploitation. The 2025 observance highlights that despite progress, millions of children remain in child labour globally, necessitating accelerated efforts.

**1. About World Day Against Child Labour:**

- **Global Observance:** Marked every year on **June 12th** to raise awareness and mobilize action against child labour. It advocates for a world where children are free from forced work and can enjoy their right to education, health, and well-being.
- **History:** Launched by the **International Labour Organization (ILO)** on **June 12, 2002**, at its Geneva headquarters. The year 2025 marks the 24th anniversary of this observance.
- **Theme for 2025: 'Progress is clear, but there's more to do: let's speed up efforts!'** This theme acknowledges past achievements while emphasizing the urgent need to intensify global actions to meet elimination goals.

**2. Policy and Initiatives:**

- **India's Efforts:**
  - **National Policy on Child Labour (1987):** Focuses on rehabilitation of affected children and tackling poverty as the root cause.
  - **Child Labour (Prohibition & Regulation) Amendment Act, 2016:** Prohibits employment of children below 14 years in all occupations and processes, and adolescents (14-18 years) in hazardous occupations. It also includes stricter punishments for violations.
  - **PENCIL Portal:** An online platform for effective enforcement of no child labour, connecting government levels and the public for better monitoring and implementation.

- o **National Child Labour Project (NCLP):** A scheme for the rehabilitation of child labourers through special training centers and mainstreaming into formal education.
- **Global Framework:**
  - o **ILO Conventions:** The ILO's core conventions critical to combating child labour are:
    - * **Convention No. 138 (Minimum Age Convention, 1973):** Aims to prevent the employment of children below a specified minimum age.
    - * **Convention No. 182 (Worst Forms of Child Labour Convention, 1999):** Focuses on prohibiting and eliminating the worst forms of child labour, including slavery, trafficking, debt bondage, forced recruitment for armed conflict, prostitution, pornography, and illicit activities, as well as hazardous work. India has ratified both conventions.

## 3. Child Labour: Latest Data and Trends (as of 2024/2025 reports):

- **Global Statistics (ILO & UNICEF estimates):**
  - o Approximately **138 million children (aged 5-17) were engaged in child labour worldwide in 2024.**
  - o **54 million of these children were involved in hazardous work.**
  - o While there has been a reduction of over 20 million children in child labour since 2020, the overall progress is slow.
  - o **Africa (Sub-Saharan Africa)** has the highest rates, with an estimated 87 million children in child labour.
  - o **Asia and the Pacific** has seen the most significant reduction, with 28 million children in child labour.
  - o **Agriculture** remains the largest sector, accounting for 61% of all child labour.

- **India's Data (2011 Census):**
  - o **10.1 million children (aged 5-14)** were working as "main workers" or "marginal workers." This was a decrease from 12.6 million in 2001.
  - o Poverty, lack of education, and economic distress are identified as key drivers.

- **Sustainable Development Goals (SDGs):**
  - o **SDG Target 8.7** aims to "end child labour in all its forms by 2025."
  - o However, current global progress indicates that this target is **unlikely to be met** at the current rate, necessitating an 11-fold acceleration of efforts.

## Global Gender Gap Report 2025



**Context:**

India has been ranked **131st out of 148 countries** in the World Economic Forum's (WEF) **Global Gender Gap Report 2025**, slipping two places from its position last year (129th in 2024). This report benchmarks gender equality across various dimensions and highlights the persistent disparities globally.

## 1. About the Global Gender Gap Index:

- **Publisher:** It is an **annual index released by the World Economic Forum (WEF)**.
- **Objective:** Designed to **measure gender equality** by benchmarking gender-based gaps between women and men. It aims to serve as a strategic tool for countries to assess and compare their progress towards closing these gaps over time.

- **Duration:** It is the **longest-standing index** tracking gender gaps, having been published annually **since its inception in 2006**. The 2025 report is the 19th edition.
- **Methodology:** The index evaluates gender parity across **four key dimensions (sub-indexes)**. Each dimension is scored on a scale from 0 to 1, where 1 represents full gender parity and 0 denotes complete inequality:
    1. **Economic Participation and Opportunity:** Measures gaps in labor force participation, wage equality for similar work, estimated earned income, and representation in leadership roles (legislators, senior officials, managers, and professional/technical workers).
    2. **Educational Attainment:** Measures gaps in literacy rate, and enrollment rates in primary, secondary, and tertiary education.
    3. **Health and Survival:** Measures gaps in sex ratio at birth and healthy life expectancy.
    4. **Political Empowerment:** Measures gaps in representation in parliament and ministerial positions, as well as the number of years with female heads of state.

**2. Highlights of the Global Gender Gap Report 2025:**
- **Global Progress:** The global gender gap has closed by **68.8% in 2025**, marking the strongest post-COVID-19 pandemic progress. However, at the current rate, it will still take **123 years to reach full gender parity globally**, far beyond the 2030 SDG target.
- **No Full Parity:** No economy has yet achieved full gender parity.
- **Top Performers:**
    o **Iceland** retains the world's most gender-equal economy for the **16th consecutive year**, closing 92.6% of its gender gap. It remains the only economy to have closed more than 90% of its gender gap.
    o European countries dominate the top 10 rankings, accounting for eight of the spots. **Finland, Norway, UK, and New Zealand** also feature among the top performers.
- **Bottom Performers:** The bottom 10 countries in the Global Gender Gap Index 2025—led by **Pakistan, Sudan, Chad, and Iran**—continue to show the widest gender disparities globally.

**3. India's Performance in the 2025 Report:**
- **Overall Rank:** India is ranked **131st out of 148 countries**, slipping two places from 129th in 2024.
- **Gender Parity Score:** India's gender parity score stands at **64.1%**, indicating that approximately 35.9% of the gender gap remains to be closed. This places India among the lowest-ranked countries in the South Asian region.
- **Performance Across Dimensions:**
    o **Educational Attainment:** India scores **97.1%**, reflecting significant gains in female literacy and tertiary education enrollment. India ranks 110th in this category.
    o **Economic Participation and Opportunity:** India's score improves by 0.9 percentage points to **40.7%**. This improvement is mainly due to a rise in estimated earned income parity (from 28.6% to 29.9%), while labor-force participation remained steady at 45.9%. Despite this improvement, India remains one of the worst performers globally in this dimension (ranking 144th), indicating a significant gap in women's economic integration and leadership roles.
    o **Health and Survival:** India records higher parity, driven by improved scores in sex ratio at birth and in healthy life expectancy. However, India still ranks relatively low (143rd) in this sub-index.

o **Political Empowerment:** India recorded a **slight drop in parity (-0.6 points)** since the previous edition. Female representation in Parliament fell from 14.7% to 13.8% in 2025. Similarly, the share of women in ministerial roles also dropped from 6.5% to 5.6%, moving further away from its 2019 peak of 30%. This makes it the only sub-index where India's score declined.

- **South Asian Context:** India trails behind some of its neighbors. Bangladesh (rank 24) is the region's top performer, followed by Bhutan (119), Nepal (125), and Sri Lanka (130). Maldives (138) and Pakistan (148) rank below India.

**4. Challenges and Way Forward for India:**

- **Translating Education into Economic Opportunity:** Despite near-parity in educational attainment, this does not translate into proportional gains in economic participation and leadership roles for women. This highlights systemic barriers like patriarchal norms, unsafe workplaces, and lack of childcare support.

- **Political Representation:** The decline in female representation in Parliament and ministerial positions is a significant concern, indicating a setback in political empowerment.

- **Wage Inequality:** Women in India continue to earn significantly less than men for the same work, and female labor force participation remains dismally low.

- **Recommendations:** The report implicitly and explicitly suggests:

  o **Enhancing Economic Inclusion:** Through workplace reforms (e.g., crèches, maternity benefits), incentives for hiring women, and valuing unpaid care work.

  o **Education and Skilling:** Ensuring girls' retention in school, promoting

participation in STEM and vocational training, and bridging the digital gender divide.

o **Inclusive Governance:** Empowering women in leadership roles at all levels, strengthening gender budgeting, and ensuring robust data collection for targeted policy interventions.

o **Legal Frameworks and Implementation:** Addressing the "implementation gap" where gender-equal laws exist but lack the infrastructure and enforcement mechanisms for practical impact.

## Pradhan Mantri Ujjwala Yojana (PMUY)



**Context:** Recent reports indicate that the consumption of petroleum products, particularly diesel and cooking gas, in the **Andaman & Nicobar (A&N) Islands** has increased significantly in recent years, partly due to the success of the **Pradhan Mantri Ujjwala Yojana (PMUY)**.

**1. About Pradhan Mantri Ujjwala Yojana (PMUY):**

- **Launch:** PMUY is a flagship scheme of the **Ministry of Petroleum and Natural Gas (MOPNG)**, launched on **May 1, 2016**, in Ballia, Uttar Pradesh.

- **Objective:** Its primary goal is to provide **clean cooking fuel, such as LPG (Liquefied Petroleum Gas)**, to rural and deprived households. These households traditionally relied on polluting cooking fuels like firewood, coal, and cow-dung cakes, which have negative impacts on health,

especially for women and children, and the environment.

- **Tagline:** "Swachh Indhan, Behtar Jeevan" (Clean Fuel, Better Life).

**2. Benefits Under PMUY:**

- **Financial Assistance for Connection:** The scheme provides financial assistance for an LPG connection:
    o ₹ 1600 for a 14.2 kg cylinder.
    o ₹ 1150 for a 5 kg cylinder.
    o This assistance covers the security deposit for the cylinder, pressure regulator, LPG hose, domestic gas consumer card, and installation/administrative charges.

- **Free First Refill and Stove (Ujjwala 2.0):** Under Ujjwala 2.0 (launched in August 2021 to expand the scheme), all PMUY beneficiaries also receive their **first LPG refill and a stove (hot plate) free of cost**, along with their deposit-free connection.

- **Targeted Approach:** Priority for connections is given to states that had lower LPG coverage compared to the national average as on January 1, 2016.

- **Subsidy:** The government provides a subsidy on LPG cylinders, which has varied over time, to make refills affordable for PMUY beneficiaries. For instance, the government has extended a subsidy of ₹ 300 per cylinder for PMUY beneficiaries.

**3. Eligibility Criteria (Ujjwala 2.0):**

- **Applicant:** An adult woman (18 years or older) belonging to a poor household and who does not already have an LPG connection in her household is eligible.

- **Household Categories:** Beneficiaries must belong to any of the following categories:
    o Identified as eligible in the **SECC 2011 (Socio-Economic Caste Census 2011) list**.
    o Belong to **SC/ST households**.

    o Beneficiaries of **Pradhan Mantri Awas Yojana (PMAY)**.
    o Beneficiaries of **Antyodaya Anna Yojana (AAY)**.
    o **Forest dwellers**.
    o **Most Backward Classes (MBC)**.
    o **Tea and Ex-Tea Garden Tribes**.
    o **People residing in river islands**. (Beneficiary needs to submit supporting documents for these categories).

- **Self-Declaration:** If a household does not fall into the above categories, an adult woman can still apply by submitting a **14-point declaration** (in a prescribed format) to claim eligibility as a "poor household."

- **Exclusions:** Male members from a household cannot apply for the scheme.

**4. Impact and Significance:**

- **Increased LPG Coverage:** PMUY has significantly increased LPG penetration across India. LPG coverage rose from about 62% in May 2016 to nearly 99.8% by April 2021. As of March 1, 2025, over 10.33 crore beneficiaries have received connections under PMUY.

- **Health Benefits:** By replacing traditional polluting fuels, the scheme has reduced indoor air pollution, leading to improved respiratory health, especially for women and children.

- **Women's Empowerment:** It has reduced the drudgery and time spent by women in collecting firewood, allowing them to engage in other productive activities. LPG connections are issued in the name of the female head of the household, enhancing their economic and social standing.

- **Environmental Protection:** Reduced reliance on biomass fuels contributes to decreased deforestation and lower carbon emissions.

- **Economic Impact:** The scheme has also led to an increase in per capita LPG consumption

among beneficiaries over the years, indicating greater sustained usage of clean fuel.

- **Impact in Andaman & Nicobar Islands:** The scheme's success in regions like the Andaman & Nicobar Islands demonstrates its reach and effectiveness in promoting clean energy access even in remote areas. The rise in LPG consumption aligns with the scheme's goals.

## UNESCO Creative Cities Network (UCCN)



**Context:**

Recently, **Lucknow** has officially submitted its nomination for inclusion in the **UNESCO Creative Cities Network (UCCN)**, aiming for the title of **"City of Gastronomy"**. This highlights the ongoing efforts by Indian cities to gain international recognition for their cultural and creative heritage.

**1. About UNESCO Creative Cities Network (UCCN):**

- **Creation:** The UCCN was established in **2004** by the United Nations Educational, Scientific and Cultural Organization (UNESCO).
- **Purpose:** Its main goal is to **promote cooperation among cities** that recognize **creativity as a key factor for sustainable urban development**.
- **Broader Goals:** It was launched to support UNESCO's broader objectives of promoting cultural diversity and building resilience in cities against challenges like climate change, rising inequality, and rapid urbanization.
- **Creative Fields:** The network covers seven creative fields:
  - o Crafts and Folk Arts
  - o Design
  - o Film
  - o **Gastronomy**
  - o Literature
  - o Media Arts
  - o Music

**2. Aims and Objectives of UCCN:**

- **Leveraging Cultural Industries:** The network aims to use the creative, social, and economic potential of cultural industries for urban growth.
- **Culture of Creativity:** It encourages integrating creativity into urban planning and finding creative solutions to city problems.
- **Collaboration:** It allows member cities to recognize creativity as a vital part of urban development, especially through partnerships involving government, private businesses, and civil society.
- **Innovation Hubs:** It works towards creating centers of creativity and innovation, expanding opportunities for artists and professionals in the cultural sector.
- **Sustainable Development:** Member cities are encouraged to contribute to the **UN 2030 Agenda for Sustainable Development**, particularly Sustainable Development Goal 11 (Sustainable Cities and Communities), by placing culture and creativity at the core of their urban plans.

**3. Indian Cities in the UCCN:**

- As of recent updates, **ten Indian cities** are part of the UCCN.
- **Latest Additions (2023):**
  - o **Kozhikode (Kerala):** Designated as a "City of Literature."
  - o **Gwalior (Madhya Pradesh):** Designated as a "City of Music."
- **Previously Included Cities:**
  - o **Jaipur (Rajasthan):** "Crafts and Folk Arts" (2015).
  - o **Varanasi (Uttar Pradesh):** "Music" (2015).

- o **Chennai (Tamil Nadu):** "Music" (2017).
- o **Mumbai (Maharashtra):** "Film" (2019).
- o **Hyderabad (Telangana):** "Gastronomy" (2019).
- o **Srinagar (Jammu & Kashmir):** "Crafts and Folk Arts" (2021).
- o **Neemuch (Madhya Pradesh):** (Information about its specific category and year might vary, but it's mentioned in some lists as the tenth city).
- **Lucknow's Nomination:** Lucknow, known for its rich culinary heritage (Awadhi cuisine), has submitted its bid to be recognized as a **"City of Gastronomy"**, aiming to join Hyderabad in this category.

**4. Significance for India:**

- **International Recognition:** Inclusion in UCCN provides global recognition for India's diverse cultural and creative traditions.
- **Tourism Promotion:** It can boost cultural tourism, attracting more visitors and contributing to local economies.
- **Urban Development:** It encourages cities to integrate culture and creativity into their urban planning, leading to more vibrant and sustainable urban environments.
- **Knowledge Sharing:** Indian cities can engage in global networks, sharing best practices and learning from other creative cities around the world.

## PM-WANI Scheme



**Context:**

The Telecom Regulatory Authority of India (TRAI) recently took a significant step to ensure the affordability of public Wi-Fi under the **PM-WANI scheme** by prescribing a cap on tariffs charged to Public Data Offices (PDOs). This move aims to accelerate the scheme's proliferation.

**1. About PM-WANI Scheme:**

- **Full Form:** PM-WANI stands for **Prime Minister Wi-Fi Access Network Interface**.
- **Launch:** The scheme was launched by the **Department of Telecommunications (DoT)**, under the Ministry of Communications, in **December 2020**.
- **Objective:** The primary goal is to significantly **enhance the proliferation of public Wi-Fi hotspots** across the country, thereby creating a robust digital communications infrastructure, with a special focus on **rural and underserved areas**.
- **Socio-Economic Goals:**
  - o To increase **employment opportunities for small and micro-entrepreneurs** by enabling them to become Wi-Fi providers.
  - o To provide **low-cost internet access** to the urban poor and rural households, bridging the digital divide.
- **Ease of Doing Business:** The scheme encourages local shops and establishments to provide Wi-Fi for last-mile internet delivery. A key feature is that these **Public Data Offices (PDOs) do not require a license or have to pay a registration fee** to the DoT, which reduces entry barriers and promotes participation.

**2. PM-WANI Ecosystem Components:**

The PM-WANI framework disaggregates the Wi-Fi ecosystem into four distinct entities to simplify operations and encourage wider participation:

- **(a) Public Data Office (PDO):**
  - o These are local shops, small establishments, or individuals who set up, maintain, and operate **WANI-compliant Wi-Fi access points**.

- o Their role is to deliver broadband services to subscribers by procuring internet bandwidth from existing Telecom Service Providers (TSPs) or Internet Service Providers (ISPs).
- o **No license or registration fee** is required from the DoT for PDOs. They can earn extra income by selling internet services.

- **(b) Public Data Office Aggregator (PDOA):**
  - o A PDOA acts as an **aggregator for multiple PDOs**.
  - o Their functions include providing services related to **authorization and accounting** for the PDOs, as well as managing billing and payment collection from users.

- **(c) App Provider:**
  - o This entity develops a **mobile application** that serves two main purposes:
    - \* **User Registration:** It registers users who wish to access PM-WANI internet services.
    - \* **Hotspot Discovery:** It helps users discover nearby WANI-compliant Wi-Fi hotspots and displays them within the app, allowing users to connect and access internet services.

- **(d) Central Registry:**
  - o This is a central database that **maintains the details of all registered App Providers, PDOAs, and PDOs**.
  - o It ensures a standardized and verifiable ecosystem.
  - o Currently, the **Centre for Development of Telematics (C-DoT)** maintains the Central Registry.

### 3. How to Access PM-WANI Internet:

The process for a user to access broadband through the PM-WANI public Wi-Fi network is designed to be simple and user-friendly:

- **Download App:** A user needs to download the relevant mobile application provided by an **App Provider**.
- **Authentication:** The user registers and gets authenticated through the app (often using mobile number and OTP).
- **Discover Hotspots:** When the user is near a public Wi-Fi hotspot, the app on their mobile phone will automatically show the various available WANI-compliant networks.
- **Connect and Pay:** The user can then select their preferred Wi-Fi network, choose a suitable data plan, pay a nominal amount (either online through the app or via a voucher), and start using the internet service until their purchased data balance is exhausted.

### 4. Latest Developments (TRAI's Role):

- **TRAI's Intervention:** The Telecom Regulatory Authority of India (TRAI) recently prescribed a **cap on tariffs** charged by TSPs/ISPs to PDOs.
- **Reason:** The Department of Telecommunications (DoT) highlighted that the proliferation of PM-WANI hotspots was below target, partly due to the **high cost of internet connectivity charged to PDOs** by service providers (often through expensive Internet Leased Lines).
- **New Tariff Framework:** TRAI's new framework aims to balance the interests of all stakeholders. It stipulates that retail Fiber to the Home (FTTH) broadband plans up to 200 Mbps offered by service providers to PDOs under PM-WANI should not exceed **twice the tariff** applicable to retail subscribers for the corresponding FTTH broadband plan.
- **Impact:** This move is expected to keep public Wi-Fi affordable for end-users, make it more commercially viable for small entrepreneurs to become PDOs, and thereby accelerate the overall deployment and success of the PM-WANI scheme in achieving widespread digital connectivity.

## Bajau Tribe



**Context:**

Recent research has highlighted the remarkable biological adaptation of the **Bajau tribe**, revealing that their spleens are, on average, 50% larger than those of the general population. This natural adaptation allows them to free-dive deeper and hold their breath longer, shedding light on human evolution in extreme environments.

**1. About the Bajau Tribe:**

- **Nomenclature:** The Bajau are also commonly known as the **Sea Gypsies** or **Sea Nomads**, reflecting their traditional maritime, nomadic lifestyle.

- **Origin and Distribution:** They originate from the **Sulu Islands region in the Southern Philippines**. Due to their nomadic seafaring life, they eventually spread across the waters of **Malaysia, Brunei, and Indonesia** (particularly in coastal areas of Sulawesi, Sabah, and various parts of the Philippines archipelago).

- **Lifestyle - The "Sea Nomads":**
  - Historically, they lived almost entirely on the sea, residing in **wooden pole houses built on stilts over the water** or in **houseboats called Lepa-Lepa**.
  - Most of their daily activities, including birth and sometimes even death, traditionally occur on their boats.
  - They are highly dependent on the sea for food, income, and daily needs, moving between islands following seasonal changes and marine resources.

- Fishing remains central to their lifestyle and is a strong reflection of their cultural heritage. Communal fishing activities help preserve traditional practices and strengthen social bonds.
  - They occasionally go ashore only to sell their catch or to procure goods they cannot produce themselves.

- **Exceptional Free-Diving Abilities:** The Bajau are globally renowned for their extraordinary free-diving capabilities.
  - Without using modern diving gear (such as scuba tanks or fins), they can dive to impressive depths of **20–30 meters** (some reports even suggest up to 60 meters).
  - They can hold their breath for extended periods, typically ranging from **five to 13 minutes**. Children are immersed in swimming and diving from a very young age.

**2. Natural Adaptations of the Bajau Tribe:**

- **Enlarged Spleen:** Research has confirmed that the Bajau's spleens are, on average, **50% larger than those of ordinary people**.
  - **Physiological Role:** The spleen plays a crucial role in the human "dive response." When the body is submerged and oxygen levels drop, the spleen contracts, releasing a surge of oxygenated red blood cells into the bloodstream. A larger spleen acts as a bigger reservoir of these oxygen-carrying cells, significantly increasing the amount of oxygen available to the body during a breath-hold dive. This enables them to dive deeper and stay underwater for longer.

- **Genetic Basis:** Scientists have traced this unique adaptation to a **genetic variation in the PDE10A gene**.
  - This gene is believed to influence spleen size, possibly by affecting thyroid hormone levels, which have been linked to spleen size in other mammals.
  - This suggests that the enlarged spleen is not merely a result of training or a "plastic response," but rather a genetic trait that has been favored by natural selection over generations due to their extreme diving lifestyle.
  - Evidence also suggests selection on the **BDKRB2 gene**, which affects the human diving reflex (a set of physiological responses that help the body conserve oxygen during immersion).

### 3. Challenges and Future:

- **Modernization and Citizenship:** Their nomadic lifestyle often poses challenges for gaining formal citizenship in the countries they inhabit, leading to limited access to basic services like healthcare and education.
- **Environmental Threats:** Overfishing, destructive fishing practices (like dynamite fishing), and climate change-induced marine degradation threaten their traditional food sources and way of life.
- **Cultural Preservation:** There is increasing pressure for them to settle on land due to government regulations and changing economic landscapes, which challenges their unique cultural heritage and traditional practices tied to the sea.
- Despite these challenges, efforts are being made by some Bajau leaders and supporting organizations to protect their culture, advocate for their rights, and find a balance between traditional knowledge and modern influences. The Bajau remain a powerful example of human adaptability and the profound connection between culture, environment, and biology.

## QS World University Rankings 2026



**World University Rankings**
Rankings tables report
2026

**Context:**

Quacquarelli Symonds (QS), a global higher education consultancy, recently released the **QS World University Rankings 2026**, showcasing significant shifts in global higher education performance, with India achieving its best-ever representation.

### 1. About QS World University Rankings:

- **Publisher:** Published annually by **Quacquarelli Symonds (QS)**, a British company specializing in education and study-abroad services. The first edition was released in 2004.
- **Evaluation Scope:** The 2026 edition rigorously evaluated **8,467 institutions** and featured **over 1,500 institutions from more than 100 countries**.
- **Parameters/Indicators:** QS evaluates universities on a comprehensive set of parameters (indicators), broadly categorized into:
  - **Research and Discovery (50% weighting):**
    - **Academic Reputation (30%):** Based on a global survey of academics.

* **Citations per Faculty (20%):** Measures the impact of an institution's research by normalizing the total number of citations received by all papers produced by a university over a five-year period by the number of faculty members.

o **Employability and Outcomes (20% weighting):**

* **Employer Reputation (15%):** Based on a global survey of graduate employers.

* **Employment Outcomes (5%):** Reflects how well universities prepare students for successful careers.

o **Global Engagement (15% weighting):**

* **International Faculty Ratio (5%):** Measures success in attracting faculty from overseas.

* **International Research Network (5%):** Assesses the diversity of an institution's research collaborations with other institutions globally.

* **International Student Ratio (5%):** Measures success in attracting students from overseas.

* **International Student Diversity (ISD) (New, 0% unweighted indicator for 2026):** Introduced this year, it looks at both the ratio of international students to overall students and the diversity of nationalities from which those students originate, aiming to measure success in attracting students from a wide range of locations and backgrounds.

o **Learning Experience (10% weighting):**

* **Faculty Student Ratio (10%):** An indication of commitment to high-quality teaching and support.

o **Sustainability (5% weighting):** Includes green practices, sustainability research, and community impact, aligning education with global sustainable development goals (SDGs).

* **Data Basis:** The rankings are based on data from over **16 million research papers**, feedback from more than **151,000 academics**, and insights from **100,000 global employers**.

**2. QS World University Rankings 2026 Global Highlights:**

* **Global Leader:** The **Massachusetts Institute of Technology (MIT), United States**, maintains its top position for the **14th straight year**, underscoring its consistent excellence.

* **Top 10:** The leading institutions globally include:
  o Massachusetts Institute of Technology (MIT), US
  o Imperial College London, UK
  o Stanford University, US (climbed from sixth to third)
  o University of Oxford, UK
  o Harvard University, US
  o University of Cambridge, UK
  o ETH Zurich, Switzerland
  o National University of Singapore (NUS), Singapore
  o University College London (UCL), UK
  o California Institute of Technology (Caltech), US

* **Country Representation:**
  o The **United States** remains the most represented country overall, with **192 institutions** featured, and most showing improved positions.
  o **China** continues its strong presence, with Peking University at 14th and Tsinghua University rising to 17th. Fudan University climbed nine spots to 30th, and the Chinese University of Hong Kong (CUHK) secured 32nd.

o Hong Kong SAR and Ireland were recognized among the most improved education systems.

## 3. India's Performance in QS World University Rankings 2026:

- **All-Time High Representation:** India has achieved an all-time high in the rankings, with **54 institutions featured** in the 2026 list. This is a significant rise from 46 in 2025 and 45 in 2024, representing a **390% increase in representation over the past decade** (from 11 in 2015).

- **Fourth Most Represented Nation:** With 54 institutions, India has become the **fourth most represented nation globally**, following the United States (192), the United Kingdom (90), and Mainland China (72).

- **Fastest-Growing G20 Nation:** India marks its position as the **fastest-growing G20 nation** in the QS rankings, with a remarkable increase in institutions.

- **New Entrants: Eight Indian universities** are new entrants this year, the highest number from any country, signaling a broader institutional momentum.

- **Improved Positions:** Nearly half (**48%**) of India's ranked institutions improved their positions this year, while only 20% saw a decline, indicating consistent progress.

- **Leading Indian Institutions:**
    1. **Indian Institute of Technology (IIT) Delhi:** Emerged as India's highest-ranked university, climbing to the **123rd position globally** (jointly with Georgia Institute of Technology, USA). This is its highest-ever rank, significantly up from 197th in 2024 and 150th in 2025. It performed strongly in Employer Reputation (50th globally), Citations per Faculty (86th), and Academic Reputation (142nd).

    2. **IIT Bombay:** Although it slipped slightly to **129th overall** (from its all-time high of 118 last year), it remains in the global top 130 and continues to score highly on Employer Reputation (39th).

    3. **IIT Madras:** Recorded a remarkable jump of **47 spots to reach 180th**, entering the global top 200 for the first time (up from 227 in 2025).

- **Strength in Specific Indicators:**
    1. **Employer Reputation:** Five Indian universities made it to the global top 100 for Employer Reputation, reflecting strong industry confidence in Indian graduates.

    2. **Citations per Faculty (Research Quality):** Eight Indian institutions secured a place among the top 100 globally for Citations per Faculty, achieving an impressive average score of **43.7**, which is ahead of Germany, the UK, and the US in this metric.

- **Top 10 Indian Institutes in QS World University Rankings 2026:**
    1. IIT Delhi - Rank 123
    2. IIT Bombay - Rank 129
    3. IIT Madras - Rank 180
    4. IIT Kharagpur - Rank 215
    5. IISc Bangalore - Rank 219
    6. IIT Kanpur - Rank 222
    7. University of Delhi - Rank 328
    8. IIT Guwahati - Rank 334
    9. IIT Roorkee - Rank 339
    10. Anna University - Rank 465

## 4. Challenges for India:

- Despite overall progress, India continues to face challenges in certain areas critical to global competitiveness, particularly:
    o **International Student Diversity/Ratio:** A significant number of Indian universities (78%) witnessed a decline in this metric, with no Indian institution

ranking within the top 500 globally for attracting international students. This impacts campus diversity and global exposure.

o **Faculty-Student Ratio:** This presents structural challenges, highlighting a need for faculty expansion and better resource allocation across institutions. Only O.P. Jindal Global University is in the global top 350 for this metric from India.

India's consistent rise in the QS rankings reflects a growing focus on improving the quality and international visibility of its higher education institutions, often attributed to the momentum created by the National Education Policy (NEP) 2020 and other ongoing reforms.

## e-Raktkosh



**Context:**

- The Central Health Ministry is taking a significant step towards enhancing blood transfusion services by integrating the country's **Rare Donor Registry** with **e-Raktkosh**, the national online platform for blood bank management and blood availability information.

- This integration aims to streamline the identification and access to rare blood groups, crucial for patients with complex medical conditions.

**1. About e-Raktkosh:**

- **Definition:** e-Raktkosh is a **centralized, web-based blood bank management system** implemented under the **National Health Mission (NHM)** of the Ministry of Health and Family Welfare, Government of India.

- **Official Portal:** It serves as the **official national portal for all blood-related services in India**, aiming for "One Nation, One Platform for Blood Services."

- **Information Provided:** The platform provides real-time and comprehensive information on:
  o **Blood availability** (by blood group and component)
  o **Blood banks** across the country
  o **Blood donation camps** schedules

- **Coverage:** More than **3800 blood centers** from across the country are currently registered on e-Raktkosh, making it a vast network.

- **Development:** It has been developed by the **Centre for Development of Advanced Computing (C-DAC)**.

- **Architecture:** It features a **modular and scalable approach** with a configurable rule-based architecture, allowing for customization to easily incorporate specific requirements from nationwide stakeholders and ensuring compliance with the Drugs & Cosmetics Act and National Blood Policy.

**2. e-Raktkosh Objectives:**

The primary objectives of e-Raktkosh are to:

- **Ensure Safe and Adequate Blood Supplies:** By providing real-time data and enabling efficient management.

- **Reduce Turnaround Time:** To quickly locate and facilitate the delivery of required blood units, especially in emergencies.

- **Prevent Wastage of Blood:** Through efficient inventory management and tracking of near-expiry units.

- **Restrict Professional Donors:** By maintaining a robust donor database and enforcing eligibility criteria, promoting voluntary blood donation.

- **Networking of Blood Banks:** To enable seamless coordination and information sharing among blood banks nationwide.
- **Create a Donor Repository:** To build a comprehensive database of voluntary blood donors, including those with rare blood groups and regular repeat donors.

**3. e-Raktkosh Features:**

e-Raktkosh offers several key features to achieve its objectives:

- **Web-Based Application:** Accessible from anywhere with an internet connection, allowing for real-time updates.
- **Aadhaar Linkage:** Enables biometric identification of donors, enhancing traceability and preventing fraudulent donations.
- **Decision Support System:** Helps blood banks enforce regulatory guidelines, donation rules, and make informed decisions on inventory management.
- **Enforces Guidelines:** Ensures compliance with national blood safety guidelines and standards.
- **Dashboard:** Provides instant insights into donation activity, stock levels, and alerts through a user-friendly interface.
- **Statutory Reports:** Generates necessary reports for regulatory compliance and performance monitoring.
- **Citizen-Centric Services:** Public portal and mobile apps allow citizens to search for blood availability, locate nearby blood banks, and find donation camp schedules.

**4. e-Raktkosh's Six Major Components for Management of the Blood Donation Life Cycle:**

The system is designed with integrated modules to manage the entire blood donation and transfusion process:

1. **Biometric Donor Management System:** For identifying, tracking, and blocking donors based on their health status, donation history, and eligibility criteria. This module helps ensure donor safety and prevents donations from ineligible individuals.

2. **Blood Testing and Processing Module:** Provides features for essential blood processing steps such as blood grouping, Transfusion-Transmitted Infection (TTI) screening (e.g., for HIV, Hepatitis B & C, Syphilis, Malaria), antibody screening, and component preparation (e.g., Packed Red Blood Cells, Plasma, Platelets) as per defined processes and rules.

3. **Centralized Blood Inventory Management System:** For keeping real-time track of the blood stock (by blood group and component) across numerous registered blood banks, optimizing distribution and minimizing wastage.

4. **Bio-Medical Waste Management System:** Facilitates the proper handling and disposal of discarded blood units and other biomedical waste generated during the blood collection and processing stages, ensuring environmental and public health safety.

5. **Generation of Rare Blood Group Donor Registries and Regular Repeat Donors:** This component specifically focuses on identifying, registering, and maintaining a database of donors with rare blood groups (e.g., Bombay Blood Group, Rh-null, P-null) and encouraging regular repeat donations from healthy individuals.

6. **Alert and Notification System:** Provides real-time alerts and notifications to blood banks, donors, and recipients regarding blood availability, urgent requirements, expiry dates of blood units, and upcoming blood donation drives.

**5. Latest Developments: Integration with Rare Donor Registry:**

- **Rare Donor Registry of India (RDRI):** Maintained by the **Indian Council of Medical**

Research - National Institute of Immunohaematology (ICMR-NIIH) in collaboration with other institutes. It currently holds a carefully screened database of over **4,000 donors**, tested for over **300 rare blood markers**.

- **Purpose of Integration:** This integration aims to:
  - Significantly **improve accessibility, traceability, and timely availability of rare blood types** across India.
  - Enable **faster access to ultra-rare blood types** (like Bombay Blood Group, P-null, Rh-null) for patients who need specific matches.
  - Support **safer transfusions** for patients with complex conditions such as thalassemia, sickle cell anemia, or those who are alloimmunized (developed antibodies against common antigens), where finding compatible blood is challenging.
  - Create a **unified, single-window digital interface** under NHM that connects rare blood group donors with hospitals and blood banks nationwide.
- **Supporting Innovations:** ICMR-NIIH has also developed DNA-based rapid testing kits (multiplex PCR) to quickly identify rare blood types and point-of-care (POC) tests for genetic blood disorders, reducing diagnostic costs and making testing accessible even at primary health centers.
- **Significance:** This integration is a transformative step that will enhance India's capacity to respond to medical emergencies involving rare blood groups, ensuring that no life is lost due to lack of access to safe and compatible blood.

# Indian Society & Social Justice

## NAVYA Initiative



- **Launch of Joint Pilot Initiative:** The Government of India is launching a joint pilot initiative called **NAVYA** for skilling adolescent girls.
- **Vision Alignment:** This initiative is aligned with the **Viksit Bharat@2047 Vision**.
- **Significance:** NAVYA marks a crucial step towards empowering adolescent girls through skill development, especially in non-traditional sectors. It aims to foster confidence, economic independence, and an entrepreneurial spirit, contributing significantly to India's journey towards being a developed, self-reliant, and inclusive nation by 2047.

**About NAVYA Initiative**

- **Full Form:** **N**urturing **A**spirations through **V**ocational Training for **Y**oung **A**dolescent Girls (NAVYA).
- **Joint Initiative Of:**
  - Ministry of Women and Child Development (MWCD)
  - In convergence with the Ministry of Skill Development and Entrepreneurship (MSDE)
- **Objective:** To equip adolescent girls with vocational training, primarily in non-traditional

job roles, to enhance their employability, build confidence, and promote entrepreneurship.

**Features of NAVYA Initiative**

- **Target Group:** Adolescent girls aged **16-18 years** with a minimum qualification of **Class 10**.
- **Focus Areas for Training:** Vocational training mainly in **non-traditional job roles** and emerging sectors. Examples include:
  - o Graphic design
  - o Telecom and financial services
  - o Smartphone and drone assembly
  - o Solar PV and CCTV installation
  - o Hand embroidery
- **Implementation (Pilot Phase):**
  - o Will be implemented in **27 Districts** across **19 States**.
  - o Includes **Aspirational districts** and districts from **North-eastern States**, reflecting the Government's inclusive and targeted approach to reaching underserved regions and vulnerable populations.
  - o Each participating district will have designated training centers.
- **Collaboration & Convergence:**
  - o Both Ministries (MWCD and MSDE) will formalize their collaboration to institutionalize convergence on skilling efforts for adolescent girls.
  - o The program will draw upon the strengths of existing flagship skill development schemes such as **Pradhan Mantri Kaushal Vikas Yojana (PMKVY)** and PM Vishwakarma Yojana.
- **Expected Outcomes:** Through NAVYA, the Government aims to empower girls with skills, confidence, and opportunities, enabling every young woman to become a catalyst in India's journey towards a developed, self-reliant, and inclusive future. It seeks to bridge gender gaps in skill training and promote women-led development.

## SPREE Scheme



- **Re-launch Approved:** The Employees' State Insurance Corporation (ESIC) recently approved the **re-launch of the SPREE Scheme** from **July 1 to December 31, 2025**.
- **Context:** This decision was made during the 196th ESIC meeting.
- **Complementary Scheme:** ESIC has also approved an **Amnesty Scheme 2025**, active from October 1, 2025, to September 30, 2026, which aims to resolve long-standing disputes and reduce litigation under the ESI Act.

**About SPREE Scheme**

- **Full Form:** SPREE stands for **Scheme to Promote Registration of Employers/Employees**.
- **Original Introduction:** It was originally introduced in **2016**.
- **Objective:** The primary objective is to **expand ESI coverage across the country** by encouraging the registration of unregistered employers and left-out employees.
- **Previous Success:** The scheme successfully facilitated the registration of over **88,000 employers and 1.02 crore employees** in its initial run.
- **Renewed Opportunity (2025):** The renewed SPREE (July 1 to December 31, 2025) offers a **one-time opportunity** for:
  - o Unregistered employers.
  - o Left-out workers, including contractual and temporary staff.
  - o To enroll voluntarily under the ESI Act.

- **Coverage Commencement:**
  - o Employers registering during this period will be treated as covered from the date of registration or as declared by them.
  - o Newly registered employees will be covered from their respective dates of registration.
- **Approach:** By focusing on **voluntary compliance rather than penalization**, the scheme seeks to:
  - o Ease the litigation burden for both employers and ESIC.
  - o Encourage formal registration and adherence to the ESI Act.
  - o Foster improved engagement and goodwill among stakeholders (employers, employees, and ESIC).

**Features and Benefits of SPREE Initiative**

- **No Penalties for Past Non-Compliance (during the scheme period):** Employers who register during this special window will not face penal actions for non-compliance with ESI provisions prior to their registration under the scheme. This is a significant incentive for employers who were previously hesitant to register due to potential penalties.
- **Inclusion of Informal Workers:** Specifically targets "left-out" workers, including contractual and temporary staff, ensuring that a wider segment of the informal workforce gains access to social security benefits.
- **Streamlined Registration:** Aims to simplify the registration process for employers and employees.
- **Legal Clarity and Reduced Litigation:** By encouraging voluntary registration and offering a non-penalizing approach, the scheme is expected to reduce the number of legal disputes and cases related to ESI non-compliance.
- **Broader Social Security Net:** Contributes to the government's broader goal of providing social

security benefits, including medical, sickness, maternity, disability, and unemployment allowances, to a larger portion of the Indian workforce.
- **Worker Welfare:** Ensures that more employees receive the comprehensive benefits provided under the ESI scheme, improving their access to healthcare and financial security in times of need.
- **Employer-Friendly Environment:** The emphasis on voluntary compliance and reduced penalties aims to create a more conducive regulatory environment for businesses.
- **Alignment with Government Vision:** Directly supports the government's commitment to empowering workers and achieving an inclusive, self-reliant "Viksit Bharat."

## Ahmedabad Air Crash : A Safety Wake-Up Call for Indian Aviation



**Context:**

- The recent crash landing of an **Air India Boeing 787 Dreamliner (Flight AI 171) from Ahmedabad to London, shortly after takeoff on June 12, 2025**, resulted in significant casualties.
- It has also highlighted critical aviation safety concerns and broader systemic challenges, particularly during high-risk flight phases.

**I. Key Dimensions of the Ahmedabad Plane Crash**

- **Incident Overview:**
  - o **Aircraft:** Air India Boeing 787 Dreamliner (Flight AI 171).
  - o **Route:** Ahmedabad to London Gatwick.

## India plane crash



- o **Event:** Faced **technical issues** and crashed shortly after takeoff.
- o **Casualties:** Almost all 241 passengers and crew killed except 1.
- o **Location:** Crashed into Meghani Nagar, a densely populated residential and medical college area near Ahmedabad airport, causing ground-level casualties.
- o **Cause:** Not immediately known.

- **Immediate Emergency Signalled:**
  - o The pilot issued a **"Mayday" call** within seconds of takeoff, indicating a life-threatening emergency.
  - o **No further communication** followed, suggesting instant system failure or structural damage.

- **Breakdown in Real-Time Air-Ground Coordination:**
  - o Despite the Mayday call, **Air Traffic Control (ATC)** could not establish further contact.
  - o Raises concerns over the efficacy of emergency protocols between cockpit and ATC during critical moments.

- **Highly Experienced Pilot:**
  - o The Captain had over **8,200 flying hours**, including 1,100 hours on the Boeing 787.
  - o This experience profile makes **human error less likely**, shifting focus towards mechanical failure or technical glitch.

- **Crash in Civilian Zone:**
  - o Impact in a residential and medical college area highlights the urgent need for **safe buffer zones around airports** in urban areas.

- **DGCA and Safety Regulation Challenges:**
  - o **Directorate General of Civil Aviation (DGCA)** acknowledged the emergency but could not intervene effectively.
  - o Reveals the need for **stronger monitoring systems, quicker response infrastructure, and regular audits of high-risk aircraft**.

## II. Key Aviation Terminology & Bodies

- **Mayday Call:**
  - o An **emergency radio signal** used by aircraft and ships to request urgent help.
  - o Must be used only for genuine emergencies; false calls carry severe penalties.

- **Directorate General of Civil Aviation (DGCA):**
  - o An **attached office of the Ministry of Civil Aviation**, Government of India.
  - o **Functions:**
    - \* Regulatory Body for Aviation Safety: Ensures safety of aircraft, passengers, airline operations in India.
    - \* Controls Air Transport Services: Regulates flights within India and those to/from the country.
    - \* Enforces Aviation Laws: Ensures airlines follow air safety rules and maintain aircraft standards.

- **Black Box (Flight Recorders):**
  - o Essential tools for accident investigation.
  - o Aircraft must have two types:
    - \* **Cockpit Voice Recorder (CVR):** Captures conversations and cockpit sounds.

* **Flight Data Recorder (FDR):** Stores over 80 types of flight data (altitude, speed, heading, autopilot status, etc.).
  - o **Location:** Usually at the tail end of the aircraft for maximum protection.
  - o **Construction:** Stored in strong, protected units with insulation to resist fire, water, and impact.

## III. Why Accidents Mostly Occur During Take-off or Landing

- **Statistical Evidence:** Data from IATA (2005–2023) and Boeing (2015–2024) consistently shows most crashes happen during landing **(53% IATA) and takeoff/initial climb (8.5% IATA, 20% Boeing fatal accidents).**
- Cruise phase has the lowest fatal accident rate despite highest exposure.
- **Contributing Factors:**
  1. **Limited Time & Space for Correction:**
     * Pilots have minimal time and space to react during these phases.
     * No altitude buffer to correct errors or system failures (unlike cruise altitude where planes can glide).
  2. **Aircraft Under Maximum Stress:**
     * **Takeoff:** Engines and airframe experience maximum pressure to generate lift.
     * **Landing:** Aircraft must simultaneously manage speed, alignment, descent, and runway conditions.
  3. **External Risk Factors:**
     * Lower altitudes are more prone to **bird strikes, turbulence, wind shear, and poor visibility**.
  4. **Pilot Workload:**
     * Landings are particularly demanding, requiring complex, real-time decisions.

  5. **Stall Risk (Especially during takeoff):**
     * **Wing Stall:** Occurs when an aircraft's wing suddenly loses lift.
     * This happens when the **angle of attack (angle between wing and oncoming air) becomes too steep (typically >15-20 degrees).**
     * Leads to turbulent airflow over the wing, detachment, sudden lift drop, and loss of altitude.

## IV. Boeing 787 Dreamliner: Features & Scrutiny

- **Aircraft Type:** Next-generation, **long-haul jet (introduced 2007).**
- **Key Features:** Carbon fibre composite structure **(lighter), 25% more fuel efficient than older models,** improved cabin comfort.
- **Scrutiny:** Crash intensifies scrutiny on Boeing, already under **pressure from prior 737 MAX crashes.**
- **Safety Concerns & Incidents:**
  - o FAA investigations into production practices.
  - o Whistleblower allegations (Sam Salehpour on fuselage fastening, John Barnett on substandard parts).
  - o Past incidents: 2013 global grounding due to lithium-ion battery fires, 2024 Latam Airlines 787 plunge (human error).

## V. Economic Impact of the Crash

- **Fall in Boeing's Share Price:** Immediate **~8% drop in pre-market trading,** reflecting investor fears about safety and future sales.
- **Rise in Aviation Insurance Premiums:**
  - o Seen as a "significant event" by global insurance industry.
  - o Likely to lead to higher premiums worldwide, especially for wide-body aircraft like the 787.
  - o Stricter policy renewals and terms of coverage.

- **Reinsurance Cost Escalation:**
  - o Insurance for large aircraft is typically shared globally via reinsurance.
  - o This crash could increase reinsurance costs, particularly if similar incidents occur.
- **Financial Liability for Air India & Tata Group:**
  - o Potential liability burden exceeding ₹ **500 crore** (compensation, legal costs, aircraft damage).
  - o Reputation and financial stress despite swift humanitarian response.
- **Impact on Aircraft Manufacturing Sector:**
  - o May further delay deliveries or affect demand for Boeing's 787 models.
  - o Impacts global aviation production and supply chains.
- **Impact on India's Aviation Sector:**
  - o Potential downgrade in global rankings.
  - o Stricter regulations and increased scrutiny from international aviation bodies.
  - o Decline in foreign investments due to safety concerns.

## VI. Way Forward (Safety Enhancements)

1. **Proactive Aircraft Health Checks:** Implement modern tools for early detection of technical problems before every flight.
2. **Enhanced Training:** Improve pilot and ATC staff training for emergencies, incorporating regular practice and mock drills.
3. **Airport Buffer Zones:** Enforce stricter regulations to avoid construction of homes/ schools too close to airports to minimize ground casualties.
4. **Aircraft Audits:** Ensure older aircraft strictly follow safety rules and undergo more frequent inspections.
5. **Smart Technology Integration:** Utilize advanced technology for early warning of engine or system malfunctions.

6. **Transparent Investigations:** Ensure crash investigations are open, prompt, and transparent, using findings to improve safety rules and protocols.
7. **International Cooperation:** Strengthen collaboration with international aviation bodies (ICAO, FAA, NTSB, AAIB) for best practices and incident analysis.

## Global Education Crisis - Over 272 Million Children Out-of-School



**Why in News?**

- The **UNESCO Global Education Monitoring (GEM) Report**, released on **June 15, 2025**, reveals that **272 million children and youth** are currently out of school worldwide.
- This marks an **increase of over 21 million** compared to the last estimate. The report highlights a major concern regarding the global effort to meet **Sustainable Development Goal 4 (SDG 4)** — ensuring quality education for all by 2030.
- It also warns that most countries are not on track to meet their **national education targets by 2025**.

### 1. Out-of-School Distribution by Age Group

| Age Group | Number Out of School | Percentage of Group |
|---|---|---|
| Primary School (6–11 yrs) | 78 million | 11% |
| Lower Secondary (12–14) | 64 million | 15% |
| Upper Secondary (15–17) | 130 million | 31% |

- The numbers **increase with age**, indicating growing dropouts at higher levels of education.

## 2. Reasons for the Increase

(a) Improved Enrolment and Attendance Data

- Accounts for **8 million** of the increase (about 38%).
- Better data collection has resulted in **more accurate, higher counts** of out-of-school children.
- For example, the **ban on girls' secondary education in Afghanistan** since 2021 is a significant contributor.

(b) Updated UN Population Estimates

- Accounts for **13 million** of the increase (62%).
- The **2024 UN World Population Prospects** showed a **49 million (3.1%) increase** in the number of 6–17-year-olds.
- This increase in population naturally raises the total number of children out of school, especially when enrolment has not improved proportionally.

**How Population Updates Impact Estimates:**

- If enrolment data comes from **administrative sources** (like school records), the full increase in school-age population is added to the out-of-school estimate.
- If enrolment data comes from **household surveys**, the increased population is split between those in and out of school, depending on past trends.

## 3. Progress Towards SDG 4 and National Education Targets

**SDG 4 Objective:**

To "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2030.

- Countries committed to reducing the global out-of-school population by **165 million** by 2030.

**Projected Shortfall by 2025:**

- Countries are expected to fall **75 million short** of their national targets.

| Education Level | Estimated Shortfall |
|---|---|
| Primary & Lower Secondary | 4 percentage points |
| Upper Secondary | 6 percentage points |

- These gaps indicate that most countries are not on pace to achieve SDG 4 within the next five years.

## 4. Underestimated Impact of Conflicts and Emergencies

**Key Challenges:**

- Conflict zones often **lack reliable data** on education.
- The model assumes stable school progression, which does **not apply in crisis situations**.
- As a result, the true number of out-of-school children in conflict-affected areas is likely **higher** than reported.

## 5. Methodology of the GEM Report

- The figures are based on a **statistical model** that ensures consistency in trends across countries and regions.

**Data Sources Used:**

- **Administrative data** (e.g., from education ministries)
- **Survey data** (e.g., DHS, MICS)
- **Census data**

**Features of the Model:**

- Reconciles inconsistencies between data sources.
- Fills gaps where yearly data is missing.
- Makes short-term projections to estimate current numbers.

**Note:**

- These **are not the same** as official country-level statistics, which often rely on a single data source.
- However, the model provides a **more complete global picture** for policymaking and planning.

## 6. Broader Implications and Policy Recommendations

**Key Concerns:**

- A large number of out-of-school children means a **loss of human potential** and **slower development**.
- **Vulnerable groups** (girls, disabled children, refugees, and those in remote/conflict areas) are the most affected.
- **Inequality is widening**, and cycles of poverty are likely to continue.

**Recommendations:**

- **Increase education funding**, especially for marginalized groups.
- **Strengthen data systems**, particularly in fragile and conflict-affected areas.
- **Adopt inclusive policies** to remove barriers to education.
- **Implement emergency education responses** to maintain learning during crises.
- **Enhance global cooperation** to help high-burden countries meet their education goals.

**Conclusion**

The UNESCO GEM Report highlights a deepening global education crisis. With 272 million children and youth out of school and progress toward SDG 4 off track, urgent global action is required.

Focused investment, better data systems, inclusive policies, and strong international cooperation are essential to ensure that **every child has access to quality education** by 2030.

## India Breaks into Top 100 of SDG Index for the First Time



**Why in News?**

- **India has, for the first time**, secured a position among the top 100 countries in the Sustainable Development Goals (SDG) Index, ranking **99th out of 167 nations** in the **2025 edition** of the Sustainable Development Report (SDR).
- Released by the UN Sustainable Development Solutions Network on June 24, 2025.

**I. India's Performance in the SDG Index**

- **Historic Achievement:** This marks India's first entry into the top 100 of the global SDG Index.
- **Current Ranking and Score:** India is **ranked 99th with a score of 67 on the SDG Index in the 2025** report. A score of 100 indicates full achievement of all 17 SDGs.
- **Significant Improvement:** This is a substantial leap from its previous ranks:
  - 2024: 109th
  - 2023: 112th
  - 2022: 121st
  - 2021: 120th
  - The continuous improvement since the adoption of SDGs in 2015 reflects India's sustained efforts.
- **Comparison with Neighbors:**
  - **Bhutan**: 74th (70.5)
  - **Nepal**: 85th (68.6)
  - **Sri Lanka:** 93rd (maritime neighbor)
  - **Bangladesh**: 114th (63.9)
  - **Pakistan**: 140th (57)
  - **Maldives**: 53rd (maritime neighbor)
- **Areas of Progress:** The report noted that India has made notable gains in basic services and infrastructure, particularly in:
  - Mobile broadband access (SDG 9)
  - Electricity (SDG 7)
  - Internet usage (SDG 9)
  - Under-five mortality (SDG 3)
  - Neonatal mortality (SDG 3)

## II. About the Sustainable Development Goals (SDGs) Index and Report

- **SDG Index:** Measures overall progress toward achieving the **17 SDGs** adopted by United Nations member states in 2015.

- **Sustainable Development Report (SDR):**
  - Released annually by the **UN Sustainable Development Solutions Network (SDSN)**.
  - Authored by a team led by world-renowned economist **Jeffrey Sachs**.
  - The 2025 edition is the 10th and latest report.
  - Provides an independent assessment of countries' progress towards the SDGs.

- **The 17 SDGs:** A universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030.

- They cover a wide range of social and economic development issues including poverty, hunger, health, education, climate change, gender equality, water, sanitation, energy, environment, and social justice.

## III. Global Trends and Challenges

- **Stalled Global Progress:** Despite India's gains, the report flagged that global progress on the SDGs has largely stalled.

- Only **17% of the SDG targets are on track** to be achieved by 2030.

- **Reasons for Slowdown:** Attributed to "conflicts, structural vulnerabilities, and limited fiscal space" in many regions.

- **Regional Performance:**
  1. **Leading Region:** European nations continue to dominate the index, with **Finland, Sweden, and Denmark** holding the top three positions.
  2. 19 of the top 20 countries are located in Europe. However, even these nations face challenges related to climate change and biodiversity due to unsustainable consumption patterns.
  3. **Fastest Progress:** East and South Asia have shown the fastest regional progress since 2015, driven by rapid socioeconomic development. Countries registering the largest gains in SDG performance include Nepal (+11.1), Cambodia (+10), the Philippines (+8.6), Bangladesh (+8.3), and Mongolia (+7.7). Other notable improvers globally include Benin (+14.5), Peru (+8.7), UAE (+9.9), Uzbekistan (+12.1), Costa Rica (+7), and Saudi Arabia (+8.1).

- **Areas of Global Regression (since 2015):** The report identified five critical areas where significant regression has occurred:
  1. **Obesity rates (SDG 2: Zero Hunger)**
  2. **Press freedom (SDG 16: Peace, Justice, and Strong Institutions)**
  3. **Sustainable nitrogen management (SDG 2: Zero Hunger)**
  4. **Red List Index measuring biodiversity loss (SDG 15: Life on Land)**
  5. **Corruption Perceptions Index (SDG 16: Peace, Justice, and Strong Institutions)**

- **Commitment to Multilateralism:** Barbados, Jamaica, and Trinidad and Tobago were ranked highest in terms of commitment to multilateralism and the UN system.

- **G20 & OECD Leaders:** Among G20 economies, Brazil leads at 25th, while Chile is the top OECD performer at 7th.

- **United States:** The U.S., which has taken policy positions opposing the SDGs, ranked last (193rd) for the second consecutive year.

## IV. Call for Financial Architecture Reform

- **Context:** The report is released ahead of the **Fourth International Conference on Financing for Development (FfD4)**, to be held in Seville,

Spain, from June 30 to July 3, 2025.

- **Key Urgency:** It called for urgent reform of the global financial architecture.
- **Problem Statement:** The report argued that "money flows readily to rich countries and not to the emerging and developing economies (EMDEs) that offer higher growth potential."
- **Recommendation for FfD4:** The report urged that the FfD4 place Global Financial Architecture (GFA) reform "at the top of the agenda" to ensure more capital flows to EMDEs.

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## Economics

### World Wealth Report 2025

**Why in News**

The recently released **World Wealth Report 2025** indicates that India witnessed a significant **8.8% rise in high-net-worth individual (HNWI) wealth in 2024**. By the end of last year, India was home to **378,810 millionaires** with a combined wealth of **$1.5 trillion**.

**About World Wealth Report 2025**

- **Publisher:** The report is released by the **Capgemini Research Institute**.
- **Coverage:** It provides comprehensive insights into global wealth trends and high-net-worth individual statistics, covering **71 countries**. These countries collectively account for over 98% of global gross national income (GNI) and 99% of world stock market capitalization.

**Highlights of World Wealth Report 2025**

- **Global HNWI Population Growth:** The global high-net-worth individual (HNWI) population increased by **2.6% in 2024**.
- **Driver of Growth:** This increase was primarily driven by the growth in the population of **ultra-high-net-worth individuals (UHNWIs)**, which saw a **6.2% rise**. This surge was attributed to strong stock market performance and optimism surrounding Artificial Intelligence (AI), which boosted portfolio returns.
- **Definition of HNWI:** High-net-worth individuals (HNWIs) are defined as persons with **investable assets of $1 million or more**, excluding their primary residence, collectibles, consumables, and consumer durables.
- **HNWI Segmentation:** HNWIs are further categorized into three tiers based on their wealth:
  - **Ultra-HNWIs (UHNWIs):** Individuals with **$30 million or more** in investable assets.
  - **Mid-Tier Millionaires:** Individuals with **$5 million to $30 million** in investable assets.
  - **Millionaires Next Door:** Individuals with **$1 million to $5 million** in investable assets.
- **Alternative Investments:** The report highlights that alternative investments, such as **private equity and cryptocurrencies**, have become a well-established part of HNWI portfolios, representing **15% of their total holdings**.
- **Market Leaders (Individual Countries):**
  - The **U.S.** remained the clear leader, adding **562,000 millionaires**, with its HNWI population growing by 7.6% to reach 7.9 million.
  - The U.S. also dominates in the higher wealth tiers, being home to **36% of the world's centi-millionaires** (those with over $100 million) and **33% of the world's billionaires**.

- **Asia-Pacific Standouts:** In the Asia-Pacific region, **India and Japan** were notable performers, both registering a **5.6% growth** in their HNWI populations. Japan added 210,000 millionaires, while India added 20,000.
- **China's Decline:** In contrast, **China experienced negative growth**, with its HNWI population declining by 1.0%.
- **India's Specifics:**
  o India saw an **8.8% rise in HNWI wealth in 2024**, reaching a total of **$1.5 trillion**.
  o The country ended 2024 with **378,810 millionaires**.
  o A significant portion, **333,340 individuals**, fell into the "millionaires next door" category, collectively holding **$628.93 billion**.
  o India also saw **4,290 ultra-high-net-worth individuals (UHNWIs)** by the end of 2024, collectively possessing **$534.77 billion**.

## Algorithmic Trading

### ALGORITHMIC TRADING
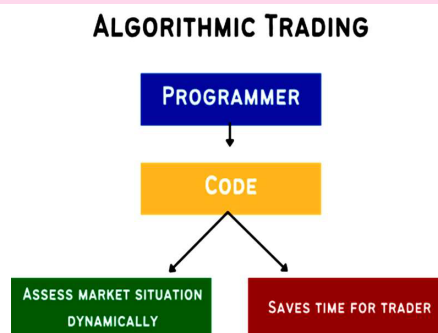


**Context:**
- The Securities and Exchange Board of India (SEBI) recently announced a **settlement scheme** for stockbrokers under regulatory scrutiny for collaborating with **unregulated algorithmic (algo) trading platforms**.
- This move by SEBI aims to streamline compliance and address past issues in the rapidly evolving landscape of algo trading.

**1. About Algorithmic Trading:**
- **Definition:** Algorithmic trading (also known as automated trading, black-box trading, or algo-

trading) is a method of executing financial trades using a **computer program that follows a defined set of instructions (an algorithm)**.
- **Mechanism:** It combines **computer programming and financial market knowledge** to execute trades at precise moments, often at speeds and frequencies impossible for human traders.
- **Instruction Basis:** The predefined instructions (algorithms) are based on various parameters such as:
  o **Timing:** Executing trades at specific times or intervals.
  o **Price:** Placing orders when a certain price level is reached.
  o **Quantity:** Trading specific volumes of shares or contracts.
  o **Mathematical Models:** Utilizing complex mathematical formulas, technical indicators (e.g., moving averages, RSI), or statistical arbitrage strategies.
  o **Market Data:** Reacting to real-time market data like bid-ask spreads, order book depth, or news events.
- **Prevalence in India:** Algo trading is already widely used in India by both **institutional investors (e.g., hedge funds, mutual funds)** and, increasingly, **retail investors**.
- **Benefits (Potential):**
  o **Speed and Efficiency:** Executes trades in milliseconds, capitalizing on fleeting market opportunities.
  o **Reduced Emotional Bias:** Eliminates human emotions (fear, greed) from trading decisions, leading to more disciplined and consistent execution.
  o **Accuracy and Reduced Errors:** Minimizes manual errors in order placement.
  o **Backtesting:** Allows strategies to be tested against historical data to

evaluate potential performance and refine parameters before live deployment.

- o **Liquidity and Systematic Trading:** Can contribute to increased market liquidity and makes trading more systematic.
- o **Simultaneous Operations:** Can monitor multiple markets and execute numerous trades across different asset classes concurrently.
- o **Lower Transaction Costs:** Can reduce operational costs due to automation.
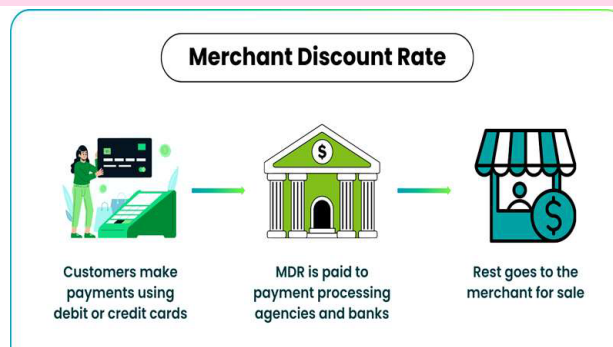
## 2. Black Swan Events:

- **Definition:** Black Swan Events are **rare, unpredictable, and high-impact occurrences** that fall outside the realm of normal expectations. They have severe consequences, particularly for financial markets and investments.
- **Characteristics (as per Nassim Nicholas Taleb):**
  - o **Rarity:** So rare that the possibility of its occurrence is unknown or considered highly improbable.
  - o **Extreme Impact:** Causes catastrophic damage or significant disruption when it does occur.
  - o **Hindsight Rationalization:** After the event, people often falsely claim it was predictable or "obvious in hindsight."
- **Relevance to Algorithmic Trading:** Algorithmic trading relies heavily on historical data and mathematical models to predict future market movements. However, Black Swan Events, by their very nature, are not captured in historical data and cannot be predicted by standard models. This can lead to **significant losses for algorithmic traders** during such unforeseen market disruptions, as their algorithms might not be programmed to handle or react appropriately to unprecedented conditions.
- **Examples:** The 2008 global financial crisis, the COVID-19 pandemic, and the 9/11 terrorist attacks are often cited as Black Swan Events.

## 3. SEBI Regulations and Latest Developments:

- **Growing Regulatory Scrutiny:** With the increasing adoption of algo trading, especially by retail investors, market regulators like SEBI are increasing their oversight to ensure market integrity, investor protection, and systematic risk management.
- **SEBI's New Regulations (2025 - Key Highlights):** SEBI has introduced comprehensive regulations to govern algorithmic trading in India, including:
  - o **Mandatory Exchange Approval:** All algorithmic strategies, regardless of complexity, require prior approval from stock exchanges before going live.
  - o **Unique Algo ID Tagging:** Each algorithm is assigned a unique identifier (Algo ID) that must be attached to every order it places, ensuring accountability and traceability.
  - o **Classification:** Algos are often classified into "White Box" (transparent, rule-based logic) and "Black Box" (proprietary, less disclosed logic). Providers of Black Box algorithms may be required to register as research analysts and disclose their models.
  - o **Broker Responsibility and Oversight:** Brokers are mandated to:
    * Approve and register client strategies.
    * Ensure only exchange-approved algorithms are used.
    * Track and log API usage and activity per client.
    * Maintain complete audit trails of all orders.
    * Implement real-time risk controls.
  - o **Deployment via Broker Infrastructure:** Algorithms can only be deployed and hosted through the broker's own infrastructure, prohibiting direct, unregulated third-party access to trading systems. This ensures end-to-end control and accountability.

- o **Risk Mitigation Controls:** Mandatory risk controls include:
  - \* **Order throttle limits:** Limiting the number of orders per second.
  - \* **Kill Switch:** An emergency mechanism that allows brokers or exchanges to instantly disable a malfunctioning or erratic algorithm to prevent market disruption.
  - \* **Two-Factor Authentication (2FA)** and whitelisted IP addresses for API access to enhance security.
- o **Self-Developed Algorithms:** Retail traders can use self-developed algorithms for personal or family trading, but sharing or selling them publicly without SEBI clearance is restricted, and certain frequency thresholds might trigger registration requirements.

- • **Settlement Scheme (Current News):**
  - o **Purpose:** SEBI introduced a "Settlement Scheme for Association with Certain Algo Platforms, 2025" to provide an opportunity for stockbrokers to resolve regulatory proceedings pending against them for past associations with unregulated algo platforms.
  - o **Mechanism:** Under this scheme (operational from June 16 to September 16, 2025), eligible brokers can pay a settlement amount (reportedly around ₹ 1 lakh per case) and seek an expeditious conclusion of pending cases before adjudicating officers, SAT, or courts.
  - o **Rationale:** Aims to provide relief to brokers and reduce the regulatory burden, while encouraging compliance with the updated norms. Brokers not opting for the scheme will face continued regulatory proceedings as per existing laws.

## Merchant Discount Rate (MDR)



**Merchant Discount Rate**

Customers make payments using debit or credit cards | MDR is paid to payment processing agencies and banks | Rest goes to the merchant for sale

**Context:** The Finance Ministry recently issued a strong clarification, dismissing "completely false, baseless, and misleading" speculation and claims that the **Merchant Discount Rate (MDR)** would be charged on **UPI (Unified Payments Interface) transactions**. This reiterates the government's commitment to promoting free digital payments via UPI.

**1. About Merchant Discount Rate (MDR):**

- • **Definition:** MDR is a **fee that merchants (businesses) must pay to a payment processing company** (typically a bank or payment service provider) for accepting payments from customers via digital modes.
- • **Applicability:** Traditionally, it applies to payments made using **credit cards, debit cards**, and historically, it was also applicable to UPI and other digital modes before specific government interventions in India.
- • **Compensation:** MDR compensates various stakeholders involved in the digital payment ecosystem for their services:
  - o The **bank issuing the card** (issuing bank/customer's bank).
  - o The **bank that installs the PoS (Point of Sale) terminal** or facilitates the online payment (acquiring bank/ merchant's bank).
  - o **Payment network providers** (e.g., Visa, Mastercard, RuPay).
  - o **Payment gateways** and other technology providers.
- • **Components of MDR:** MDR is not a single fee but a bundle of charges, which typically include:

- o **Interchange Fee:** The largest portion, paid by the acquiring bank to the issuing bank for processing the transaction and covering aspects like fraud risk and card rewards.
- o **Acquirer's Fee/Processing Charges:** Charged by the acquiring bank or payment processor for its services in processing the payment.
- o **Card Network Fee/Assessment Fee:** A small fee paid to the card network (Visa, Mastercard, RuPay) for using their infrastructure.
- o **Payment Gateway Fee:** If a separate payment gateway is involved (especially for online transactions).
- o **GST:** Applicable Goods and Services Tax on the sum of the above fees.
- **Structure:** The MDR typically comes in the form of a **percentage of the transaction amount**. It is commonly between 1% and 3% for credit/debit card transactions, though it can vary.
- **Variable Rates:** The exact rates depend on several factors:
  - o The **type of digital transaction** (e.g., credit card, debit card, specific wallet).
  - o The **type of card** used by customers (debit or credit, premium vs. standard).
  - o The **level/volume of business transactions** being processed by the merchant.
  - o The **value of the average transaction** (also known as average tickets or average sales).
  - o The **industry/Merchant Category Code (MCC)** of the business.
- **Merchant Agreement:** Before accepting digital payments, merchants must set up this service with a payment processor and **agree to the MDR rate**.
- **Cost for Merchants:** Merchants must consider these fees as part of managing their **business costs** and factor them into their pricing strategies. MDR charges are **automatically deducted** from the merchant's account at the time of settling the transaction batch.
- **RBI Rules:** Under the rules laid down by the Reserve Bank of India (RBI), business owners are **generally not allowed to pass on the MDR charges directly to their customers** (i.e., by adding a surcharge at the point of sale). This is to encourage digital payment adoption.

## 2. Recent Controversy and Finance Ministry's Stand on UPI MDR:

- **Zero MDR Policy on UPI (India):** To boost digital payments, particularly UPI and RuPay debit card transactions, the Indian government implemented a **"zero MDR" policy effective January 1, 2020**. This means that merchants are not charged any MDR fee for accepting payments via UPI or RuPay debit cards.
- **Industry Concerns:** Payment service providers and banks have periodically raised concerns about the financial sustainability of operating the UPI infrastructure without an MDR, despite government incentives (like the ₹ 1,500 crore allocation) to offset some operational costs.
- **Recent Speculation:** Speculation arose that the government was considering re-introducing MDR on certain UPI transactions (e.g., large-ticket transactions above ₹ 3,000) to support the digital payment ecosystem.
- **Finance Ministry's Clarification:** The Ministry of Finance categorically denied these claims, stating they are "completely false, baseless, and misleading." The Ministry reaffirmed the government's commitment to promoting digital payments via UPI **without burdening citizens or merchants** with such charges, emphasizing UPI's role in financial inclusion.
- **Significance:** The government's firm stance aims to reassure the public and small businesses that UPI will remain a free and accessible digital payment method, which is crucial for its continued exponential growth and widespread adoption across India.

# Special Economic Zones (SEZs)



**SPECIAL ECONOMIC ZONE (SEZ)**
Need of SEZs

**Context:** The Indian government recently eased some rules related to **Special Economic Zones (SEZs)**. These changes are designed to encourage the domestic manufacture of **semiconductors and electronics**, aiming to boost production in these key sectors.

## 1. About Special Economic Zones (SEZs):

- **Definition:** SEZs are specific areas within a country where business and trade laws are different from the rest of the country. They are designed to offer special benefits to businesses operating within them.

- **Purpose:** The main goals of SEZs are:
    o To generate more economic activity.
    o To promote the export of goods and services from the country.
    o To attract both foreign and domestic investment.
    o To create more job opportunities.
    o To develop better infrastructure facilities.

- **Benefits Offered:** SEZs typically provide competitive infrastructure, duty-free exports, tax incentives, and other measures to make it easier to conduct business.

- **Types of Zones:** The term 'SEZ' covers various types of zones, including:
    o Free Zones (FZs)
    o Industrial Estates (IEs)
    o Free Ports
    o Free Trade Zones (FTZs)
    o Export Processing Zones (EPZs)

## 2. SEZs in India:

- **History:**
    o Asia's first **Export Processing Zone (EPZ)** was established in **Kandla, Gujarat, in 1965**. Seven more EPZs were set up later.
    o The **SEZ policy** was introduced in **April 2000**. Its aim was to make SEZs a driver for economic growth, supported by good infrastructure and attractive incentives from both central and state governments.
    o The eight existing EPZs (at Kandla, Surat, Mumbai, Cochin, Chennai, Visakhapatnam, Falta, and Noida) were converted into SEZs under this policy.
    o The comprehensive **SEZ Act, 2005**, was passed by the Indian Parliament in May 2005. This Act, along with the SEZ Rules, became effective on **February 10, 2006**, providing a stable legal framework for SEZs.

- **Current Status:** As of **March 31, 2024**, there are **280 operational SEZs in India**.

## 3. Key Rules and Incentives for SEZs in India (General):

- **Customs Status:** A designated SEZ is treated as a territory outside the customs jurisdiction of India for authorized operations within it. This means separate customs procedures apply.

- **Duty-Free Benefits:**
    o Duty-free import and domestic purchase of goods are allowed for the development, operation, and maintenance of the SEZ unit.
    o Exemption from Goods and Service Tax (GST) and state government levies (supplies to SEZs are "zero-rated" under the IGST Act, 2017, meaning they are not taxed, and input tax credit can be claimed).
    o SEZ Developers/Co-Developers and Units receive direct and indirect tax benefits as per the SEZ Act, 2005.

- **Import/Export:**
  - No import license is required.
  - Routine inspections of export/import cargo by customs authorities are generally not required.
- **Income Tax Exemption (for SEZ units):**
  - **100% income tax exemption** on export income for the first five years.
  - **50% exemption** for the next five years.
  - **50% of the ploughed-back export profit** for the subsequent five years (under Section 10AA of the Income Tax Act).
- **Manufacturing and Services:** Both manufacturing and service activities are allowed within SEZs.
- **Net Foreign Exchange (NFE):** Units within the SEZ must show "Positive Net Foreign Exchange" over a cumulative period of five years from the start of production. This means the value of their exports must exceed the value of their imports.
- **Domestic Sales:** Goods sold from SEZs into the domestic market (Domestic Tariff Area - DTA) are subject to full customs duty and adhere to the current import policy, similar to imported goods.
- **Minimum Alternate Tax (MAT):** SEZ units are required to pay Minimum Alternate Tax (MAT).
- **Ease of Business:**
  - **Single window clearances** for all state and central government approvals.
  - SEZ units have the freedom to engage in subcontracting.

**4. Recent Rule Relaxations for Semiconductor and Electronics Manufacturing SEZs (Announced June 9, 2025):**

The government made these amendments to specifically promote the highly capital-intensive and import-dependent semiconductor and electronics component manufacturing sectors, which often have longer periods before becoming profitable.

- **Reduced Land Requirement (Amendment to Rule 5 of SEZ Rules, 2006):**
  - The minimum land requirement for SEZs exclusively for semiconductors or electronic components has been reduced from **50 hectares to 10 hectares**. This aims to facilitate smaller, specialized investments.
- **Allowed Domestic Sales (Amendment to Rule 18):**
  - SEZ units in these specific sectors (semiconductors and electronic components) are now allowed to sell their products in the **domestic market**, subject to payment of applicable duties. Previously, SEZ units were primarily export-oriented. This change helps these units cater to India's growing domestic demand for electronics.
- **Relaxation of Encumbrance-Free Land Rule (Amendment to Rule 7):**
  - The **SEZ Board of Approval** is now empowered to waive the requirement for land to be **encumbrance-free** (i.e., free of mortgages or legal claims) in certain cases.
  - This applies specifically when the land is mortgaged or leased to central or state governments or their authorized agencies. This offers greater flexibility in land acquisition and development, addressing a long-standing bottleneck.

## SCORES Portal
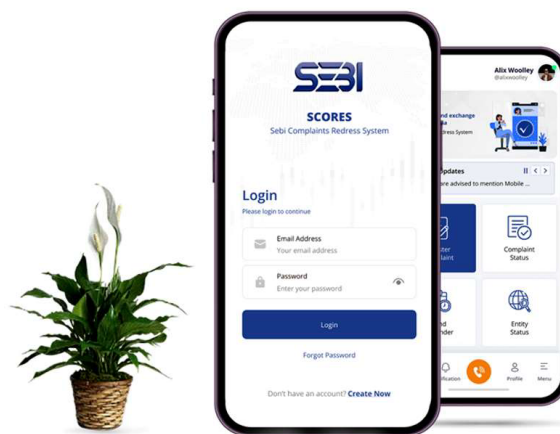
**Context:**

The capital markets regulator, SEBI (Securities and Exchange Board of India), recently resolved **4,493 investor complaints** through its online grievance redressal platform, **SCORES**, in the last month. This highlights the platform's role in addressing investor grievances in the Indian securities market.

**1. About SCORES Portal:**

- **Full Form:** SCORES stands for the **SEBI Complaints Redress System**.
- **Launch:** It is an online platform launched by SEBI in **2011**.
- **Purpose:** Its main purpose is to enable investors to **file and track complaints** against listed companies and market intermediaries registered with SEBI. This includes stockbrokers, mutual funds, merchant bankers, etc.
- **Objective:** To provide a simple, accessible, and efficient mechanism for investors to get their grievances addressed in the securities market, thereby enhancing investor confidence and market integrity.
- **Accessibility:**
  - o Investors can file complaints directly through the SCORES web portal or its mobile app.
  - o For investors not familiar with the online system or without internet access, complaints can still be lodged in physical form at any of SEBI's offices. These physical complaints are then scanned and uploaded to SCORES for processing.

**2. How SCORES (SCORES 2.0) Works:**

The system has been upgraded to **SCORES 2.0** to improve efficiency and timeliness:

- **Complaint Filing:** Investors register on the portal (often linked with PAN and mobile OTP) and then submit their complaints, providing details and attaching supporting documents.
- **Auto-Routing:** Once a complaint is filed, it is **automatically directed to the concerned listed company or SEBI-registered market intermediary** against whom the complaint is made. This minimizes manual intervention and speeds up the initial processing.
- **Action Taken Report (ATR) - First Level Resolution:**
  - o The concerned entity is **mandated to respond with an Action Taken Report (ATR)** within **21 calendar days** of receiving the complaint.
  - o The ATR details the steps taken to resolve the grievance.
- **First Level Review by Investor:**
  - o If the investor is **dissatisfied with the entity's response (ATR)**, they may seek a **First Level Review** within **15 calendar days** from the date of receiving the ATR.
  - o During this review period, even if an ATR has been submitted, the complaint remains classified as "pending" until the investor confirms satisfaction or the review period expires.
- **Second Level Review by SEBI:**
  - o If the grievance remains unresolved after the First Level Review (i.e., the investor is still not satisfied or no response was received), investors have the option to **escalate the matter to SEBI for a Second Level Review**.
  - o SEBI then intervenes to further investigate and facilitate resolution.
- **Online Dispute Resolution (ODR):**
  - o For certain types of complaints, if the grievance remains unresolved even after the SCORES process, investors have the option to pursue resolution through the **Online Dispute Resolution (ODR) mechanism** (which is linked with SCORES). This involves conciliation and potentially arbitration, aiming for out-of-court settlements.
  - o If the investor opts for ODR, the complaint on SCORES may be closed as being referred to another mechanism.

- **Monitoring and Enforcement:** SCORES enables market intermediaries and listed companies to receive, address, and report redressal of complaints online. SEBI closely monitors the progress of complaints. Non-compliance by entities in resolving complaints within stipulated timelines can lead to penalties.

**3. Significance of SCORES Portal:**

- **Investor Protection:** It serves as a crucial tool for protecting the interests of investors in the Indian securities market by providing an official and monitored channel for grievance redressal.
- **Transparency and Accountability:** The online system brings transparency to the complaint resolution process and holds listed entities and intermediaries accountable for addressing investor concerns promptly.
- **Efficiency and Timeliness:** SCORES 2.0, with its automated routing and reduced timelines, aims to expedite the resolution of investor grievances.
- **Accessibility:** The online platform and mobile app make it easy for investors from anywhere in India to lodge and track their complaints.
- **Data Collection:** It provides SEBI with a centralized database of investor complaints, which helps in identifying systemic issues, market misconduct, and areas requiring regulatory intervention.
- **Digital Initiative:** It is a key digital initiative by SEBI to leverage technology for better governance and investor service in the financial markets.

## Reverse Flipping



**Context:**

The Securities and Exchange Board of India (SEBI) recently announced a series of measures aimed at easing compliance burdens in the stock market ecosystem. A key objective of these reforms is to encourage more companies, particularly startups, to list on Indian stock exchanges after "reverse flipping" back to India. These measures also seek to facilitate greater foreign fund flows into government bonds.

**1. What is Flipping?**

- **Definition:** Flipping, also known as **'externalized structure,'** refers to a corporate strategy where an Indian entity (company, especially a startup) transfers its entire ownership and key assets (such as intellectual property, patents, trademarks) to an entity that is **incorporated abroad**.
- **Operational Reality:** Despite this transfer of legal domicile, the majority of the company's market, personnel, and founders remain in India, and its day-to-day operations continue in India. The Indian company effectively becomes a wholly-owned subsidiary of the foreign parent company.
- **Reasons for Flipping (Historical Trend for Indian Startups):**
  - **Taxation Benefits:** Many foreign countries offer more favorable tax regimes (e.g., lower corporate taxes, capital gains tax exemptions) compared to India. Common destinations included Singapore, the UAE, the Cayman Islands, the United Kingdom, and the United States (Delaware).
  - **Access to Capital Markets:** Historically, international markets (like NASDAQ in the US or SGX in Singapore) offered deeper pools of capital, higher valuations, and easier access to global venture capital funds and institutional investors.
  - **Higher Valuations:** International investors sometimes provided higher

valuations to companies domiciled in certain foreign jurisdictions.

- o **Branding and Global Reach:** An overseas domicile was sometimes perceived to enhance a company's global brand image and reach, attracting international talent and customers.
- o **Protective Intellectual Property (IP) Environment:** Some foreign jurisdictions were perceived to have more robust or predictable intellectual property protection laws.
- o **Ease of Doing Business:** Earlier, some foreign jurisdictions offered simpler regulatory frameworks and fewer compliance hurdles.

## 2. About Reverse Flipping:

- **Definition**: Reverse flipping, also termed 'internalization' or 'ghar-wapsi' (homecoming), is the practice where a startup or company that previously flipped its domicile to a foreign entity **shifts its legal and operational base back to** India.
- **Primary Reason for Reverse Flipping:** The most significant driver for startups to reverse flip is the potential to **get listed on Indian stock exchanges**. This allows them to attract interested domestic retail investors and leverage India's deepening capital markets for public offerings.
- **Other Reasons for Reverse Flipping to India:**
  - o **Robust Economic Policies:** India's stable and favorable economic policies are making the domestic market more attractive.
  - o **Expanding Local Market:** India's massive and growing consumer base provides significant market opportunities.
  - o **Growing Investor Confidence:** There is increasing confidence among both domestic and international investors in

India's startup ecosystem and public markets. Indian venture capital and private equity firms are increasingly preferring investments in Indian-domiciled companies.

- o **Improved Regulatory Environment:** The Indian government and regulators (like SEBI and RBI) have been actively working to streamline regulatory compliances, simplify legal pathways, and make it easier for companies to operate and raise capital in India. This includes easing cross-border merger processes and addressing issues like the "angel tax."
- o **Better Valuations in Indian Market:** Indian markets are now offering competitive valuations, making domestic listings more appealing.
- o **Reduced Compliance Costs:** Navigating multiple global regulatory structures can be complex and costly. Operating under a single, increasingly transparent Indian framework can be more cost-efficient.
- o **Talent Pool:** India offers a vast and growing talent pool, especially in tech and startup sectors.
- **Structures for Executing a Reverse Flip:**
  - o The appropriate structure for a reverse flip depends on factors like the size, current location, and nature of the firm. Choosing the right structure is critical due to its impact on legal, regulatory, and tax considerations.
  - o Two commonly used structures are:
    - * **'Inbound Merger':** The foreign parent company merges with its Indian subsidiary, resulting in the Indian entity becoming the main operating and holding company. This process has been simplified by recent regulatory changes.

**\* 'Share Swap Arrangement':** Shareholders of the foreign holding company exchange their shares for shares in the Indian company. This can trigger capital gains tax implications in India.

**3. SEBI's Role in Encouraging Reverse Flipping:**

- SEBI's recent measures specifically aim to remove roadblocks for companies considering reverse flipping and subsequent listing in India.

- **Key Changes (as of June 2025):**

  o **Relaxation for ESOPs (Employee Stock Options) for Founders:** SEBI has allowed startup founders (classified as promoters) to retain and exercise ESOPs even after filing for an Initial Public Offering (IPO), provided these ESOPs were granted at least one year before the Draft Red Herring Prospectus (DRHP) filing. This addresses a major pain point for founders who rely on ESOPs as deferred compensation.

  o **Easier Exit for Investors Holding Compulsorily Convertible Securities (CCS):** The mandatory one-year lock-in period for shares received from the conversion of Compulsorily Convertible Securities (CCS) has been scrapped. This improves liquidity and exit visibility for early investors, particularly those in companies that reverse-flip.

  o **Inclusion of Certain Institutional Investors in Promoter Contribution:** Shares held by venture capital funds, Alternative Investment Funds (AIFs), and public financial institutions can now be counted towards the minimum promoter contribution required for an IPO.

- **Impact:** These measures reduce the perceived regulatory risks and complexities associated with reverse flipping and listing in India, making India a more competitive and attractive venue for startups to domicile and go public. This is expected to fuel a "ghar-wapsi" trend and strengthen India's position as a global startup hub.

## FASTag Annual Pass Scheme



**Context:**

The Union Minister of Road Transport and Highways recently announced a significant initiative: a **FASTag-based annual pass priced at ₹ 3,000 for "hassle-free highway travel."** This new scheme, set to launch on **August 15, 2025**, aims to simplify toll payments for frequent private vehicle users on National Highways and Expressways.

**1. About FASTag:**

- **Electronic Toll Collection System:** FASTag is an electronic toll collection system that uses Radio Frequency Identification (RFID) technology.

- **Management:** It is jointly managed by the **National Payments Corporation of India (NPCI)**, which developed the National Electronic Toll Collection (NETC) program, and the **National Highways Authority of India (NHAI)**, the primary implementing agency.

- **Launch & Mandate:**

  o Launched as a pilot project in **2014**.

  o Made **mandatory** for all four-wheelers at every toll plaza on National Highways across the country from **January 1, 2021**.

- **Functionality:** A FASTag sticker is affixed to the vehicle's windscreen. When the vehicle passes through a FASTag-enabled toll plaza, the RFID reader scans the tag, and the applicable toll amount is automatically deducted from the linked prepaid wallet or bank account, allowing for near non-stop movement.

**2. About the FASTag Annual Pass Scheme:**

- **Objective:** The new annual pass scheme is designed to provide **cost-effective and seamless travel** for frequent private vehicle users on National Highways (NH) and National Expressways (NE) by eliminating per-trip toll charges within defined limits.
- **Eligibility:**
  - It is applicable **only for private, non-commercial vehicles** such as **cars, jeeps, and vans**.
  - Commercial or goods vehicles are **not eligible**.
  - The vehicle must have an **active FASTag properly affixed** to its windshield and linked to a **valid Vehicle Registration Number (VRN)**. The FASTag should not be blacklisted or under dispute.
- **Cost:** The annual pass costs a one-time payment of ₹ **3,000** (for the base year 2025–26).
- **Validity:**
  - The pass is valid for **one year from the date of activation OR for 200 trips**, whichever comes first.
  - Once either the 200-trip limit is exhausted or one year from activation has passed, the FASTag will automatically revert to a regular pay-per-trip FASTag.
  - The user has the option to **re-purchase the Annual Pass** even if the one-year validity period has not ended, provided the 200-trip limit has been exhausted.
- **Non-Transferable:** The pass is strictly **non-transferable** and is valid only for the specific vehicle on which the FASTag is affixed and registered.

- **Coverage:** It is valid **only at National Highway and National Expressway fee plazas** operated by NHAI. It does *not* apply to state highways, private-run toll roads, or expressways managed by state governments or local authorities.
- **Trip Counting:**
  - For **point-based (open) toll plazas**, each crossing of the fee plaza (one-way) is counted as **one trip**. A round trip (to and fro) will be counted as two trips.
  - For **closed tolling fee plazas** (where tolls are based on distance traveled), one pair of entry and exit will be counted as **one trip**.
- **Activation Process (Expected from August 15, 2025):**
  - Users will need to verify the eligibility of their vehicle and the associated FASTag.
  - Upon successful verification, the payment of ₹ 3,000 can be made through the **Rajmargyatra mobile application** or the official **NHAI website** or Ministry of Road Transport and Highways (MoRTH) portals.
  - The pass is expected to be activated within a few hours of successful payment and verification.

**3. Benefits of the FASTag Annual Pass Scheme:**

- **Cost Savings:** Expected to offer significant cost savings (potentially thousands of rupees annually) for frequent commuters compared to paying per-trip tolls or current monthly passes (which are typically for a limited radius around a single plaza).
- **Hassle-Free Travel:** Enables seamless, near non-stop movement through toll plazas, reducing queues and eliminating the need for frequent recharges or cash payments.
- **Reduced Congestion:** By encouraging more digital toll payments, it aims to reduce traffic congestion at toll plazas.

- **Enhanced Convenience:** Simplifies financial management for frequent travelers with a single annual payment.
- **Digitalization Push:** Aligns with the government's broader vision of promoting digital transactions and modernizing India's highway infrastructure.

## Net Interest Margin (NIM)



**Context:** State-run lender **Indian Overseas Bank (IOB)** has recently announced measures to mitigate the impact on its **Net Interest Margin (NIM)** following a recent **repo rate cut** by the Reserve Bank of India (RBI). This highlights how central bank monetary policy directly affects bank profitability.

**1. About Net Interest Margin (NIM):**

- **Definition:** NIM is a crucial **financial metric** used to measure the **profitability of a bank or financial institution's core lending activities**. It essentially indicates how efficiently a bank generates income from its interest-earning assets relative to the cost it incurs on its interest-bearing liabilities.
- **Components:**
    - **Interest Income:** The revenue earned by the bank from interest on its **assets** that generate interest. These typically include loans (to individuals, businesses), mortgages, investment securities (like government bonds), and other interest-bearing financial instruments.
    - **Interest Expense:** The cost incurred by the bank from paying interest on its **liabilities** that bear interest. These

primarily include customer deposits (savings accounts, fixed deposits), borrowings from other banks or the central bank, and other interest-bearing funds.
    - **Average Earning Assets:** The average value of the bank's assets that actively generate interest income over a specific period (e.g., a quarter or a year). This denominator allows for a standardized comparison of profitability across different periods or institutions, regardless of their absolute size.
- **Interpretation:**
    - A **positive NIM** signifies that the bank is operating profitably in its core lending and borrowing activities, earning more interest than it pays out.
    - A **negative NIM** implies investment inefficiency, meaning the bank is paying more interest on its liabilities than it is earning from its assets. This is generally an unsustainable situation for a bank.
- **Significance for Investors:** NIM is a key indicator for prospective investors to assess the financial health and operational efficiency of a financial services firm, helping them decide whether or not to invest. A higher NIM generally suggests better profitability and effective management of interest rate risk.

**2. Calculation of NIM:**

- The formula for calculating Net Interest Margin is:
- NIM=Average Earning AssetsInterest Income Interest Expense

**3. Factors Affecting Net Interest Margin:**

NIM is influenced by a multitude of internal and external factors:

- **Interest Rate Environment:** This is a major factor.
    - **Rising interest rates:** Can increase a bank's interest income (on new loans

or floating-rate loans) faster than its interest expense (on deposits, which may reprice slower), potentially leading to a higher NIM.

- **Falling interest rates (like a repo rate cut):** Can compress NIM if the interest earned on assets falls faster than the interest paid on liabilities. This is because banks' lending rates are often more quickly linked to policy rates than their deposit rates.

- **Asset and Liability Composition (Mix of Business):**
  - **High-yielding assets:** Banks with a higher proportion of assets that command higher interest rates (e.g., unsecured personal loans, credit cards, or long-term fixed-rate loans during a rising rate cycle) tend to have a higher NIM.
  - **Low-cost liabilities:** Banks that can attract a larger share of low-cost deposits (like Current Account Savings Account - CASA deposits) will have lower interest expenses, thereby improving NIM.

- **Credit Risk:**
  - Higher credit risk in the loan portfolio often leads to banks charging higher interest rates (risk premium) on those loans, which can initially increase interest income and NIM.
  - However, it also increases the risk of **loan defaults and non-performing assets (NPAs)**, which can negatively impact NIM in the long run as interest income on such assets is often not recognized.

- **Operational Efficiency:** Efficient management of operational costs, effective cost-to-income ratios, and prudent interest rate risk management (Asset-Liability Management - ALM) can positively influence NIM by minimizing non-interest expenses and optimizing interest-earning activities.

- **Competition:** Intense competition within the banking sector can limit the ability of banks to charge higher interest rates on loans or force them to offer higher interest rates on deposits to attract funds, potentially compressing NIM.

- **Regulatory Environment:** Regulatory changes, such as those affecting capital requirements, liquidity norms, provisioning rules, or direct controls on lending/deposit rates, can significantly impact a bank's ability to manage its NIM.

- **Economic Growth:** In periods of strong economic growth, credit demand is usually high, allowing banks to lend more and potentially at better rates. Conversely, a slowdown can reduce credit demand and increase defaults, impacting NIM.

**4. Gross Interest Margin (GIM):**

- **Definition:** GIM measures the **absolute difference** between the total interest income generated by a bank's earning assets and the total interest expense incurred on its interest-bearing liabilities.

- **Key Distinction from NIM:** Unlike NIM, GIM **does not consider the relative size of earning assets**. It is a raw, absolute figure (e.g., in rupees or dollars) rather than a percentage.

- **Formula:** GIM = Interest Income Interest Expense.

- **Usefulness:** GIM provides a straightforward measure of the total net profit from interest-related activities but is less useful for comparing the efficiency or profitability of banks of different sizes. NIM is preferred for comparative analysis as it standardizes the metric by relating it to the asset base.

**5. Impact of RBI Repo Rate Cut on NIM (and IOB's Response):**

- **Repo Rate Cut Implications:** When the RBI cuts the repo rate (the rate at which commercial banks borrow money from the RBI), it generally leads to:

- o **Lower lending rates:** Banks tend to reduce their lending rates (e.g., for home loans, auto loans, corporate loans) to pass on the benefit to borrowers and stimulate credit growth. This directly impacts their interest income.
- o **Potential pressure on deposit rates:** While deposit rates may not fall immediately or as sharply as lending rates due to competition for funds, there is often a downward pressure on them.
- **Impact on NIM:** If a bank's lending rates (yielding interest income) fall faster than its deposit rates (incurring interest expense), its NIM will likely experience **compression (reduction)**. This is a common challenge for banks in a declining interest rate environment.
- **IOB's Strategy:** To "offset the impact on NIM from the repo rate cut," IOB would likely be taking steps such as:
  - o **Optimizing asset mix:** Shifting towards higher-yielding loan categories while managing risk.
  - o **Focusing on low-cost deposits (CASA):** Aggressively attracting more current and savings account deposits to lower their overall cost of funds.
  - o **Prudent liability management:** Actively managing the repricing of their various liabilities to ensure interest expenses decline sufficiently.
  - o **Improving operational efficiency:** Reducing non-interest expenses to indirectly support overall profitability even if NIM faces pressure.
  - o **Growth in non-interest income:** Increasing income from fees, commissions, and other services to diversify revenue streams.
  - o **Asset Quality Management:** Reducing Non-Performing Assets (NPAs) to ensure maximum interest realization from loans.

## EDITORIALS

### Crux of The Hindu & Indian Express

### EConomics

## India Post Payments Bank (IPPB)

**1. Latest News & Significance**

- **Digital Payments Award 2024-25:** Recently conferred the prestigious Digital Payments Award 2024-25 by the Department of Financial Services (DFS), Ministry of Finance.
- **Significance:** This award highlights IPPB's crucial role in promoting digital financial services and its efforts in bridging the urban-rural divide in banking, contributing to the Government's vision of a cash-light, digitally empowered economy.

**2. About India Post Payments Bank (IPPB)**

- **Ownership:** 100% Government of India-owned entity.
- **Parent Ministry:** Operates under the Department of Posts, Ministry of Communications.
- **Launch Date:** September 1, 2018.
- **Vision:** To build the **most accessible, affordable, and trusted bank for the common man in India.**
- **Mandate:** To remove barriers for the **unbanked and underbanked** populations and achieve **last-mile connectivity** by leveraging the extensive Postal network.
- **Network Reach:**
  - o Comprises approximately 1,65,000 Post Offices (around 140,000 in rural areas) acting as banking access points.

- o Leverages approximately 3,00,000 postal employees (postmen and Gramin Dak Sevaks) to provide doorstep banking services.
- **Operating Model:** Built on the pillars of **India Stack** (Aadhaar, UPI, etc.) enabling Paperless, Cashless, and Presence-less banking. Services are delivered at the customer's doorstep using CBS-integrated smartphones and biometric devices.

## 3. Functions and Services of IPPB

- **Scope of Operations:** Operates on a smaller scale compared to traditional commercial banks.
- **Restrictions: Does not advance loans or issue credit cards** to avoid risk.
- **Key Services Offered:**
  - o **Deposits:** Accepts deposits up to ₹ 2 lakh. Beyond this limit, the account is automatically converted into a Post Office Savings Account (POSA).
  - o **Remittance Services:** Facilitates instant money transfers (IMPS, NEFT, UPI).
  - o **Payments:** Mobile payments, bill payments (utility bills, DTH/mobile recharges, EMIs), third-party fund transfers.
  - o **Cards:** Issues ATM/debit cards (RuPay debit card).
  - o **Other Banking Services:** Net banking, mobile banking apps.
  - o **Direct Benefit Transfer (DBT):** Enables direct disbursement of government welfare schemes and subsidies, reducing leakages and ensuring efficient delivery of benefits.
  - o **Aadhaar-Enabled Services:** Uses Aadhaar for account opening and QR card/biometrics for authentication, transactions, and payments.
  - o **Doorstep Banking:** Provides banking services at the customer's doorstep through postmen/Gramin Dak Sevaks.

- o **POSA Linkage:** Allows seamless sweep-in/out of funds between IPPB accounts and existing Post Office Savings Accounts.
- o **Third-Party Products:** Offers third-party insurance (e.g., Group Term Insurance, Accident Cover) and facilitates payments for DoP products like PPF, Sukanya Samriddhi Yojana (SSA), Recurring Deposit (RD).
- o **Digital Life Certificate (Jeevan Pramaan):** Facilitates the issuance of Digital Life Certificates for pensioners.
- o **Merchant On-boarding:** Enables merchants to open current accounts and utilize digital payment acceptance solutions.
- o **Whatsapp Banking:** Launched Whatsapp Banking services for customer convenience.

## 4. Distinctive Features & Advantages

- **Financial Inclusion:** Primary focus on serving the unbanked and underbanked, especially in rural and remote areas where traditional banks have limited presence.
- **Leveraging Postal Network:** Utilizes the vast and trusted network of India Post, reaching even the remotest corners of the country.
- **Doorstep Banking:** Unique model providing banking services at the customer's home, overcoming geographical barriers.
- **Simplified Processes:** Emphasizes paperless, cashless, and presence-less banking through technology.
- **Low Minimum Balance:** Offers basic savings accounts with low minimum balance requirements, making it accessible to a wider population.
- **Multilingual Interface:** Banking solutions available in multiple languages (e.g., 13 languages) for ease of use.

## Statistics Day 2025

- **Celebration:** The Ministry of Statistics and Programme Implementation (MoSPI) will celebrate the **19th Statistics Day in Delhi on June 29th, 2025**.
- **Significance:** This annual observance highlights the critical role of statistics in India's socio-economic planning and evidence-based policymaking, aiming to raise awareness, especially among the youth, about the power of data.

**What is Statistics Day?**

- **Date:** Celebrated annually on **June 29th**.
- **Commemoration:** Commemorates the birth anniversary of **Prof. Prasanta Chandra Mahalanobis**, a pioneering Indian statistician and planner.
- **Objective:** To create awareness, especially among the youth, about the importance of statistics in:
    o Socio-economic planning.
    o Evidence-based policymaking.
    o National development.
- **Theme for 2025:** "**75 Years of National Sample Survey**".
- **Theme Significance:** This theme highlights the long-standing and significant contribution of the **National Sample Survey (NSS)** in providing reliable, timely, and large-scale socio-economic data essential for effective governance and national development over the past 75 years. It acknowledges NSS's role as a principal data source for policy planning, development programs, and research in India.

- **Organizer:** Ministry of Statistics and Programme Implementation (MoSPI).
- **First Celebration:** National Statistics Day was first celebrated in **2007**.
- **World Statistics Day:** Observed by the United Nations every five years on **October 20th**.

**About Prasanta Chandra Mahalanobis**

- **Birth:** June 29, 1893.
- **Title:** Widely known as the **"Father of Indian Statistics."**
- **Key Contributions:**
    o **Mahalanobis Distance:** Creator of the **Mahalanobis Distance (D2 statistic)** – a key statistical metric for multivariate data analysis, used in fields like taxonomy, pattern recognition, and cluster analysis. It measures the distance between a point and a distribution.
    o **Indian Statistical Institute (ISI):** Founder of the **Indian Statistical Institute (ISI)** in **1931** in Kolkata, which became a premier institution for statistical research and training.
    o **National Sample Survey (NSS):** Established the **National Sample Survey (NSS)** in **1950**. He pioneered the concept of large-scale sample surveys and robust sampling methodologies (e.g., pilot surveys, randomized sampling techniques) for data collection across diverse socio-economic aspects.
    o **Central Statistical Organization (CSO):** Played an indispensable role in establishing the CSO (now merged into the National Statistical Office/NSO) to coordinate statistical activities in India.
    o **Planning Commission:** Member of India's **First Planning Commission**, where he prominently contributed to the **Second Five-Year Plan (1956-1961)**. His **"Mahalanobis model"** for

economic planning prioritized rapid industrialization and investment in heavy industries, aiming for self-reliance.

- o **Advocate for Data-Based Governance:** A strong advocate for using data for evidence-based governance and planning, believing that statistics are a "key technology for increasing the efficiency of human efforts in the widest sense."

- **Awards:** Awarded the **Padma Vibhushan** (India's second-highest civilian honor) for his immense contribution to science and statistics.

- **Legacy:** His foresight and pioneering work laid the foundation for India's modern statistical system, shaping national policies and development strategies.

## ADB Announces $10 Billion Funding for India's Urban Projects



**Context:**

- Recently, The Asian Development Bank (ADB) has announced a significant **5 -year initiative to boost urban infrastructure development across India.**

- This plan involves an estimated investment of **$10 billion**, signalling strong international support for India's urban growth and its potential as an economic engine.

### I. Key Announcement and Funding Details

- **Who: Masato Kanda**, President of the Asian Development Bank (ADB).

- **What:** Announced a **five-year initiative** for urban infrastructure transformation in India.

- **Investment:** Estimated investment of **$10 billion**.

- **Funding Sources:** This support includes:
  - o **Sovereign loans** (loans to the Indian government).
  - o **Private sector financing**.
  - o **Third-party capital** (investment from other sources).

- **Purpose:** To transform urban infrastructure, including:
  - o Metro extensions.
  - o New Regional Rapid Transit System (RRTS) corridors.
  - o General urban infrastructure and services.

- **Rationale:** Kanda emphasized that "Cities are engines of growth."

### II. Anchoring Initiatives and Support Mechanisms

- **Urban Challenge Fund (UCF):** The initiative is anchored by India's flagship **Urban Challenge Fund (UCF)**.
  - o ADB is supporting the UCF to attract private investment for urban infrastructure projects.
  - o Groundwork for the UCF is being laid through completed analytical work on growth hubs, creative city redevelopment, and water and sanitation upgrades in **100 cities across India**.

- **Technical Assistance:** ADB has committed **$3 million in technical assistance**. This aid will help:
  - o Design "bankable projects" (projects attractive to investors).
  - o Enhance the institutional capacity of states and urban local bodies.

### III. Meetings with Indian Officials

During his visit, ADB President Masato Kanda held important discussions with key Indian ministers:

- **Finance Minister Nirmala Sitharaman:** Discussions covered:

- o Expanding metro networks, including **transit-oriented development (TOD)**.
- o Supporting rural prosperity.
- o Scaling rooftop solar capacity.
- o Operationalizing the Urban Challenge Fund (UCF).
- **Housing and Urban Affairs Minister Manohar Lal:** Talks focused on:
  - o Mobilizing private capital for urban projects.
  - o Replicating successful ADB-backed urban transport models.
  - o Creating new Transit-Oriented Development (TOD) opportunities.

## IV. India's Urban Landscape and ADB's Past Contributions

- **Projected Urban Population:** India's towns and cities are projected to house **more than 40% of the population by 2030**.
- **ADB's Existing Urban Portfolio:**
  - o ADB has worked with **over 110 cities across 22 states** on projects related to water supply, sanitation, housing, and solid-waste management.
  - o The active urban portfolio currently comprises **27 loans worth $5.15 billion**.
- **Urban Transport Commitments (Past Decade):**
  - o ADB has committed **$4 billion** for metro projects and RRTS.
  - o This covers **300 kilometers in eight cities**, including:
    - % Delhi–Meerut RRTS
    - % Mumbai Metro
    - % Nagpur Metro
    - % Chennai Metro
    - % Bengaluru Metro
  - o These projects aim to cut congestion and emissions while improving access for vulnerable populations, including people with disabilities.

## V. Additional Investment: Skills Development

- **National Industrial Training Institute Upgradation Program:** ADB will also invest in skills development through this program.
- **Objective:** To boost India's manufacturing sector, catalyze private sector growth, and create quality jobs, especially for the youth.

## VI. Significance of the Funding

- This substantial commitment from ADB underscores the critical role of urban development in India's economic growth trajectory.
- By focusing on sustainable infrastructure, private sector engagement, and skills development, the initiative aims to make India's cities more livable, economically vibrant, and inclusive.

## I. Asian Development Bank (ADB)

- Establishment: Established on December 19, 1966.
- Nature: It is a multilateral development bank.
- Primary Role: The principal international development finance institution for the Asia-Pacific region.
- Vision: Aims for a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while actively working to eradicate extreme poverty in the region.
- Headquarters: Manila, Philippines.

## II. ADB's Functions

The ADB provides comprehensive assistance to its developing member countries:

- Financial Assistance: Offers grants, loans, technical assistance, and equity investments to promote social and economic development. This assistance extends to the private sector and public-private partnerships.
- Development Impact Maximization:
  - o Facilitates policy dialogues.
  - o Provides advisory services.
  - o Mobilizes financial resources through cofinancing operations, drawing from

official, commercial, and export credit sources.

- **Key Focus Areas:** The Bank aligns its efforts with the UN's Sustainable Development Goals (SDGs), focusing on 6 key sectors:
  - o Education
  - o Health
  - o Transport
  - o Energy
  - o Finance
  - o Climate Change
- **Partnerships:** Works collaboratively with NGOs and private companies to enhance capital markets and improve the business environment in developing countries within the region.

### III. ADB Membership

- **Open Membership:** Open to members and associate members of the United Nations Economic Commission for Asia and the Far East. Also open to other regional and non-regional developed countries that are UN members or members of its specialized agencies.
- **Growth:** Started with 31 members in 1966 and has grown to 69 members today.
  - o **Regional Members:** 49 from Asia and the Pacific (e.g., India, China, Japan, South Korea, Australia).
  - o **Non-Regional Members:** 20 from Europe, North America, and other regions.

### IV. ADB Governance

- **Board of Governors:** The highest decision-making body, composed of one representative from each member state.
- **Board of Directors:** The Board of Governors elects 12 members to serve as the Board of Directors.
  - o Eight directors are from Asia and the Pacific region.
  - o Four directors are from non-regional members.

- **President:** The Board of Governors also elects a President who serves a five-year term.
  - o The President chairs the Board of Directors and is responsible for the bank's day-to-day operations.
  - o Historically, every single President of the ADB has been from Japan, as Japan was a founding member and remains the largest shareholder.

### V. ADB Voting Power and Funding

- **Weighted Voting System:** The ADB is modelled on the World Bank and employs a weighted voting system, where votes are distributed in proportion to members' capital subscriptions.
- **Largest Shareholders:**
  - o Japan (15.6% of total shares)
  - o United States (15.6%)
  - o People's Republic of China (6.4%)
  - o India (6.3%) – India ranks first in terms of financial commitments received from the bank (14% of total), followed by China, Bangladesh, the Philippines, and Pakistan.
  - o Australia (5.8%)
- **Sources of Funding:**
  - o Regularly raises capital through the international bond markets.
  - o Relies on member contributions.
  - o Uses retained earnings from its lending operations.
  - o Reinvestment of loan repayments.

## India to Lead Global Oil Demand Growth by 2030 – IEA Report



INDIA TO BE LARGEST SOURCE OF GLOBAL OIL DEMAND GROWTH BY 2030: IEA

**Why in News?**

- The **International Energy Agency (IEA)**, in its latest report **"Oil 2025"** released on June 17, 2025, projected that **India, currently the world's 3rd-largest oil consumer and importer, will lead global oil demand growth** by a significant margin.

- India is expected to add **1 million barrels per day (bpd) to global demand by 2030**, driven by its stellar economic expansion.

**I. Global Oil Demand Outlook (IEA "Oil 2025" Report):**

- **Global Demand Growth:** Expected to grow by **2.5 million bpd** by 2030.

- **Plateauing Demand:** Global oil demand is forecast to reach a plateau near **105.5 million bpd by 2030**.

- **Supply Outlook:** The world is expected to remain **well-supplied** through the end of the decade, barring major disruptions.

- **Risks to Outlook:** Rising geopolitical risks in the Middle East and unresolved trade tensions could cast a shadow over the projections.

- **EV Impact:** Electric vehicles are projected to displace **5.4 million bpd of oil demand globally by 2030**. Electric car sales reached a record 17 million in 2024 and are expected to surpass 20 million in 2025.

**II. India's Position as the Driver of Global Oil Demand Growth:**

- **Leading Growth:** India will contribute a steep **1 million bpd** to global oil demand growth by 2030, more than any other country.

- **Current Demand:** Forecast to rise from **5.64 million bpd in 2024 to 6.66 million bpd in 2030**.

- **Economic Driver:** This growth is primarily fueled by India's "stellar GDP expansion," projected at an average annual rate of **2.8%** over the forecast period.

- **Fastest Growing Major Economy:** India will remain the world's fastest-growing major economy in 2025 for a fourth year running.

- **Economic Size:** Projected to overtake Japan as the world's **fourth-largest economy** in 2025.

- **Import Dependence:** India meets over **95% of its oil needs through imports**, as domestic production is declining.

**III. Key Drivers of India's Oil Demand Growth:**

1. **Transport Fuels (A Global Anomaly):**

   o Unlike other regions where EV adoption is curbing transport fuel demand, India's transport fuels will lead the gains.

   o **Jet Fuel/Kerosene:** Expected to rise fastest, at almost **6% annually**. Benefits from population growth (5% between 2025-2030) and a rapidly expanding middle class keen on travel.

   o **Gasoline (Petrol):** Annual demand growth of **4%**, with significant scope for expansion due to low levels of car ownership. Projections assume a **40% increase in the car fleet by 2030**.

   o **EV Impact:** The expansion rate of the car fleet comfortably outstrips the impact of efficiencies and EVs, with EV growth mainly in two- and three-wheelers.

2. **Industrial-Linked Products:**

   o Demand will marginally lag transport fuels, with annual increases in:

      * **Gasoil (Diesel): 3.3%** annually, contributing an aggregate gain of **380,000 bpd** over the forecast period. Buoyed by urbanization, industrialization, and infrastructure development. Diesel currently accounts for one-third of India's total oil use.

      * **Naphtha: 2.0%** annually, driven by expansion in petrochemical feedstocks and new projects.

      * **LPG/Ethane: 2.5%** annually.

### 3. Clean Cooking Initiatives:

- o Widespread adoption of clean cooking methods (LPG) acts as an additional boost to LPG demand.

- o **Pradhan Mantri Ujjwala Yojana (PMUY):** Government subsidy programs like PMUY (launched 2016 to provide LPG connections to rural households) have been instrumental in this respect, replacing traditional cooking methods.

### IV. Risks to India's Oil Demand Outlook:

- **Debt-Fueled Consumption:** The IEA cautions that India's consumption boom, particularly for transport fuels, is "to a large extent debt-fueled."

- **Rising Household Debt:** Household debt rose to **43% of GDP in 2024**, up from 35% in 2022.

- **Credit Spiral:** A possible credit spiral could derail the projected expansion, posing a risk to the outlook.

### V. Global and Indian Refining and Production Capacities:

- **Global Production Capacity:** Forecast to rise by more than 5 million bpd to **114.7 million bpd by 2030**.

- **Indian Crude Oil Production:** Expected to decline marginally by **30,000 bpd to 670,000 bpd by 2030**.

- **Refining Capacity by 2030:**
  - o **China:** Largest refiner at **19.5 million bpd** (with nearly 2.2 million bpd excess capacity).
  - o **United States: 17.7 million bpd**.
  - o **Russia: 7.1 million bpd**.
  - o **India: 6.8 million bpd**.

### Conclusion:

The IEA's "Oil 2025" report strongly positions India as the primary driver of global oil demand growth in the coming years. This projection underscores India's robust economic expansion and its unique consumption patterns, particularly in the transport sector. While this

signifies a booming economy, it also highlights India's escalating energy import dependence and the associated challenges for energy security and macroeconomic stability. For policymakers, this report serves as a critical guide to strategize on diversified energy sources, sustainable urban planning, and prudent fiscal management to support continued growth while mitigating potential risks.

## India Rises to 15th in Top FDI Destinations (UNCTAD World Investment Report 2025)
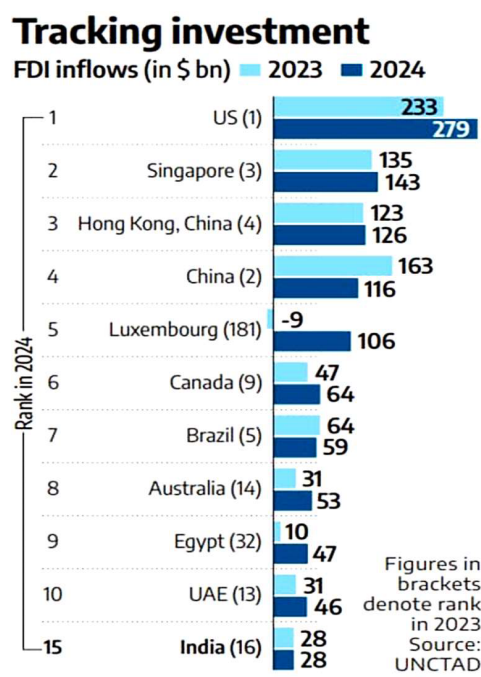


*Figures in bracket denote rank in 2023 Source : UNCTAD*

**Why in News?**

*Released: June 19, 2025 | Published by: United Nations Conference on Trade and Development (UNCTAD)*

India's Foreign Direct Investment (FDI) Performance :

**Global Ranking**

- In 2024, India rose to the **15th position globally** for FDI inflows, improving from **16th in 2023**.

- This rise occurred despite an **11% decline in global FDI flows**, marking India as a stable destination for foreign investment.

**FDI Inflows and Trends**

- India maintained **$28 billion in FDI inflows** in 2024, the same level as 2023.

- This stability is considered a **positive sign** after a significant **43% drop** in 2023 from the previous year.

**Other FDI Metrics**

- According to the Reserve Bank of India (RBI), **net FDI (excluding repatriation)** stood at approximately **$29 billion** for FY25.
- Data from the Department for Promotion of Industry and Internal Trade (DPIIT) indicated **FDI equity inflows of $50 billion**, representing a **13% increase** in FY25.

**India's Standing in Developing Asia**

- India attracted **46% of all international private equity investment** in developing Asia, making it the **leading recipient** in the region.

**Investment Categories and Sector Highlights**

**Greenfield Projects**

- India retained its **4th position globally** for greenfield project announcements.
- In 2024, a total of **1,080 greenfield projects** were announced.
- The projected **capital expenditure surged over 25%**, reaching **$110 billion**—almost **one-third of Asia's total** greenfield investments.
- This growth reflects strong **long-term industrial investment** interest in India.

**International Project Finance (IPF)**

- India ranked among the **top five countries** for IPF deals, with **97 transactions**.
- However, India slipped from its **2nd place ranking in 2023**.

**Outward FDI**

- India improved its position in outward investments, ranking **18th globally** in 2024.
- Outward FDI flows reached **$24 billion**, up from **23rd position and lower volumes in 2023**.

Key Sectors Attracting Investment

1. **Renewable Energy**
2. **Semiconductors**
3. **Basic Metals**
4. **Digital Infrastructure**

- Notably, **Microsoft committed $3 billion** to build out cloud and AI infrastructure in India.
- The report also highlighted M&A activity, such as:
  - **Walt Disney's $3 billion merger** with Viacom18, forming a **majority Indian-owned joint venture**.
  - **International pharmaceutical operations** being sold to Indian companies.

**Global FDI Context – 2024 :**

**Global Trends**

- Global FDI dropped by **11%** in 2024, marking the **second consecutive year of decline**.
- This decline excludes volatile conduit flows through select European countries.
- The outlook for 2025 remains **pessimistic** due to **geopolitical tensions** and **economic uncertainty**.

**Top FDI Destination Countries**

| Rank | Country | FDI Inflows |
|------|---------|-------------|
| 1 | United States | $279 billion |
| 2 | Singapore | (Moved up) |
| 3 | Hong Kong | (Moved up) |
| 4 | China | $116 billion (**29% decline**) |

**Regional Patterns**

- **Africa**: FDI rose by **75%**, largely driven by a megaproject in Egypt.
- **Developing Asia**: Received **$605 billion** in FDI (a slight **3% decline**).
- **ASEAN (Southeast Asia)**: FDI grew by **10%**, defying global trends.

FDI in Sustainable Development Goals (SDGs)

- Investment in SDG-related sectors **fell sharply in 2024**:
  - **Infrastructure, renewable energy, water/sanitation, agrifood**: Down **25–33%**.

- o Only the **health sector** saw modest growth (from a low base).
- **International Project Finance (IPF)** fell **26% globally**, severely affecting **Least Developed Countries (LDCs)**.

**Digital Economy Investment :**
- FDI into the **digital economy increased by 14%** in 2024.
- However, **80% of greenfield digital projects in the Global South** were concentrated in just **10 countries**, including **India**.
- This highlights an **uneven distribution** of digital investment across developing nations.

**What is Foreign Direct Investment (FDI):**

**Foreign Direct Investment (FDI)** refers to an investment made by a person or company based in one country into a business or asset located in another country. Unlike portfolio investment (such as buying stocks or bonds), FDI involves **significant ownership**, **control**, or **influence** over the foreign business.

**Key Features of FDI**

1. **Long-Term Interest**: FDI implies a lasting interest in the foreign enterprise, not just a short-term financial investment.
2. **Ownership or Control**: It usually involves acquiring at least **10% of the equity** in a foreign company, giving the investor some control over management decisions.
3. **Active Participation**: The investor often participates in the decision-making and operations of the foreign business.

**Types of FDI**

| Type | Description |
|---|---|
| **Greenfield FDI** | Establishing a new business or facility in a foreign country (e.g., factory, office). |
| **Brownfield/ M&A** | Acquiring or merging with an existing foreign company. |
| **Joint Ventures** | Partnering with a local company to operate a business together. |

**Examples**
- **Amazon investing in warehouse infrastructure in India** (Greenfield FDI).
- **Tata Motors acquiring Jaguar Land Rover in the UK** (Brownfield/M&A).
- **Toyota forming a joint venture with Kirloskar Group in India**.

**Benefits of FDI (for the host country)**
- Brings in **capital**, **technology**, and **expertise**.
- Creates **employment** and boosts **infrastructure**.
- Increases **exports** and integrates the local economy into global supply chains.

**Risks and Concerns**
- Can lead to **foreign dominance** in key sectors.
- Potential for **profit repatriation**, where profits are sent back to the investor's home country.
- Risk of **exploitation** of natural resources or local labor.

**FDI in India**

India receives FDI across multiple sectors including:
- **Information Technology**
- **Telecommunications**
- **Pharmaceuticals**
- **Renewable Energy**
- **Retail and E-commerce**

The Indian government regulates FDI through policies published by the **Department for Promotion of Industry and Internal Trade (DPIIT)**. Some sectors allow **100% FDI through the automatic route**, while others require **government approval**.
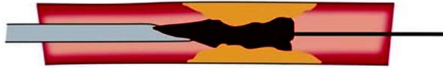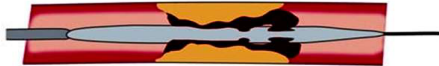
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# Science & Technology

## Thrombectomy



Thrombectomy

Catheter aspiration thrombectomy

Blood clot is removed using suction

Mechanical thrombectomy

Blood clot is broken up into small pieces and removed

**Why in News**

Recently, the Technology Development Board (TDB) in India announced financial support for developing **India's first home-grown (indigenous) thrombectomy device** for stroke treatment. This is a big step for stroke care in the country.

**About Thrombectomy**

- **What it is:** A thrombectomy is a medical procedure to **remove a blood clot** from an artery or vein. The goal is to restore normal blood flow.

- **What is a Blood Clot?** Also called a thrombus, it's a clump of blood that can block blood flow. If blood flow is blocked, it can damage tissue or even cause death.

- **Common Locations:** Blood clots can form in various parts of the body, including legs, arms, intestines, brain (causing stroke), lungs (pulmonary embolism), and heart (causing heart attack).

- **Why it's Done:** Thrombectomies are performed to bring back blood flow and prevent severe problems like stroke, organ damage, or loss of a limb. Often, it needs to be done within hours to save a life or limb.

**Types of Thrombectomy**

There are two main types:

1. **Surgical (Open) Thrombectomy:**
   o The surgeon makes an incision (cut) to reach the blocked blood vessel.
   o They open the vessel and physically remove the clot, sometimes using a balloon.
   o Then, they repair the blood vessel.

2. **Percutaneous (Minimally Invasive) Thrombectomy:**
   o This is a less invasive method.
   o The surgeon inserts special devices through thin tubes called **catheters** into the blood vessel.
   o These devices can either break up the clot into smaller pieces (macerate) or suck it out (suction).
   o If some clot remains, the surgeon might use clot-dissolving medicines directly at the site.

**Significance of India's Indigenous Device**

- **Self-Reliance (Atmanirbhar Bharat):** Developing a home-grown device reduces India's reliance on expensive imported medical equipment for stroke care.

- **Affordability:** Local manufacturing can make these life-saving procedures more affordable and accessible for more patients across India.

- **Accessibility:** Increased availability of devices means more hospitals, especially in smaller cities, can perform thrombectomies.

- **Innovation:** It boosts India's capabilities in medical technology (medtech) and encourages further innovation in the healthcare sector.

- **Stroke Care:** Thrombectomy is a highly effective treatment for acute ischemic stroke (stroke caused by a clot). An indigenous device will improve outcomes for stroke patients, potentially reducing paralysis and disability.

- **Ayushman Bharat:** The goal is to integrate these devices into government health programs like Ayushman Bharat, making them available to a wider population.

## Folate (Vitamin B9) Deficiency
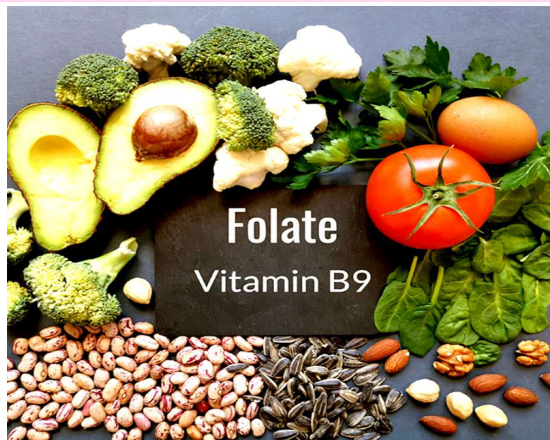


**Why in News**

A recent study by AIIMS (All-India Institute of Medical Sciences) found that almost **41% of urban adolescents in government schools in north India** have a **folate (Vitamin B9) deficiency**. This deficiency could be affecting their growth and development.

**About Vitamin B9 (Folate)**

- **What it is:** Folate is the natural form of **Vitamin B9**. It's a water-soluble vitamin, meaning your body doesn't store it for long, so you need to get it regularly from your diet.
- **Key Functions:**
  - **Red Blood Cell Formation:** It's essential for making healthy red blood cells, which carry oxygen throughout the body.
  - **Cell Growth and Function:** Crucial for healthy cell growth and function, especially during periods of rapid growth.
  - **DNA/RNA Synthesis:** Involved in building and repairing DNA and RNA, the genetic material in cells.

**Foods Containing Vitamin B9**

You can find folate naturally in many foods:

- **Green leafy vegetables:** Spinach, fenugreek, kale, broccoli, brussels sprouts.
- **Legumes:** Lentils, chickpeas, beans (like kidney beans, black-eyed peas).
- **Citrus fruits:** Oranges, lemons.
- **Nuts and Seeds:** Walnuts, sunflower seeds, peanuts.
- **Whole grains and fortified cereals:** Many cereals and breads have extra folic acid (the synthetic form of folate) added.
- **Other sources:** Liver, eggs, avocado, beetroot.

**Role of Vitamin B9 in Children**

Vitamin B9 is very important for children for several reasons:

- **Rapid Growth:** It supports the fast growth phases that children go through.
- **Brain Development:** Aids in the development of the central nervous system in early childhood and ensures proper brain function and emotional health in growing children.
- **Tissue Growth and Repair:** Essential for constant tissue growth and cellular repair during childhood.
- **Prevents Anemia:** If a child doesn't get enough folate, it can lead to **anemia**, a condition where the body doesn't have enough healthy red blood cells to carry oxygen. This can cause fatigue, weakness, and reduced academic performance.
- **Cognitive Development:** Deficiency can impair thinking skills and overall cognitive development.
- **Immunity:** Can compromise a child's immune system, making them more prone to infections.

**Why the AIIMS Study is Important**

- The high percentage (41%) of deficiency among adolescents in north India shows a widespread nutritional problem.
- Adolescent girls tend to have a higher deficiency due to increased needs during menstruation and puberty, which can impact their future reproductive health.
- It highlights the need for better diets or supplements for children in these age groups to support their overall health and development.

# Lysosomal Storage Disorders (LSDs)



**Why in News**

Despite India's **National Policy for Rare Diseases (NPRD) 2021** and a financial assistance program, over **300 patients, mostly children, diagnosed with Lysosomal Storage Disorders (LSDs) are still not receiving essential medical care**. This highlights the ongoing challenges in providing treatment for rare diseases in India.

**About Lysosomal Storage Disorders (LSDs)**

- **What they are:** LSDs are a group of **rare genetic conditions**. They happen when certain substances, called **toxic materials or macromolecules**, build up inside the body's cells.

- **The Role of Lysosomes:**
  - A **lysosome** is a tiny compartment within a cell. Think of it as the cell's recycling or waste disposal unit.
  - Lysosomes contain special proteins called **digestive enzymes**. These enzymes break down excess, worn-out, or unwanted cell parts and other substances like fats, sugars, and proteins.

- **What goes wrong in LSDs:**
  - People with LSDs have a problem with these enzymes. They might **lack a specific enzyme**, or the enzyme might not work properly (due to a missing "enzyme activator" or "modifier").
  - Without these functioning enzymes, the body **cannot break down fats, sugars, and other complex substances** as it should.
  - This leads to the **accumulation of these harmful materials** inside the lysosomes and throughout the body's cells.
  - This buildup causes **dysfunction in the affected organs** (like the brain, liver, spleen, bones, heart, kidneys), leading to severe illness (morbidity) and often early death (mortality).

- **Examples of LSDs:** Common examples include Gaucher disease, Pompe disease, Fabry disease, various Mucopolysaccharidoses (MPS I, MPS II, etc.), Mucolipidoses, and Oligosaccharidoses. There are over 50 different types of LSDs.

- **Genetics:**
  - Most LSDs are **autosomal recessive disorders**. This means a child inherits an abnormal gene from **both parents** to develop the disorder. The parents themselves are usually just "carriers" and don't show symptoms.
  - **Exceptions:** Hunter syndrome (MPS II) and Fabry disease are **X-linked recessive disorders**, meaning they are primarily passed down through the mother to sons.

- **Onset:** LSDs usually appear during **pregnancy or soon after birth** (infantile onset). More rarely, symptoms might develop later in childhood or even in adulthood (late-onset). Generally, earlier onset often means more severe cases.

- **Symptoms:** Symptoms vary widely depending on the specific LSD and which organs are affected. Common symptoms can include:
  - Enlargement of organs (spleen, liver, heart).

- o Skeletal abnormalities and joint stiffness.
- o Developmental delays and neurological problems (seizures, loss of motor skills, intellectual disability).
- o Skin issues, pain in hands/feet.
- o Vision and hearing problems.
- o Breathing and feeding difficulties.
- **Treatment:**
  - o Currently, there are **no cures** for lysosomal storage diseases.
  - o However, treatments can help **manage symptoms** and lessen damage to organs and tissues. These can include:
    - \* **Enzyme Replacement Therapy (ERT):** Providing the missing enzyme through intravenous infusions. This can be very effective for some LSDs but is extremely expensive and lifelong.
    - \* **Substrate Reduction Therapy (SRT):** Using medicines to reduce the amount of the substance that builds up in the cells.
    - \* **Bone Marrow Transplantation/ Hematopoietic Stem Cell Transplantation (HSCT):** In some cases, this can provide cells that produce the missing enzyme.
    - \* Symptomatic and supportive care (e.g., pain management, physical therapy).

## National Policy for Rare Diseases (NPRD) 2021

- This policy was launched by India's Ministry of Health & Family Welfare to address the challenges of rare diseases.
- It aims to provide financial support (up to ₹ 50 lakhs per patient) for treatment in designated **Centres of Excellence (CoEs)** for certain rare diseases, including some LSDs.

- It also focuses on promoting research and development of indigenous drugs and diagnostic facilities.
- The current news highlights the gap between policy intent and actual delivery of care, particularly for LSD patients requiring lifelong and very expensive treatments.

## BharatGen



**Why in News**

Recently, the Union Minister launched the **BharatGen Multimodal LLM** at the BharatGen Summit. This marks a significant step for India's indigenous Artificial Intelligence (AI) capabilities.

**About BharatGen**

- **What it is:** BharatGen is **India's first of its kind, indigenously developed, government-funded, Artificial Intelligence (AI) based, Multimodal Large Language Model (LLM)**. Its unique focus is on **Indian languages**.
- **Development:** It was developed under the **National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)**. The implementation is led by the TIH Foundation for IoT and IoE at IIT Bombay.
- **Aim:** BharatGen aims to transform AI development across India, covering its diverse languages and cultures. It strives to create AI that is ethical, inclusive, multilingual, and rooted in Indian values.
- **Support:** The initiative is supported by the **Department of Science and Technology (DST)** and involves a strong group of leading academic institutions, experts, and innovators.
- **Modality:** It integrates **text, speech, and image modalities**. This allows for seamless AI solutions

that can understand and respond in multiple forms of data.

- **Language Support:** It offers AI solutions in **22 Indian languages**, making AI more accessible and useful for a wider population.
- **Impact on Sectors:** This initiative is set to empower critical sectors like:
  1. **Healthcare:** E.g., AI-powered telemedicine services where an AI doctor can communicate in a patient's native language.
  2. **Education:** Aligning with NEP 2020 to promote interdisciplinary learning.
  3. **Agriculture:** Providing region-specific AI solutions.
  4. **Governance:** Enhancing citizen engagement and grievance redressal systems (like CPGRAMS) with multilingual feedback.
- **Execution Network:** The BharatGen initiative is being carried out through a network of **25 Technology Innovation Hubs (TIHs)** across the country. Four of these TIHs have been upgraded to Technology Translational Research Parks (TTRPs) to boost research and commercialization.
- **Mission Pillars (of NM-ICPS):** The overarching mission has four main pillars:
  1. Technology Development
  2. Entrepreneurship
  3. Human Resource Development (creating skilled manpower)
  4. International Collaboration

## Key Features of BharatGen

- **Multilingual and Multimodal Models:** Capable of processing and generating content across various Indian languages and integrating text, speech, and images.
- **Bharatiya Dataset-based Training:** Trained on datasets that reflect India's unique linguistic and cultural diversity, ensuring relevance and accuracy for Indian contexts.

- **Open-Source Platform:** Promotes collaborative development and allows researchers and developers to build upon its foundation.
- **Generative AI Research Ecosystem:** Aims to foster a robust ecosystem for generative AI research and innovation within India.

## Nanozymes
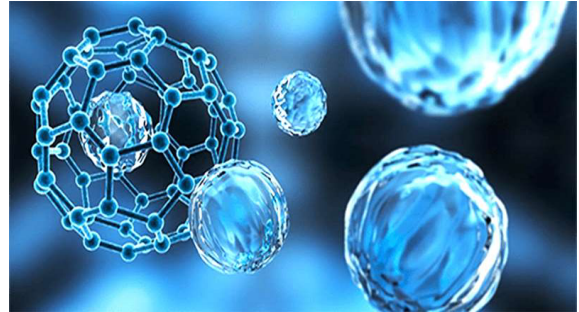


### Why in News

Researchers at the **Indian Institute of Science (IISc.)** recently developed an artificial metal-based **nanozyme** that shows potential in preventing abnormal blood clotting, a condition seen in issues like pulmonary thromboembolism (PTE). This breakthrough offers a promising alternative to current anti-clotting drugs that often have severe side effects.

### What are Enzymes?

- Enzymes are primarily **proteins** (though some are RNA molecules) that act as **biological catalysts**.
- They **speed up biochemical reactions** in our bodies without being consumed in the process.
- Their main functions include **building substances** (anabolism) and **breaking others down** (catabolism), essential for metabolism.
- All living organisms produce enzymes naturally, and they are also used in various manufactured products and food industries.
- Each enzyme typically has a specific "active site" that binds to a particular molecule (substrate) to facilitate a specific reaction.

### About Nanozymes

- **Definition:** Nanozymes are **nanomaterials** (materials at the nanoscale, typically 1 to 100 nanometers) that exhibit **enzyme-like characteristics** or catalytic activity. They mimic the functions of natural enzymes.

- **Composition:** They can be made from various materials, including **metallic, metal oxide-based, carbon-based**, or other types of nanomaterials. The IISc breakthrough uses spherical vanadium pentoxide (V2O5) nanozymes.
- **Mechanism:** The IISc team found that their nanozymes mimic natural antioxidant enzymes, particularly **glutathione peroxidase**. They work by controlling the levels of toxic **Reactive Oxygen Species (ROS)**, which are often elevated in abnormal clotting conditions (oxidative stress). By reducing ROS, they prevent the over-activation of platelets that leads to excessive clot formation.

## Nanozymes Advantages

Compared to natural enzymes, nanozymes offer several benefits:

- **Cost-Effectiveness:** They are generally **less expensive** to produce.
- **Recyclability and Reusability:** Many nanozymes can be recovered and **reused**, further reducing costs.
- **Easy Manufacturing and Storage:** They can be **easily manufactured** on a large scale and **stored for long periods** without losing their activity, unlike many delicate natural enzymes.
- **Robustness:** Unlike typical inorganic catalysts or even natural enzymes that often require specific, harsh conditions (high temperature, high pressure, extreme pH), nanozymes can function effectively in environments closer to **physiological conditions** (body temperature, neutral pH). They can also respond to various external stimuli.
- **Tunable Activity:** Their catalytic activity can be precisely **designed and tuned** by simply varying their shape, structure, and composition (size/composition-dependent activity). This allows for a broad range of catalytic applications.
- **Multi-functionality:** Nanozymes often possess unique properties beyond just catalysis, allowing for **integrated multi-functions**. For example, they can also have photothermal properties, superparamagnetism, or fluorescence.
- **Large Surface Area:** Their nanoscale size provides a **large surface area**, which is beneficial for catalytic reactions and allows for easier modifications and bioconjugation (linking with biological molecules).
- **Self-Assembly:** The ability of some nanozymes to **self-assemble** mimics biological strategies, making it easier to incorporate biological components for more complex functions.
- **Reduced Side Effects:** As demonstrated by the IISc research, some nanozymes can selectively modulate specific pathways (like redox signaling) without interfering with normal physiological processes (like essential blood clotting), leading to **fewer side effects** compared to conventional drugs.

## Nanozymes Applications

Nanozymes have a wide and growing range of applications, including:

- **Diagnostic Medicine:** Used in biosensors for detecting biomarkers of diseases, rapid diagnostic tests, and disease imaging.
- **Targeted Therapy:** Delivering therapeutic agents specifically to diseased cells or tissues.
- **Biosensing:** Detecting various molecules in biological samples with high sensitivity.
- **Antioxidant Activity:** Many nanozymes exhibit antioxidant properties, allowing them to mimic the body's natural antioxidant system. This is crucial for **cell protection** and can be applied in treating diseases related to **reactive oxygen species (ROS)**, such as:
  - **Neurological diseases:** Alzheimer's, Parkinson's, and ischemic stroke (as explored by IISc).
  - **Inflammation**
  - **Cancer therapy** (by modulating the tumor microenvironment).

- **Antimicrobial Agents:** Showing promise in antibacterial, antiviral, and antifungal applications.
- **Environmental Monitoring and Remediation:** Degrading pollutants, detecting toxins in water, and various environmental applications.
- **Food Safety:** Detecting foodborne pathogens and toxins.

## Neglected Tropical Diseases (NTDs)
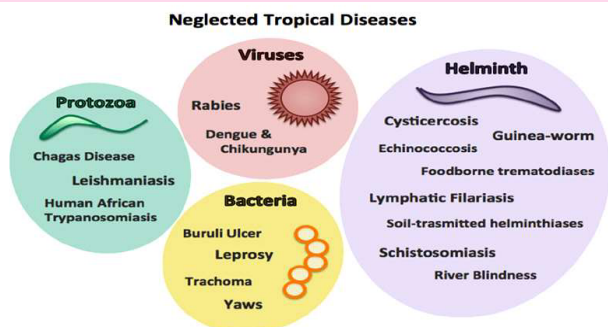


**Context:** As of May 2025, **56 countries have successfully eliminated at least one NTD**, demonstrating significant progress towards WHO's global target of **100 countries reaching elimination by 2030**. This highlights the ongoing global efforts and successes in combating these debilitating diseases.

### 1. About Neglected Tropical Diseases (NTDs):

- **Definition:** NTDs are a **diverse group of conditions** caused by a variety of pathogens, including:
  - Viruses
  - Bacteria
  - Parasites (protozoa and helminths/worms)
  - Fungi
  - Toxins They are associated with devastating health, social, and economic consequences. The World Health Organization (WHO) identifies **21 different conditions** as NTDs.

- **Prevalence:**
  - Mainly prevalent among **impoverished communities in tropical and subtropical areas**.
  - Widespread where people in vulnerable situations live, with **inadequate or suboptimal water safety, sanitation, and access to healthcare**.
  - Some NTDs have a much larger geographical distribution beyond purely tropical regions.

- **"Neglected" Status:** These diseases are called "neglected" because they have historically received **very little attention and funding** on the global health agenda compared to other major diseases like HIV/AIDS, tuberculosis, and malaria.

- **Examples:** NTDs include a wide range of diseases such as:
  - Guinea worm disease (Dracunculiasis)
  - Chikungunya
  - Dengue
  - Kala Azar (Visceral Leishmaniasis)
  - Elephantiasis (Lymphatic Filariasis)
  - Leprosy (Hansen's Disease)
  - Trachoma (a leading cause of preventable blindness)
  - Onchocerciasis (River Blindness)
  - Schistosomiasis
  - Rabies
  - Snakebite envenoming
  - Soil-transmitted helminthiases (intestinal worms)
  - Chagas disease
  - Human African Trypanosomiasis (Sleeping sickness)
  - Buruli ulcer
  - Yaws
  - Mycetoma
  - Echinococcosis
  - Foodborne trematodiases
  - Scabies and other ectoparasitoses
  - Noma

- **India's Burden:** India is home to a significant burden of NTDs, with approximately **12 NTDs** being prevalent in the country. India has made progress in eliminating some NTDs, such as Guinea worm, Trachoma, and Yaws.
- **Complex Epidemiology:** The epidemiology of NTDs is complex:
    o Some have animal and/or human reservoirs.
    o Many are **vector-borne** (e.g., mosquitoes, sandflies, blackflies).
    o Most are associated with intricate life cycles.
    o These factors make their prevention or elimination particularly challenging.
- **Global Impact:** It is estimated that NTDs affect **more than 1 billion people globally**, with approximately **1.5 billion people requiring interventions** (both preventive and curative).

2. Global Efforts and Targets:
- **WHO Road Map 2021-2030:** The **"Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030"** sets out ambitious global targets for the prevention, control, elimination, and eradication of NTDs.
- **Overarching Global Targets by 2030 (aligned with SDGs):**
    o **90% fewer people requiring interventions** against NTDs.
    o **75% fewer NTD-related DALYs** (Disability-Adjusted Life Years - a measure of overall disease burden).
    o **100 countries achieving elimination of at least 1 NTD** (significant progress has been made, with 56 countries already achieving this as of May 2025).
    o **Eradication of 2 NTDs – dracunculiasis (Guinea worm disease) and yaws**.
- **World NTDs Day:** Every year on **January 30th**, the global community observes **World NTDs Day** to raise awareness, reflect on the suffering caused by NTDs, celebrate achievements, and renew commitment to their elimination. This day was formally recognized by the World Health Assembly in May 2021.
- **Strategies for Tackling NTDs (WHO Recommended):**
    o **Innovative and Intensified Disease Management:** Early diagnosis, treatment, and care.
    o **Preventive Chemotherapy (Mass Drug Administration - MDA):** Administering drugs to entire populations at risk to prevent and control specific NTDs (e.g., for Lymphatic Filariasis, Soil-transmitted Helminthiases).
    o **Vector Control:** Measures to control the insects or other vectors that transmit these diseases (e.g., bed nets, spraying).
    o **Veterinary Public Health:** Interventions at the human-animal interface for zoonotic NTDs.
    o **Provision of Safe Water, Sanitation, and Hygiene (WASH):** Fundamental for preventing the spread of many NTDs.
    o **Integrated Approaches:** Moving from disease-specific programs to integrated, cross-cutting approaches that leverage existing health systems.
    o **Country Ownership:** Emphasizing national leadership and financing for sustainable programs.
    o **Research & Development (R&D):** For new tools, diagnostics, and treatments.

3. Significance:
- **Poverty and Equity:** NTDs disproportionately affect the poorest and most marginalized communities, perpetuating cycles of poverty by impacting health, productivity, and educational outcomes. Addressing NTDs is crucial for achieving health equity.
- **Sustainable Development Goals (SDGs):** The elimination of NTDs is embedded in SDG 3

("Good Health and Well-being"), specifically Target 3.3, which aims to end the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases by 2030.

- **Public Health Impact:** Reducing the burden of NTDs improves overall public health, reduces disability and disfigurement, and enhances the quality of life for millions.
- **Economic Benefits:** Eliminating NTDs can lead to significant economic benefits by improving workforce productivity and reducing healthcare costs.
- **Climate Change Link:** The WHO has highlighted that climate change could exacerbate the spread of NTDs, as changing environmental conditions create new habitats for vectors. This necessitates adapting control interventions.

## Nickel



**Context:** A recent study has revealed a groundbreaking method for extracting nickel from low-grade ores using **hydrogen plasma instead of carbon**. This innovation has significant implications for making nickel production more sustainable and reducing its carbon footprint, especially relevant for countries like India with substantial low-grade reserves.

**1. About Nickel:**

- **Elemental Nature:** Nickel (Ni) is a metallic element with an atomic number 28. It has a **silvery-white, lustrous appearance** with a slight golden tinge and can be polished to a high shine.
- **Physical Properties:** It is a **hard, malleable, and ductile** transition metal. It is also a **good conductor of heat and electricity**. Nickel is one of only four elements (along with iron, cobalt, and gadolinium) that are **ferromagnetic at or near room temperature**.

- **Occurrence:**
  - o It is the **fifth-most common element on Earth** and occurs extensively in the Earth's crust and core (the Earth's core is thought to be composed primarily of an iron-nickel alloy).
  - o Nickel, along with iron, is also a common element in **meteorites**.
  - o It occurs naturally in **soil and water**.
  - o **Essential Nutrient:** It is an **essential micronutrient for plants**, required in very small amounts for certain enzyme functions.
- **Forms in India:** In India, nickel occurs principally as **oxides, sulphides, and silicates**.
- **Indian Reserves:** India has substantial **nickel laterite reserves**, particularly in **Odisha's Sukinda region** (Sukinda Valley, Jajpur district). Smaller deposits are also reported in parts of Jharkhand (e.g., Singhbhum). India's overall nickel resources are estimated at 189 million tonnes, with Odisha accounting for the majority.
- **World Distribution (Reserves):** The major countries with significant nickel reserves include:
  - o Indonesia (largest, ~42% of global reserves)
  - o Australia (~18%)
  - o Brazil (~12%)
  - o Russia (~6%)
  - o Cuba (~5%)
  - o Philippines

**2. Applications of Nickel:**

Nickel's outstanding physical and chemical properties make it essential in hundreds of thousands of products and critical for various industries:

- **Alloying (Dominant Use):** Its biggest use is in **alloying**, particularly with chromium and other metals to produce **stainless and heat-resisting steels**. Nickel enhances corrosion resistance,

strength, and durability. Over 60% of global nickel production goes into stainless steel.

- **Clean Energy Technologies (Growing Use):** Nickel is an increasingly important metal used in several clean energy technologies, especially for the **energy transition**:
    - o **Electric Vehicles (EVs):** Crucial component in **lithium-ion batteries** (specifically in cathode materials like Nickel Manganese Cobalt - NMC, and Nickel Cobalt Aluminium - NCA formulations) used in EVs due to its ability to increase energy density, allowing for longer range and better performance.
    - o **Hybrid Vehicles:** Used in **rechargeable nickel-cadmium batteries and nickel-metal hydride (NiMH) batteries**.
    - o **Renewable Energy Storage:** Employed in grid-scale battery storage systems.
    - o **Renewable Energy Infrastructure:** Found in components for solar panels, wind turbines (especially in offshore environments where corrosion resistance is vital), and geothermal energy systems.
    - o **Nuclear Energy & Carbon Capture:** Used in high-temperature alloys for nuclear reactors and carbon capture systems.
    - o **Hydrogen Production:** Relevant for hydrogen production technologies.
- **Other Applications:**
    - o **Plating and Coatings:** Used to electroplate other metals to provide a corrosion-resistant and attractive finish (e.g., in automotive and marine industries).
    - o **Aerospace and Defense:** High-temperature nickel alloys (superalloys) are critical for jet engines, gas turbines, and other aerospace components due to their ability to withstand extreme temperatures and corrosive environments.
    - o **Electronics:** Used in mobile phones, power tools, and hard drives.
    - o **Coins:** Historically used in coinage (e.g., the US "nickel" coin, which is an alloy of copper and nickel).
    - o **Catalysts:** Used as a catalyst in various chemical processes, particularly for hydrogenation.
    - o **Medical Applications:** Due to its biocompatibility and corrosion resistance, it finds use in medical implants and surgical instruments.

**3. Latest Development: Hydrogen Plasma Extraction:**

- **Traditional Extraction Challenges:** Conventional nickel extraction, especially from low-grade laterite ores, is often energy-intensive and involves pyrometallurgical methods that use carbon (like coke) as a reducing agent, leading to significant **CO2 emissions** (up to 20 tons of CO2 per ton of nickel produced).
- **New Method:** A recent study by the **Max Planck Institute for Sustainable Materials** has developed a method to extract nickel using **hydrogen plasma instead of carbon**.
- **Process:**
    - o Hydrogen gas is converted into **plasma using an electric arc furnace**.
    - o This hydrogen plasma then reacts directly with nickel oxide (the form found in laterite ores) in a single-step metallurgical process.
    - o The reaction produces **pure nickel and water (H2 O)**, instead of carbon dioxide (CO2 ).
- **Advantages:**
    - o **Reduced CO2 Emissions:** Significantly lowers the carbon footprint of nickel production. If the electricity for the electric arc furnace is sourced from

renewables, it can achieve near-zero emissions.

- o **Energy Efficiency:** Can be more energy-efficient (reportedly up to ~18% more) compared to multi-step traditional methods.
- o **Single-Step Process:** Simplifies the extraction and purification process, potentially reducing overall costs and time.
- o **Economic Viability for Low-Grade Ores:** This method is particularly effective for low-grade laterite ores, which are abundant in tropical regions (like Odisha's Sukinda belt in India), making it economically viable to exploit these previously challenging resources.

- **Significance:** This breakthrough is crucial for the sustainable supply of nickel, especially with the surging demand from the EV battery sector. It aligns with global efforts to decarbonize industrial processes and move towards a circular economy. India, with its substantial laterite reserves, could particularly benefit from this cleaner extraction technology to enhance domestic nickel production and reduce import dependency.

## BBX32 Protein



**Context:** Researchers from the **Indian Institute of Science Education and Research (IISER), Bhopal**, have made a significant discovery, finding that a single protein named **BBX32 helps plants time their crucial first step from darkness into light**, which is essential for successful seedling emergence and establishment.

**1. About BBX32 Protein:**

- **Classification:** BBX32 is a type of **B-box (BBX) protein**. B-box proteins are a diverse family of zinc finger transcription factors and regulators found in various plants. They play important roles in diverse aspects of plant growth and development, including seedling development, flowering, and stress responses.
- **Function:** This specific protein helps **control the precise timing of seedling emergence** from the soil and plays a crucial role in maximizing **proper seedling establishment**.
- **Significance of Timing:** The timing of seedling emergence is critical for plant survival. If the seedling emerges too early before reaching the surface, its delicate shoot tip could be damaged. If it emerges too late, it might exhaust its stored energy reserves.

**2. How BBX32 Works (Mechanism of Action):**

The discovery from IISER Bhopal elucidates a complex molecular pathway involving BBX32, which ensures the seedling's protective hook opens only when it's safe to do so:

- **Apical Hook Formation (in darkness):**
    1. When a seed sprouts underground in darkness, its stem (hypocotyl) forms a characteristic **small hook shape** at its tip.
    2. This hook acts as a **protective shield** for the delicate shoot tip (containing the meristematic tissues and nascent leaves) as the seedling pushes upward through the soil.

- **Maintaining the Hook (Underground):**
    1. The hook needs to **stay 'closed'** or tightly curved until the seedling successfully breaks through the soil and senses light.
    2. **Ethylene** (a gaseous plant hormone that accumulates underground) and **light** (once the seedling breaches the soil) work together to precisely determine when this hook should open.

3. BBX32 plays a direct role in this process by **helping keep its first leaves folded and the hook closed** until emergence from the soil. This provides crucial aid in the overall seedling establishment process.

- **Molecular Pathway:** The research details a specific protein chain reaction:
    1. **BBX32's Role:** BBX32 was found to **raise the activity of the PIF3 protein**.
    2. **PIF3 Activation: PIF3 (Phytochrome Interacting Factor 3)** is a key transcription factor known to negatively regulate light responses in plants and plays a role in shade avoidance and dark growth. In this context, it is "switched on" or its activity is enhanced by BBX32.
    3. **HLS1 Activation:** The activated PIF3 protein, in turn, **switches on the HLS1 (HOOKLESS1) gene**.
    4. **HLS1 Function:** HLS1 is the protein that **directly keeps the hook closed/bent**. It is essential for apical hook formation and maintenance.

- **Validation:** The study found that if **PIF3 was missing** (in mutant plants), **BBX32 couldn't prevent the hook from opening prematurely**, demonstrating that BBX32 acts upstream of PIF3 and its function is dependent on PIF3. Conversely, if BBX32 levels were higher (e.g., due to ethylene in the dark), PIF3 activity was boosted, and the hook remained closed.

## 3. Importance of the Discovery:

- **Fundamental Plant Biology:** This research provides crucial insights into the **complex molecular mechanisms** that govern early plant development, specifically how plants integrate environmental cues (light, soil conditions, hormones) to time critical developmental transitions.

- **Agricultural Applications:** Understanding BBX32's role offers **new leads to control the timing of seedling emergence**. This knowledge can potentially be applied in agriculture to:
    o **Improve Crop Survival:** Develop crop varieties that can establish better in challenging soil conditions (e.g., dense, wet, compacted soils), leading to higher survival rates.
    o **Enhance Yields:** By ensuring proper seedling establishment, it can contribute to more robust early growth and ultimately higher crop yields.
    o **Climate Adaptation:** As climate change brings more variable and extreme environmental conditions, understanding and manipulating such intrinsic plant mechanisms can help develop climate-resilient crops.
    o **Genetic Engineering/Breeding:** BBX32 could be a target for gene editing or traditional breeding programs to enhance desirable traits related to germination and early growth.

- **Sustainable Agriculture:** By improving seedling establishment and plant resilience, this research contributes to more sustainable agricultural practices, potentially reducing the need for repeated sowing or chemical interventions.

## Cathepsin B
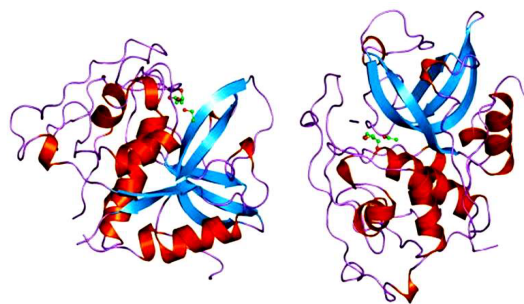


**Context:** Researchers at the **National Institute of Animal Biotechnology (NIAB)** in India have made a significant finding: reducing the activity of a cellular protein called **'Cathepsin B' (Cat B)** helps preserve the ovarian reserve. This discovery has major implications for understanding and potentially extending female fertility in both humans and livestock.

## 1. About Cathepsin B (Cat B):

- **Classification:** Cathepsin B is a type of **lysosomal cysteine protease**. Proteases are enzymes that break down proteins, and cysteine proteases use a cysteine amino acid residue in their active site. Lysosomal means it primarily functions within lysosomes, which are cellular organelles responsible for waste degradation and recycling.

- **Localization:** It is primarily located within subcellular **endosomal and lysosomal compartments**, but can also be found in other cellular locations and even secreted outside cells under certain conditions.

- **Functions:** Cathepsin B is involved in a wide array of vital cellular processes:

  o **Protein Turnover and Degradation:** A fundamental role in the breakdown and recycling of both intracellular (within the cell) and extracellular (outside the cell) proteins.

  o **Lysosome-mediated Cell Death:** Plays a role in triggering or executing programmed cell death pathways.

  o **Antigen Processing:** Important for the immune system, by processing antigens for presentation to immune cells.

  o **Apoptosis:** Involved in this specific type of programmed cell death.

  o **Extracellular Matrix Degradation:** It can degrade key components of the extracellular matrix like collagen and fibronectin, which are structural proteins outside cells.

- **Role in Disease:** Cathepsin B is implicated in various pathological conditions:

  o **Neurodegenerative Diseases:** Involved in neuropathological conditions such as dementia, Alzheimer's disease, and traumatic brain injury.

  o **Cancer:** Upregulated in many cancers, contributing to tumor invasion and metastasis.

  o **Inflammatory Diseases:** Implicated in chronic inflammatory conditions.

## 2. What is Ovarian Reserve?

- **Definition:** The ovarian reserve refers to the **finite pool of egg cells (oocytes)** that female mammals (including humans) are **born with**. It represents the reproductive potential of a female.

- **Non-Regenerative:** Unlike sperm in males, these crucial egg cells **cannot be naturally regenerated** or produced after birth.

- **Decline over Time:** Over a female's lifespan, the **quantity and quality of these eggs naturally decline**. This decline is a normal part of reproductive aging and is influenced by several factors:

  o **Age:** The most significant factor; the process accelerates with age, particularly after the early 30s in humans.

  o **Oxidative Stress:** Damage to cells caused by reactive oxygen species.

  o **Inflammation:** Chronic inflammatory processes can negatively impact ovarian health.

  o **General Cellular Wear and Tear:** Accumulation of cellular damage over time.

  o **Genetic Factors:** Some genetic predispositions can lead to a faster decline.

  o **Lifestyle Factors:** Smoking, excessive alcohol consumption, and exposure to environmental toxins.

  o **Medical Interventions:** Previous ovarian surgeries, chemotherapy, or radiation therapy.

- **"Cat B" as a Key Driver:** The NIAB research suggests that **Cathepsin B, being a protein-degrading enzyme, seems to be a key driver of this natural decline** in ovarian reserve.
- **Potential for Fertility Extension:** By **lowering the levels or activity of Cathepsin B**, scientists may be able to **delay egg loss**, thereby potentially extending fertility naturally in both human females and livestock. This opens new avenues for addressing infertility and improving reproductive health outcomes.

### 3. NIAB Research Significance:

- The findings from the National Institute of Animal Biotechnology (Hyderabad) utilized **mouse models and cultured goat ovaries**.
- This research is pivotal because it identifies a specific molecular target (Cathepsin B) that could be manipulated to slow down ovarian aging.
- **Implications for Human Fertility:** Could pave the way for non-invasive or pharmacological interventions to extend a woman's reproductive lifespan, providing more choices for family planning and potentially reducing reliance on expensive and often challenging assisted reproductive technologies like IVF.
- **Implications for Livestock Productivity:** In the agricultural sector, extending the reproductive lifespan of animals like cattle and goats could lead to more offspring per animal, directly boosting herd productivity and enhancing the economic stability of farmers.
- The study highlights the intricate interplay of cellular degradation pathways and reproductive aging, offering a novel therapeutic strategy to preserve fertility.

## DNA Identification



**Context:** Following the recent Air India Boeing 787 Dreamliner crash in Ahmedabad, authorities are utilizing **DNA analysis** to identify the remains of the victims. DNA identification is considered the most reliable method for such critical tasks, especially in mass fatality events.

### 1. About DNA Identification:

- **Gold Standard:** DNA identification is the **gold standard** for identifying human remains, particularly after mass fatality incidents (like plane crashes, natural disasters, or terror attacks) where traditional identification methods (visual recognition, dental records, fingerprints) are not feasible due to severe fragmentation or degradation of bodies.
- **Principle:** It relies on the unique genetic makeup of each individual. While most of our DNA is similar, specific regions have variations that are unique to almost every person (except identical twins).

### 2. Collection and Storing Samples of DNA:

- **Degradation:** DNA begins to degrade immediately after an individual dies.
- **Environmental Impact:** DNA survives much better in **cold and dry conditions** compared to hot and humid environments.
- **Storage Conditions:** Once collected, DNA samples should be stored in as cool and dry an environment as possible. Ideal storage involves:
  - **Freezing:** At minus 20 degrees Celsius.
  - **Chemical Preservation:** Soft tissues (skin, muscles, etc.) may be stored in 95% ethanol.

- **Tissue Type and Degradation:**
  - o DNA from **soft tissues degrades much faster** than DNA from **hard tissues (bones and teeth)**.
  - o This is because the cells within hard tissues are largely protected from the effects of decomposition and putrefaction. Bones and teeth provide a protective matrix that preserves DNA for longer periods.

**3. Methods to Analyze DNA Samples for Identification:**

Different methods are used depending on the quality and quantity of the DNA sample available:

- **(a) Short Tandem Repeat (STR) Analysis:**
  - o **Mechanism:** This method evaluates **short tandem repeats (STRs)**. These are short, repeating sequences of DNA (typically 2 to 7 base pairs long) found at specific locations (loci) on chromosomes.
  - o **Uniqueness:** STRs are highly variable between individuals, making them ideal for identification.
  - o **Profiling:** By analyzing 15 or more of these highly variable regions of DNA, a unique "DNA profile" is generated. This profile can then be used to confirm individual identity or ascertain family relationships with high confidence.
  - o **DNA Type:** STRs are typically found on **nuclear DNA**, which is located within the nucleus of a cell.
  - o **Requirement:** For STR analysis to be effective, the nuclear DNA extracted from the sample must **not be significantly degraded**. This is the most common and preferred method when good quality DNA is available.
- **(b) Mitochondrial DNA (mtDNA) Analysis:**
  - o **When Used:** This method is employed when **nuclear DNA is degraded or unavailable** (e.g., from very old or highly compromised remains).

- o **Location:** Mitochondrial DNA (mtDNA) is found within the cell's energy-producing organelles called **mitochondria**.
  - o **Advantage:** mtDNA is present in **multiple copies** within each cell (hundreds to thousands of copies), making it easier to recover from poorly preserved human remains compared to nuclear DNA (which has only two copies per cell).
  - o **Inheritance:** mtDNA is passed down exclusively by the **mother** to all her children (both male and female), largely unchanged across generations.
  - o **Matching:** This allows for matching samples from a person's remains with reference samples from any individual in their direct maternal line, such as their mother, maternal grandmother, siblings, maternal aunts or uncles, and more distant maternal relatives.
- **(c) Y Chromosome Analysis:**
  - o **Chromosomes:** Biological males typically have one X and one Y chromosome, while biological females typically have two X chromosomes.
  - o **Inheritance:** The Y chromosome is passed down almost entirely **from father to son**, unchanged.
  - o **Mechanism:** This method examines a panel of STRs located on the Y chromosome.
  - o **When Used:** It is particularly useful when close direct relatives are not available for comparison. Any male member of the victim's paternal line, including brothers, paternal uncles, and paternal male cousins, can be used for matching the remains. This method is also useful in cases involving mixed DNA samples where male DNA needs to be isolated and identified from female DNA.

- **(d) Single Nucleotide Polymorphisms (SNPs) Analysis:**
    - **When Used:** This method is used when the DNA to be analyzed is **highly degraded** and other methods might not yield sufficient information.
    - **Mechanism:** A SNP (pronounced "snip") is a variation in the DNA sequence where a **single base** (A, C, G, or T) at a specific location differs among people.
    - **Uniqueness:** Although individual SNPs might be common, the unique combination of thousands or millions of SNPs across a person's genome can be highly distinctive.
    - **Matching:** SNPs can be used for identification with the help of reference samples taken from the victim's personal belongings (e.g., toothbrush, hairbrush, clothing with shed skin cells) or from family members, especially when a large number of SNPs are analyzed.

## Kounis Syndrome



Allergic reaction → Acute phase Kounis syndrome → Late phase ( > 6 h) Recurrent Kounis syndrome

Coronary artery — Vasospasm — Recurrent Vasospasm
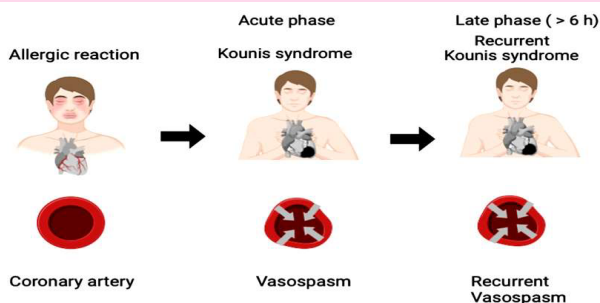
- **Prominent Indian Industrialist's Death:** Recently, a prominent Indian industrialist died due to a bee sting, which has raised questions about rare allergic reactions like Kounis Syndrome and sudden heart attacks in otherwise healthy adults.
- **Significance:** This incident highlights the critical and potentially fatal link between allergic reactions and cardiovascular events, emphasizing the need for increased awareness

and prompt diagnosis of this often-misunderstood condition.

**About Kounis Syndrome**
- **Definition:** A rare medical condition where an allergic reaction *triggers* a heart problem.
- **Classification:** Classified as a form of **Acute Coronary Syndrome (ACS)** – a term typically used for conditions like heart attacks – but specifically brought on by an allergic or hypersensitivity response.
- **Other Names:** Sometimes referred to as **allergic angina** or **allergic myocardial infarction**.
- **Mechanism:**
    - Occurs when a person is exposed to a **trigger** (e.g., insect sting, drug, food).
    - The body's immune system activates **mast cells**.
    - Mast cells release chemicals including **histamine and cytokines**.
    - These substances cause:
        * Sudden **spasm or tightening of coronary arteries**.
        * May rupture or erode existing plaque, worsening any blockages.
        * Reduce blood flow to the heart, leading to **ischemia** (lack of oxygen) or **infarction** (tissue death).
- **Symptoms:**
    - Chest pain
    - Rash, hives, or swelling (angioedema)
    - Shortness of breath or wheezing
    - Low blood pressure
    - ECG changes such as ST-segment elevation or depression (similar to a typical heart attack)

**Types of Kounis Syndrome**
- **Type I:**
    - Occurs in individuals with **normal coronary arteries** (no pre-existing heart disease).
    - The allergic reaction causes coronary artery spasms, reducing blood flow and potentially leading to a heart attack.

- **Type II:**
  - Affects individuals with **existing coronary artery disease** (e.g., atherosclerotic plaques).
  - The allergic reaction destabilizes these plaques, causing them to rupture and leading to a full heart attack.
- **Type III:**
  - Seen in patients with **coronary stents**.
  - The allergic response may lead to clot formation (*thrombosis*) within the stent.

**Triggers of Kounis Syndrome**

- **Insect stings or bites:** Especially from bees and wasps.
- **Certain medications:** Particularly antibiotics (e.g., beta-lactams), NSAIDs (painkillers), anesthetic agents, contrast dyes.
- **Foods:** Such as shellfish, nuts, or kiwi.
- **Environmental allergens:** Such as latex.
- **Underlying health conditions:** Like mastocytosis (a disorder involving excess mast cells).

**Treatment for Kounis Syndrome**

Treatment is complex and requires addressing both the allergic reaction and the cardiac event simultaneously, often with caution to avoid exacerbating either condition.

- **For the allergic reaction:**
  - Antihistamines (H1 and H2 blockers)
  - Corticosteroids
  - Epinephrine (adrenaline) - administered cautiously in cardiac patients due to potential to worsen ischemia.
- **For the heart (Standard Cardiac Care):**
  - Oxygen administration.
  - Nitrates (vasodilators) - to relax coronary arteries, if blood pressure allows.
  - Calcium channel blockers - also used as vasodilators.

- Blood thinners (antiplatelet agents like aspirin, clopidogrel; anticoagulants) - especially in Type II and III.
- **Avoid (or use with extreme caution):** Beta-blockers (can worsen anaphylaxis) and opiates (can cause histamine release).
- **Specific for Type III:** May require aspiration of the intrastent thrombus and/or a new stent placement.

## Gwada Negative (EMM-negative) Blood Group System
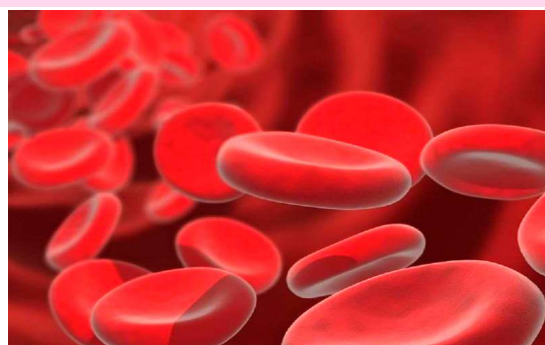


- **New Blood Group System Identified:** France's national blood agency, the French Blood Establishment (EFS), has identified a completely new blood group system, officially recognized by the International Society of Blood Transfusion (ISBT).
- **Naming:** Dubbed "Gwada negative" colloquially, but officially registered as **EMM-negative (ISBT042)**. "Gwada" refers to the Guadeloupean origin of the woman who carries it.
- **Significance:** This discovery adds to the understanding of human blood diversity and has critical implications for transfusion medicine, especially for the individual carrying this extremely rare blood type, as finding compatible blood for transfusions becomes a major challenge.

**About Gwada Negative (EMM-negative)**

- **Formal Name:** EMM-negative (ISBT042).
- **Informal Name:** "Gwada negative."

- **Defining Characteristic:** Defined by the **absence of the EMM antigen**.
- **EMM Antigen:**
  - Normally found on red blood cells.
  - Considered a **high-incidence antigen**, meaning it is present in nearly all humans (over 99.99% of the population).
- **Rarity:** The absence of such a high-incidence antigen makes this new system extremely rare and medically significant.
- **Criteria for a New Blood Group System:** For a blood group to be recognized as a new system, it must meet these criteria:
  - Genetically determined.
  - Inherited.
  - Identifiable via serological or molecular techniques.
  - Have an associated antibody.
  - The EMM-negative system meets all these criteria.
- **Current Status of Recognition:** It is the **48th globally recognized blood group system** in transfusion science, adding to the previously known 47 systems.
- **Known Cases:** As of now, the woman from Guadeloupe is the **only known person in the world** to possess this blood type.
- **Inheritance:** Her unique case stems from inheriting the mutated gene from both her mother and her father, each of whom likely carried a single copy of the rare gene variant. This dual inheritance led to a complete lack of the EMM antigen in her red blood cells.
- **Clinical Implications:** Individuals with such rare blood types (lacking common antigens) can develop alloantibodies, which can lead to severe immune reactions (e.g., hemolytic shock) if transfused with blood containing the antigen they lack. For the Gwada-negative individual, this means she is only compatible with her own blood (autologous donation) or

potentially other, yet-to-be-discovered, EMM-negative individuals.

**Key Facts about International Society of Blood Transfusion (ISBT)**

- **Founded:** 1935 in Paris.
- **Headquarter:** Amsterdam, Netherlands.
- **Functions:**
  - Aids in the solution of scientific and practical problems in blood transfusion.
  - Facilitates the development of closer ties among those concerned with blood transfusion issues.
  - Promotes **standardization of methods, equipment, and norms** for its field (e.g., blood group nomenclature).
  - Acts as the global knowledge network for Transfusion Medicine.
  - Promotes research and best practices across the entire transfusion chain.
  - Maintains the official record of all currently recognized blood group systems.

## Black Mass Recovery Technology



- **Financial Support for Commercialization:** The Technology Development Board (TDB), Department of Science & Technology (DST), Government of India, has extended financial support for the commercialization of **Indigenous Battery Recycling Technology**.
- **Recipient:** This support has been provided to Gurugram-based startup **BatX Energies Pvt. Ltd.**
- **Significance:** This initiative marks a crucial step towards establishing a robust domestic battery

recycling infrastructure, aligning with India's "Atmanirbhar Bharat" (self-reliant India) vision. It will significantly reduce India's reliance on imported critical minerals for battery manufacturing, enhance resource security, promote a circular economy, and contribute to the country's clean energy goals.

**About Black Mass Recovery Technology**

- **Purpose:** Designed to extract battery-grade lithium, cobalt, nickel, and manganese from **end-of-life lithium-ion batteries**.

- **Process Method:** Utilizes a **dual-mode (wet and dry) black mass recovery technology**.

  - **Wet method (Hydrometallurgy):** Involves using chemical solutions to dissolve metals from the black mass. This process is generally preferred for its higher efficiency and purity of recovered materials.

  - **Dry method (Pyrometallurgy):** Involves high-temperature treatment to recover metals, though it can lead to loss of some volatile elements like lithium. The dual-mode capability ensures versatility.

- **Efficiency:** Ensures high separation efficiency and recovery rates of **up to 97–99%** for critical metals.

- **Indigenous Development:** The entire end-to-end process, including:

  - Collection of batteries.
  - Shredding.
  - Metal leaching (dissolving metals).
  - Downstream purification.
  - This entire process is **indigenously developed and patented**, significantly reducing reliance on imported recycling equipment and expertise.

- **Recovered Products:** The technology recovers battery-grade compounds such as **lithium carbonate, cobalt sulphate, nickel sulphate, and manganese sulphate**.

- **Market Impact:** These recovered compounds meet global specifications and will cater to both domestic consumption (for new battery manufacturing) and exports.

- **Significance:**

  - **Minimize Import of Critical Minerals:** Aims to minimize the import of critical minerals by recycling already available ones within the country. This is crucial as India currently imports a large percentage of these minerals, making it vulnerable to supply chain disruptions and price volatility.

  - **Circular Economy:** Promotes a circular economy model by turning waste into valuable resources, reducing the environmental impact of battery disposal.

  - **Environmental Benefits:** Reduces the need for virgin mining, which is energy-intensive and environmentally damaging.

  - **Strategic Independence:** Enhances India's strategic independence in the critical minerals supply chain, essential for the growth of electric vehicles (EVs) and renewable energy storage.

**What is Black Mass?**

- **Definition:** It is the term used to describe the **dark, granular material** that remains after lithium-ion batteries are shredded and mechanically processed during recycling.

- **Composition:** It contains a valuable mix of active materials from the battery's cathode and anode, including:

  - **Lithium**
  - **Cobalt**
  - **Nickel**
  - **Manganese**
  - **Graphite** (which gives it its dark color)
  - May also contain smaller amounts of other elements like iron, aluminum, and copper.

- **Importance:** These materials are essential to the production of new lithium-ion batteries, particularly for electric vehicles, grid-scale energy storage systems, and various consumer electronics. Recovering them from black mass is more sustainable and often more economical than mining new virgin materials.

# EDITORIALS

## Crux of The Hindu & Indian Express

### Science & Technology

## Mobile Biosafety Level-3 Laboratory



- **Capacity Expansion:** The Indian Council of Medical Research (ICMR) is in the process of **adding to its Mobile Biosafety Level-3 (MBSL-3) laboratory capacity**. This is a strategic move to enhance India's outbreak response capabilities and strengthen public health delivery, particularly in remote and underserved regions.

- **Current Status & Deployment:** Currently, two such mobile laboratories are operational, stationed at the **National Institute of Virology (NIV) in Pune** and the **Regional Medical Research Centre (RMRC) in Gorakhpur, Uttar Pradesh**.

- **Proven Effectiveness:** These mobile labs were successfully deployed during the **Nipah virus outbreaks in Kerala** (Kozhikode in 2023 and Malappuram in 2024), where they played a crucial role in rapid diagnosis and containment, showcasing their strategic value in managing health crises.

## About Mobile Biosafety Level-3 Laboratory

- **Alternative Name:** Also known as **RAMBAAN (Rapid Action Mobile BSL-3 Advanced Augmented Network)**.

- **Nature:** It is a fully **indigenous and sophisticated Mobile BSL-3 'laboratory on wheels'**. It's a field-deployable unit designed for rapid diagnosis and investigation of high-risk pathogens.

- **First Deployment:** First operationally deployed in response to the **Nipah virus outbreak in Kozhikode, Kerala in September 2023**, and again in Malappuram in July 2024.

- **Development:** Developed under the **Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM-ABHIM)** in collaboration with **Klenzaids Contamination Controls Pvt. Ltd., Mumbai**. It is built on a heavy-duty Bharat Benz chassis, compliant with BS VI standards, and designed to function in extreme environmental conditions.

- **WHO Classification:** It's classified as a **Type-IV Rapid Response Mobile Laboratory** in the WHO's Global Outbreak Alert and Response Network (GOARN) classification, signifying its rapid deployment and advanced capabilities.

## Features of Mobile Biosafety Level-3 Laboratory

- **Biosafety Environment:** Designed to maintain a **negative air pressure environment**, meaning air flows into the laboratory from outside, preventing contaminants from escaping. This is a critical containment feature for BSL-3 labs.

- **HVAC System:** Equipped with an advanced **heating, ventilation, and air-conditioning (HVAC) system with HEPA filters**. HEPA (High-Efficiency Particulate Air) filters remove airborne particulates, including microbes, ensuring clean air circulation within the lab and before exhaust.

- **Waste Management:**
  - Features a **double-door autoclave** for safe decontamination of biological waste and lab equipment through high-

pressure steam sterilization without breaking the containment barrier.

- o Includes a **biological liquid effluent decontamination (BLED)** system to treat and neutralize liquid waste generated inside the lab before disposal.
- o Utilizes a **hydrogen peroxide (H2O2) fogger system** for thorough disinfection of the lab environment after use.

- **Internal Layout:** Divided into four designated zones for operational efficiency and biosafety:
  - o Zone 1: Driver's cabin and outer change room.
  - o Zone 2: Shower and inner change room (for donning/doffing PPE).
  - o Zone 3: Main laboratory (where work with pathogens occurs).
  - o Zone 4: Decontamination and staging area.

- **Other Systems:** Includes biological safety cabinets (Class II A2), a programmable logic controller (PLC) system, dynamic pass boxes for material transfer, and a biometric-controlled shower system.

- **Validation:** The MBSL-3 was rigorously validated by **ICMR-National Institute of Virology, Pune, in 2022-2023**, including onsite and on-field validation, ensuring its adherence to stringent BSL-3 protocols.

- **Power Supply:** Can operate on direct electric supply, diesel generators, or petrol generators, ensuring an uninterrupted power supply.

- **Communication & Surveillance:** Managed via walkie-talkies for internal communication and CCTV systems for real-time surveillance.

**What is a Biosafety Level 3 (BSL-3) Laboratory?**

- **Definition:** BSL-3 laboratories are high-containment facilities used to study infectious agents or toxins that may be transmitted through the air (aerosols) and can cause **serious or potentially lethal infections** in humans.

- **Examples of Agents:** Pathogens requiring BSL-3 containment include *Mycobacterium tuberculosis* (tuberculosis), SARS-CoV-2 (COVID-19), Nipah virus, influenza virus strains, yellow fever virus, West Nile virus, and *Francisella tularensis* (tularemia).

- **Safety Features & Practices:** BSL-3 labs incorporate stringent safety features and practices to protect personnel, the community, and the environment:
  - o **Controlled Access:** Access is strictly controlled, often requiring multiple locked doors, card access, or biometrics.
  - o **Specialized Ventilation: Negative air pressure** is maintained, and all exhaust air is **HEPA-filtered** before being released.
  - o **Decontamination:** All waste generated, including liquids and solids, must be decontaminated (e.g., autoclaved, chemically treated) before removal from the lab.
  - o **Personal Protective Equipment (PPE):** Personnel wear extensive PPE, including respirators (like N95 or PAPRs), scrub suits, coveralls, double gloves, and sometimes full-body suits.
  - o **Biological Safety Cabinets (BSCs):** All work involving infectious materials is performed within Class I or Class II Biological Safety Cabinets, which provide primary containment.
  - o **Facility Design:** Labs are designed to be easily decontaminated, with seamless, non-porous surfaces and controlled entry/exit procedures, including showers.
  - o **Training:** Personnel undergo rigorous training in BSL-3 practices and emergency procedures.

# India's AI Progress - Common Compute Capacity and Foundation Models
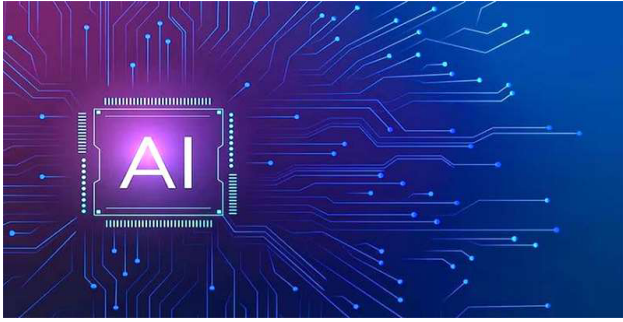


**Context:**

- India has taken big steps in Artificial Intelligence (AI) through its **IndiaAI Mission**.
- Recently, the country significantly increased its AI computing power (GPUs) and selected more startups to build India-specific AI models.

## I. Key Milestones and Vision

- **Increased Compute Capacity:** India's total AI computing power, measured in **GPUs (Graphics Processing Units)**, has now crossed **34,000 GPUs**. This is a major increase.
- **New Foundation Models:** Three more Indian startups have been chosen to develop **"Foundation Models"** – these are like the core AI brains that other AI tools are built upon.
- **Minister's Vision:** Union Minister for Electronics & Information Technology, Shri Ashwini Vaishnaw, emphasized **democratizing technology**. This means making AI accessible to many people, not just a few, so more can use it to create new solutions and opportunities.
- **Global Aim:** The Minister urged the selected AI teams to aim for a **top-five global position** in their areas.
- **Comprehensive Ecosystem:** The IndiaAI Mission aims to build a complete AI system in India, including:
  - Foundation models (the core AI).
  - Compute capacity (processing power).
  - Safety standards (ethical and responsible use).
  - Talent development (training skilled people).
  - **Reverse Brain Drain:** The mission also aims to bring talented Indians back to India.

## II. Development of Indigenous Foundation Models

The **IndiaAI Foundation Model pillar** focuses on creating AI models trained on India-specific data.

- **Proposals Received:** By April 30, 2025, **506 proposals** were received for this initiative.
- **Sarvam AI (Already Selected):**
  1. Selected on April 26, 2025, to build India's own **Sovereign LLM Ecosystem** (a large language model).
  2. Developing an **open-source 120 billion-parameter AI model**.
  3. Aims to improve government services and public access through tools like "2047: Citizen Connect" and "AI4Pragati."
  4. Previously launched **Sarvam-1 (2 billion parameters)** and **Sarvam-M (24 billion parameters)**.
- **Three New Startups Selected (after expert review):**
  1. **Soket AI:** Will develop India's first open-source **120 billion-parameter foundation model**. It will be optimized for India's many languages and used in areas like defense, healthcare, and education.
  2. **Gnani AI:** Will build a **14 billion-parameter Voice AI foundation model**. This model will process speech in many languages in real-time with advanced understanding.
  3. **Gan AI:** Will create a **70 billion-parameter multilingual foundation model** focused on "Superhuman TTS (text-to-speech)," aiming to be better than current global leaders.

### III. Expansion of Compute Capacity

- **Significant Addition:** An additional **15,916 GPUs** have been added to the existing **18,417 GPUs**, making a total of **34,333 GPUs**.
- **Industry Partnership:** This expansion was done with the help of industry partners.
- **Purpose:** This increased computing power will provide a shared AI platform for training AI models and running AI solutions. This is vital for developing Indian AI models and solutions tailored to India's needs.
- **Contributing Bidders:** Seven companies have offered their services for this compute capacity: Cyfuture India Pvt. Ltd., Ishan Infotech Ltd., Locuz Enterprise Solutions Ltd., Netmagic IT Services Pvt. Ltd., Sify Digital Services Ltd., Vensysco Technologies Ltd., and Yotta Data Services Pvt. Ltd.

### IV. IndiaAI I4C CyberGuard AI Hackathon

- **Initiative:** Part of the IndiaAI Applications Development Initiative.
- **Organizers:** Jointly with the **Indian Cyber Crime Coordination Centre (I4C)**, Ministry of Home Affairs.
- **Outcome:** Developed AI-based solutions to:
  - Improve how cybercrime complaints are classified.
  - Help find new crime patterns, trends, and common methods on the **National Cyber Crime Reporting Portal (NCRP)**.
- **Capabilities:** These AI models can understand complex inputs like handwritten police reports, screenshots, and audio calls, making analysis faster and more accurate.

### V. About IndiaAI

- **Implementation Agency:** IndiaAI is an **Independent Business Division under MeitY (Ministry of Electronics & Information Technology)**.
- **Mission:**
  - Make AI benefits available to everyone.
  - Strengthen India's leadership in AI.
  - Achieve technological self-reliance (making India independent in AI).
  - Ensure AI is used ethically and responsibly.

## India's DHRUVA Policy – Revolutionizing Digital Addresses



**Context:**

- The Department of Posts has launched a new digital policy called **DHRUVA (Digital Hub for Reference and Unique Virtual Address)**.
- This big step aims to change how address information is handled in India, making it a core part of India's Digital Public Infrastructure (DPI).

### I. What is DHRUVA and Why is it Important?

- **Goal:** DHRUVA aims to transform address data into a key pillar of Digital Public Infrastructure (DPI), like Aadhaar and UPI.
- This will help with new ideas, improve how the government works, and make services easier to get.
- **Building on Past Success:** DHRUVA builds on the success of **DIGIPIN (Digital Postal Index Number)**.
  - **DIGIPIN:** A strong, geo-coded (location-based) addressing system that was part of India's National Addressing Grid.
  - It provided unique, location-accurate IDs with clear names and directions, freely available to everyone.
  - **Groundwork:** DIGIPIN helped improve emergency services, logistics (delivery), and targeted public services by linking addresses to exact locations.

## II. Address-as-a-Service (AaaS): A Unified System

DHRUVA introduces **Address-as-a-Service (AaaS)**, a dynamic way for address data to be used and shared.

- **How AaaS Works:** People, government bodies, and businesses can securely share verified address information in real-time, but **only with consent**.

- **Key Features of AaaS:**
    - **Works Together:** Different address systems used by various groups can work with each other.
    - **Standard Format:** Addresses will follow a common format and have exact location tags.
    - **Consent-Based:** Users control who sees their address information, ensuring privacy.
    - **Public-Private Integration:** Government and private companies can easily use and develop new services with this system.

- **Impact:** By making digital addresses a core part of infrastructure, DHRUVA will make things smoother for:
    - E-governance (online government services)
    - Online shopping
    - City planning
    - Emergency services

## III. Benefits for Governance and Citizens

A single, reliable digital address system is vital for better governance.

- **Better Government Services:** DHRUVA helps governments deliver schemes and benefits more precisely. Ministries, state governments, local bodies, and public sector groups are encouraged to use it for accurate and inclusive service delivery.

- **Bridging the Digital Divide (Rural/Underserved Areas):**
    - In remote areas where addresses are often unclear, DHRUVA will give virtual, geo-coded IDs.
    - These IDs can be easily accessed and updated on phones or online.
    - This ensures that even far-off communities can benefit from digital services, financial inclusion, and emergency help.

## IV. Unlocking Potential for the Private Sector

DHRUVA is designed to boost efficiency in the private sector as well.

- **Business Efficiency:** For online shopping, financial tech (fintech), logistics, and delivery services, accurate address data is crucial.
    - Companies can avoid duplicate efforts.
    - Reduce delivery mistakes.
    - Plan delivery routes better, saving costs and making customers happier.

- **Trust and Compliance:** Businesses can use DHRUVA to verify addresses during **KYC (Know Your Customer)** checks, ensure rules are followed, and build trust in online deals.

- **Innovation:** The system's open design allows tech companies and startups to create new tools and services built on DHRUVA, encouraging a vibrant innovation ecosystem.

## V. Citizen Empowerment and Data Control

A core principle of DHRUVA is putting users in charge of their data.

- **User Control:** Citizens will have full control over their digital address identity.

- They can manage who accesses their details, update information, and securely share their verified address for different uses.

- **Privacy:** This approach boosts trust and supports India's commitment to data privacy and inclusive digital growth.

- **Accessibility:** The DHRUVA platform will support multiple languages, be easy to use on mobile phones, and connect with identity systems like Aadhaar, making it accessible to everyone.

## VI. Invitation for Public Feedback

- **Consultation:** The Department of Posts has released the DHRUVA policy document for public feedback.
- **Stakeholders:** Government bodies, tech companies, city planners, e-commerce firms, NGOs, and the public are invited to review and provide suggestions.
- **Purpose:** This feedback is important to refine the framework, ensuring it is inclusive, practical, and can adapt to future needs.
- **Submission:** Suggestions can be sent via email to digipin@indiapost.gov.in by **July 31, 2025**.

## VII. Looking Ahead: A Smarter India

- **Revolutionizing Addresses:** DHRUVA will change how India views addresses – not just as fixed labels, but as dynamic, verifiable, and useful data.
- **Future-Ready Nation:** It's a big step towards building a nation where everyone, service providers, and policymakers can rely on a secure, efficient, and interconnected addressing system.
- **Smart and Inclusive:** By combining location data, digital governance, and user-focused design, DHRUVA aims to create a smarter, more inclusive, and adaptable India.

## Using Bacteriophages to Combat Antimicrobial Resistance (AMR) – A Novel Solution to a Silent Pandemic



- Antimicrobial resistance (AMR) is a growing global health crisis causing millions of deaths every year.
- As traditional antibiotics lose their power and drug development stalls, scientists are turning to a surprising alternative: **bacteriophages — viruses that naturally kill bacteria.**
- This promising approach is gaining attention worldwide as a potential solution to AMR.

**What is Antimicrobial Resistance (AMR)?**

AMR happens when bacteria, viruses, fungi, or parasites change and stop responding to medicines. This makes infections harder to treat, spreading disease more easily and increasing the risk of severe illness and death.

- **The Scale of the Problem:** Around 5 million deaths each year are linked to AMR, and this number could double by 2050.
- Because it spreads quietly and steadily, AMR is called a "silent pandemic."
- **Consequences:** AMR leads to failed treatments, longer sickness, higher healthcare costs, and more deaths as common infections become untreatable.

Why Aren't New Antibiotics Being Developed?

- **Low Profit:** Antibiotics are usually taken for a short time, making them less profitable compared to drugs for chronic diseases like cancer.
- **Resistance Risks:** New antibiotics are used sparingly to avoid fast resistance, which lowers demand.
- **Insufficient Research:** Efforts to develop new drugs aren't keeping pace with the growing resistance problem.

**What Are Bacteriophages?**

Bacteriophages, or phages, are viruses that infect and kill bacteria. They're everywhere — in water, soil, and even inside our bodies. In fact, there are ten times more phages than bacteria on Earth!

- **History:** Phages were studied as treatments about 100 years ago but were overshadowed by antibiotics.
- However, countries in the former Soviet Union continued to use phage therapy when antibiotics were scarce.
- **Current Revival:** With the rise of AMR, many countries are now rediscovering phages.

- They've been used to treat infections like burns, ulcers, gut infections, respiratory diseases, and urinary tract infections.

How Does Phage Therapy Work?

**Two Main Approaches:**

1. **Natural Phages (Personalized Treatment):**

   o The patient's bacterial infection is isolated.

   o Scientists test different phages to find one that kills the bacteria.

   o That phage is grown in large amounts and given to the patient.

   This is a highly personalized approach, similar to precision medicine.

2. **Genetically Engineered Phages:**

   o Phages are modified in labs to target more types of bacteria or be more effective.

Unique Features and Challenges of Phage Therapy

- **An Evolving Treatment:** Bacteria can become resistant to phages, but phages can also evolve to overcome this resistance. This makes phage therapy a "living" treatment that changes over time.

- **Regulatory Difficulties:** Traditional drug approval processes don't work well for treatments that evolve. This is a major challenge for regulators.

- **High Specificity:** Phages target specific bacteria strains, unlike broad-spectrum antibiotics. This makes it hard to run typical clinical trials, which require testing one drug on many similar patients.

**Current Ways to Access Phage Therapy**

Due to the urgent need for new treatments, some countries have special programs to allow phage use before full approval:

- **Compassionate Use or Emergency Access:** For critically ill patients who have no other options.

- **Magistral Route (e.g., Belgium):** Pharmacies prepare personalized phage treatments under medical supervision.

**A Vision for the Future: The "Device" Approach**

Researchers in Belgium, led by Jean-Paul Pirnay, are developing an innovative solution to overcome regulatory issues:

- **An Integrated Device That Can:**

   o Isolate the patient's bacteria.

   o Sequence its genetic code.

   o Use Artificial Intelligence (AI) to select the best phage.

   o Produce that phage on-site

   o Deliver it immediately to the patient.

- **Regulatory Benefit:** Instead of regulating the phage as a drug, the device would be regulated like a medical instrument, making approval simpler.

- **Why It Matters:** This approach could allow fast, personalized, on-demand phage treatments anywhere, offering a powerful tool against AMR.

**Conclusion**

AMR is a global threat that demands new ideas. While antibiotics face serious limits, bacteriophage therapy offers a dynamic and effective weapon against resistant bacteria. Tackling the unique challenges of phage regulation is essential. The "device" approach integrating AI is a groundbreaking step toward scalable, personalized treatment. Supporting bold initiatives like this is crucial in the urgent fight against the silent pandemic of AMR.

**Why Axiom-4 Matters: Explained**



**Introduction: A New Phase in India's Space Journey**

- Indian astronaut **Shubhanshu Shukla's** trip to the International Space Station (ISS) on the **Axiom-4 mission** is an important step for India's space program.

- India has already done many important missions like **Chandrayaan-3's Moon landing**.
- The Axiom-4 mission brings India closer to sending its own astronauts into space with the upcoming **Gaganyaan mission**.

## I. From Rakesh Sharma to Shubhanshu Shukla: How India's Space Program Has Grown

- In 1984, **Rakesh Sharma** became the first Indian in space on a Russian mission.
- It was a proud moment but mostly symbolic **because India didn't have the technology or plans to send humans into space regularly.**
- Shukla's mission is different.
- It is connected to India's current space plans and will help with future missions like Gaganyaan.
- ISRO has grown into a capable space agency able to do complex missions, but sending humans into space is still a new challenge.

## II. Why Axiom-4 Is Important for Gaganyaan and Future Missions

- Sending humans into space is much harder than sending machines because of safety concerns.
- **Shukla is the pilot of Axiom-4 and will gain real experience flying a spacecraft** and reaching the ISS, which moves in orbit.
- This hands-on experience is very useful for training future Indian astronauts who will fly on Gaganyaan.
- Shukla will be the **first Indian to visit the ISS and** learn how it works, which will help ISRO plan its own space station in the future.

## III. Experiments on Axiom-4: Building India's Space Research

- ISRO has designed special experiments for the mission, many related to biology and technology.
- **Space's zero-gravity helps to study things like muscle loss** without the effect of weight, which is hard to do on Earth.

- **Experiments on plants like moong dal sprouts and micro-algae** are important for India's future space research.
- These experiments will help to prepare for more studies on the Gaganyaan mission.

## IV. Helping India's Space Economy and Inspiring New Talent

- Shukla's mission is part of efforts to build a strong space sector with more involvement from private companies.
- Private sector participation can speed up innovation, lower costs, and bring new ideas.
- The **global space market is worth about $500 billion and is expected to grow.**
- **India currently has only about 2% share** but wants to increase this to 10%.
- The mission will inspire young people in India to take interest in space careers, unlike before when there were fewer opportunities.

## V. Looking Ahead: Preparing for Bigger Goals

- Axiom-4 is a step toward India's own crewed space mission, Gaganyaan.
- Learning from the ISS experience will help ISRO plan and build its own space station.
- India also aims to land humans on the Moon by 2040, and missions like Axiom-4 help prepare for that.

## Conclusion

The Axiom-4 mission is more than just a space trip. It provides important real-world experience for India's astronauts, supports scientific research, helps build the space industry, and prepares India for bigger future missions. It marks a new phase in India's journey to become a major space power.

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# Ecology & Environment

## Kawal Tiger Reserve



**Why in News**

Recently, the Telangana State government created the **'Kumram Bheem Conservation Reserve'**. This new reserve is a tiger corridor that connects the Kawal Tiger Reserve in Telangana with the Tadoba-Andhari Tiger Reserve in Maharashtra.

**About Kawal Tiger Reserve**

- **Location:** In Telangana, along the Godavari River. It's part of the Deccan peninsula's central highlands.
- **Mountain Range:** It lies in the Sahyadri Mountain Ranges.
- **Connectivity:** It's at the southern end of the Central Indian Tiger Landscape. It links to Tadoba-Andhari Tiger Reserve (Maharashtra) and Indravati Tiger Reserve (Chhattisgarh). This link is very important for tigers to move between these areas.
- **Vegetation:** Mainly Southern Tropical Dry Deciduous Forest.
- **Flora (Plants):** Dominated by teak and bamboo. Other trees include *Anogeissus latifolia, Mitragyna parviflora, Terminalia crenulata, Terminalia arjuna, Boswellia serrata*.
- **Fauna (Animals):** Major animals include nilgai, chousinga, chinkara, blackbuck, sambar, spotted deer, wild dog, wolf, jackal, fox, tiger, leopard, and jungle cat. It's also home to over 240 bird species, including the Malabar Pied Hornbill and Long-Billed Vulture.

**What is a Conservation Reserve?**

- **Legal Basis:** Section 36(A) of the Wildlife Protection Act, 1972.
- **Who Declares:** The State government can declare these areas.
- **Which Areas:** Areas owned by the government, especially those next to national parks and sanctuaries, or areas that connect one protected area to another (corridors).
- **Purpose:** To protect landscapes, seascapes, plants (flora), animals (fauna), and their habitats.
- **Consultation:** The government must consult local communities before declaring a conservation reserve.

**Significance of Kumram Bheem Conservation Reserve**

- **Tiger Movement:** It ensures tigers can move freely between Kawal and Tadoba-Andhari reserves. This is vital for their survival, allowing them to find new mates and new territories.
- **Genetic Health:** Helps maintain healthy genetic diversity among tiger populations by preventing them from becoming isolated.
- **Less Conflict:** By securing these corridors, tigers are less likely to stray into human areas, which helps reduce conflicts between people and wildlife.
- **More Habitat:** It expands the available habitat for tigers and other wildlife.
- **Overall Conservation:** Protects not just tigers, but also leopards, wild dogs, sloth bears, and many other animals, contributing to the health of the whole ecosystem.

## Nalsarovar Bird Sanctuary

**Why in News**

A very rare Arctic seabird, the **Sabine's Gull**, was recently seen at Gujarat's Nalsarovar Bird Sanctuary. This is the first time it has been recorded in India since 2013.

**About Nalsarovar Bird Sanctuary**

- **Location:** About 64 km west of Ahmedabad, in Gujarat.
- **Description:** It's a natural lake with shallow waters and muddy areas, containing about 360 small islands.
- **Size:** Covers an area of 120.82 sq km.
- **History:**
  - The lake was formed in the 15th century due to a check dam built across the Sabarmati River.
  - It was first used for irrigation and drinking water.
  - Over time, it became an important home for many bird species.
  - The British government recognized it as a protected wetland in the early 20th century.
  - In **1969**, the Gujarat government declared it a **bird sanctuary** to protect its bird population.
  - In **2012**, it was designated as a **Ramsar Site**, recognizing its global importance as a wetland.
- **Flora (Plants):** Has 48 species of algae and 72 species of flowering plants. Common aquatic plants include *Cyperus sp., Scirpus sp., Typha ungustata, Eleocharis palustris, Ruppia, Potamogeton, Vallisnaria, Naias, Chara*, etc.
- **Fauna (Animals):**
  - **Birds:** Home to about **250 bird species**, including large numbers of greater and lesser flamingoes, pelicans, various ducks and geese, cranes (like Sarus cranes), cormorants, herons, egrets, storks, ibises, spoonbills, and waders. It's a critical stopover point for migratory birds along the Central Asia Flyway.
  - **Other Animals:** Small herds of wild ass can be seen on its southern or southwestern edges. Also present are mongoose, jungle cat, Indian fox, jackal, wolf, and hyena.

**Key Facts about Sabine's Gull**

- **Type:** A small gull, also known as the fork-tailed gull or xeme.
- **Breeding Grounds:** It breeds in the subarctic and high arctic regions of North America and Russia, and also in Greenland and Svalbard. It has the longest migration of any gull, traveling up to 39,000 km per year to winter in the Southern Hemisphere.
- **Identification:** Easily recognized by its unique wing pattern: a pale grey back, black primary (outer) flight feathers, and white secondary (inner) flight feathers. Its white tail is forked.
- **Conservation Status (IUCN Red List): Least Concern**.

**Ramsar Convention and Nalsarovar**

- The **Ramsar Convention on Wetlands** is an international treaty for the conservation and sustainable use of wetlands.
- Nalsarovar Bird Sanctuary was designated as a Ramsar Site in **2012**. This highlights its global ecological importance as a wetland habitat, providing a framework for its conservation and sustainable use, and recognizing its value to local communities.

## Phytoplankton
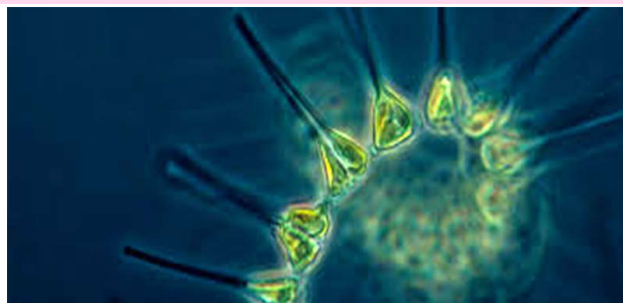


**Why in News**

According to recent research from U.S. institutions, **iron released due to human activities** is **boosting spring**

**phytoplankton blooms** and speeding up how quickly nutrients are used in oceans. This highlights how human actions can impact marine ecosystems.

**About Phytoplankton**

- **What they are:** Phytoplankton are **microscopic plants** (also called microalgae) that live in water.
- **How they live:** Like land plants, they contain **chlorophyll** and need **sunlight** to grow through **photosynthesis**. They also need inorganic nutrients like nitrates, phosphates, and sulfur, which they turn into proteins, fats, and carbohydrates.
- **Where they live:** Most phytoplankton float in the **upper parts of the ocean** where sunlight can reach them.
- **Main Types:**
    - **Dinoflagellates:** These have a whip-like tail (flagella) to move and complex outer shells.
    - **Diatoms:** These also have shells, but they are rigid and made of different materials. Diatoms don't use flagella; they drift with ocean currents.

**Role in the Ecosystem**

- **Food Source:** In a healthy ecosystem, phytoplankton are the **base of the marine food web**. They provide food for a wide range of sea creatures, from tiny zooplankton to large whales, shrimp, snails, and jellyfish.
- **Harmful Algal Blooms (HABs):** When there are too many nutrients available (often from pollution), phytoplankton can grow too much, creating **harmful algal blooms** (also known as "red tides"). These blooms can:
    - Discolor the water.
    - Produce harmful toxins that can kill fish, shellfish, mammals, birds, and even harm humans.
    - Deplete oxygen in the water when they die and decompose, creating "dead zones."

**Ecological Significance of Phytoplankton**

Phytoplankton are incredibly important for Earth's environment:

- **Oxygen Production:** They are estimated to produce about **50% of the Earth's oxygen**, similar to forests on land.
- **Carbon Cycle:** They play a crucial role in the **global carbon cycle**. Through photosynthesis, they absorb large amounts of carbon dioxide from the atmosphere and oceans. When they die, some of this carbon sinks to the deep ocean, helping to regulate Earth's climate.
- **Food Source:** They are the essential primary producers, providing the foundation of nearly all aquatic food webs, feeding zooplankton and, in turn, larger marine life.
- **Seasonal Growth:** Like land plants, their populations grow more in certain seasons when conditions (sunlight, nutrients) are favorable.

## Greater Flamingo Sanctuary



**Why in News**

The Tamil Nadu government has officially declared a **Greater Flamingo Sanctuary at Dhanushkodi in Ramanathapuram district**. This significant move, announced on World Environment Day (June 5, 2025), aims to provide formal protection to a crucial wetland habitat for migratory birds.

**About Greater Flamingo Sanctuary**

- **Location:** The newly declared sanctuary is located in **Dhanushkodi, within the Ramanathapuram district of Tamil Nadu, India**.
- **Ecological Setting:** It is nestled within the ecologically sensitive **Gulf of Mannar Biosphere Reserve**, a globally recognized biodiversity hotspot.

- **Diverse Ecosystems:** The designated area spans approximately 524.7 hectares of revenue and forest land and is home to a rich variety of ecosystems, including:
  - o **Mangroves:** Dominated by species like *Avicennia* and *Rhizophora*, which are vital for stabilizing the coastline, preventing erosion, and acting as nurseries for marine life.
  - o **Sand Dunes:** Unique coastal landforms providing specific habitats.
  - o **Mudflats:** Rich feeding grounds for wading birds.
  - o **Marshes:** Wetland areas supporting diverse flora and fauna.
- **Central Asian Flyway (CAF) Significance:** The sanctuary is a **critical stopover point along the Central Asian Flyway (CAF)**. This major migratory route spans a vast continental area of Eurasia, extending from the northernmost breeding grounds in Siberia to the southernmost non-breeding (wintering) grounds in West Asia, India, the Maldives, and the British Indian Ocean Territory. The establishment of this sanctuary aims to preserve this vital passage for thousands of migratory wetland birds.
- **Biodiversity:** This region supports a remarkable **128 bird species**, including significant populations of both **Greater Flamingos** and **Lesser Flamingos**, along with herons, egrets, sandpipers, and other wetland birds. A recent wetland bird survey (2023-24) recorded over 10,700 birds in the area.
- **Support for Marine Life:** Beyond birds, the diverse ecosystems, particularly the mangrove forests, provide crucial habitats for various marine life, including fish, crustaceans, molluscs, and serve as important nesting sites for sea turtles.

**Key Facts about Greater Flamingo (Phoenicopterus roseus)**

- **Description:** The Greater Flamingo is a **large wading bird** renowned for its distinctive **pink feathers**, long S-shaped neck, and unique feeding habits. It is the largest and most widespread of the six flamingo species.
- **Distribution:** Its natural range spans across **Africa, western Asia, and southern Europe**. In India, it is found almost all over the country, except in the high-altitude Himalayas and the extreme East/Northeast.
- **Habitat:** Greater Flamingos typically inhabit **shallow, saline, and alkaline wetlands**. This includes salt lakes, coastal lagoons, intertidal mudflats, and saltworks, particularly during their breeding season. Their pink coloration comes from carotenoid pigments in their diet of algae and small crustaceans.
- **Feeding Habits:** They are **filter-feeders**, using their specially adapted, downturned bills to filter small organisms like algae, diatoms, and small invertebrates from the water.
- **Social Behavior:** They are highly gregarious birds, forming large colonies, especially during breeding.

**Conservation Status of Greater Flamingo**

- IUCN Red List: Least Concern (LC)
- Wild Life (Protection) Act, 1972 (India): Schedule-II

While the Greater Flamingo is currently categorized as 'Least Concern' globally, their wetland habitats are shrinking rapidly due to human activities, pollution, and climate change, which poses a long-term threat to their populations.

**Sindoor Plant (Bixa orellana)**
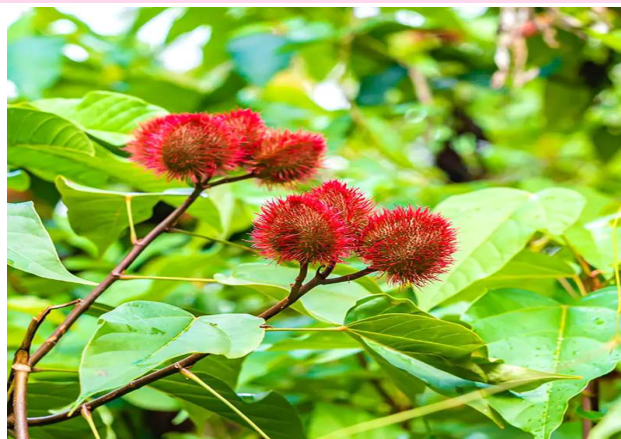
**Why in News**

Recently, the Prime Minister of India marked **World Environment Day (June 5th)** by planting a **Sindoor sapling** at his official residence, 7 Lok Kalyan Marg, in New Delhi. This act highlights the environmental significance and traditional importance of the Sindoor plant.

**About Sindoor Plant**

- **Scientific Name:** *Bixa orellana*.
- **Common Names:** It is famously known as 'Annatto' in English and 'Sindoor plant' or 'Sinduri' in Hindi. It is also sometimes referred to as the 'Lipstick Tree' due to one of its traditional uses.
- **Description:** It is a small **tropical shrub** or a small evergreen tree, typically reaching 6–10 meters (20–33 ft) in height. It is most famous for its **bright red seeds**.
- **Fruits:** The fruits of the *Bixa orellana* are unique:
    - They are **globular, ovoid capsules** arranged in clusters.
    - They resemble **spiky, red-brown seed pods** covered in soft spines.
    - Each pod contains numerous cone-shaped seeds, which are covered in a thin, waxy, blood-red aril (the fleshy covering of the seed).
    - When mature, the pods dry, harden, and split open, exposing the seeds.
- **Native Region:** The plant is native to **Brazil** and other regions of **northern South and Central America**.
- **Global Cultivation:** Due to its valuable uses, it is widely grown in various tropical countries, including Peru, Mexico, Ecuador, Indonesia, India, Kenya, and East Africa. In India, it is also traditionally used for making 'sindoor' (vermilion) in Hindu rituals.

**Required Climatic Conditions for Sindoor Plant**

The Sindoor plant thrives in specific environmental conditions:

- **Climate:** It requires a **frost-free, warm, and humid climate**.
- **Sunlight:** A **sunny location** with **full direct sunlight** is most suitable for its optimal growth and development.
- **Soil:** It is quite adaptable and can grow on almost any type of soil, but it shows a preference for **neutral to slightly alkaline soils** with good drainage.

**Uses of Sindoor Plant**

The seeds and extracts of the Sindoor plant are highly versatile and widely used across various industries:

- **Natural Dye and Colorant (Annatto):** The seeds produce **annatto**, one of the most frequently used natural dyes worldwide. Its primary coloring compounds are **bixin** (oil-soluble) and **norbixin** (water-soluble), which are carotenoids.
- **Food Industry:** Annatto extracts are extensively used as an **industrial food coloring** to impart yellow or orange hues to a wide range of products, including:
    - Cheese (e.g., cheddar cheese gets its color from annatto)
    - Butter and margarine
    - Ice creams and custards
    - Meats (e.g., sausages)
    - Condiments (e.g., sauces, mustard)
    - Bakery products, snacks, and breakfast cereals.
    - It also adds a subtle flavor and aroma in some cuisines.
- **Textile Industry:** Historically, annatto has been used for dyeing textiles like cotton, wool, and silk, though it has largely been replaced by synthetic dyes due to its lightfastness.
- **Paint Industry:** Used as a pigment in various paints.
- **Cosmetic Industry:** Extracts are incorporated into cosmetics, most notably in **lipstick** (hence the "Lipstick Tree" moniker), nail gloss, and hair oil.

- **Traditional and Medicinal Uses:**
  - Traditionally used by indigenous communities for **body, face, and hair paint**, and as a sunscreen and insect repellent.
  - In traditional medicine systems like Ayurveda, different parts of the plant (seeds, leaves, bark) are believed to possess various medicinal properties (e.g., antioxidant, antimicrobial, anti-inflammatory, antipyretic, antidiabetic, diuretic, digestive aid).
- **Cultural Significance:** In Hindu culture, the red-orange pigment from the seeds is traditionally used to make 'sindoor' or vermilion, a sacred mark applied by married women.

## Ranthambore Tiger Reserve (RTR)



**Context:** The Supreme Court recently ordered the Rajasthan government to impose an immediate ban on all mining activities within the core area of the Ranthambhore Tiger Reserve. This highlights the ongoing efforts to protect critical tiger habitats from environmental degradation.

**1. About Ranthambore Tiger Reserve:**

- **Location:** Situated in the **Sawai Madhopur district of southeastern Rajasthan**, India.
- **Name Origin:** Derives its name from the historic **Ranthambore Fort**, a **World Heritage Site**, located within its boundaries.
- **Geographical Setting:** Surrounded by the **Vindhyas and Aravalis hill ranges**, and lies at their intersection.
- **Historical Significance:** Once served as a **royal hunting ground for the Maharajas of Jaipur**.

- **Size:** One of the **largest tiger reserves in northern India**, spanning approximately **1,411 sq. km** (including core and buffer areas). Its Critical Tiger Habitat (CTH) is about 1113.03 sq. km.
- **Landscape:** Characterized by boulder-strewn highland plateaus, lakes, and rivers, dotted with old forts and abandoned mosques, creating a unique blend of wilderness and history.
- **Rivers:** Bounded to the north by the **Banas River** and to the south by the **Chambal River**.
- **Lakes:** Features several important lakes, including **Padam Talab, Raj Bagh Talab, and Malik Talab**.

**2. Vegetation and Biodiversity:**

- **Vegetation Type:** Primarily consists of **dry deciduous forests** and **open grassy meadows**. The proximity to the Thar Desert influences the sparse vegetation in some areas.
- **Dominant Flora:** The most dominant tree species is **Dhok (Anogeissus pendula)**, which constitutes a significant portion (around 80%) of the forest cover, especially on hill slopes. Other notable species include Acacia, Capparis, Zizyphus, Prosopis, Banyan (Ficus bengalensis), Peepal (Ficus religiosa), Neem (Azadirachta indica), Mango, Tamarind, Jamun, and Ber. Aquatic flora like lotus and water lilies are found in the lakes.
- **Key Fauna:**
  - **Mammals:** Famous for its population of **Royal Bengal Tigers**. Other significant mammals include Leopard, Caracal, Jungle Cat, Sloth Bear, Striped Hyena, Jackal, Desert Fox, Sambar deer, Chital (spotted deer), Chinkara (Indian Gazelle), Nilgai (Bluebull), Wild Boar, Common or Hanuman langurs, and Macaques.
  - **Reptiles:** Marsh Crocodiles, Desert Monitor Lizards, Pythons, Cobras, Kraits, and various other snakes and tortoises.

o **Birds:** Over 300 species of resident and migratory birds, including Kingfisher, Painted Spurfowl, Sarus Crane, Indian Skimmer, Serpent Eagle, and various waterfowl.

**3. Conservation and Challenges:**

- **Project Tiger:** Declared one of the first nine Tiger Reserves under Project Tiger in 1973. It was further notified as a National Park in 1980.

- **Threats:** The reserve faces threats from various human activities. The recent Supreme Court order specifically addressed **illegal mining activities** within the core area, as well as concerns about unauthorized construction and high footfall of devotees at ancient temples (like Trinetra Ganesh Temple) located inside the critical tiger habitat. These activities lead to habitat degradation, disturbance to wildlife, and pollution.

- **Connectivity:** While Ranthambore is a prime tiger habitat, its connectivity with other Protected Areas in the region (like Kailadevi Sanctuary and Sawai Mansingh Sanctuary, which are part of the larger Tiger Reserve) is often fragmented, hindering safe dispersal of tigers.

- **Conservation Efforts:** The Supreme Court's intervention underscores the commitment to protecting this vital ecosystem. Committees are being formed to regulate human activities, including pilgrimage, and ensure stricter enforcement of conservation laws.

## Tamhini Wildlife Sanctuary



**Context:** The Maharashtra forest department recently partnered with Microsoft and the Centre for Youth Development and Activities (CYDA), Pune, to address socio-ecological challenges and undertake eco-restoration efforts in the Tamhini Wildlife Sanctuary.

**1. About Tamhini Wildlife Sanctuary:**

- **Location:** A protected forest area located in the **Western Ghats** near **Pune, Maharashtra**. It is about 70 km from Pune.

- **Area:** Covers an area of **49.62 sq. km**.

- **Formation:** Carved out by incorporating **12 compartments of reserved forest** from the Paund and Sinhgad ranges in the Pune forest division, and **8 compartments** from the Mangaon range in the Roha division (Thane district). It was officially declared a Wildlife Sanctuary in January 2013.

- **Landscape:** Known for its scenic beauty, especially during the monsoon, with lush green landscapes, cascading waterfalls, and misty weather. Popular spots include Andharban forest, Plus Valley, and Devkund Waterfall.

**2. Vegetation and Biodiversity:**

- **Vegetation Type:** Comprises a mix of **evergreen forests, semi-evergreen forests, and moist deciduous forests**. Sacred groves are also present.

- **Flora:** Key species found include **Teak (Tectona grandis), Bamboo, Ain (Terminalia crenulata), Shisham (Dalbergia latifolia), Mango (Mangifera indica), and Jamun (Syzygium cumini)**. Other trees like Pisa, Anjani, Behada, Mahua, Palas, Pangari, Khair, Kakad, Shireesh, and Taman are also present.

- **Fauna:**
  o **Mammals:** Rich diversity including **Indian Giant Squirrel (Shekaru - Maharashtra's state animal)**, Leopard, Caracal, Jungle Cat, Sloth Bear, Striped Hyena, Jackal, Desert Fox, **Barking Deer, Indian Pangolin, Indian Civets**, Sambar, Chital, Chinkara, Nilgai, Wild Boar, Common or Hanuman langurs,

and Macaques. The endangered Kondana Soft-furred Rat has also been recorded.

- o **Avifauna (Birds):** Over 150 species, with 12 endemic to India. Notable species include **Malabar Whistling Thrush, Crested Serpent Eagle, Grey Junglefowl, Golden Oriole, Indian Pitta**, Indian Shag, Little Cormorant, Little Egret, Indian Pond Heron, Asian Openbill, Black-winged Kite, Brahminy Kite, Shikra, Red-wattled Lapwing, Common Sandpiper, and Spotted Dove.
- o **Reptiles & Amphibians:** Significant populations of Marsh Crocodiles, various snakes (e.g., Pythons, Cobras, Kraits), and a diverse array of amphibians, being part of the Western Ghats biodiversity hotspot.
- o **Insects:** Rich butterfly diversity, although studies indicate changes in butterfly populations due to anthropogenic pressure.

## 3. Socio-Ecological Challenges and Conservation Efforts:

- **Challenges:**
  - o **Human-driven land-use change:** Expanding monoculture plantations (e.g., cashew, mango, rubber), clear-felling of forests, and agricultural expansion leading to habitat loss and fragmentation.
  - o **Forest fires:** A recurring threat to the ecosystem.
  - o **Environmental pollution:** Including plastic waste, especially from unregulated tourism.
  - o **Rapid infrastructure development:** Construction of roads and other infrastructure impacting the sanctuary's integrity.
  - o **Unmanaged tourism:** Issues like inadequate signage, benches, lighting,

and waste management facilities, leading to safety concerns and ecological disturbance. Popular trekking routes like Andharban and Plus Valley see high visitor footfall, which, if not managed, can negatively impact the ecosystem.

- **Recent Partnership (Maharashtra Forest Department, Microsoft, CYDA):**
  - o **Objective:** To implement a one-year "Biodiversity and Eco-Protection in Plus Valley, Tamhini Wildlife Sanctuary" project aimed at **restoring the delicate ecosystem** and addressing socio-ecological challenges.
  - o **Funding & Implementation:** Funded by **Microsoft** through its Corporate Social Responsibility (CSR) initiative, with **CYDA (Centre for Youth Development and Activities), Pune,** implementing the project on the ground in close collaboration with the Forest Department.
  - o **Key Interventions:**
    - * Installation of directional signboards, benches, protective entrance gates, and solar-powered lighting along trekking routes.
    - * Construction of drinking water points and sanitation blocks for both tourists and wildlife.
    - * Implementation of waste management systems, including dustbins and bottle crushers, to tackle plastic pollution.
    - * Ecosystem measures like bunds and gabion structures for water conservation and habitat resilience.
    - * Promoting **responsible ecotourism** and community involvement through training for local youth as eco-guides, conservation ambassadors, and homestay hosts.

o **Alignment:** This initiative aligns with the United Nations' Sustainable Development Goals (SDGs), particularly **SDG 13 (Climate Action)** and **SDG 15 (Life on Land)**.

- **Significance:** This collaboration represents a crucial step towards participatory conservation, integrating nature-based solutions with community engagement to ensure the long-term ecological resilience of the sanctuary while balancing tourism and local community needs.

## India's First E-Waste Recycling Park in Delhi



**Context:** In a significant move towards sustainable development and a circular economy, the Delhi government has announced plans to develop **India's first integrated E-Waste Eco Park at Holambi Kalan in north-west Delhi.** This initiative addresses the mounting challenge of electronic waste (e-waste) management in India.

### 1. About India's First E-Waste Recycling Park:

- **Location:** Holambi Kalan in **north-west Delhi**.

- **Nature of Facility:** It will be India's **first integrated E-Waste Eco Park**, designed as a state-of-the-art facility for the scientific and environmentally sound processing of e-waste.

- **Model of Development:** To be built under a **Public-Private Partnership (PPP) model**, specifically on a **Design, Build, Finance, Operate, and Transfer (DBFOT)** basis. This model involves a private entity designing,

building, financing, and operating the facility for a specified period (concession period) before transferring it back to the public authority.

- **Concession Period:** The project will have a **15-year concession period**.

- **Area:** Spanning **11.4 acres**.

- **Processing Capacity:** Expected to process up to **51,000 metric tonnes of e-waste annually**, covering all **106 categories** outlined in the E-Waste Management Rules, 2022.

- **Developing Agency:** The project will be developed by the **Delhi State Industrial and Infrastructure Development Corporation (DSIIDC)**, which has been appointed as the nodal agency. DSIIDC will issue a global tender (RFQ-cum-RFP) to attract green technology partners.

- **Capital Investment:** Estimated initial capital investment of ₹ 150 crore, with an operational budget of over ₹ 325 crore. The park is projected to generate ₹ 350 crore in revenue.

- **Construction Timeline:** Expected to be completed within **18 months** from the finalization of the tender.

### 2. Key Features and Objectives:

- **Integrated Zones:** The park will feature dedicated zones for various stages of e-waste processing:

  o **Dismantling:** Safe and systematic disassembly of electronic items.

  o **Refurbishing:** Repairing and restoring electronic products for reuse.

  o **Component Testing:** Evaluating the functionality of individual components for reuse or proper recycling.

  o **Plastic Recovery:** Processing plastic components for reuse in new products.

  o **Scientific Metal Recovery:** Extraction of valuable and rare-earth metals (e.g., copper, lithium, gold, silver) from e-waste, reducing reliance on virgin resources.

o **Second-Hand Electronics Market:** A dedicated area for the sale of refurbished and tested electronics, promoting circularity.

- **Employment Generation:** Expected to create over **1,000 green jobs** and establish **skilling/training centres for informal recyclers**. This aims to formalize the largely informal e-waste sector, providing safer working conditions and integrating workers into the mainstream economy.

- **Addressing E-Waste Challenge:** India is the **third-largest producer of e-waste globally**, generating over 1.6 million metric tonnes annually. Delhi alone contributes nearly 9.5% of this total. The park aims to manage nearly **25% of Delhi's e-waste** within five years of becoming operational.

- **Circular Economy Model:** Embodies the principles of a **circular economy** by minimizing waste, maximizing resource recovery, and creating a closed-loop system for electronic goods, thereby promoting sustainable consumption and production.

- **National Benchmark:** Designed to set a **national benchmark for smart, scientific, and environmentally sound waste processing**, serving as a model for similar initiatives across the country. It is reportedly one of four such facilities planned nationally.

- **Environmental Impact:**
  o Reduces dependency on landfills for e-waste disposal.
  o Minimizes the release of hazardous waste and toxic elements (like lead, mercury, cadmium) into the environment, preventing air, soil, and water pollution.
  o Promotes resource recovery and reuse, conserving natural resources.

- **Social Impact:** Improves the livelihoods and safety of informal e-waste workers by transitioning them into the formal sector with proper training and infrastructure.

**3. Significance:**

- The establishment of this e-waste eco park is a crucial step for India in tackling its rapidly growing e-waste problem.

- It aligns with India's commitments to **sustainable development goals (SDGs)**, particularly those related to responsible consumption and production (SDG 12) and climate action (SDG 13).

- By formalizing and scientifically managing e-waste, the park will mitigate significant environmental and health risks associated with crude and unregulated recycling practices.

- It marks a proactive approach by a state government to implement large-scale, integrated waste management solutions, fostering green industrial growth and employment.

## Blue Nationally Determined Contributions (NDCs) Challenge
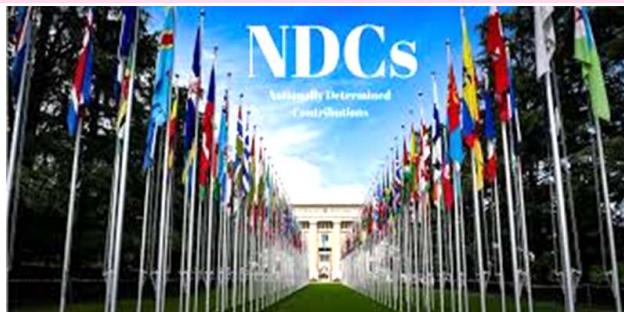


**Context:** The **Blue NDC Challenge initiative** was recently launched on the first day of the **third UN Ocean Conference (UNOC3)** in Nice, France. This landmark initiative aims to dramatically scale up ocean-focused climate action by urging countries to integrate marine considerations into their national climate pledges.

**1. About the Blue NDC Challenge:**

- **Launch:** A landmark international initiative launched by **France and Brazil**.

- **Objective:** It specifically urges countries to **incorporate ocean-focused climate measures into their Nationally Determined Contributions (NDCs)**. This call to action is made ahead of the **30th Conference of Parties (COP30) to the United Nations Framework**

Convention on Climate Change (UNFCCC), which is scheduled to be held in **Belém, Brazil**, in November 2025.

- **Participating Countries:** In addition to France and Brazil as founders, six other countries have joined this initiative: **Australia, Fiji, Kenya, Mexico, Palau, and the Republic of Seychelles**. These are nations with significant coastal and marine interests.

- **Support & Endorsement:** The initiative is supported by key international organizations and alliances, including:
  - Ocean Conservancy
  - The Ocean and Climate Platform
  - The World Resources Institute (WRI) through the Ocean Resilience and Climate Alliance (ORCA)
  - It has also been endorsed by WWF-Brazil.

- **Key Action Areas promoted by the Challenge:** Governments joining the Challenge are encouraged to include actions such as:
  - **Sustainably managing, conserving, and restoring coastal and marine ecosystems:** This includes blue carbon ecosystems like mangroves, seagrasses, and salt marshes for carbon sequestration and coastal protection, as well as expanding climate-smart Marine Protected Areas (MPAs).
  - **Phasing out offshore oil and gas production and expanding clean ocean energy:** Promoting offshore wind, wave, and tidal power.
  - **Cutting emissions and strengthening resilience in maritime sectors:** Decarbonizing shipping and seafood value chains.
  - **Supporting sustainable, climate-resilient fisheries and aquaculture:** To ensure long-term ocean health and food security.

- Integrating **Marine Spatial Planning (MSP)** and Integrated Coastal Zone Management.

## 2. What are Nationally Determined Contributions (NDCs)?

- **Core of Paris Agreement:** NDCs are the **national climate plans** that outline a country's efforts to reduce greenhouse gas emissions and adapt to the impacts of climate change. They are at the heart of the **Paris Agreement**.

- **Paris Agreement Context:** The Paris Agreement was adopted by 195 Parties at **UNFCCC COP21 in Paris, France, on December 12, 2015**. Its long-term temperature goal is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels."

- **Nature of NDCs:**
  - They represent **voluntary commitments** by each country, determining their own contributions based on national circumstances, capabilities, and priorities (hence "nationally determined").
  - NDCs are required to be **updated every five years**, with each successive NDC expected to represent a **progression over time** (i.e., be more ambitious) to collectively achieve the Paris Agreement's long-term goals. The NDCs due before COP30 in 2025 are often referred to as NDC 3.0.
  - While the NDCs themselves are non-binding in terms of specific targets, the **procedures for their preparation, communication, and maintenance are binding** under the Paris Agreement.

- **Global Stocktake:** Starting in 2023 and every five years thereafter, a "global stocktake" assesses the collective progress towards achieving the Paris Agreement's purpose and long-term goals. The outcome of this stocktake

is intended to inform and encourage greater ambition in subsequent NDCs.

- **India's NDCs:** India submitted its first NDC in 2015 and an updated NDC in 2022. At COP26 in Glasgow, India announced its "Panchamrit" pledges, which include:
  - o Achieving 500 GW non-fossil energy capacity by 2030.
  - o Meeting 50% of its energy requirements from renewable energy by 2030.
  - o Reducing the emissions intensity of its GDP by 45% by 2030, from 2005 levels.
  - o Reducing total projected carbon emissions by 1 billion tonnes by 2030.
  - o Achieving Net-Zero carbon emissions by 2070.

**3. UN Ocean Conference (UNOC3) and COP30:**

- **UN Ocean Conference (UNOC):** A high-level global summit convened by the United Nations to accelerate action toward **Sustainable Development Goal 14 (SDG 14): "Conserve and sustainably use the oceans, seas and marine resources for sustainable development."** The third such conference (UNOC3) was held in Nice, France, in June 2025.

- **Significance of UNOC3:** The UNOC3 adopted the declaration "Our Ocean, Our Future: United for Urgent Action," aiming to reinforce global commitments to tackle the triple planetary crisis (climate change, biodiversity loss, and pollution) threatening the oceans. The Blue NDC Challenge was launched here to specifically link ocean action to national climate plans.

- **UNFCCC COP30:** The **30th Conference of the Parties to the UNFCCC (COP30)** will be held in **Belém, Brazil, from November 10 to 21, 2025**. It will be the first COP hosted in the Amazon region, bringing a focus on biodiversity and climate solutions from forest ecosystems, in addition to the ocean.

- **Interlinkage:** The Blue NDC Challenge aims to build momentum from UNOC3 towards COP30

by ensuring that the critical role of oceans in climate regulation and climate action is adequately reflected in countries' next round of NDCs. Ocean-based climate solutions can deliver a significant portion of the emissions reductions needed to meet the 1.5°C target.

## Kanha Tiger Reserve (KTR)



**Context:**

The **Kanha Tiger Reserve (KTR)** has recently been recognized as India's **leading tiger habitat in terms of its ungulate (hoofed herbivore) population**. This finding comes from a report released by the Wildlife Institute of India (WII), Dehradun, underscoring Kanha's robust prey base crucial for its tiger population. The report specifically states that "Kanha Tiger Reserve boasts the highest ungulate population (1,02,485) among India's major tiger reserves."

**1. About Kanha Tiger Reserve (KTR):**

- **Location:** Kanha Tiger Reserve, also known as Kanha National Park, is situated in the **Maikal ranges of the Satpuras**. It falls within the **Mandla and Balaghat districts of Madhya Pradesh**.

- **Geographical Setting:** It is located in the **Central Indian Highlands**, which are part of the extensive tableland forming India's main peninsula.

- **Size:** It is the **largest national park in Madhya Pradesh**, sprawling over an area of **2074 sq. km.**, comprising a 940 sq. km. core area and a 1,009 sq. km. buffer zone.

- **Historical Context:** This region was historically under the control of the **Gondwana dynasty**, with Gond rulers governing large parts of Central India.

- **Evolution of Status:**
  - Declared a **reserve forest in 1879**.
  - Revalued as a **wildlife sanctuary in 1933**.
  - Upgraded to a **national park in 1955**.
  - Designated as one of the first **Tiger Reserves** under Project Tiger in **1973-74**.
- **Corridors:** KTR maintains active wildlife corridors, specifically between:
  - **Kanha and Pench Tiger Reserves** (in Madhya Pradesh).
  - It is also connected with the **Achanakmar Tiger Reserve** of Chhattisgarh. These corridors are vital for genetic exchange and long-term viability of tiger populations.
- **Habitat Characteristics:** The landscape is primarily characterized by forested shallow undulations, hills with varying degrees of slopes, plateaus, and valleys, providing diverse ecological niches.
- **Cultural Significance:**
  - The forest depicted in Rudyard Kipling's famous novel, **"The Jungle Book,"** is widely believed to be based on the jungles, including Kanha Tiger Reserve, influencing its popular image.
  - The region is home to ancient tribal communities, such as the **Gond and Baiga**.
- **Unique Distinction:** It is the **first tiger reserve in India to officially introduce a mascot, "Bhoorsingh the Barasingha"**, highlighting its focus on the conservation of the endangered Barasingha.

**2. Flora of Kanha Tiger Reserve:**
- It is primarily a **moist Sal (Shorea robusta) forest** and **moist mixed deciduous forest**.
- Key tree species found here include Bamboo, Tendu, Sal, Jamun, Arjun, and Lendia.
- The diverse flora supports the rich herbivore population.

**3. Fauna of Kanha Tiger Reserve:**
- **Key Predators:** The park boasts a significant population of apex predators and carnivores, including:
  - **Royal Bengal Tigers**
  - Leopards
  - Sloth bears
  - Indian wild dogs (Dholes)
- **Ungulates (Prey Base):** Kanha is renowned for its abundant ungulate population, which includes:
  - **Barasingha (Swamp Deer)**: Kanha is globally respected for its role in saving the hard ground Barasingha (*Rucervus duvaucelii branderi* - the state animal of Madhya Pradesh) from near extinction. It holds the unique distinction of harboring the **last world population of this specific subspecies of deer**.
  - Chital (Spotted Deer) - most abundant
  - Sambar Deer
  - Gaur (Indian Bison)
  - Wild Pig
  - Barking Deer
  - Nilgai (Blue Bull)
  - Chousingha (Four-horned Antelope)
- The high ungulate population and biomass density (69.86 animals per sq. km and 8,602.15 kg per sq. km, respectively, as per the WII report) are critical for sustaining a healthy tiger population, making Kanha a high-quality predator habitat.

## Idukki Wildlife Sanctuary

**Context:** Tribal students and residents of Kannampadi, a settlement located within the **Idukki Wildlife Sanctuary**, are set to benefit from the opening of three new libraries, marking a positive development for these communities.

## 1. About Idukki Wildlife Sanctuary:

- **Location:** The Idukki Wildlife Sanctuary is situated in the **Idukki district of Kerala, India**. It specifically covers the forests surrounding the catchment area of the **Idukki Arch Dam** (including the Idukki, Cheruthoni, and Kulamavu dams).
- **Establishment:** It was declared a Wildlife Sanctuary on February 9, 1976.
- **Terrain & Topography:**
  - The terrain is characterized by **steep mountains, valleys, and hills**.
  - Altitude ranges from approximately **450 meters to 1272 meters** above sea level.
  - The **highest peak within the sanctuary is Vanjur Medu (1272 m)**.
- **Rivers:** The major rivers flowing through the area and feeding the Idukki reservoir are the **Periyar and Cheruthoniar**.
- **Rainfall:** The region experiences an average annual rainfall of **3800 mm**, indicative of its moist tropical climate.
- **Vegetation:** The sanctuary boasts diverse forest types, including:
  - **West Coast Tropical Evergreen forests**
  - **Semi-Evergreen forests**
  - **Moist Deciduous Forests**
  - **Hill shoals** (patches of stunted evergreen forests in valleys of grasslands)
  - **Grasslands**

## 2. Flora of Idukki Wildlife Sanctuary:

- The forests are essentially dense and comprise a rich variety of tree species.
- Prominent trees include **Teak, Rosewood, Jackfruit, Ebony, Cinnamon**, and diverse **bamboo species**.
- The sanctuary is also home to various medicinal plants and a wide array of flowering plants, orchids, and ferns.

## 3. Fauna of Idukki Wildlife Sanctuary:

- **Mammals:** The sanctuary provides habitat for a significant population of large mammals and carnivores:
  - **Elephants**
  - Bison (Gaur)
  - Sambar deer
  - Wild dogs (Dhole)
  - Jungle cats
  - Tiger
  - Wild boar
  - Leopard
  - Bonnet Macaque, Nilgiri Langur
  - Indian giant squirrel
  - Muntjac (Barking Deer), Chevrotain (Mouse Deer)
- **Reptiles:** Various species of snakes, including **Cobra, Viper, and Krait**, are found here, along with a large number of non-poisonous snakes.
- **Birds:** The avian diversity is rich, including species like **Jungle fowl, Myna, Laughing thrush, Black bulbul, Peafowl, Woodpecker, and Kingfisher**. The Vairamani islet within the Idukki Reservoir also serves as a breeding ground for many birds.
- **Endangered Species:** It is notably home to populations of the **endangered Nilgiri Tahr**, an endemic mountain goat species of the Western Ghats.

## 4. Significance and Recent Developments:

- **Biodiversity Hotspot:** Idukki Wildlife Sanctuary is recognized for its rich biodiversity and plays a crucial role in the conservation of flora and fauna native to the Western Ghats.
- **Dam and Reservoir:** The presence of the Idukki Arch Dam and its reservoir within the sanctuary adds to its unique ecosystem and scenic beauty, although the dam's construction in the past did lead to some habitat alteration.

- **Community Development:** The recent news about opening new libraries in the Kannampadi tribal settlement within the sanctuary highlights ongoing efforts to improve the living conditions and educational access for tribal communities residing in and around protected areas. Such initiatives are crucial for inclusive conservation and sustainable development.

## Sharavathi Lion-Tailed Macaque Wildlife Sanctuary



**Context:** Tensions have recently escalated around the **Sharavathi Lion-Tailed Macaque Wildlife Sanctuary** in Sagar taluk, Karnataka, following the arrest and subsequent bail of farmers accused of entering the sanctuary with country-made weapons. This incident highlights human-wildlife conflict and conservation challenges in the region.

**1. About Sharavathi Lion-Tailed Macaque Wildlife Sanctuary:**

- **Location:** The sanctuary is located in the **Sharavathi River Valley** of Sagar taluk in **Shivamogga District, Karnataka**.

- **Geographical Significance:** It is an integral part of the **Western Ghats**, which is recognized as a **UNESCO World Heritage Site** due to its exceptional biodiversity and endemism.

- **Area:** The total area of the sanctuary is approximately **431.23 sq. km.**, with the **Linganamakki reservoir** (formed by the Sharavathi River) covering a significant portion of **124 sq. km.** within its boundaries.

- **Formation:** The current sanctuary was formed by **combining and expanding existing protected areas**:

  o The former **Sharavathi Valley Wildlife Sanctuary** (originally established in 1972).

  o The **Aghanashini Lion-Tailed Macaque Conservation Reserve**.

  o Adjoining reserve forest blocks.

  o This expansion aimed to create a more contiguous and viable habitat for the endangered lion-tailed macaque and other species.

- **Boundaries:** The sanctuary shares its southwestern boundary with the **Mookambika Wildlife Sanctuary**, facilitating wildlife movement across a larger landscape.

- **Terrain:** The overall terrain is highly undulating, with altitudes ranging from **94 meters to 1102 meters**, contributing to varied microhabitats.

- **Vegetation:** The sanctuary's vegetation primarily consists of:

  o **Tropical evergreen to semi-evergreen types of forests** (especially in the valleys).

  o **Moist deciduous forests**.

  o Patches of **grasslands and savanna**.

**2. Flora of Sharavathi Lion-Tailed Macaque Wildlife Sanctuary:**

- The sanctuary is known for its immense richness in specific tree species, characteristic of the Western Ghats rainforests.

- Prominent tree species include **Dhoopa (Vateria indica), Gulmavu (Litsea floribunda), Surahonne (Calophyllum tomentosum), Mavu (Mango - Mangifera indica)**, and **Nandi (Lagerstroemia microcarpa)**.

- The diverse flora supports a wide range of faunal species.

**3. Fauna of Sharavathi Lion-Tailed Macaque Wildlife Sanctuary:**

- **Key Species - Lion-Tailed Macaque:** The sanctuary is considered a **key habitat for protecting the endangered lion-tailed macaque** (*Macaca silenus*). This primate

species is **endemic to the Western Ghats** of India, meaning it is found nowhere else in the world. Its conservation is the primary focus of this sanctuary's designation and expansion.

- **Other Mammals:** The sanctuary supports a variety of other mammalian species, indicative of a healthy forest ecosystem:
  - o **Tiger**
  - o **Leopard**
  - o Wild dog (Dhole)
  - o Jackal
  - o Sloth bear
  - o Spotted deer (Chital)
  - o Sambar
  - o Barking deer (Muntjac)
  - o Mouse deer (Indian Chevrotain)
  - o Wild pig
  - o Common langur
  - o Bonnet macaque
  - o Malabar giant squirrel
  - o Malabar civet
  - o Giant flying squirrel

- **Other Fauna:** The sanctuary also hosts a rich diversity of birds, reptiles (including King Cobra, Indian Python, monitor lizard), amphibians, and insects.

## Sariska Tiger Reserve



**Latest News & Significance**

- A plan to rationalize the boundary of Sariska Tiger Reserve's Critical Tiger Habitat (CTH) is under consideration.
- This plan could offer a lifeline to over 50 marble and dolomite mines previously closed by a Supreme Court order due to their proximity to the CTH.

**About Sariska Tiger Reserve**

- **Location:** Rajasthan.
- **Mountain Range:** Spread over the Aravallis (world's oldest mountain range).
- **History:**
  - o Once a hunting ground of the Maharaja of Alwar.
  - o Proclaimed a natural reserve in 1955.
  - o Declared a National Park in 1979.
- **Cultural & Historical Sites within/near Reserve:** Famous for old temples, palaces, and lakes such as Pandu Pol, Bhangarh Fort, Ajabgarh, Pratapgarh, Siliserh Lake, and Jai Samand Lake.
- **Topography:** Rocky landscape, scrub thorn arid forests, grasses, hilly cliffs, and semi-deciduous wood.
- **Vegetation:** Northern Tropical Dry Deciduous Forests and Northern Tropical Thorn Forest.

**Flora and Fauna of Sariska Tiger Reserve**

- **Flora:**
  - o Area primarily covered with **Dhok trees**.
  - o Other species: Salar, Kadaya, Gol, Ber, Banyan, Gugal, Bamboo, Kair, Adusta, etc.
- **Fauna:**
  - o **Tiger**
  - o Other wild animals: Leopard, Sambhar, Chital, Nilgai, Four-horned antelope, Wild boar, etc.

## Himalayan Brown Bear
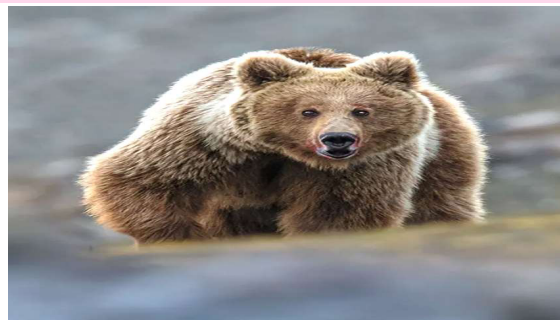
**Latest News & Significance**

- **Rare Sighting:** A rare sighting of a Himalayan brown bear, reportedly with its family, has occurred in the Nelong and Jadung Valleys of **Gangotri National Park, Uttarakhand**.

- **Significance:** This sighting highlights the presence and potential breeding of this critically endangered species in the region, offering hope for its conservation. Gangotri National Park is a key habitat for this species in India.

**About Himalayan Brown Bear**

- **Scientific Name:** *Ursus arctos isabellinus*

- **Description:** The largest mammal found in the high-altitude regions of the Himalayas.

- **Lineage:** One of the most ancient brown bear lineages.

- **Other Names:** "Himalayan Red Bear," "Isabelline Bear." Known as "Denmo" in the Ladakhi language.

- **Folklore:** Its ability to walk upright is believed by some to have given rise to the legend of the Yeti or "Abominable Snowman."

**Distribution**

- **Geographical Range:** Found in northwestern and central Himalayas, including Pakistan, India, Nepal, the Tibetan Autonomous Region of China, and Bhutan.

- **Altitude:** Typically found above the timberline, between 3,000 and 5,500 meters (9,800 and 18,000 feet) above sea level.

- **Distribution in India:** Exists in small isolated populations in fragmented alpine and subalpine habitats of:
  - Jammu and Kashmir
  - Himachal Pradesh
  - Uttarakhand

**Features**

- **Size:** Males are larger than females.
  - Males: Average length of 1.9 m, weight of 135 kg.
  - Females: Average length of 1.6 m, weight of 70 kg.

- **Fur:** Thick fur, most often sandy or reddish-brown in color.

- **Diet:** Omnivorous. Eats grasses, roots, bulbs, and other plants, insects, and small mammals (e.g., marmots, pikas, voles). They also consume fruits and berries, and can opportunistically prey on livestock like sheep and goats.

- **Behavior:**
  - Hibernates in dens during the winter (typically October to April/May).
  - Primarily solitary, interacting only for mating or fighting over mates.
  - The only exception is a mother and her cubs.

- **Lifespan:** 20 to 30 years in the wild.

**Conservation Status**

- **IUCN Red List: Critically Endangered** (specific to the Himalayan subspecies, while the broader brown bear species is Least Concern).

- **Wildlife (Protection) Act of 1972 (India): Schedule I** (highest protection).

- **CITES: Appendix I** (most endangered species, trade is highly restricted).

## India's First Off-Grid Green Hydrogen Pilot Plant



- **Commissioning:** Adani Group recently commissioned India's first off-grid 5-megawatt green hydrogen pilot plant in **Kutch, Gujarat**.

- **Developer:** Developed by Adani New Industries Limited (ANIL), the clean energy arm of Adani Enterprises Ltd.

- **Significance:** This marks a significant milestone in India's clean energy transition and its pursuit of energy self-sufficiency and decarbonization

goals. It demonstrates the technical feasibility of decentralized, renewable-powered hydrogen production, setting a benchmark for industrial applications in hard-to-abate sectors.

**About India's First Off-Grid Green Hydrogen Pilot Plant**

- **Location:** Kutch, Gujarat.
- **Capacity:** 5 Megawatt (MW).
- **Definition of Off-Grid Green Hydrogen Plant:** A facility that produces hydrogen using electrolysis powered solely by renewable energy sources (such as solar or wind) and is *not connected to the main electrical grid*. This means it relies entirely on its own renewable energy generation for hydrogen production.
- **Power Source:** Fully powered by **solar energy**.
- **Energy Storage:** Integrates a **Battery Energy Storage System (BESS)**, which enables it to operate completely off-grid, ensuring continuous operation even when solar availability fluctuates.
- **Technology:** Features a fully automated and controlled **electrolyser system**.
- **Closed-Loop System:** This electrolyser system is designed to respond dynamically to real-time renewable energy inputs. This "closed-loop system" aids in operational flexibility, particularly in addressing the intermittent nature of solar power, while ensuring efficiency, safety, and performance.
- **Alignment with National Mission:** The initiative is directly aligned with the **National Green Hydrogen Mission (NGHM)**, a flagship Government of India program.
- **NGHM Objectives:** The NGHM aims to:
    - Reduce import dependence (on fossil fuels).
    - Improve energy self-sufficiency.
    - Ramp up decarbonization of energy-intensive industries.
    - All in fulfilment of India's **Atmanirbhar Bharat (self-reliant India)** vision.

- **Proof of Concept:** This pilot plant serves as a proof of concept for ANIL's upcoming larger Green Hydrogen Hub in Mundra, Gujarat.
- **Role of Green Hydrogen:** Green hydrogen is seen as a critical tool for decarbonizing challenging sectors such as fertilizers, oil refining, and heavy transport, playing a central role in achieving India's (and global) net-zero emissions targets.

## World Environment Day 2025



**Context:**

- World Environment Day (WED) 2025 is being celebrated on **June 5, 2025**, with South Korea as the global host.
- The theme focuses on **"Beat Plastic Pollution."**
- Prime Minister Narendra Modi strengthened the "Ek Ped Maa Ke Naam" initiative by planting a **Banyan sapling at the Bhagwan Mahavir Vanasthali Park in New Delhi** on June 5, on the occasion of World Environment Day.
- This is also aimed to enhance the reforestation efforts in the **Aravalli mountain range.**

**I. What is World Environment Day 2025?**

- **About:**
    - WED was set up by the **United Nations General Assembly** in 1972.
    - This was the same day the **Stockholm Conference on the Human Environment** (the first big global meeting on environmental issues) began.
    - Since 1973, the event has been led by the **United Nations Environment Programme (UNEP).**

- o The Stockholm Conference was a major turning point for the global environmental movement.

- **Theme:** The 2025 theme is **"Beat Plastic Pollution."**
  - o It aims to make people aware of how plastics are made, used, and thrown away.
  - o It promotes solutions like **refusing, reducing, reusing, and recycling** plastic.

- **Significance of Plastic Pollution:**
  - o Plastic pollution makes other problems like pollution, loss of plants and animals (biodiversity loss), and climate change worse.
  - o Every year, **11 million tonnes of plastic enter water bodies.**
  - o Tiny plastic pieces called **microplastics** from landfills and sewage pollute soil.
  - o The global cost of plastic pollution is estimated to be **USD 300–600 billion each year.**
  - o India produces about **9.3 million tonnes of plastic waste yearly**, which is nearly 20% of the world's total.
  - o Burning over **5.8 million tonnes of plastic yearly** releases harmful chemicals.

## II. India's Key Initiatives for the Environment

- **'Ek Ped Maa Ke Naam' Campaign:**
  - o **About:** This campaign encourages planting trees in mothers' names. It combines environmental protection with honoring motherhood, showing how mothers, like trees, nourish and support life.
  - o **Launch:** It was launched by the Prime Minister on World Environment Day, June 5, 2024.
  - o **Objective:** To promote protecting the environment, increasing forest cover,

and supporting sustainable development, while honoring mothers.
  - o **Record:** On September 22, 2024, the Territorial Army planted over 5 lakh (500,000) saplings in one hour in Jaisalmer, setting a world record.

- **Aravalli Green Wall Project:**
  - o **About:** This project aims to create a **1,400 km long and 5 km wide green belt** around the Aravalli Mountain range. It covers the states of Haryana, Rajasthan, Gujarat, and Delhi.
  - o **Inspiration:** It is inspired by Africa's **'Great Green Wall' project**, which goes from Senegal to Djibouti and started in 2007.
  - o **Objectives:** To fight **land degradation** and stop the Thar desert from spreading east. This green belt will restore damaged land, block desert dust, improve local wildlife, and help with things like absorbing carbon and improving water quality.
  - o **Need:** India faces severe land degradation. According to a report by ISRO, **29.7% of India's land** was degraded in 2018-19. The Aravalli region is a key area targeted for greening to help India reach its goal of restoring 26 million hectares of land.

## III. Plastic Pollution in India: Causes and Issues

- **Main Causes of High Plastic Pollution:**
  - o **High Plastic Use:** India produces about **3.5 million tonnes of plastic waste annually**, with each person using around 11 kg of plastic per year.
  - o This is due to more industries and consumerism.
  - o India is among the top 10 plastic-polluting countries.
  - o **Poor Waste Management:** Only **15-20% of plastic waste is recycled** in India. The rest ends up in landfills, water bodies, or is burned.

- o Most recycling is informal, done by waste pickers in unsafe conditions.
- o **Too Much Single-Use Plastic (SUPs):** In 2023, nearly 43% of India's total plastic waste was single-use plastic.
- o Even though some states have bans, rules are often not strongly enforced, and alternatives are expensive or hard to find.
- o **Plastic in Rivers & Oceans:** Three of the world's top ten rivers carrying 90% of plastic waste (Ganga, Indus, and Brahmaputra) are in India.
- o India adds **0.6 million tonnes of plastic waste to oceans every year.**
- o **Fast Urbanization:** Big cities produce a lot of waste. In cities like Bengaluru and Mumbai, where daily waste is huge, plastic pollution shows problems in planning and management.
- o Many people and small businesses don't know about eco-friendly alternatives or proper disposal.

- **Issues with Mismanaged Plastic Waste:**
  - o **Environmental Harm:** Plastic waste in landfills releases harmful chemicals into the soil, affecting farming. Burning plastic releases toxic gases, polluting farmland.
  - o Tiny plastics (microplastics) in rivers harm water animals. Stray animals and marine life eat plastic, leading to blockages and death.
  - o **Public Health Risks:** Every year, **5.8 million tonnes of plastic waste are openly burned**, especially in villages and urban slums, releasing cancer-causing chemicals.
  - o Microplastics have been found in Indian table salt, seafood, and drinking water.
  - o Also, plastic waste blocking drains leads to still water, making malaria and dengue outbreaks worse.

- o **Economic Costs:** A report estimates India could lose over **USD 133 billion** in material value from plastic packaging by 2030, with USD 68 billion lost from uncollected plastic waste.
- o Plastic-filled beaches deter tourists, hurting coastal economies. City governments spend a lot of money (Rs 1,500–2,000 crore annually) on cleaning drains.

## IV. Regulations and Solutions for Plastic Waste Management in India

- **Key Regulations:**
  - o Plastic Waste Management Rules, 2016
  - o Plastic Waste Management (Amendment) Rules, 2022
  - o Plastic Waste Management (Amendment) Rules, 2024
  - o Swachh Bharat Mission
  - o India Plastics Pact

- **Steps to Strengthen Plastic Waste Management:**
  - o **Stronger Rules & Enforcement:** Strictly enforce the 2022 ban on single-use plastic items with clear punishments. Ensure that companies (like FMCG and e-commerce) follow **Extended Producer Responsibility (EPR)** rules, meaning they must collect and recycle their plastic waste.
  - o **Better Waste Management Systems:** India's plastic recycling rates have dropped, showing a need for more **Material Recovery Facilities (MRFs)**. Bringing waste pickers into formal systems with fair pay and safety gear can make things more efficient.
  - o **Reduce Plastic Use & Promote Alternatives:** Put **higher taxes on single-use plastics** and encourage alternatives. Promote using bamboo/cloth bags, edible cutlery, and biodegradable packaging.

- o **Public Awareness & Behavior Change:** The Swachh Bharat Mission should include plastic waste awareness through community and school programs. Campaigns can offer goods in exchange for plastic waste. Schools should teach the 3Rs (Reduce, Reuse, Recycle).
- o **Technology & New Ideas: Pyrolysis plants** can turn non-recyclable plastic into diesel. India has also built over a lakh (100,000) kilometers of roads using plastic waste in at least 11 states, showing an innovative reuse method.

## Conclusion

World Environment Day 2025 highlights the urgent need for action against plastic waste, both globally and locally. India's initiatives like the 'Ek Ped Maa Ke Naam' campaign and the Aravalli Green Wall project show its dedication to sustainability. However, stronger policies, public involvement, and new ideas are essential to truly fight plastic pollution and environmental harm.

## Rajasthan's Udaipur and Phalodi Sites Get Ramsar Tag



**Context:**

- On the eve of **World Environment Day (June 5, 2025),** Union Minister for Environment, Forest and Climate Change announced that **Khichan in Phalodi** and **Menar in Udaipur** have been designated as new Ramsar sites.
- This addition brings **India's total tally of Ramsar sites to 91.**

**About Ramsar Sites and Wetlands**

- **Ramsar Convention:**
  - o An **intergovernmental treaty** signed in **1971 in Ramsar, Iran**.
  - o Encourages the protection and conservation of wetlands worldwide by designating them as **"Wetlands of International Importance" (Ramsar Sites).**
- **Definition of Wetlands (as per Ramsar Convention):**
  - o It is an area of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is **static or flowing, fresh, brackish or salt, including areas of marine water** the depth of which at low tide does not exceed 6 metres."
- **Significance of Wetlands:**
  - o Vital for human survival and among the world's most productive environments.
  - o **"Cradles of biological diversity"** supporting countless plant and animal species.
  - o Provide numerous "ecosystem services" such as freshwater supply, food, building materials, biodiversity, flood control, groundwater recharge, and climate change mitigation.
- **Criteria for Identification:** Currently, there are **9 criteria** for identifying Wetlands of International Importance, including:
  - o Sites containing representative, rare, or unique wetland types.
  - o Sites of international importance for conserving biological diversity.
  - o Specific criteria based on waterbirds, fish, etc.

**The New Ramsar Sites in Rajasthan**

**A. Menar Wetland Complex (Udaipur, Rajasthan)**

- **Location:** Udaipur district, Rajasthan.

- **Description:** A **freshwater monsoon wetland complex** formed by three ponds:
    - **Braham talab**
    - **Dhand talab**
    - **Kheroda talab**
    - Also includes agricultural land that connects **Dhand and Kheroda talabs,** which floods during monsoon.
- **Biodiversity:**
    - Provides habitat for **110 species of waterbirds**, of which **67 are migratory**.
    - **Notable bird species:** Critically endangered white-rumped vulture and long-billed vulture.
    - Over **70 plant species** are found.
    - Mango trees around Braham talab host a large colony of **Indian flying foxes**.
- **Conservation Model:** Recognized as one of the best examples of **community-led conservation** in Rajasthan. Residents of Menar village play a key role in conserving wildlife by preventing poaching or fishing.

**B. Khichan Wetland (Phalodi, Rajasthan)**

- **Location:** Phalodi district, northern Thar Desert, Rajasthan.
- **Description:** Comprises two main water bodies:
    - **Ratri nadi (river)**
    - **Vijaysagar talab (pond)**
    - Also includes riparian habitat and scrub land.
- **Ecosystem:** A desert ecosystem supporting drought-resistant plant species.
- **Biodiversity:**
    - Provides habitat for over **150 species of birds**.
    - **Especially recognized** for hosting large wintering flocks of migratory **demoiselle cranes**, with over **22,000 individuals each year**.
- **Community Involvement:** Residents of the adjacent village work to reduce threats to the cranes' survival, such as mortalities from power line collisions and stray dog attacks.
- **Tourism/Research:** The site attracts bird-watchers, tourists, students, and scientists due to the large seasonal gathering of cranes.

**Significance of the Announcement**

- **Increased Ramsar Tally:** India's total number of Ramsar sites has now increased to **91**.
- **Commitment to Conservation:** This addition shows India's commitment to environmental conservation, with Prime Minister Narendra Modi highlighting that these strides are "powered by public participation."
- **Recognition of Local Efforts:** The designation acknowledges the crucial role played by local communities in conserving these wetlands, particularly in Menar and Khichan.
- **Boost for Rajasthan:** These new sites bring international recognition to Rajasthan's wetlands, potentially boosting tourism and conservation efforts in the state.

## Release of Publication "EnviStats India 2025: Environment Statistics"

**Context:**

- On June 5, 2025, the Ministry of Statistics and Programme Implementation (MoSPI), Government of India, released the 8th issue of its annual publication, **"EnviStats India 2025: Environment Statistics."**

**About "EnviStats India" Publication**

- **Publisher:** Ministry of Statistics and Programme Implementation (MoSPI), Government of India.
- **Purpose:** To offer a comprehensive overview of the country's environmental landscape, highlighting trends, challenges, and supporting evidence-based policy development for environmental sustainability and resilience.
- **Alignment:** Since 2018, the National Statistics Office (NSO) has been publishing "EnviStats India" in alignment with the **Framework for the Development of Environment Statistics (FDES) 2013**, developed by the United Nations Statistics Division (UNSD).

Figure B.1: Component of FDES
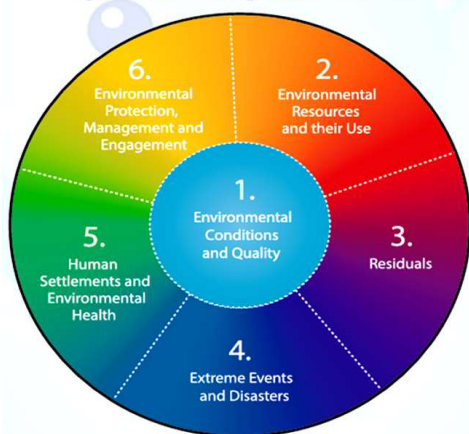
- **Data Sources:** Data compiled from various Ministries, Departments, and Organizations of the Government of India.
- **Structure:** Following FDES 2013, the data is organized into **6 components**, with related topics grouped for easier understanding.
- The publication includes a comprehensive list of indicators under the Basic Set of Environment Statistics from FDES 2013.

**Important Highlights/Key Trends from "EnviStats India 2025"**

The publication presents critical data insights across various environmental parameters:

- **Energy Sector:**
  - **Thermal Power Generation:** Increased from 7,92,053 GWh in 2013-14 to **13,26,549 GWh in 2023-24**.
  - **Renewable Energy Generation:** Significantly increased from 65,520 GWh to **2,25,835 GWh during 2013-14 to 2023–24**, indicating a strong push towards clean energy sources.
- **Climate Change Indicators (Source: India Meteorological Department, Ministry of Earth Sciences):**
  - **Annual Mean Temperature:** Increased from 25.05°C in 2001 to **25.74°C in 2024**.
  - **Annual Minimum and Maximum Temperature:** Rose from 19.32°C to **20.24°C** (minimum) and 30.78°C to

**31.25°C** (maximum) respectively, during the same period.
  - **Annual Rainfall:** Data from 2001 to 2024 highlights significant year-to-year variability influenced by monsoon patterns. Despite this, the data **does not indicate any clear long-term upward or downward trend in total annual rainfall**.
- **Biodiversity (Source: Zoological Survey of India, Ministry of Environment, Forest & Climate Change):**
  - **Marine Faunal Species:** India accounts for **20,613** species out of 2,47,605 globally.
  - **Freshwater Species:** India has **9,436** species.
  - **Indian Mangrove System:** Hosts **5,023** species.
  - **Estuarine Ecosystem:** Home to **3,383** species.
  - **Soil Ecosystem:** A notable **22,404** species are found in India's soil ecosystem, highlighting its significant diversity.
  - **Total Faunal Species (Global vs. India):** Globally, there are 16,73,627 faunal species, of which **1,04,561 are found in India**. This underscores India's significant contribution to global faunal diversity across different habitats, with the high number of soil species being particularly noteworthy.
- **Fisheries Production (Source: Ministry of Fisheries, Animal Husbandry and Dairying):**
  - **Inland Fish Production:** Increased substantially from 61.36 lakh tonnes in 2013-14 to **139.07 lakh tonnes in 2023–24**, possibly indicating growth in inland aquaculture and freshwater fisheries.
  - **Marine Fish Production:** Showed slower growth, increasing from 34.43

lakh tonnes to **44.95 lakh tonnes** during the same period.

- **Environmental Expenditure (Source: Ministry of Corporate Affairs):**
  o The **Environment Sustainability Sector** showed the highest expenditure share at **Rs. 2433.24 crore in 2021-22**.
  o The **Conservation of Natural Resource Sector** shows an upward trend in expenditure.
  o The **Agro-Forestry Sector** exhibits the lowest expenditure among the three tracked sectors (Agro-Forestry, Conservation of Natural Resources, and Environment Sustainability).

## Conclusion

"EnviStats India 2025" serves as a vital tool for assessing India's environmental performance, identifying critical trends, and informing evidence-based policymaking. Its comprehensive data on energy, climate, biodiversity, fisheries, and environmental expenditure provides crucial insights into the country's progress and challenges in achieving environmental sustainability and resilience. The continuous effort to align with international frameworks like FDES 2013 enhances the credibility and comparability of India's environmental statistics.

## EDITORIALS

### Crux of The Hindu & Indian Express

### Ecology & Environment

### India Secures UN ECOSOC Seat, Pledges Development Focus


United Nations Economic and Social Council (ECOSOC)

**Context:**

- **India has been elected to the United Nations Economic and Social Council (ECOSOC) for a 3-year term** beginning next year (2026-2028).
- **Securing an overwhelming 181 out of 187 valid votes,** this election reaffirms India's strong commitment to global development challenges and its ongoing efforts to strengthen ECOSOC's role in advancing sustainable development.

### I. India's Election to ECOSOC

- **Election Outcome:** India secured 181 out of 187 valid votes in the election for the ECOSOC seat.
- **Term:** India will serve a **three-year term starting next year (2026)**.
- **Previous Involvement:** This marks at least the **18th term for India on ECOSOC**, demonstrating its longstanding and active engagement. India previously served a four-term run from **2008 to 2020**.
- **Pledge by EAM:** External Affairs Minister S. Jaishankar expressed gratitude for the support and stated, "India remains committed to championing development issues and keep working to strengthen the ECOSOC."

### II. what is UN ECOSOC

- **Main UN Body:** ECOSOC is the **main United Nations body** dealing with sustainable development and economic matters.
- **Role:** It plays a crucial role in addressing global economic, social, and environmental challenges.
- **Membership:**
  o Comprises **54 members**.
  o Members are elected for **three-year terms**.
  o A third of the seats are up for election every three years, ensuring continuity and regular rotation.
  o Representation from all 193 UN member states, chosen by the General Assembly.

- **Functions:** ECOSOC serves as a central platform for debate, policy review, and recommendation on issues related to sustainable development.

## III. Regional Dynamics and Election Process (2025)

The election process for ECOSOC seats is structured by regional representation.

- **Asia Pacific Region:**
  - **Four seats** were up for election for this region.
  - **Elected Countries (all endorsed by regional groups):**
    - * **India:** 181 votes (newly elected).
    - * **China:** 180 votes (re-elected, term ending this year).
    - * **Lebanon:** 183 votes (newly elected).
    - * **Turkmenistan:** 183 votes (newly elected).
- **East Europe Group (Competitive Election):**
  - **Three seats** were available, with five contestants vying for positions (no regional slate presented).
  - **First Round Results (requiring two-thirds of votes):**
    - * **Croatia:** 140 votes (Elected).
    - * **Ukraine:** 130 votes (Elected).
    - * **Russia:** 108 votes (Forced into runoff).
    - * **Belarus:** 96 votes.
    - * **North Macedonia:** 59 votes (Eliminated).
  - **Runoff:** Russia won the runoff against Belarus (115 votes to 46), with 23 abstentions lowering the two-thirds threshold. This outcome, where Ukraine surpassed Russia in the first round, highlights significant geopolitical dynamics.
- **By-Elections:** The United States and Germany won by-elections to ECOSOC seats due to the resignation of Italy and Liechtenstein, respectively. This demonstrates the strategic importance countries place on representation in ECOSOC.

## IV. India's Position and Regional Presence

- **Commitment to Development:** India's election with such strong support underscores the international community's trust in its commitment to global development issues and its ability to contribute constructively to ECOSOC's mandate.
- **Regional Collaboration:** India's election places it alongside its South Asian neighbors who are also current members of the council: **Pakistan, Nepal, Bangladesh, and Sri Lanka**.
- This regional presence can foster greater collaboration and dialogue among South Asian nations on shared development challenges and opportunities.

## Conclusion

India's decisive election to the UN ECOSOC for its 18th term signifies strong international confidence in its leadership on development issues. This position provides India with a crucial platform to champion global sustainable development goals, contribute to addressing pressing economic and social challenges, and foster greater collaboration, particularly with its South Asian neighbors, within the multilateral framework of the United Nations.

## Himalayan Bat Discovery



**Context:**

- **Recent zoological surveys (2017-2021) in Western Himalayas (HP & Uttarakhand) led to a new bat species discovery.**
- It is a significant range extension, and taxonomic validations, highlighting shared regional biodiversity.

**Primary Discovery:** *Myotis himalaicus* **(Himalayan Long-Tailed Myotis)**

- **Status: New-to-science** bat species.
- **Genus:** *Myotis* (mouse-eared bats).
- **Indian Specimen:** Collected Ansuya, Chamoli, Uttarakhand (May 2021).
- **Key Linkage:** Found identical to an **undescribed 1998 specimen from Pakistan** (Khyber Pakhtunkhwa, collected by Gabor Csorba).
  - **Significance:** Highlights **transboundary biodiversity** and blurs India-Pakistan ecological divide.
- **Taxonomic Group:** Part of the *Myotis frater* complex (widespread in **East/Central Asia**).
- **Habitat:** Southern Himalayan slopes; deodar, pine, cedar forests.

**Other Major Zoological Contributions**

1. **East Asian Free-Tailed Bat (*Tadarida insignis*)**
   - **New to India:** Added to India's bat fauna. (Previously globally data-deficient).
   - **Taxonomic Correction:** Formerly misidentified as European free-tailed bat (*Tadarida teniotis*) in India.
   - **Range Extension:** Documentation in Western Himalayas extended its known range **eastward by ~2,500 km**.
   - **Distribution:** India (Himalayas), China, Taiwan, Japan, Korean Peninsula.

2. **Babu's Pipistrelle (*Pipistrellus babu*)**
   - **Species Validation:** Conclusively proved as a **distinct species** (not a synonym of Javan pipistrelle, *P. javanicus*).
   - **Historical Context:** 1st recorded over a century ago from Muree hills (now Pakistan).
   - **Confirmed Distribution:** Pakistan, India, Nepal.

3. **First Specimen-Based Confirmations (in India):**
   - Savi's pipistrelle (*Hypsugo savii*)
   - Japanese greater horseshoe bat (*Rhinolophus nippon*)

**Key Stakeholders & Publications**

- **Lead Institution (India):** Zoological Survey of India (ZSI), Shillong (Uttam Saikia).
- **International Collaborators:** Hungarian Natural History Museum, Natural History Museum of Geneva.
- **Publication Journal: Zootaxa** (prominent zoological journal).

**Implications**

- Adds *Myotis himalaicus* as a new species.
- Increased India's confirmed bat species count to **135**.
- Reinforces the Western Himalayas as a **biodiversity hotspot**.
- **Small Mammalian Fauna:** Boosts focus on lesser-studied groups critical for ecosystem health.
- **Ecosystem Services of Bats:** (Recall for Mains: insect control, pollination, seed dispersal).

**About Zoological Survey of India (ZSI) – Key Facts**

- **Established:** 1916
- **Role:** Premier Indian organization for zoological research and studies
- **Nodal Ministry:** Ministry of Environment, Forest and Climate Change

Objectives:

- Exploration, survey, and monitoring of faunal diversity across Indian states, ecosystems, and protected areas
- Periodic review of the status of threatened and endemic species
- Preparation and maintenance of databases for all recorded species in India

**What is Biodiversity ?**

- Biodiversity = variety in genes (within species), species (plants & animals), and ecosystems in a given area.
- Estimated 8.7 million species on Earth; ~1.75 million identified so far (mostly insects).
- Influenced by climate and human activities.
- Essential for ecosystem health and productivity.

Types / Levels of Biodiversity:

- **Genetic Diversity:** Variation of genes within a species (e.g., 50,000 rice strains in India).
- **Species Diversity:** Variety of species in a region (e.g., Western Ghats have more amphibians than Eastern Ghats)
- **Ecosystem Diversity:** Variety of ecosystems (forests, wetlands, deserts, marine, etc.).

Patterns and Causes:

- Species richness decreases from equator to poles.
- Tropical forests (~7% of Earth's surface) contain ~90% of species.
- Tropical biodiversity is high due to:
  - Long evolutionary time (less glaciation)
  - Stable climate with less seasonality
  - Higher solar energy input (insolation)

Biodiversity in India:

- One of 17 megadiverse countries.
- Home to 7-8% of known species; **4 biodiversity hotspots (Himalaya, Indo-Burma, Western Ghats, Sundaland).**
- Over 1,03,258 fauna species; 55,048 flora species.
- Rich wetland and forest ecosystems (23.39% forest cover).
- 91 Ramsar wetland sites as of 2025 June , 28,948 endemic fauna species, 12,095 endemic plants.

Significance of Biodiversity:

- **Climate resilience:** Helps ecosystems adapt to climate change.
- **Ecosystem stability:** Higher diversity = more resilience to disturbances.
- **Economic value:** Supports livelihoods, agriculture, fisheries; half of global GDP depends on nature.
- **Biomimicry & Bioprospecting:** Using nature's models for innovation and genetic resources.
- **Ecosystem services:** Air & water purification, pollination, pest control.

- **Cultural & social values:** Important for traditional communities and recreation.

Causes of Biodiversity Loss:

- **Habitat loss & fragmentation:** Major threat (e.g., Amazon deforestation).
- **Overexploitation:** Overuse leading to degradation (e.g., mangrove clearing).
- **Invasive species:** Alien species threatening natives (e.g., Lantana, water hyacinth).
- **Co-extinctions:** Extinction of species linked to others
- **Climate change:** Affects habitats and species survival (e.g., polar bears, coral reefs).

Conservation of Biodiversity:

- **In-situ conservation:** Protecting natural habitats and species in the wild. Includes:
  - Protected areas (national parks, wildlife sanctuaries, biosphere reserves).
  - Biodiversity hotspots (36 worldwide, 4 in India).
  - Species-specific projects (Project Tiger, Project Hangul).
- **Ex-situ conservation:** Protecting species outside their natural habitats.
  - Zoological parks, botanical gardens, wildlife safari parks.

## Ken-Betwa Project in Panna Tiger Reserve

WHY IN NEWS?

- The Ken-Betwa Link Project, flagged off by Prime Minister Narendra Modi **in December 2024, began ground-level work in March 2025 inside the core area of Panna Tiger Reserve (PTR),** Madhya Pradesh.
- Experts and wildlife officials have **raised serious concerns about the project's impact on the reserve's wildlife, ecology, and prey base** after recent incidents of animal migration, territorial conflicts, and tiger deaths.
- On **December 25**, **Prime Minister Narendra Modi** laid the foundation stone for the **Ken-Betwa River Linking Project** (KBLP) on the

**100th birth anniversary of Atal Bihari Vajpayee**, the former Prime Minister of India.

- While the project has been hailed by some for its potential benefits, it has also faced criticism, especially concerning its impact on the **Panna Tiger Reserve** and the environment.

**What is the Ken-Betwa River Linking Project (KBLP)?**

The **Ken-Betwa River Linking Project** involves transferring water from the **Ken River** to the **Betwa River**, both of which are tributaries of the **Yamuna River**. A **221 km long canal** will be constructed, including a **2 km tunnel**.

- **Key Benefits**:
    - **Irrigation**: The project is expected to provide irrigation for **10.62 lakh hectares** of land (8.11 lakh hectares in **Madhya Pradesh** and 2.51 lakh hectares in **Uttar Pradesh**).
    - **Drinking Water**: It will provide drinking water to **62 lakh people**.
    - **Power Generation**: The project will generate **103 MW** of **hydropower** and **27 MW** of **solar power**.
- This is the **first project under the National Perspective Plan** for linking rivers, which was proposed in **1980**.

**Phases of the Project and Construction Details**

- The project will be carried out in **two phases**:
- **Phase-I**:
    - Construction of the **Daudhan Dam** complex, including tunnels, canals, and power stations.
    - The **Daudhan Dam** will be **2,031 meters long** (with **1,233 meters earthen** and **798 meters concrete**) and **77 meters high**.
    - The dam will submerge around **9,000 hectares** of land, affecting **10 villages** in **Madhya Pradesh**.
- **Phase-II**:
    - Will involve the construction of the **Lower Orr Dam**, **Bina Complex**, and **Kotha Barrage**.

- The project was approved by the **Union Cabinet** in **December 2021** with a cost of **Rs 44,605 crore**. **PM Modi** laid the foundation for the **Daudhan Dam** on **December 25, 2023**.
- **Completion Timeline**
    - The project is expected to be completed in **eight years**, according to the **Jal Shakti Ministry**.
- **Agreement for the Project**
    - On **March 22, 2021**, the **Ministry of Jal Shakti** and the governments of **Madhya Pradesh** and **Uttar Pradesh** signed a **Memorandum of Agreement (MoA)** to implement the **Ken-Betwa Link Project**.

**How Was the Project Conceptualized?**

- The idea of linking the **Ken River** with the **Betwa River** gained attention in **August 2005** when a **tripartite MoU** was signed among the **Centre and the 2 states.**
- It was declared a **National Project** in **2008** and included as part of the **Prime Minister's development package** for the **Bundelkhand region**, which faces frequent droughts.
- A **Detailed Project Report (DPR)** was completed in **2018**, which included both phases of the project and additional areas proposed by **Madhya Pradesh**.

**Regions Benefiting from the Project**

- The project will mainly benefit the **Bundelkhand region**, which spans **13 districts** in **Madhya Pradesh** and **Uttar Pradesh**. Some of the key districts that will benefit from the project are:
    - **Madhya Pradesh**: **Panna**, **Tikamgarh**, **Chhatarpur**, **Sagar**, **Damoh**, **Datia**, **Vidisha**, **Shivpuri**, and **Raisen**.
    - **Uttar Pradesh**: **Banda**, **Mahoba**, **Jhansi**, and **Lalitpur**.
- These areas will get more water for farming and drinking purposes, helping to address the water scarcity issues.

**Environmental and Social Concerns**

Despite the potential benefits, the **Ken-Betwa Project** has raised several **environmental** and **social concerns**:

- **Deforestation**: The project will require cutting down many trees in the **Panna National Park and Tiger Reserve**. This could harm the environment and wildlife living there.
- **Impact on Tigers**: One of the most controversial aspects is that the project may undo the successful **tiger reintroduction program** in the Panna Reserve.
- The construction of the **Daudhan Dam** could harm tiger habitats, which were restored after the species was locally extinct in the area in **2009**.
- **Effect on Wildlife**: The project could also harm other species, including the **Gharial** (a type of crocodile) in the **Ken Gharial Sanctuary** and **vultures** that nest in the area.
- **Displacement**: The **Daudhan Dam** will submerge around **9,000 hectares** of land, which will displace **over 6,600 families** from **Chhatarpur** and **Panna** districts. Locals have raised concerns about **low compensation** and **inadequate benefits** from the project.
- **Hydrological Concerns**: Some scientists, including those from **IIT Bombay**, have warned that moving large amounts of water in river-linking projects could affect rainfall patterns and lead to **lower rainfall** (up to **12%** less) in some months, especially **September**.
- **Legal Scrutiny**: The **Supreme Court's Central Empowered Committee (CEC)** has questioned the project's **economic viability** and suggested that alternative irrigation options should be considered before proceeding.
- The CEC also expressed concerns about the impact on **tigers** and wildlife and the lack of proper environmental reviews before building a dam in a **national park**.

Government Mitigation Measures

- **Compensatory Steps:**
  - Expansion of PTR by 60 sq km **(only 30% land acquired so far).**
  - Relocation of four villages from the core area.
  - Compensatory afforestation **(2.5 million trees).**
  - Setting up a wildlife research centre and radio-collaring of tigers/leopards.
  - Notification of new protected areas for displaced wildlife.
  - Plans to translocate prey species to PTR.
- **Environmental Clearance Conditions:**
  - Extension of PTR boundaries.
  - Afforestation.
  - Scientific monitoring of wildlife.

Expert and Activist Criticism

- **Conservation Setbacks:** Project may **undo 15 years of tiger revival in PTR.**
- **Transparency Issues:** Lack of public information and regular updates.
- **Call for Alternatives:** Experts suggest less damaging water management solutions.

**Conclusion:**

The Ken-Betwa Link Project aims to solve Bundelkhand's water crisis but poses significant risks to Panna Tiger Reserve's ecology and local communities. Balancing development with conservation is crucial for sustainable progress.

## NGT Issues Notice on Lightning Deaths & Palm Tree Felling in Bihar



**Why in News?**

- The National Green Tribunal (NGT) has taken *suo motu* **(on its own motion) cognisance of a newspaper report** linking the widespread

felling of palm trees in Bihar to a significant **increase in lightning-related deaths.**

- The NGT has issued notices seeking responses from the Central Pollution Control Board (CPCB) and various Bihar authorities.

## I. The Core Issue: Palm Trees, Lightning Deaths & Prohibition Policy

- **The Allegation:** Large-scale felling of palm trees in Bihar is **reportedly leading to a sharp increase in lightning-related fatalities**, with over 2,000 lives lost in the state since 2016.
- **Role of Palm Trees as Natural Conductors:**
    o Palm trees, **due to their considerable height (often 90-100 feet) among other trees, and high moisture/sap content within their trunks and roots**, act as **natural lightning rods and conductors**.
    o They effectively absorb and dissipate the **electrical energy from a lightning strike, diverting it safely into the ground** and thus protecting surrounding areas, including people and structures.
    o Lightning typically strikes the tallest object first, making palm trees a natural point of discharge.
- **Impact of Bihar's Prohibition Policy:**
    o **Loss of Economic Value:** After the statewide ban on toddy tapping (fermented palm sap) due to Bihar's prohibition policy (enacted April 2016), palm trees largely lost their economic value for local communities who traditionally relied on them for livelihood.
    o **Widespread Felling:** This led to widespread felling of these trees for timber or other purposes.
    o Farmers and toddy tappers lost interest in their cultivation and maintenance, leading to a reported 40% decrease in the area under palm tree cultivation in the state, with new plantations almost ceasing.
- **Consequence - Increased Vulnerability:** The removal of these natural lightning conductors has apparently made rural areas, where people often work outdoors, more vulnerable to lightning strikes.
    o **Casualty Statistics:** Lightning deaths in Bihar surged post-2016.
    o The state recorded 133 deaths in 2015 and 114 in 2016, but this rose significantly to 253 in 2019, 459 in 2020, and 303 in 2024.
    o Worst-affected districts include Aurangabad, Patna, Nalanda, Kaimur, Rohtas, Bhojpur, and Buxar.
    o Most deaths occur between 12:30 p.m. and 4:30 p.m., coinciding with peak outdoor work hours.

## II. About Palm Trees (Arecaceae / Palmae Family)

- **Classification:** Palm is a **member of the Arecaceae (or Palmae), a single family of monocotyledonous flowering plants of the order Arecales.**
- **Characteristics:**
    o **Evergreen plants that can grow in various forms:** shrubs, trees, or long, woody vines called lianas.
    o Typically characterized by a tall, unbranched stem of uniform diameter from base to top. Rarely, some species like *Hyphaene* exhibit dichotomous branching stems.
    o Leaves are coriaceous (leathery) and can be either:
        * **Palmate:** Like hands, growing in a bunch at the end of a stem (e.g., Palmyra palm).
        * **Pinnate:** Like feathers, growing along either side of a stem (e.g., Coconut palm).

- **Distribution:** Widely distributed across tropical and subtropical regions.
- **Found in America, Asia (from India to Japan and south to Australia and the islands of the Pacific and Indian oceans), with Africa and Madagascar** being a 3rd but less prominent palm region.
- **Conservation Status:** While many species are robust, approximately 100 species of palms are endangered globally due to deforestation and unsustainable cultivation practices.
- **Economic Importance:** Palms are of immense economic value, providing diverse products. The most globally important are the **coconut palm** (*Cocos nucifera*) and the **African oil palm** (*Elaeis guineensis*), both prime sources of vegetable oil and fat.
  - **In India:** Key species include Palmyra palm (*Borassus flabellifer*), Coconut palm, Date palm (*Phoenix dactylifera*), Sago palm, and various ornamental and wild varieties.
  - **Uses:**
    * **Food:** Fruits (coconut, dates, toddy), edible kernels, sap (neera, jaggery), palm oil.
    * **Building Materials:** Trunks for construction and furniture; leaves for roofing, baskets, mats, and other crafts.
    * **Medicine:** Various parts are used in traditional medicine for treating ailments.
    * **Fibers:** Coir from coconut husks for ropes and mats; other fibers for weaving.
    * **Biofuel:** Palm oil is used as a biofuel.
    * **Ecological:** Help prevent soil erosion (due to deep roots), aid in water retention, and contribute to local biodiversity.

## III. NGT's Action and Legal Basis

- **Legal Provisions:** The NGT noted that the matter "seems to attract the provisions of the **Environment (Protection) Act, 1986**."
- This Act provides a broad framework for environmental protection and improvement, including preventing environmental degradation that poses hazards to human life and the ecosystem.
- **Respondents (Parties Impleaded):** The NGT has sought responses from:
  - **Central Pollution Control Board (CPCB):** Responsible for environmental monitoring and pollution control at the national level.
  - **Bihar State Pollution Control Board (BSPCB):** The state-level environmental regulator.
  - **Regional Office of the Union Ministry of Environment, Forest and Climate Change (MoEFCC):** The nodal ministry for environmental and forestry programs.
  - **Bihar Disaster Management Department (BDMD):** Responsible for managing disasters, including lightning strikes.
- **Next Steps:** Notices have been issued, and respondents are required to file their replies. The matter is listed for further proceedings on **August 7 before the NGT's Eastern Zonal Bench in Kolkata.**

## How Crushed Stone Could Help Fight Climate Change

**Why in News**

- On June 24, 2025, reports highlighted that **crushed rock is being spread across farmland—from sugar plantations in Brazil to tea estates in India**—as part of a novel method to combat climate change.
- This method, **known as Enhanced Rock Weathering (ERW),** is attracting global attention and investment for its potential to remove carbon dioxide ($CO_2$) from the atmosphere.

**What is Enhanced Rock Weathering (ERW)?**

- Enhanced Rock Weathering (ERW) is a climate change mitigation technique that aims to **accelerate the natural process of rock weathering** in order to capture and store atmospheric carbon dioxide.
- It involves spreading finely ground, quick-weathering rocks such as **basalt** over agricultural land.
- These rocks react with carbonic acid (**formed when $CO_2$ dissolves in rainwater or soil moisture**), **triggering a chemical reaction that locks $CO_2$ into bicarbonates, which eventually form limestone.**

**How ERW Works**

- Under natural conditions, **rocks undergo weathering when rainwater containing dissolved $CO_2$ forms** carbonic acid ($H_2CO_3$) and reacts with minerals in the rocks.
- This process **binds carbon and washes it into oceans where it can precipitate as limestone ($CaCO_3$).**

**ERW speeds up this natural carbon capture process by:**

- Using rocks like basalt, which weather quickly.
- Grinding them into a fine powder to increase surface area and reaction speed.
- Spreading them over farmland where moisture and microbial activity facilitate the reaction.

**Effectiveness of ERW**

- The effectiveness of ERW as a carbon removal method is still being evaluated.

- According to a U.S. study, **applying 50 tonnes of basalt per hectare annually could remove up to 10.5 tonnes of $CO_2$ over four years.**
- However, field trials in Malaysia (on oil palm plantations) and Australia (on sugarcane farms) showed much lower $CO_2$ removal rates, indicating that initial estimates may have been overly optimistic.

**The efficiency of ERW depends on several factors:**

- The type and grain size of the rock used.
- Soil composition and land management practices.
- Climate conditions, especially temperature and rainfall.

**Challenges in Measurement**

- One of the major challenges in ERW is accurately measuring the amount of carbon dioxide removed from the atmosphere.
- The most commonly used method measures **cations** (positively charged ions) released during the weathering process.
- However, these cations are released not only by reactions with carbonic acid but also by other stronger acids present in soil.
- As a result, there is a risk of overestimating the actual amount of carbon captured through ERW.
- Experts suggest that more scientific funding and improved verification techniques are needed to accurately quantify carbon removal through this method.

**Additional Benefits of ERW**

ERW provides multiple co-benefits beyond carbon capture:

- It increases **soil alkalinity, which can boost crop yields and improve soil structure.**
- The application of rock dust adds essential nutrients to the soil, aiding long-term soil health.

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- Even if the rock reacts with non-carbonic acids, it may **still neutralize acidic runoff, reducing ocean acidification** and potentially preventing indirect $CO_2$ emissions from water bodies.
- Moreover, basalt is abundantly available and often a quarrying byproduct, making the process relatively cost-effective and scalable.

**Risks and Concerns**

While ERW is generally considered safe, there are some associated risks:

- Some types of quick-weathering rocks may contain toxic heavy metals, which could contaminate soil or water.
- Workers applying the finely ground rock must wear protective gear to avoid inhaling dust.
- The greatest concern is the overestimation of carbon credits. If companies purchase ERW-based credits based on inflated carbon capture figures, they may fail to truly offset their emissions, resulting in a net increase in atmospheric $CO_2$.

**Global Implementation of ERW**

ERW projects are being piloted and implemented in several countries across Europe, North America, Latin America, and Asia.

- In India, **crushed basalt is being applied to tea plantations in Darjeeling.**
- In Brazil, a project recently delivered the world's first verified carbon-removal credits from an ERW initiative.
- In the United States, ERW is being trialed in soybean and maize fields.

# Asia is Warming at Twice the Global Average : WMO Report

**Why in News**

- On June 23, 2025, the **World Meteorological Organization (WMO) released its "State of the Climate in Asia 2024"** report, revealing that **Asia is warming at nearly twice the global average.**
- The year 2024 was the warmest on record for Asia, marked by widespread and prolonged **heatwaves, record-high sea surface temperatures,** glacier mass loss, and a surge in extreme weather events.

**I. Key Findings on Temperature and Warming Trends**

- **Warmest Year on Record:**
  - 2024 was the warmest year on record in Asia, with its average temperature approximately 1.04'"C above the 1991–2020 baseline.
  - This makes it either the warmest or second-warmest year, depending on the dataset used.

- **Accelerated Warming:**
  - Asia is warming at nearly **twice the global average**.
  - The warming trend between 1991-2024 was almost double that during the 1961-1990 period.
  - This accelerated warming is partly attributed to Asia's massive landmass, as land temperatures tend to increase more rapidly than ocean temperatures.

- **Global Temperature Context:**
  - The global mean temperature in 2024 was the highest on record for the period **1850-2024 (1.45'"C above pre-industrial levels), surpassing the previous record set in 2023.**
  - Each of the years from 2015 to 2024 ranks among the 10 warmest years on record.

**II. Impacts on Oceans and Glaciers**

- **Sea Surface Temperatures (SSTs):** Asia's sea surface temperatures were the **highest on**

**record in 2024.** The decadal warming rate of Asia's sea surface is nearly double the global average.

- o **Marine Heatwaves:** Most of Asia's ocean areas were affected by marine heatwaves of strong, severe, or extreme intensity—the **largest extent since records began in 1993** (approximately 15 million sq km affected).
- o The northern Indian Ocean, Yellow Sea, and East China Sea (adjacent to Japan) were particularly impacted.

- **Sea Level Rise:** Sea level rise on both the Pacific and Indian Ocean sides of Asia exceeded the global average.
- This heightens risks for low-lying coastal areas, increasing vulnerability to flooding and erosion, and threatening major coastal metropolises.
- **Glacier Mass Loss:** A significant concern is the accelerated melting of glaciers in High Mountain Asia (**including the Himalayas, Pamir Mountains, Karakoram, and Hindu Kush**).

  - o **Scale of Loss:** 23 out of 24 glaciers monitored in the central Himalayas and Tian Shan suffered mass loss.
  - o **Notably, Urumqi Glacier No. 1 (Tian Shan) recorded its highest melt since 1959.**
  - o **Consequences:** This leads to an increase in hazards such as:
    - \* **Glacial Lake Outburst Floods (GLOFs):** Sudden discharges of water from glacial lakes, often due to moraine dam collapses.
    - \* **Landslides:** Triggered by unstable slopes due to melting ice and increased water saturation.
    - \* **Water Security Risks:** Poses long-term threats to water availability for hundreds of millions of people who depend on these glacial meltwaters for drinking, agriculture, and

industry, as 10 of Asia's largest rivers originate in the Hindu Kush Himalayas.

**III. Extreme Weather Events in 2024**

The report documented widespread and severe extreme weather events across Asia in 2024:

- **Heatwaves:**
  - o **Prolonged and Widespread:** Prolonged heatwaves affected East Asia from April to November 2024.
  - o **Record Temperatures:** Monthly average temperature records were repeatedly broken in Japan (April, July, October), Republic of Korea (April, June, August, September), and China (April, May, August, September, November).
  - o **Japan:** National mean summer temperature equaled the hottest on record, matching the 2023 record at 1.76'+C above the 1991-2020 average.
  - o **India:** Experienced intense heatwaves, leading to over 450 deaths across the country, with temperatures nearing 50'+C in some regions.
  - o **Other Regions:** Extreme high temperatures affected Makkah (Saudi Arabia, reaching 49'+C), northwestern Russian Federation (7-10$^\circ C$ above normal), Thailand (exceeding 5'+C above long-term average), and central Myanmar (new national record of 48.2'+C).
- **Extreme Rainfall and Floods:**
  - o **UAE:** Recorded an unprecedented 259.5 mm of rainfall in 24 hours in mid-April—one of its most extreme precipitation events since 1949.
  - o **India (Kerala):** Major landslides occurred in Wayanad district on July 30, following extreme rainfall (exceeding 500 mm in 48 hours), resulting in over 350 deaths.

- o **Nepal:** Record-breaking rainfall in late September triggered severe floods, killing at least 246 people and causing damages exceeding Nepali Rupees 12.85 billion.
  - o **Philippines, Vietnam, China, Laos, Thailand, Myanmar:** Devastated by Typhoon Yagi, Asia's strongest and deadliest tropical cyclone in 2024.
- **Tropical Cyclones:**
  - o **North Indian Ocean:** Four tropical cyclones formed (three in Bay of Bengal: Remal, Dana, Fengal; one in Arabian Sea: Asna).
  - o **Cyclone Remal:** Made landfall near Mongla and Khepupara coasts in Bangladesh and West Bengal, India, on May 26, 2024, causing flooding of up to 2.5m due to storm surge and heavy rainfall.
  - o **Cyclone Asna:** Developed in August over the Arabian Sea, a rare occurrence (only three times since 1891). It impacted Oman with rough waves.
  - o **Cyclone Fengal:** Tracked close to Sri Lanka before making landfall in India on November 30. Caused heavy rainfall, strong winds, floods, and landslides in Sri Lanka, leading to 18 fatalities and displacing approximately 5,000 people.
- **Lightning:** About 1,300 lives were lost across various parts of India due to lightning events.
- One particularly deadly event on July 10 killed 72 people across Uttar Pradesh, Madhya Pradesh, Maharashtra, Rajasthan, and Jharkhand.
- **Drought:**
  - o **China:** Affected nearly 4.8 million people, damaged 335,200 hectares of crops, and led to estimated direct losses of Chinese Yuan (CNY) 2.89 billion.
  - o Droughts caused heavy economic and agricultural losses in other parts of the region as well.

## Kappatagudda Final Notification Puts ESZ at 323 sq km



**Why in News**

- The Union government has issued the **final notification declaring the Eco-Sensitive Zone (ESZ) around the Kappatagudda Wildlife Sanctuary.**
- This marks the culmination of a decade-long movement to protect this **ecologically rich region in arid north Karnataka** from environmental degradation, particularly due to mining activities.

## I. About Kappatagudda Wildlife Sanctuary

- **Location:** Located in the **Gadag district of Karnataka,** specifically across Gadag, Mundaragi, Shirahatti, and Laxmeshwar taluks.
- **Area:** The sanctuary spans **244.15 sq km**.
- **Notification:** Officially notified as a wildlife sanctuary by the Karnataka government in May 2019.
- This was a result of sustained pressure from environmental activists, conservationists, and cultural groups who vehemently opposed mining in the region.
- **Ecological Significance:** Often referred to as the **'Western Ghats of North Karnataka'** due to its unique ecosystem in an otherwise arid region.
  - o **Flora:** Hosts a rich biodiversity, including over **500 species of rare medicinal plants**.
  - o **Fauna:** Diverse range of wildlife, including **leopards, striped hyenas, grey wolves, four-horned antelopes, blackbucks, and bar-headed geese**.

- o It also provides a crucial habitat for various small carnivores, amphibians, reptiles, and a rich variety of bird species.
  - o **Historical and Cultural Significance:** The region also holds historical significance with remnants of ancient temples and ruins, **reflecting dynasties like the Chalukyas and Rashtrakutas.**

## II. The Eco-Sensitive Zone (ESZ) Notification

- **Date of Notification:** June 4, 2025.
- **Total ESZ Area:** The ESZ spans **322.695 sq km**, making it significantly larger than the sanctuary itself.
  - o This area comprises 298.89 sq km of revenue village area and 23.80 sq km of forest area.
  - o A total of **62 villages** fall within this designated zone.
- **Extent of ESZ:**
  - o It extends **1 km** to the northeast, east, southeast, and south from the sanctuary boundary.
  - o It extends **between 1 km and 4.3 km** in other directions from the sanctuary boundary, using cadastral survey numbers as the minimum unit for delineation.
- **Purpose of ESZ:** ESZs are designated under the Environment (Protection) Act, 1986, to act as a **"shock absorber" or transitional zone** around Protected Areas (National Parks and Wildlife Sanctuaries).
- Their primary objective is to regulate certain activities in the vicinity of these protected areas to minimize the negative impacts of human activities on the fragile ecosystems.
- The notification specifically highlights the ecological threat from both human and climatic pressures.

## III. Zonal Master Plan (ZMP) and Regulations

- **ZMP Mandate:** The Union government now has **2 years** from the date of notification to prepare a **Zonal Master Plan (ZMP)** for the ESZ.
- This plan will be developed in consultation with local communities.
- **Collaborating Departments:** Thirteen state departments, including environment, agriculture, tourism, and revenue, will collaborate on the ZMP.
- **Scope of ZMP:** The ZMP aims to integrate ecological, environmental, socio-economic, and regulatory considerations for the ESZ.
- It will provide a framework for regulating development and ensuring compliance with the notification's provisions.
- It will also include a tourism master plan and inventory of heritage sites.
- **Permitted/Encouraged Activities:** The ZMP will **not impose restrictions on existing legal land use, infrastructure, or activities unless specifically mentioned in the notification**.
- Activities such as road widening, civic amenities, organic farming, and small-scale industries are encouraged, promoting sustainable livelihoods for local communities.
- **Prohibited Activities:** The notification explicitly **bans** certain activities within the ESZ to safeguard the environment:
  - o **Commercial mining, quarrying, and crushing.**
  - o **Oil drilling and dredging.**
  - o **Polluting industries.**
  - o **Establishment of major hydroelectric projects.**
  - o **Introduction of exotic species.**
  - o Commercial use of wood, operation of sawmills.
  - o Discharge of effluents or any solid waste.
  - o Production of hazardous substances.

## IV. Significance of the Notification

- **Decade-Long Movement:** The final notification is a significant victory for a decade-long conservation movement that battled against proposals for mining in the resource-rich Kappatagudda hills, which contain gold and iron ore deposits.
- **Biodiversity Conservation:** It provides a crucial legal shield for the unique biodiversity and ecological balance of the region, ensuring the protection of its rare flora, medicinal plants, and diverse fauna.
- **Sustainable Development:** The Zonal Master Plan, with its emphasis on local consultation and encouragement of sustainable activities, aims to strike a balance between conservation and the livelihood needs of the communities residing within the ESZ.
- **Preventing Fragmentation:** ESZs are vital for preventing the isolation of biodiversity fragments and maintaining ecological corridors, contributing to the long-term resilience of ecosystems.

## Integrated Biodiversity Assessment Tool



# Integrated Biodiversity Assessment Tool

**Why in News**

- On June 23, 2025, the IBAT Alliance, a collaboration of four of the world's leading conservation organizations, announced a record investment of **$2.5 million** in biodiversity data for 2024.
- This marks a significant **increase from $1.2 million in 2023,** reflecting a growing recognition of the critical role of robust data in tackling the global biodiversity crisis.

## I. About the IBAT Alliance

- **Formation:** Founded in **2008**, the IBAT Alliance (Integrated Biodiversity Assessment Tool Alliance) is a joint effort by four of the **largest and most influential global conservation organizations.**
- **Member Organizations:** The four organizations forming the Alliance are:
  1. **BirdLife International:** A global partnership of conservation organizations that strives to conserve birds, their habitats, and global biodiversity.
  2. **Conservation International (CI):** Focuses on protecting nature for the well-being of humanity.
  3. **International Union for Conservation of Nature (IUCN):** The global authority on the status of the natural world and the measures needed to safeguard it.
  4. **United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC):** The specialist biodiversity assessment arm of the UN Environment Programme.
- **Objective:** To enable the private sector, governments, and civil society to integrate biodiversity considerations into their planning and risk management processes.
- It aims to provide credible, science-based global biodiversity data for accurate screening and reporting, enabling meaningful action for nature.

## II. Increased Investment and Its Impact

- **Record Investment:** The 2024 investment reached $2.5 million, more than doubling the $1.2 million invested in 2023.
- **Reinvestment into Key Datasets:** This increased funding will be reinvested back into three of the world's most authoritative biodiversity datasets, supporting critical updates, maintenance, and expansion:

- o The World Database on Protected Areas (WDPA): The most comprehensive global database of marine and terrestrial protected areas.
- o It provides vital information on the global network of protected and conserved areas, essential for monitoring progress towards global conservation targets **(e.g., Target 3 of the Kunming-Montreal GBF, the "30x30" target).**
- o **The IUCN Red List of Threatened Species:** Often referred to as the **"barometer of life,"** it is a comprehensive inventory of the global conservation status of biological species.
- o It assesses the extinction risks facing **animals, fungi, and plants worldwide,** providing information on threats, ecological requirements, and conservation actions.
- o Investment supports adding new species groups, updating previously assessed species, and improving data systems.
- o **The World Database of Key Biodiversity Areas (WDKBA):** Identifies **"sites contributing significantly to the global persistence of biodiversity"** in terrestrial, freshwater, and marine ecosystems.
- o KBAs are globally important places for species and their habitats, guiding conservation priorities and actions.

- • **Benefits of Enhanced Data:**
  - o Ensures access to credible, science-based global biodiversity data for accurate screening and reporting.
  - o Enables meaningful action for nature by providing a more complete picture of the state of nature globally.

- o Enhances understanding of threats to biodiversity and drives tangible conservation action.

### III. Significance of Growing Private Sector Engagement

- • **Demonstrates Business Commitment:** The growth in funds demonstrates a crucial trend: businesses and financial institutions worldwide are increasingly investing in authoritative biodiversity data and incorporating it into their decision-making.
- • **Driving Action:** This integration of biodiversity data into business practices is driving **"real action on the ground at an ever-increasing scale."**
- • **User Base and Funding Model:** By the end of 2024, over 200 private sector organizations had used IBAT to access biodiversity data.
- • In doing so, they provided critical funds (through licensing commercial access to the IBAT platform) that are directly reinvested into the development and maintenance of these vital datasets.
- • **Alignment with Global Frameworks:** The datasets available through IBAT are used for:
  - o **Early risk screening:** Helping organizations assess their potential impacts and dependencies on nature.
  - o **Setting goals and measuring progress:** Towards global biodiversity targets such as those in the **Kunming-Montreal Global Biodiversity Framework (GBF)** and the **UN Sustainable Development Goals (SDGs), particularly SDG 14 (Life Below Water)** and **SDG 15 (Life on Land).**
  - o **Regulatory and Disclosure Requirements:** Supporting businesses in aligning with emerging regulations and disclosure frameworks related to nature **(e.g., Taskforce on Nature-related Financial Disclosures - TNFD, Corporate Sustainability Reporting Directive - CSRD).**

## IV. Kunming-Montreal Global Biodiversity Framework (GBF)

- **Adoption:** Adopted in December 2022 at the **15th meeting** of the Conference of the Parties (**COP 15**) to the Convention on Biological Diversity (**CBD**) in Montreal, Canada. Named after Kunming (**China**) and Montreal (**Canada**).

- **Objective:** A landmark agreement that aims to halt and reverse biodiversity loss by 2030, and to achieve a **"nature-positive" world by 2030**, with a vision of "living in harmony with nature" by 2050.

- **Key Elements:** It sets out **4 overarching goals for 2050 and 23 action-oriented targets for 2030,** including the ambitious **"30x30" target (Target 3)** to conserve at least 30% of global land and oceans by 2030.

- **Significance of IBAT Data:** IBAT's data on Protected Areas, Key Biodiversity Areas, and the Red List are crucial tools for monitoring and reporting progress towards the GBF targets.

## V. UN Sustainable Development Goals (SDGs) and Biodiversity

- **Adoption:** Adopted by all United Nations member states in 2015 as part of the 2030 Agenda for Sustainable Development.

- **Goal 15: Life on Land:** This SDG specifically aims to "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss."

- **Goal 14: Life Below Water:** Focuses on conserving and sustainably using the oceans, seas, and marine resources for sustainable development.

- **IBAT's Role:** IBAT's datasets provide indicators and data to track progress on various targets under SDG 14 and 15, enabling countries and organizations to assess their contributions to these global goals.

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## Geography

### Dibang River
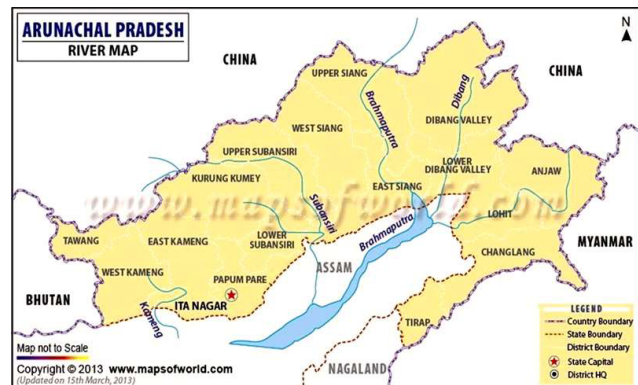


**Why in News**

The Indian Air Force (IAF) recently rescued 14 people (13 from Assam) who were stuck on an island in Arunachal Pradesh due to **flooding in the Dibang River**.

**About Dibang River**

- **Location:** Flows through Arunachal Pradesh and Assam in northeast India. The Dibang Valley district in Arunachal Pradesh is named after it.

- **Major Tributary:** It is an important tributary of the mighty **Brahmaputra River**.

- **Origin:** It starts near **Keya Pass** on the India-China border, in the Upper Dibang Valley district of Arunachal Pradesh.

- **Course:**
  - o Its upper course is in the **Great Himalayan Mountain Range**, bordering Tibet.
  - o The **Mishmi Hills** (southern part of the Himalayas, average elevation 4,500 m) are found along its upper reaches.
  - o After flowing through Arunachal Pradesh, it enters the plains of Assam.
  - o It eventually joins the **Lohit** and **Siang** rivers. Together, these three rivers form the Brahmaputra River in Assam.

- **Major Tributaries:** Dri, Mathun, Talon, Eme, Ahi, Emra, and Awa.

**Dibang Multipurpose Project**

- **Purpose:** It's a large project planned on the Dibang River in Arunachal Pradesh for **flood control** and **hydroelectric power generation**.

- **Capacity:** With an installed capacity of **2,880 MW**, it will be India's **biggest hydropower facility**.

- **Developer:** Being built by India's state-run **National Hydroelectric Power Corporation (NHPC)**.

- **Design:** Designed as an **energy storage project**. Its key goals are **flood moderation** (controlling floods) and generating electricity.

- **Dam:** It will have a **278-meter-high** and 375-meter-long concrete gravity dam. This will make it the **highest concrete gravity dam in India** and the highest Roller Compacted Concrete (RCC) dam in the world.

## Valley of Flowers National Park



**Why in News**

The Valley of Flowers in Uttarakhand's Chamoli district recently **reopened to tourists for the 2025 season**. It generally opens on June 1st each year and remains accessible until October 31st, weather permitting.

**About Valley of Flowers National Park**

- **Location:** Situated in the state of **Uttarakhand**, India.

- **Discovery:** Believed to have been discovered in 1931 by three British mountaineers led by Frank S. Smythe, who stumbled upon the valley while lost.

- **Protected Status:**
  - It is a **UNESCO World Heritage Site**.
  - It forms one of the two core zones (the other being the Nanda Devi National Park) of the **Nanda Devi Biosphere Reserve**. This means it's part of a larger protected area system recognized internationally.

- **Area:** Spreads over an area of **87 sq km**.

- **Geographical Significance:** The gentle landscape of the Valley of Flowers complements the rugged mountains of Nanda Devi National Park. Together, they represent a unique transition zone between the **Zanskar and Great Himalaya mountain ranges**.

**Flora and Fauna of Valley of Flowers National Park**

- **Flora (Plants):**
  - Famous for its meadows of endemic alpine flowers.
  - You can find over 600 species of flowering plants, including vibrant **orchids, poppies, primulas, marigold, daisies, and anemones**.
  - The valley is also rich in **medicinal plants and herbs**.
  - Sub-alpine forests of birch and rhododendron cover parts of the park's area.
  - Notable flowers include the rare **Brahma Kamal** (Uttarakhand's state flower) and the **Himalayan Blue Poppy**.

- **Fauna (Animals):**
  - Home to rare and amazing wildlife.
  - Mammals include the gray langur, flying squirrel, Himalayan weasel, **Himalayan black bear, red fox, Himalayan musk deer, and the snow leopard**.
  - Various high-altitude birds and a diverse range of butterflies like the lime butterfly are also found here.

**UNESCO World Heritage Site**

- The Valley of Flowers National Park, along with the Nanda Devi National Park, was inscribed as a **UNESCO World Heritage Site** in 1988 (expanded in 2005 to include the Valley of Flowers).

- This designation recognizes its **outstanding natural beauty** and its significance as a habitat for rare and endangered species, representing the diverse alpine flora of the West Himalayan biogeographic zone.

## Clean Plant Programme



**Why in News**

Recently, the Union Government launched the **'Clean Plant Programme'** specifically for **grapes, oranges, and pomegranates from Maharashtra**. This program aims to ensure farmers get disease-free, high-quality planting material.

**About Clean Plant Programme**

- **Objective:** It is an initiative by the Indian Government to **boost the availability of disease-free and high-quality planting material** for various horticultural crops, including fruits, vegetables, and flowers.

- **Purpose:** Its main focus is to **enhance the productivity and quality of horticultural produce**. By providing certified, disease-free planting material, it aims to significantly reduce crop losses and improve yields for farmers.

- **Key Components:** The program is structured around three main parts:

  **Establishment of Nine Clean Plant Centers (CPCs):**

  o These centers will serve multiple critical functions:
    * **Disease Diagnostics and Treatments:** Identifying and treating diseases in plant material.
    * **Mother Plant Development:** Growing healthy "mother plants" that can be used to produce more disease-free saplings for nurseries.
    * **Quarantine:** Ensuring all domestic and imported planting materials are free from diseases before they are used for commercial planting and distribution.

  o For Maharashtra, specifically, three such centers are being established: in **Pune for grapes**, **Nagpur for oranges**, and **Solapur for pomegranates**, with an investment of ₹ 300 crore.

  o **Infrastructure Development:** This involves setting up **large-scale, modern nurseries** that can efficiently multiply the clean planting material. The mother plants from the CPCs will be propagated here and then distributed to farmers. The government is providing financial support (₹ 3 crore for large nurseries and ₹ 1.5 crore for medium-sized ones) to achieve a target of 8 crore disease-free seedlings annually.

  o **Regulatory and Certification Framework:** A strong system for regulation and certification will be created. This ensures complete accountability and traceability throughout the entire process of producing and distributing planting material, giving farmers confidence in the quality.

- **Implemented by:** The program is implemented by the **Ministry of Agriculture and Farmers Welfare** through the **National Horticulture**

Board (NHB) and the **Indian Council of Agricultural Research (ICAR)**.

- o **NHB:** Works to develop high-tech commercial horticulture, improve post-harvest management, and ensure the availability of quality planting material.
- o **ICAR:** Is the apex body for coordinating, guiding, and managing research and education in agriculture, including horticulture. It plays a key role in developing and transferring technology.

- **Announced:** The program was first announced in the Union Finance interim Budget speech in February 2023 and approved by the cabinet in August 2024.

- **Collaboration:** India also plans to collaborate with countries like Israel and the Netherlands for technological support and innovation in this program.

- **"Lab to Land" Initiative:** As part of this, 16,000 agricultural scientists will directly work with farmers and agricultural departments to share knowledge on seed production, disease diagnosis, and best practices, bridging the gap between research and practical application.

## Mt. Etna



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**Why in News**

Recently, **Mount Etna** produced an explosive eruption, sending a massive cloud of ash, smoke, and rock fragments several kilometers into the sky. This event, occurring on June 2, 2025, involved Strombolian activity from the South-East Crater, escalating to a powerful lava fountain and a pyroclastic flow.

**About Mt. Etna**

- **Location:** Mount Etna, often simply called Etna, is an active stratovolcano situated on the **east coast of Sicily**, which is the largest island in the Mediterranean Sea, belonging to Italy.

- **Highest in Southern Italy and Europe's Largest Active Volcano:** Etna's peak is the highest in Italy south of the Alps, and it is the largest of Europe's active volcanoes, constantly changing its height with eruptions.

- **Craters and Vents:** Its summit has **five craters** that are responsible for most of its eruptions. Additionally, "flank" eruptions can occur from over 300 smaller vents along its slopes.

- **Type of Eruption:** The recent eruption was characterized as a "**Strombolian**" eruption.
  - o **Strombolian Eruptions:** These are typically characterized by discreet, moderately explosive bursts that eject incandescent chunks of rock (volcanic bombs, cinders, lapilli) tens to hundreds of meters into the air. They are caused by the presence of gas in the magma chamber.
  - o The name comes from **Stromboli**, another Italian volcano that exhibits minor eruptions every 10 to 20 minutes, earning it the nickname "Lighthouse of the Mediterranean."

- **UNESCO World Heritage Site:** Etna has been a **UNESCO World Heritage Site since 2013**.
  - o According to UNESCO, its eruptive history dates back **500,000 years**, with at least **2,700 years of documented activity**.

o It is recognized for its exceptional level of ongoing volcanic activity, its influence on volcanology and geophysics, and its role as a natural laboratory for studying ecological and biological processes on volcanic terrains.

## Flue Gas



**Why in News**

A high-powered committee of experts, led by **Principal Scientific Adviser (PSA) Ajay Sood**, recently recommended that India should **reconsider its decade-long policy of mandating Flue Gas Desulphurisation (FGD) units in all coal-fired thermal power plants (TPPs)**. This recommendation, under review by the Ministry of Environment, Forest and Climate Change and the Ministry of Power, could significantly alter India's approach to managing industrial emissions.

**About Flue Gas**

- **Definition:** Flue gas (also known as exhaust gas or stack gas) is the **gaseous byproduct released from combustion plants**, primarily from burning fossil fuels like coal, oil, or natural gas.
- **Composition:** It's a mixture of gases, including:
  o **Major Components:** Nitrogen ($N_2$, typically over two-thirds as it comes from ambient air), Carbon Dioxide ($CO_2$), Water Vapor ($H_2O$), and excess Oxygen ($O_2$).
  o **Pollutants:** Often contains harmful pollutants such as:
    * **Sulfur Dioxide ($SO_2$):** A major contributor to acid rain and respiratory issues.

    * **Nitrogen Oxides ($NO_x$ - NO & $NO_2$):** Contribute to smog and acid rain.
    * **Carbon Monoxide (CO):** A poisonous gas formed from incomplete combustion.
    * **Particulate Matter (PM):** Tiny solid particles or liquid droplets (like soot and dust).
    * Other trace pollutants.

- **Origin of Name:** The gas escapes through long pipes, chimneys, and ducts traditionally called 'flues,' hence the term 'flue gas.'
- **Variability:** The exact composition of flue gas depends on the type of fuel used, the combustion conditions, and the efficiency of the burning process.
- **Importance of Analysis:** Analyzing flue gas is crucial for:
  o **Environmental Compliance:** Meeting regulatory emission standards.
  o **Efficiency:** Optimizing air-to-fuel ratios and burner performance in boilers and furnaces to maximize energy output and reduce fuel consumption and operating costs.
  o **Safety:** Monitoring pollutant levels to prevent corrosion or damage to industrial equipment.

**What is Flue Gas Desulphurisation (FGD)?**

- **Definition:** Flue Gas Desulphurisation (FGD) is a set of technologies specifically designed to **remove sulfur compounds, primarily sulfur dioxide ($SO_2$), from the exhaust flue gases** of fossil-fuel power plants and other industrial processes (like waste incineration, petroleum refineries).
- **Purpose:** The main purpose is to prevent $SO_2$ from being released into the atmosphere, as $SO_2$ is a major air pollutant that causes acid rain, respiratory diseases, and contributes to environmental degradation.

- **FGD Process:**
  - FGD typically involves adding **absorbents** to the flue gas stream. These absorbents can remove up to 95% or more of the sulfur dioxide.
  - **Common Absorbents:** While substances like ammonia or sodium sulfite can be used, the most widespread method is **wet limestone scrubbing**, using a slurry of lime ($Ca(OH)_2$) or limestone ($CaCO_3$).
  - **Mechanism (Wet Limestone Scrubbing):** The uncleaned flue gas is sprayed in a scrubber tower (absorber tower) with a mixture of water and limestone slurry. The sulfur dioxide (an acidic gas) chemically reacts with the alkaline limestone to form calcium sulfite ($CaSO_3$), which can then be further oxidized to produce **calcium sulfate (gypsum)**, a marketable byproduct used in construction.

**Context of the Latest News in India**

- **2015 Mandate:** In December 2015, the Ministry of Environment, Forest and Climate Change (MoEF&CC) mandated the installation of FGD units in all coal-fired power plants across India to curb $SO_2$ emissions.
- **Implementation Challenges:** Despite multiple deadline extensions (the latest being 2027-2029 depending on categorization), a large majority of Indian coal-fired power units (around 92%) have not yet installed FGD units due to high costs and logistical challenges.
- **Reasons for the PSA Committee's Recommendation (Rollback/Relaxation):**
  - **Low Sulfur Content in Indian Coal:** Over 90% of Indian coal has a relatively low sulfur content (0.3-0.5%), meaning $SO_2$ emissions are inherently lower compared to coal from many other parts of the world.
  - **High Stack Heights:** Indian thermal power plants typically have tall chimneys (220 meters or more), which aid in wider dispersion and natural dilution of $SO_2$, reducing localized impacts.
  - **Limited Acid Rain Threat:** Studies (including one by IIT Delhi in 2024) suggest that acid rain is not a significant environmental issue in Indian climatic and atmospheric conditions.
  - **Economic Burden:** FGD installation is very expensive (estimated at ₹ 1 crore per MW of capacity), posing a massive financial burden on the power sector and potentially increasing electricity tariffs for consumers.
  - **Carbon Emission Trade-off:** FGD systems are energy-intensive, and their operation can lead to increased carbon dioxide ($CO_2$) emissions. Furthermore, $SO_2$ aerosols (sulfates) have a short-term cooling effect on the atmosphere by reflecting sunlight; removing $SO_2$ while increasing $CO_2$ might inadvertently exacerbate global warming.
  - **Focus on Particulate Matter:** The committee suggested that given India's high ash content in coal, focusing on controlling **particulate matter (PM)** emissions through efficient electrostatic precipitators (ESPs) might be a more cost-effective and impactful strategy for immediate public health benefits, as PM causes more direct respiratory issues.
- **Proposed Differentiated Approach:** The committee proposed a tiered compliance framework, mandating FGD only for plants in critically polluted areas or those near major cities, and exempting most others.

## Grand Inga Hydropower Project



**Why in News**

The **World Bank** recently approved **$250 million in financing for the Inga 3 hydropower project** in the Democratic Republic of Congo (DRC). This decision has been met with **widespread opposition from civil society groups** and has reignited longstanding concerns regarding governance and potential negative impacts. This initial funding is part of a larger plan by the World Bank to commit up to $1 billion to lay the groundwork for the project.

**About Grand Inga Hydropower Project**

- **Location:** The Grand Inga Hydropower Project is a colossal hydroelectric scheme situated on the **Congo River** in the Democratic Republic of Congo (DRC).
- **Scale:** It is widely recognized as the **world's largest proposed hydropower scheme**, with an immense potential.
- **Geographical Significance:** The project site is located approximately 50 km upstream of the Congo River's mouth into the Atlantic Ocean, and about 225 km (140 miles) southwest of Kinshasa, the capital city.
- **Unique Natural Features:** The site is characterized by:
  - **High River Flows:** The Congo River boasts the **second largest average river flow in the world**, surpassed only by the Amazon.
  - **Natural Drop:** A significant natural drop of around **97 meters caused by rapids** (Inga Falls).
  - **River Bend:** A natural bend in the river that facilitates various lower-impact design possibilities for the dam.
- **Projected Capacity:** Upon full completion, the entire Grand Inga project could produce an astonishing **40,000 megawatts (MW) of electricity**. This capacity is more than double the power generated by the world's current most powerful dam, the Three Gorges Dam in China, and represents over a third of the total electricity currently produced in all of Africa.
- **Estimated Cost:** The total project is estimated to cost around **$80 billion US dollars**.
- **Phased Development:** The Grand Inga project is envisioned to be developed in **seven phases**, beginning with **Inga 3**, which itself would have two sub-phases.
- **Existing Infrastructure:** The Inga Falls site already incorporates the existing **Inga 1 (351 MW)** and **Inga 2 (1,424 MW)** hydroelectric facilities, commissioned in 1972 and 1982, respectively.
- **Inga 3 Specifics:** Inga 3, the current focus, is projected to cost approximately **US$14 billion** and generate **4,800 MW** of electricity when completed. This phase will be located on the largest waterfall in the world by volume, Inga Falls.

**Funding for Grand Inga Project**

The ambitious project seeks significant international financing. Key institutions and countries that have expressed interest in or committed funding include:

- **World Bank:** Has approved an initial $250 million in financing for Inga 3, with potential for more.
- **African Development Bank (AfDB)**
- **European Investment Bank (EIB)**
- **French Development Agency**
- **Development Bank of South Africa**
- **Consortia of Chinese and Spanish companies** are also involved in the development.

## Controversies and Concerns

Despite the massive potential for power generation, the Grand Inga project, particularly Inga 3, has faced considerable criticism:

- **Displacement:** International Rivers, an NGO, estimates that Inga 3 could displace more than 30,000 people, many of whom were already relocated for Inga 1 and 2 and are still awaiting compensation.

- **Limited Local Benefit:** Critics argue that the majority of the electricity generated will be sold to other countries (like South Africa and Nigeria) and foreign mining companies within the DRC, rather than directly benefiting the estimated 80% of Congolese who lack electricity access, particularly in rural communities.

- **Environmental Impact:** Concerns include the flooding of vast areas of forest and farmlands, leading to methane emissions from rotting organic matter, reduced flow in the main Congo River impacting biodiversity (the Congo River has high freshwater species diversity), and creating a barrier for fish migration.

- **Governance and Transparency:** There are long-standing concerns about corruption, opaque decision-making processes, and a lack of proper consultation with affected communities. The World Bank previously withdrew funding for Inga 3 in 2016 due to "strategic differences" and concerns about government changes to implementation arrangements.

- **Debt Burden:** Critics worry that such a mega-project could saddle the DRC with unsustainable debt.

- **Alternative Solutions:** Civil society groups advocate for investing in smaller-scale, decentralized renewable energy projects that could more directly benefit local communities and have fewer environmental and social impacts.

## Kalvarayan Hills
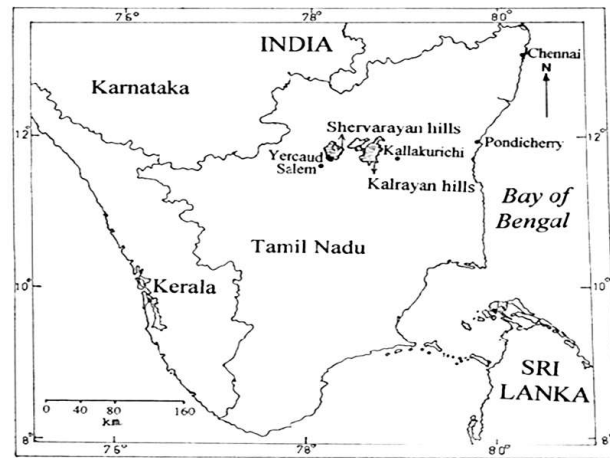


### Why in News

In a significant stride towards educational empowerment, a girl from the tribal community in the **Kalvarayan Hills** recently secured admission to an **Indian Institute of Technology (IIT)**. This marks a historic first for the region, highlighting the impact of sustained efforts to support students from remote tribal areas in pursuing higher education. (Specifically, A. Rajeshwari from Karumandurai in Salem district, a student from a government-run tribal residential school, has secured admission to IIT Madras for Aerospace Engineering).

### About Kalvarayan Hills

- **Location:** The Kalvarayan Hills (also spelled Kalrayan Hills) constitute a major range of hills situated in the **Eastern Ghats** of the southern Indian state of **Tamil Nadu**.

- **Geographical Significance:** Along with other prominent hill ranges of the Eastern Ghats in Tamil Nadu, such as the Pachaimalai, Javadi, and Shevaroy hills, the Kalvarayan Hills serve as a natural watershed, separating the **Kaveri River basin** to the south from the **Palar River basin** to the north.

- **Dimensions:** The hills range in height from **2,000 feet to 4,000 feet** (approximately 600 meters to 1,200 meters) and extend over an area of **1,095 square kilometers**.

- **Jurisdiction:** The hills straddle a number of Tamil Nadu districts, extending northeast primarily from the **Salem District** and serving as a boundary between Salem and Kallakurichi districts.
- **Divisions:** The Kalrayans are geographically divided into two distinct sections:
  - **Chinna ("little") Kalrayans:** This is the northern section, averaging around **2,700 feet** in height.
  - **Periya ("big") Kalrayans:** This is the southern section, which is generally higher, averaging around **4,000 feet**.
- **Vegetation:** The hills are characterized by a variety of vegetation types, including:
  - **Grassy jungles:** Areas dominated by tall grasses.
  - **Deciduous forests:** Forests where trees shed their leaves seasonally.
  - **Sholas:** A type of high-altitude stunted evergreen forest found in isolated plateaus, typical of certain regions of the Western and Eastern Ghats.
- **Natural Attractions:** The hills are home to several natural and cultural attractions:
  - **Waterfalls:** They contain two notable waterfalls, **Megam Falls** and **Periyar Falls**.
  - **Botanical Park:** A stunning botanical park adds to the ecological richness.
  - **Temples and Woodlands:** Numerous temples and vast woodlands dot the landscape.
- **Gomukhi Dam:** The **Gomukhi Dam** is a reservoir located at the foothills of the Kalvarayan Hills, near Kallakurichi. It is a vital water source for irrigation for surrounding villages.
- **Inhabitants:** The Kalvarayan Hills are primarily inhabited by **indigenous peoples**, notably the **Malayali tribes** (a Scheduled Tribe in Tamil Nadu). Their economy largely revolves around agriculture, collection of minor forest produce, and migratory labor.

## Stratospheric Aerosol Intervention (SAI)
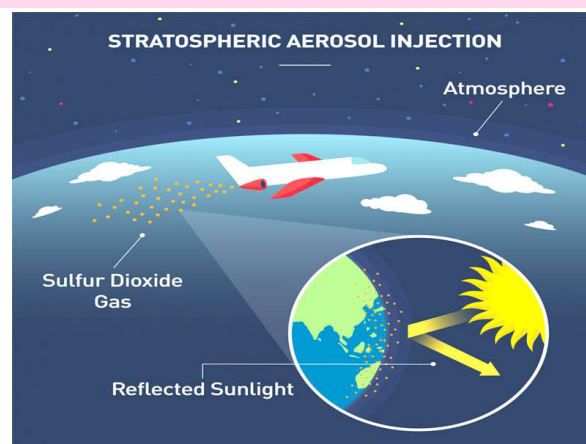


**Context:** A recent study published in the journal *Earth's Future* proposed an innovative approach to Stratospheric Aerosol Injection (SAI) that could potentially reduce costs and bring the technique closer to implementation, despite ongoing opposition.

### 1. About Stratospheric Aerosol Injection (SAI):

- **Definition:** SAI is a proposed **geoengineering method** aimed at **cooling the planet** and mitigating the impacts of climate change. It involves intentionally **adding a layer of tiny reflective particles to the high atmosphere (stratosphere)**.
- **Inspiration:** The concept is inspired by **large volcanic eruptions**, such as Mount Pinatubo (1991), which naturally spew significant amounts of aerosols into the stratosphere, leading to a temporary global cooling effect.
- **Mechanism:** The primary goal is to **mimic these natural cooling effects** by injecting substances like **sulfur dioxide ($SO_2$)** directly into the stratosphere. $SO_2$ reacts to form **sunlight-reflecting sulfate aerosols**, which scatter a portion of incoming solar radiation back into space, thereby reducing the amount of sunlight reaching Earth's surface.
- **Primary Objective:** To **reduce global warming** and its associated impacts, offering a potential temporary measure while humanity transitions to a low-carbon economy.

## 2. Key Facts about Aerosols:

- **Definition:** Aerosols are **tiny solid or liquid particles suspended in a gas**, typically air.
- **Origin:** They can be:
    - **Natural:** Examples include fog, mist, dust from deserts, sea spray, pollen, and gases/ash from volcanic eruptions.
    - **Artificial (Anthropogenic):** Examples include smoke from burning fossil fuels (industrial emissions), vehicle exhaust, and agricultural burning.
- **Formation:**
    - **Primary aerosols:** Directly emitted into the atmosphere (e.g., dust, sea salt, volcanic ash).
    - **Secondary aerosols:** Formed in the atmosphere from precursor gases through chemical reactions (e.g., sulfate aerosols from $SO_2$, nitrate aerosols from $NO_x$ emissions).
- **Composition:** Aerosol particles are diverse and often comprise various inorganic and organic substances.
- **Size:** True aerosol particles range in diameter from a few nanometers to about 1 micrometer ($10^{-4}$ cm). Particles smaller than 0.1 micrometer are sometimes referred to as Aitken nuclei.
- **Visible Forms:** Common visible atmospheric aerosol plumes include smoke, smog, haze, and dust.
- **Climate Impact:** Aerosols play a complex role in Earth's climate system. While some, like sulfates, have a cooling effect by reflecting sunlight, others, like black carbon, absorb sunlight and contribute to warming. They also influence cloud formation and precipitation patterns.

## 3. Latest Developments and Controversies:

- **Research & Feasibility:** The recent study suggests that injecting aerosols at **lower altitudes (e.g., 13 km) in polar regions** using **existing aircraft** could be a more cost-effective and faster way to deploy SAI compared to higher-altitude tropical injections requiring specialized aircraft. While less effective per unit of aerosol, it might offer a quicker start.
- **Alternatives to SO2:** Research is also exploring other reflective particles like **calcite (calcium carbonate)** or **diamond dust**, which might have fewer adverse side effects (e.g., less impact on stratospheric ozone) compared to sulfur-based aerosols.
- **Benefits (Potential):**
    - Rapid and significant cooling effect, potentially reducing global temperatures quickly.
    - Could buy time for drastic greenhouse gas emission reductions to take effect.
    - Reduced temperature extremes and potential benefits for regional precipitation and crop productivity in some vulnerable areas (though regional impacts vary).
- **Controversies & Risks:** SAI is highly controversial due to significant uncertainties and potential negative consequences:
    - **Moral Hazard:** Critics argue that the prospect of SAI might **reduce the urgency to cut greenhouse gas emissions**, distracting from the root cause of climate change.
    - **Unintended Environmental Effects:**
        * **Changes in precipitation patterns:** Could lead to droughts in some regions (e.g., Africa, Asia) and altered monsoons.
        * **Ozone Layer Depletion:** Sulfur injections, in particular, could delay the recovery of the stratospheric ozone layer.

* **Ocean Acidification:** SAI does not address the fundamental issue of increasing CO2 in the atmosphere, and thus will not halt ocean acidification.

* **Regional Imbalances:** Cooling effects might be unevenly distributed globally, potentially benefiting some regions more than others and leading to geopolitical tensions.

o **Termination Shock:** If SAI deployment were suddenly stopped (e.g., due to political instability or technical failure), temperatures could rebound very rapidly, potentially at a rate much faster than gradual global warming, leading to catastrophic impacts.

o **Governance Challenges:** There is currently no global regulatory framework for SAI. Unilateral deployment by one country could have global climate impacts, raising complex ethical, legal, and geopolitical issues and potentially triggering international disputes.

o **Ecological Impacts:** Unknown effects on ecosystems, human health (due to aerosol inhalation), and biodiversity.

o **Monitoring and Verification:** Difficulties in accurately monitoring and verifying the effects of large-scale SAI.

**Conclusion (Current Stance):** While research into SAI continues, it is generally emphasized that it is **not a replacement for aggressive greenhouse gas emission reductions**. It is viewed by many as a potential temporary measure or a "last resort" in a severe climate crisis, but one that comes with significant risks and requires extensive, transparent research and robust international governance before any large-scale deployment.

## Gangotri National Park



**Context:** Residents of Uttarkashi district in Uttarakhand have recently raised concerns with the Union government regarding a new waste incinerator operating within the **Gangotri National Park** and, significantly, within the **Bhagirathi Eco-Sensitive Zone**. This highlights the ongoing tension between development activities and environmental conservation in fragile Himalayan ecosystems.

**1. About Gangotri National Park:**

* **Location:** Situated in the **Uttarkashi District** of the state of **Uttarakhand**, in the Garhwal Himalayas.

* **Establishment:** Established in **1989**.

* **Area:** Covers an area of approximately **2,390 square kilometers (920 sq mi)**.

* **Altitude:** Ranges from around 1,800 meters (5,900 ft) to 7,083 meters (23,238 ft) above sea level.

* **River System:** It sits along the **upper catchment of the Bhagirathi River**, which is a major headstream of the Ganges River. The Bhagirathi River flows through the park.

* **International Boundary:** The **northeastern section of the park forms the international boundary of India with Tibet (China)**. This geographical feature makes it strategically important.

* **Contiguous Protected Areas:** The area enclosed by the park forms a viable conservation corridor and borders two other significant protected areas:

    o **Kedarnath Wildlife Sanctuary** (to the south)

    o **Govind National Park** (to the west)

- **Mountain Range:** The mountains within the park are part of the **Gangotri Group of the Garhwal Himalayas**, which are a sub-range of the eastern Himalayas.
- **Important Peaks:** Major peaks located within the park include:
  - **Chaukhamba I, II, and III**
  - **Satopanth**
  - **Kedarnath Main**
- **Glacier and Source of Ganga:** The famous **Gangotri Glacier** is located within the park boundaries. This glacier is renowned for being one of the primary sources of the **Ganges River**, with the snout of the glacier known as **Gaumukh**. The sacred pilgrimage site of Gangotri is also nearby.
- **Landscape:** Characterized by high ridges, deep gorges, precipitous cliffs, rocky crags, glaciers, and narrow valleys.

## 2. Flora and Fauna of Gangotri National Park:

- **High-Altitude Ecosystem:** The park is home to typical **high-altitude ecosystems** common in the Himalayas, showing influences from Trans-Himalayan elements.
- **Vegetation Zones:**
  - **Lower Elevations (approx. 2,600 to 3,600 m):** Dominated by **Western Himalayan subalpine conifer forests**. These forests are typically filled with species like **fir (Abies pindrow), deodar (Cedrus deodara), oak (Quercus spp.), spruce (Picea smithiana), and rhododendrons (Rhododendron spp.)**. Chirpine is also present. This zone acts as a transitional area between temperate forests and treeless alpine meadows.
  - **Higher Elevations (above 3,500 m):** Home to **Western Himalayan alpine shrubs and alpine meadows**. These meadows are common beneath the massive glaciers and feature cold-adapted vegetation, including species

like birch (Betula utilis) and various grasses. Alpine scrub is also a prominent feature.
- **Fauna (Mammals):** The park harbors a diverse range of high-altitude Himalayan wildlife, including several rare and endangered species:
  - **Snow Leopard** (*Panthera uncia*): A critical habitat for this apex predator.
  - **Brown Bear** (*Ursus arctos*): Including the Himalayan brown bear.
  - **Blue Sheep (Bharal)** (*Pseudois nayaur*): A primary prey species for snow leopards.
  - **Musk Deer** (*Moschus chrysogaster*): Known for its valuable musk.
  - **Asian Black Bear** (*Ursus thibetanus*)
  - **Himalayan Tahr** (*Hemitragus jemlahicus*): A large wild goat.
  - Other species include Himalayan Monal (state bird of Uttarakhand), Koklass pheasant, Himalayan Snowcock, serow, and various other bird species (over 150 documented).

## 3. Bhagirathi Eco-Sensitive Zone (ESZ):

- **Declaration:** In **2012**, the Ministry of Environment, Forest and Climate Change (MoEF&CC) issued a gazette notification declaring the watershed area along the stretch of the **Bhagirathi River, covering 4,179.59 sq km from Gaumukh to Uttarkashi, as an Eco-Sensitive Zone (ESZ)**.
- **Purpose of ESZs:** ESZs are ecologically important areas around Protected Areas (National Parks and Wildlife Sanctuaries) that are designated to be protected from industrial pollution and unregulated developmental activities. They act as a "shock absorber" to protect the highly sensitive core areas from adverse impacts.
- **Legal Basis:** ESZs are notified under the **Environment (Protection) Act of 1986**.

- **Regulations:** The Bhagirathi ESZ notification aims to protect this fragile Himalayan region by regulating or prohibiting certain activities. Originally, it restricted hydropower projects (above 2 MW), riverbed mining, and land-use change. While some amendments have been made for infrastructure (like the Char Dham project), any significant developmental activity typically requires prior approval and environmental impact studies, especially for projects of public interest or national security.
- **Current Concern (Waste Incinerator):** The ongoing protest by Uttarkashi residents highlights concerns that the new waste incinerator, located both within the national park and the ESZ, could pose a significant threat to the region's biodiversity, purity of the Bhagirathi River, and violate environmental norms. The Solid Waste Management Rules, 2016, for instance, prohibit landfills in hilly areas, advocating for waste transfer to suitable locations in the plains. This incident underscores the importance of adhering to ESZ regulations for safeguarding ecologically fragile regions.

## CROPIC Initiative



**Context:** The Ministry of Agriculture and Farmers Welfare is set to launch **CROPIC**, a new initiative that will leverage field photographs and AI-based models to gather real-time crop information. This is a significant step towards modernizing crop monitoring and enhancing the efficiency of crop insurance in India.

**1. About CROPIC Initiative:**
- **Acronym:** CROPIC stands for **Collection of Real Time Observations & Photo of Crops**.

- **Parent Scheme:** It is a key initiative under the **Pradhan Mantri Fasal Bima Yojana (PMFBY)**, India's flagship crop insurance scheme.
- **Dual Purpose:** CROPIC has two primary objectives:
    1. **Monitoring Crop Health and Stress:** To continuously track the health of crops and identify potential stress factors (e.g., disease, pest attacks, water scarcity) in real-time.
    2. **Automation of Crop Loss Assessment and Claim Payments:** To streamline and accelerate the process of assessing crop losses and facilitate quicker, more accurate payment of insurance claims to affected farmers using advanced technology.
- **Methodology:** Under this initiative, crops will be photographed **four to five times** during their entire growth cycle. These pictures will then be subjected to analysis to assess crop health, growth stage, and potential mid-season losses.
- **Initial Rollout:** The study will be carried out for two seasons initially: **Kharif 2025 and Rabi 2025-26**.
- **Data Collection Tool:** The initiative envisages the collection of field photographs during the crop season using the **CROPIC mobile application**, which has been developed by the Union Ministry of Agriculture and Farmers' Welfare.

**2. Working of CROPIC:**
- **Crowd-sourced Photographs:** The photographs from the field will be **crowd-sourced directly from farmers** and/or collected by field officials. This bottom-up approach ensures wider coverage and real-time ground-level data.
- **AI-based Analysis:** The collected geo-tagged and time-stamped images will be uploaded to an **AI-based cloud platform for photo analysis and information extraction**. This platform will

utilize computer vision technology and photo-analytic models to derive crucial information, including:

- o Crop type
- o Crop growth stage
- o Identification of crop damage and its extent (e.g., due to pests, diseases, or extreme weather)
- o Signs of crop stress

- **Visualization and Decision Support:** A **web-based dashboard** will be available for visualization of the analyzed data by agriculture officials and insurance providers. This will inform proactive decisions on compensation, advisories, and early interventions.

- **Role in Claim Settlement:** When compensation or insurance is to be paid to farmers under PMFBY, officials will collect the photographs using the CROPIC Mobile App. This photographic evidence, analyzed by AI, will serve as verifiable data to validate claims, reducing manual subjectivity and speeding up the settlement process.

- **Phased Implementation:** CROPIC will be rolled out initially in at least **50 districts per season**. These districts will be strategically selected to be well distributed across different agro-climatic zones. The focus in the initial phase will be on three major notified crops (those covered under PMFBY) in each selected district for each season. A full-scale nationwide rollout to cover all notified crops under PMFBY is expected from 2026 onwards.

- **Funding:** The initiative will be funded through the **Fund for Innovation and Technology (FIAT)**, which operates under the Pradhan Mantri Fasal Bima Yojana (PMFBY). FIAT has a corpus specifically allocated for supporting technology-driven innovations in crop insurance.

**3. Significance and Benefits:**

- **Automation and Efficiency:** CROPIC aims to largely automate the complex and often time-consuming process of crop loss assessment, leading to faster and more objective claim settlements for farmers. This reduces delays and disputes.

- **Transparency and Accuracy:** By using geo-tagged and time-stamped photo evidence along with AI analysis, the system enhances transparency and accuracy in loss estimation, minimizing manual bias and potential for errors.

- **Farmer Empowerment:** Timely and accurate compensation will strengthen the financial resilience of farmers, especially during unforeseen crop failures, preventing them from falling into debt traps.

- **Data Repository:** The initiative will create a rich digital repository of crop images and associated data from various regions and seasons. This "crop signature" database will be an invaluable resource for future agricultural research, policy-making, yield prediction models, and the development of more advanced AI tools for agriculture.

- **Digital Agriculture Vision:** CROPIC is a key component of India's broader vision for digital agriculture, leveraging modern technologies like AI, computer vision, and crowdsourcing to bring efficiency and resilience to the agricultural sector.

- **Proactive Management:** Real-time monitoring of crop health can enable early detection of issues, allowing for timely advisories and interventions to mitigate losses even before they become widespread.

### Shipki La Pass
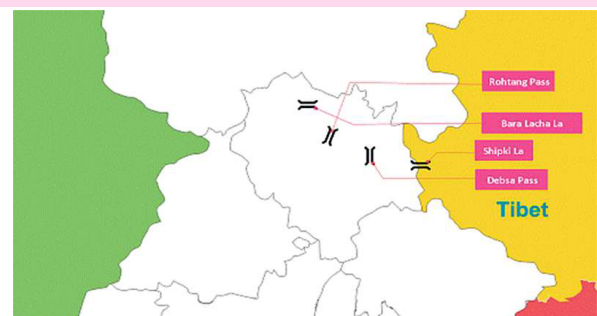


**Context:** Himachal Pradesh has recently opened **Shipki La Pass**, a significant motorable mountain pass

in the tribal Kinnaur district, to **domestic tourists**. This move is part of a broader strategy to boost tourism and economic growth in the border regions.

**1. About Shipki La Pass:**

- **Location:** Shipki La is a **motorable mountain pass** located at an altitude of **3,930 meters (12,894 feet)**. It is situated in the **Kinnaur district of Himachal Pradesh**, India, and lies on the **border between India and China**.
- **Border Post:** It serves as an official **border post on the frontier between India and China**. Along with Nathu La in Sikkim and Lipulekh in Uttarakhand, it is one of India's designated border trading points with Tibet (now China), though commercial trade via Shipki La has been largely disrupted since 1962.
- **River Entry Point:** The **Sutlej River** (known as Langqen Zangbo in Tibet) **enters India near this pass**. This makes the pass strategically important for water resources and hydrological considerations.
- **Historical Name:** Its old name was **Pema La**, or "Shared Gate," also known as "Shared Pass."
- **LAC Designation:** It was declared part of the **Line of Actual Control (LAC)** post the 1962 Sino-Indian War. The Indo-Tibetan Border Police (ITBP) later officially named it Shipki La.
- **Accessibility:** Historically, access to Shipki La has been heavily restricted due to its sensitive location and harsh winter conditions. Civilian access was largely limited and required special permits from security agencies. The current opening is a significant policy shift.
- **Road Connectivity:** National Highway 5 (NH5) passes through Shipki La.

**2. Significance of Shipki La Pass:**

- **Historical Trade Route:** Shipki La has a rich history as a **vital ancient trade corridor between India and Tibet**. For centuries, it facilitated the exchange of goods like wool, salt, grains, spices, and metals, fostering deep cultural and economic ties between the communities of Kinnaur and their Tibetan

counterparts. This trade has been documented since at least the 15th century.

- **Geographical and Strategic Importance:**
  - As the entry point of the Sutlej River into India, it holds hydrological significance.
  - Its high-altitude location in the Himalayas makes it strategically important for border security and military considerations, especially given its proximity to the India-China border.
- **Cultural Connection:** The communities on both sides of the border in this region share significant cultural ties, including pastoral lifestyles, common surnames, and a shared Buddhist faith. Monastic traditions, festivals, and oral lore reflect a continuous shared heritage despite political divisions.
- **Economic Growth and Tourism:**
  - The recent opening of Shipki La to domestic tourists is a key part of Himachal Pradesh's strategy to **stimulate economic growth in the tribal districts of Kinnaur and Lahaul-Spiti**, which share a 240-km border with China.
  - It aims to revitalize local tourism, boost the hospitality sector, create employment opportunities for local youth, and enhance regional trade infrastructure.
  - Indian tourists can now visit using just their Aadhaar card, without the previously mandatory permit system. However, foreign nationals still require Protected Area Permits (PAPs) or Restricted Area Permits (RAPs).
  - The move is seen as promoting "border tourism," allowing regulated civilian access to historically restricted yet culturally rich frontier areas.

- **Religious Tourism:** Reopening routes like Shipki La has the potential to shorten the travel time for the **Kailash Manasarovar Yatra**, a significant Hindu pilgrimage, by almost two weeks, thus boosting religious tourism.
- **Soft Diplomacy:** The increased civilian presence and engagement in border areas, even for tourism, can also be viewed as a form of "soft diplomacy" and a confidence-building measure. This is particularly relevant in the context of the sensitive India-China border.

## 3. Challenges and Future Outlook:
- While the pass is now open for tourism, full-scale commercial trade via Shipki La, which was disrupted after the 1962 Sino-Indian War and further strained by recent geopolitical tensions and the COVID-19 pandemic, has not yet resumed.
- The Himachal Pradesh government plans to take up the issue of fully resuming cross-border trade with the Ministry of External Affairs.
- The move towards "regulated border tourism" in sensitive zones aims to balance strategic security concerns with economic development and cultural exchange.

## Shongtong Karcham Hydroelectric Project



**Context:** The Chief Minister of Himachal Pradesh recently set a deadline of **November 2026** for the completion of the **Shongtong Karcham Hydroelectric Project**. This project, located in Kinnaur district, is a significant clean energy initiative that has faced delays.

## 1. About Shongtong Karcham Hydroelectric Project:
- **Type:** It is a **hydropower project** (also known as a hydroelectric project).
- **River:** The project is located on the **River Satluj** (Sutlej) in the Kinnaur District of Himachal Pradesh.
- **Design:** It is a **run-of-river project**.
  - **Run-of-river project:** This type of hydropower project generates electricity by using the natural flow and elevation drop of a river without needing a large reservoir. Water is diverted from the river, channeled through pipes (penstocks) to turbines, and then returned to the river downstream. This design generally has less environmental impact compared to projects with large dams and reservoirs, as it minimizes land submergence.
- **Capacity:** The project has an installed capacity of **450 MW (Megawatts)**, achieved through **3 units of 150 MW Francis turbines each**.
- **Generation:** It is designed to produce approximately **1,594 million units (or 1,593.93 GWh) of electricity per year**.
- **Hydraulic Head:** The gross head (total vertical distance the water falls) of the project will be 128.57 meters, and the net head (effective head after accounting for losses) will be 126.58 meters.
- **Penstocks:** It will have **3 penstocks** (large pipes or channels that carry water from the intake to the turbines). Each penstock will have a length of 5.1 meters.
- **Ownership and Developer:** The project is being developed and is currently owned by the **Himachal Pradesh Power Corporation Limited (HPPCL)**, a state government undertaking.

## 2. Significance and Current Status:
- **Clean Energy:** The project will provide clean and renewable energy, contributing to Himachal Pradesh's and India's efforts to increase their

green energy footprint and reduce reliance on fossil fuels.

- **Revenue Generation:** Once operational, the project is expected to generate significant annual revenue for the state, estimated at around ₹ 1,000 crore. This will provide a major boost to Himachal Pradesh's economy.
- **Long-Delayed Project:** The project has been under construction for approximately 13 years, experiencing various delays. The recent firm deadline by the Chief Minister aims to accelerate its completion.
- **State Control over Hydropower:** The Himachal Pradesh government is actively taking steps to ensure proper exploitation of its river water resources for power generation and to protect the state's interests. This includes plans to take over other hydro power projects like Dhaulasidh, Luhri, and Sunni, and manage their construction on its own terms.

**3. Location Context (Kinnaur District, Himachal Pradesh):**

- **Kinnaur District:** Located in the northeastern part of Himachal Pradesh, bordering Tibet (China). It is known for its rugged mountainous terrain and significant hydropower potential due to the presence of major rivers like the Sutlej.
- **Satluj River:** A major trans-Himalayan river that originates in Tibet and enters India through Himachal Pradesh. It is a key source for several hydroelectric projects in the state.

### Extreme Helium Star



**Context:**

Researchers have made a significant discovery concerning a star named **A980**, identifying it as an **Extreme Helium (EHe) star** that contains a surprisingly high amount of **germanium**. This is the first time germanium has been observed in this rare class of stars, offering new insights into stellar evolution and nucleosynthesis.

**1. About Extreme Helium Star (EHe Star):**

- **Definition:** An Extreme Helium (EHe) star is a rare type of **low-mass supergiant** that is **almost entirely devoid of hydrogen**.
- **Composition:** Unlike typical stars (like our Sun), which are predominantly made of hydrogen, EHe stars consist primarily of **helium**, along with other heavier elements (like carbon, nitrogen, neon, and as recently discovered, germanium).
- **Rarity:** They are extremely rare and enigmatic. Only **21 such stars** have been detected so far in our Milky Way galaxy.
- **Temperature Range:** These stars have effective surface temperatures ranging from **8000 K to 35000 K**.
- **Origin (Formation Theory):** The most widely accepted theory for the formation of EHe stars is the **merger of two white dwarfs** in a close binary system:
    - o A **carbon-oxygen white dwarf** (the more massive component).
    - o A less massive **helium white dwarf**.
    - o This dramatic cosmic collision is thought to create the hydrogen-deficient, helium-rich composition observed in these stars.
- **Discovery:** The first extreme-helium star, **HD 124448**, was discovered at McDonald Observatory in Austin in **1942** by Daniel M. Popper of the University of Chicago.
- **Significance of A980:** Star A980, located in the Ophiuchus constellation about 25,800 light-years away, has shown the **first-ever detection of singly-ionized germanium (Ge II)** in an EHe star. Its germanium levels are remarkably **eight**

**times higher than in the Sun**. This finding challenges existing models of stellar evolution and nucleosynthesis, suggesting that element formation may occur during white dwarf mergers in ways not fully understood, or that A980's past involved heavy-duty cosmic chemistry, possibly through the s-process (slow neutron capture) during an Asymptotic Giant Branch (AGB) phase before it became a white dwarf.

**2. Key Facts about Germanium (Ge):**

- **Chemical Element:** Germanium is a chemical element with the symbol **Ge** and the **atomic number 32**.
- **Periodic Table Placement:** It is located in **Group 14 (IVa)** of the periodic table, positioned between silicon (Si) and tin (Sn).
- **Classification:** It is a **silvery-gray metalloid**, meaning it exhibits properties intermediate between metals and nonmetals.
- **Structure & Properties:**
  - It has a **diamond-like crystalline structure**.
  - It is similar in chemical and physical properties to **silicon**.
  - It is a **semiconductor**, meaning its electrical conductivity is between that of a conductor and an insulator, and can be altered by external influences.
- **Reactivity:** Germanium is **stable in air and water** at room temperature. It is generally unaffected by alkalis and most acids, with the notable exception of **nitric acid**, which can dissolve it.
- **Applications:** Germanium is used in various high-tech applications due to its semiconductor and optical properties, including:
  - **Fiber optics**
  - **Infrared optics** (lenses, windows, thermal imaging cameras)
  - **Solar cells** (especially high-efficiency multi-junction cells for space applications)

  - **Electronics** (early transistors, diodes, some high-speed chips, though largely replaced by silicon for mainstream semiconductors)
  - Polymerization catalysts (e.g., for PET plastics)

**3. Major Producers of Germanium:**

- Germanium is not typically found as a primary ore but is primarily obtained as a **by-product** of the processing of other metals, mainly **zinc ores** and **coal fly ash**.
- The **major worldwide producer of germanium is China**, accounting for around **60% or more** of total global production. China has also imposed export restrictions on germanium (and gallium) for national security reasons, causing global supply chain disruptions.
- The remaining significant production of germanium comes from countries such as **Canada, Finland, Russia, and the United States**. Other countries like Belgium (refining), Namibia (potential new source from copper smelters), and Kazakhstan are also involved in its production or exploration.

## Rice Yellow Mottle Virus (RYMV)



**Context:** A recent genomic study has revealed a significant outbreak and spread of **Rice Yellow Mottle Virus (RYMV)** disease across various African rice ecosystems, posing a serious threat to food security in the region.

## 1. About Rice Yellow Mottle Virus (RYMV):

- **Classification:** RYMV is a plant pathogenic virus belonging to the **genus *Sobemovirus***. Its genome is a positive-sense single-strand RNA.

- **Discovery & Origin:** It first emerged in the **mid-1800s** in the **Eastern Arc Mountains**, a biodiversity hotspot located in what is now part of Tanzania. While first reported in Kenya in 1966, DNA analysis indicates its evolution in East Africa in the 19th century.

- **Geographic Restriction:** RYMV is **endemic and largely restricted to the African continent**. It has been detected in most rice-growing countries across sub-Saharan Africa. It has not been reported outside Africa.

- **Host Range:** Its primary host is **rice** (*Oryza sativa* and *Oryza glaberrima* - African rice). It also infects a few related wild grass species, particularly those in the Oryzeae tribe (e.g., *Oryza longistaminata*).

- **Impact:** RYMV poses a **major threat to rice production in Africa**, causing significant yield losses that can range from 10% to 100% depending on the age of the plant at infection, varietal susceptibility, and environmental conditions.

- **Genetic Variability:** The virus exhibits **high genetic variability**, which allows it to evolve rapidly. This rapid evolution means it can potentially **overcome existing resistance genes** in rice plants, making breeding for durable resistance challenging. Different strains and serotypes exist across Africa (e.g., S1-S6 strains, East African and West African serotypes).

## 2. Symptoms of RYMV Infection:

The symptoms vary with the rice variety, viral strain, and environmental conditions, but typical signs include:

- **Yellowing/Orange Discoloration:** Leaves, especially younger ones, show yellow or orange mottling, streaks, or discoloration. These spots often elongate parallel to the leaf veins.

- **Stunting:** Infected plants exhibit significantly stunted growth, leading to reduced plant height.

- **Reduced Tillering:** The number of tillers (side shoots) produced by the plant is reduced, leading to fewer productive stems.

- **Poor Panicle Filling/Sterility:** Panicles (rice flower clusters) may be poorly exerted or filled, resulting in low or no seed production and poor grain quality.

- **Leaf Malformation:** In severe cases, leaves may roll up and dry.

- **Plant Death:** Young seedlings (3-4 leaf stage) are most susceptible and can die from severe infection.

## 3. Transmission of Rice Yellow Mottle Virus:

RYMV is transmitted through various means, primarily mechanical:

- **Insect Vectors:**
  - **Beetles:** Several species of beetles, particularly those belonging to the genus **Chrysomelidae** (e.g., *Sesselia pusilla*, *Chaetocnema pulla*, *Trichispa sericea*), are important vectors.
  - **Grasshoppers:** Species like *Conocephalus merumontanus* and *Oxya spp.* are also known to transmit the virus.
  - These insects acquire the virus by feeding on infected plants and then transmit it to healthy plants during subsequent feeding.

- **Animal Transmission:**
  - **Cows, rats (e.g., *Arvicanthis niloticus*), and donkeys** have been shown to be potent and efficient transmitters. They can spread the virus through their faeces or by grazing on infected plants and then moving to healthy fields, causing mechanical injury and transferring sap.

- **Mechanical Transmission (Human-mediated and Abiotic):**

- o **Plant-to-plant contact:** Direct contact between infected and healthy plants can transmit the virus.
- o **Contaminated Farm Equipment:** Agricultural tools (e.g., hoes, sickles, tractors) can carry infected sap and spread the virus.
- o **Irrigation Water:** The virus can be transmitted through irrigation water in paddy fields, especially via guttation fluid (water excreted by plants) or root sap.
- o **Root-to-Root Contact:** The virus can be found in the roots of infected plants and can infect healthy plants through injured roots if they come into contact.
- o **Rice Stubble/Residues:** The virus can remain viable in infected plant residues (e.g., stubble after harvest) for a period, acting as a source of inoculum for subsequent crops.
- **NOT Seed-borne:** Although the virus can be detected on seeds, studies have consistently shown that **RYMV is not transmitted through seeds**. This is an important distinction for disease management.

**4. Control and Management Strategies:**

Controlling RYMV is challenging due to its high genetic variability and multiple transmission pathways. Integrated pest management (IPM) strategies are crucial:

- **Resistant Varieties:** Breeding and deploying rice varieties with genetic resistance to RYMV is considered the most sustainable and effective long-term solution. However, the virus's rapid evolution means new resistant varieties are continuously needed.
- **Sanitation:**
  - o Removing and destroying infected rice plants and wild grass hosts in and around fields.
  - o Plowing under or burning infected crop residues and ratoon crops (stubble that regrows).
  - o Weed control, as some weeds can serve as alternative hosts for the virus and its vectors.
- **Cultural Practices:**
  - o **Synchronized Planting:** Avoiding staggered planting dates to break the cycle of virus and vector populations.
  - o **Avoiding Mechanical Injury:** Minimizing mechanical damage to plants during weeding or other farm operations to reduce sap transmission.
  - o **Controlling Water:** Managing irrigation water to prevent spread from infected fields.
- **Vector Control:** While challenging, controlling insect vectors (beetles, grasshoppers) and limiting the movement of animal vectors (rats, cattle) can help reduce primary and secondary spread.
- **Quarantine:** Strict quarantine measures are important to prevent the spread of the virus to new areas, especially outside the African continent.

The ongoing genomic studies are vital for understanding the evolution and spread of RYMV, which will inform the development of more effective and durable resistance strategies to protect rice production in Africa.



**Chios Island**

- **Wildfire Incident:** More than 100 firefighters, supported by water-dropping helicopters and planes, recently battled a large wildfire near the main town of the eastern Aegean island of Chios.
- **Cause & Impact:** A Georgian woman has been charged with unintentional arson after allegedly sparking one of the fires by discarding a lit cigarette.
- The fires scorched significant areas (estimated 40,000 hectares by some reports) and threatened residential areas and the island's vital mastic tree groves, leading to evacuations and declarations of a state of emergency.
- This highlights the vulnerability of the island to wildfires, especially during hot, dry summers exacerbated by climate change.

**About Chios Island**

- **Location:** Greek island situated in the **Aegean Sea**.
- **Size:** Fifth-largest island in Greece, with a surface area of 842.29 sq. km.
- **Proximity to Turkey:** Situated 5 miles (8 km) off the western coast of Turkey.
- **Dimensions:** Approximately 30 miles (50 km) long north-south and from 8 to 15 miles (13 to 24 km) wide.
- **Topography:** Traversed north-south by mountains, culminating in **Mount Pelinaíon** (1,297 meters). Features rocky landscapes, lush vegetation, fine beaches, and unique medieval villages.
- **Principal Town:** Chios town (also known as Chios Chora), which is the principal town of the island and seat of the municipality.
- **Key Export:** Notable for its exports of **mastic gum**, leading to its nickname, **"the Mastic Island."** Mastic production is unique to Chios and is a UNESCO Intangible Cultural Heritage.
- **Tourism Appeal:** Attractive due to its lush vegetation, fine beaches, and unique, well-preserved medieval villages (e.g., Pyrgi, Mesta, Olympoi).

- **Historical Significance:**
  o Rich in history, with historic records dating back to the Neolithic Age.
  o Said to be the **birthplace of Homer** (the ancient Greek epic poet).
  o Associated with several other Greek writers and politicians.
  o Examples of Byzantine architecture, such as the **Nea Moni Monastery (a UNESCO World Heritage Site)**, can be found across the island.
  o Known for the **Massacre of Chios in 1822** during the Greek War of Independence, a brutal event by Ottoman forces that garnered international sympathy and was depicted by artists like Delacroix.

## Coffee



**Latest News & Significance**

- **Export Surge:** According to central government data, India's coffee exports have jumped about **125% to USD 1.8 billion in the last 11 years** (from over $800 million in 2014-15 to $1.8 billion in 2024-25).
- **Reason for Growth:** Attributed to a series of measures taken by the **Coffee Board of India**. These include:
  o Online issuance of Registration-cum-Membership Certificate (RCMC), export permits, and Certificates of Origin with digital signatures.
  o Regular interaction with exporters to address bottlenecks.

- o Providing transit/freight assistance to maximize export earnings by enhancing the market share of value-added coffee.
  - o Financial incentives: ₹ 3/kg for value-added coffee exports and ₹ 2/kg for high-value green coffee exports to distant markets.
  - o Support for installing roasting, grinding, and packaging machinery (40% cost, up to ₹ 15 lakh).
- **Significance:** This growth highlights India's increasing presence in the global coffee market and the success of government initiatives in promoting agricultural exports and value addition. It contributes to farmer incomes and overall economic growth, aligning with India's "Atmanirbhar Bharat" vision.

**About Coffee**

- **Plant Type:** A tropical plant generally grown under shady trees. India is unique for its shade-grown coffee, which promotes biodiversity and carbon sequestration.
- **Cultivation Elevation:** Grown on hill slopes at elevations from 600 to 1,600 metres above sea level.
- **Major Species:** The vast majority of the world's coffee comprises two main species:
  - o **Coffea Arabica (Arabica):** Known for its mild, aromatic flavor and higher market value. More sensitive to climate variability.
  - o **Coffea Canephora (Robusta):** Hardier, with a strong, earthy taste, often used in instant coffee production and blends for its crema. Robusta accounts for about 72% of India's total coffee production.
- **Vulnerability:** Coffee, especially Arabica, is considered a sensitive crop, vulnerable to climate variability and change.

**Distribution (in India)**

- **Major Cultivating States:** Coffee is largely cultivated in the hill tracts of the Southern Indian states:
  - o **Karnataka:** Produces the most, accounting for over 70% of the total output.
  - o **Kerala**
  - o **Tamil Nadu**
- **Emerging Regions:** Andhra Pradesh, Odisha, and some North-eastern states are also expanding coffee cultivation.
- **Export Destinations:** Europe remains the top destination for India's coffee exports. Major importing countries include:
  - o Italy
  - o Germany
  - o Belgium
  - o Middle East nations
  - o Korea
  - o Japan
  - o Also, increasingly to the US, Canada, Australia, and Scandinavian countries for high-value green coffee.

**Climatic Conditions Required for Coffee Production**

- **Climate:** Requires a hot and humid climate for its growth. Strong sunlight, temperatures exceeding 30°C, cold, and snowfall are detrimental.
- **Temperature:** Ranging between 15°C and 28°C.
- **Rainfall:** 150 to 250 cm annually. Blossom showers (pre-monsoon rains) are crucial for flowering.
- **Soil:** Well-drained, loamy soil containing a good deal of humus and minerals like iron and calcium are ideal. Stagnant water is harmful.
- **Dry Weather:** Necessary at the time of ripening of the berries.
- **Labor:** Requires plenty of cheap and skilled labor for various operations like sowing, weeding, pruning, plucking, drying, grading, and packing.

# Iliamna Volcano
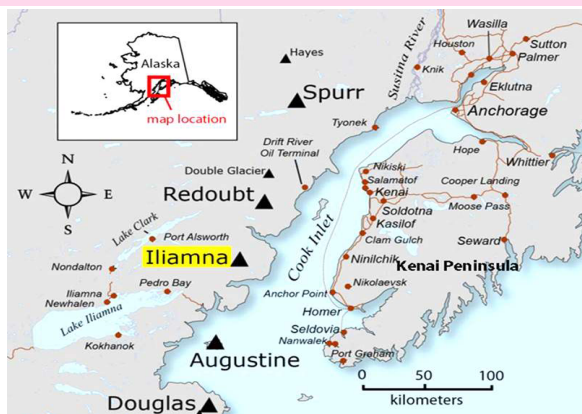


- **Satellite Image & Seismic Spike:** A recent satellite image showing Alaska's Iliamna Volcano "ready to rumble" has sparked renewed interest, coinciding with scientists recording a spike in earthquakes on its slopes.
- **Nature of Seismicity:** The Alaska Volcano Observatory (AVO) has reported that this recent seismic activity (e.g., around June 15, 2025) is likely **not caused by volcanic unrest**, but rather resembles activity observed preceding large **ice and rock avalanches** at the volcano.
- **Significance:** While not indicative of an imminent volcanic eruption, the increased seismicity and visual changes highlight the dynamic nature of this glacier-covered volcano and the need for continuous monitoring, especially given its potential for large avalanches which can pose hazards in remote areas.

**About Iliamna Volcano**

- **Location:** Southwest Alaska, United States.
- **Geographical Setting:** Sits in the **Chigmit Mountains** within **Lake Clark National Park and Preserve**. It is part of the Aleutian Arc, a highly active volcanic chain.
- **Elevation:** Soars to 10,016 feet (3,053 m) tall from nearby Cook Inlet.
- **Type of Volcano:** Iliamna is a **stratovolcano** (also known as a composite volcano).
- **Composition:** Comprises andesite lava flows and pyroclastic rocks on a base of Jurassic-era granite.

- **Shape:** Not a perfectly symmetric cone, but made of a summit peak and four other peaks that form a 5-km-long ridge.
- **Glacial Cover:** Most of the volcano is covered by perennial snow and ice, with numerous glaciers radiating from the summit area.
- **Avalanches:** Large avalanche deposits occur on the flanks of the volcano, particularly down the Umbrella Glacier on the southwest side. The frequent large ice and rock avalanches are unusual and provide a natural laboratory for studying such events.
- **Current Status:** The volcano is currently considered **dormant**.
- **Last Reported Eruption:** The most recent confirmed eruption occurred in **1876**. However, fumaroles (steam vents) near the summit produce nearly constant steam plumes, sometimes visible from Anchorage, which have historically led to mistaken reports of eruptions.

**What is a Stratovolcano?**

- **Shape:** A tall, steep, and cone-shaped type of volcano. They have higher peaks compared to flat shield volcanoes.
- **Formation:** Built by successive layers of solidified lava flows, pyroclastic material (ash, cinders, bombs), and volcanic debris from episodic eruptions. This layering gives them their alternative name, "composite volcanoes."
- **Geological Setting:** Typically found above **subduction zones**, where one tectonic plate slides beneath another. They are often part of large volcanically active regions, such as the **Ring of Fire** that frames much of the Pacific Ocean.
- **Prevalence:** Stratovolcanoes comprise the largest percentage (~60%) of the Earth's individual volcanoes.
- **Magma Characteristics:** Most are characterized by eruptions of **andesite and dacite** lavas. These lavas are cooler and more viscous (thicker) than basaltic lavas found in shield volcanoes.

- **Eruption Pattern:** Due to the viscous nature of their lavas, gas pressures can build up to high levels. Therefore, these volcanoes often suffer **explosive eruptions**, ejecting ash, pyroclastic flows (fast-moving mixtures of hot gas, ash, and rock), and volcanic gases.
- **Summit Features:** At the peak, stratovolcanoes usually have a small crater. The crater may be filled with water or ice, or it may contain a volcanic dome during a period of relative inactivity.

## Nuvvuagittuq Greenstone Belt



- **Age Determination:** Recently, scientists determined that rocks from the Nuvvuagittuq Greenstone Belt are approximately **4.16 billion years old**, using **two independent radioactive dating methods** (specifically, using the decay of samarium into neodymium, and also employing uranium-lead dating in conjunction).

**About Nuvvuagittuq Greenstone Belt (NGB)**

- **Location:** A region of ancient rock formations located on the **eastern shore of Hudson Bay in Quebec, Canada**.
- **Geological Features:** Known for their exceptional age and unique geological features.
- **Comparison to Other Formations:** These rocks are potentially the oldest known rocks on Earth, challenging earlier estimates and rivalling other ancient formations like the **Acasta Gneiss Complex** (approximately 4.03 billion years old) in Canada.
- **Geological Period:** The rocks date back to the **Hadean Eon** (4.5 to 4.0 billion years ago) and Eoarchean Eon (4.0 to 3.6 billion years ago).

- **Rarity:** Rocks older than 4 billion years are extremely rare because Earth formed around 4.5 billion years ago, but most early rocks were destroyed or transformed due to intense tectonic activity, melting, and recycling of the crust. The NGB represents a rare remnant of primordial crust.
- **Composition:** The NGB is a sequence of metamorphosed mafic to ultramafic volcanic and associated sedimentary rocks. It is primarily composed of metavolcanic rocks (like cummingtonite amphibolites, which are altered basalts) and chemical sedimentary rocks such as banded iron formations. Some rocks are believed to have formed from the precipitation of seawater, offering clues about the composition and temperature of early oceans and the atmosphere.
- **Indigenous Land:** The rock site lies on **Inuit tribal land in Inukjuak, Nunavik**.
- **Community Restrictions and Collaboration:**
    o Due to environmental damage from earlier research and reports of rock samples being sold online, the local **Inuit community has restricted further sampling**.
    o The community, led by the Pituvik Landholding Corporation, seeks to collaborate with scientists to create a **provincial park** to balance research and conservation, protecting the site while allowing for continued study.

**Scientific Significance**

- **Radiometric Dating:** Researchers used **radiometric dating**, which tracks the decay of radioactive isotopes (like samarium to neodymium) over time, to determine the age of ancient magma trapped in the rocks. This method relies on the predictable decay rates of unstable parent isotopes into stable daughter isotopes.

- **Window into Early Earth:** Provides a direct window into the planet's earliest crust, offering insights into:
  - How Earth's first crust formed.
  - Early tectonic regimes (e.g., potential evidence of early subduction).
  - The environment (e.g., early atmosphere, presence of liquid water, temperature of oceans) where early life could have arisen on Earth.
- **Potential for Early Life:** Some studies have also reported evidence for microfossils (hematite tubes and filaments) in these rocks, which, if confirmed, would be the oldest traces of life yet discovered on Earth (potentially over 3.77 billion years old).

**What are Ultramafic Rocks?**

- **Definition:** Ultramafic rocks are dark-colored igneous or meta-igneous rocks.
- **Composition:**
  - **Rich in:** Magnesium oxide (MgO) and Iron oxide (FeO).
  - **Low in:** Silica (less than 45%).
  - Contain over **90% mafic minerals** (dark-colored minerals rich in magnesium and iron, e.g., olivine, pyroxene).
  - Poor in potassium.
- **Occurrence:**
  - The Earth's mantle is believed to be composed predominantly of ultramafic rock types.
  - These rocks are commonly found in **orogenic (mountain-forming) belts** and can offer insights into mantle composition and deep Earth processes, including the early differentiation of the Earth.
- **Greenstone Belts:** Ultramafic rocks are a significant component of many greenstone belts, which are zones of variably metamorphosed mafic to ultramafic volcanic sequences with associated sedimentary rocks found within ancient cratons. The "green" color comes from metamorphic minerals like chlorite and actinolite.

## Jellyfish



- **Increasing Blooms:** Recent studies indicate that **jellyfish blooms are increasing along Indian coasts**.
- **Significance:** This trend is a concern as it points towards potential shifts in marine ecosystems, often exacerbated by human-induced factors like climate change, pollution, and overfishing. Increased blooms can have significant ecological and economic impacts, affecting fisheries, aquaculture, tourism, and coastal infrastructure.

**About Jellyfish**

- **Classification:** Jellyfish are ancient and resilient gelatinous zooplankton belonging to the phylum **Cnidaria**. This phylum also includes sea anemones, sea whips, and corals.
- **Adaptability:** They are highly adaptable marine organisms with a simple anatomy, stinging tentacles, and efficient jet propulsion.
- **Body Forms:** Cnidarians typically exhibit two basic body forms: the sessile **polyp** (like sea anemones) and the free-swimming **medusa** (the jellyfish form). Many species have both stages in their life cycle.

**Characteristics of Jellyfish**

- **Invertebrates:** They are simple invertebrates, lacking a backbone.
- **Symmetry:** Their body parts radiate from a central axis, exhibiting **radial symmetry**. This allows them to detect and respond to food or danger from any direction.
- **Simplicity:** They are relatively simple organisms, lacking complex organs like brains, blood, or even hearts.

- **Body Layers:** Composed of three main layers:
  o **Epidermis:** An outer protective layer.
  o **Mesoglea:** A thick, elastic, jelly-like, non-living substance forming the middle layer, which gives them their gelatinous consistency and bulk.
  o **Gastrodermis:** An inner layer that lines the gastrovascular cavity, responsible for digestion.
- **Stinging Tentacles:** Jellyfish have the ability to sting with their tentacles. This is achieved through specialized stinging cells called **cnidocytes**, which contain a harpoon-like structure called a **nematocyst**. When triggered by touch or chemicals, the nematocyst rapidly fires, injecting venom into prey or potential threats.

**Ecological Impact of Jellyfish**

- **Role in Food Webs:** They play essential roles in marine food webs as both predators (feeding on zooplankton, fish eggs, and larvae) and prey (for species like sea turtles and certain fish).
- **"Blooms" (Population Explosions):** Under favorable conditions, their populations can explode into dense "blooms." These events are increasingly driven by human-induced and environmental stressors, including:
  o **Climate change and ocean warming:** Warmer waters can accelerate jellyfish reproduction and growth.
  o **Eutrophication and pollution:** Excess nutrients from runoff can lead to algal blooms, providing more food for jellyfish.
  o **Overfishing:** Reduction of natural predators (like fish and sea turtles) and competitors (like small pelagic fish) can allow jellyfish populations to proliferate unchecked.
  o **Coastal development:** Artificial structures provide more substrate for the polyp stage to attach and multiply.

  o **Hypoxia (dead zones):** Jellyfish can often tolerate low-oxygen conditions better than many fish species.
- **Disruption of Ecosystems:** These blooms disrupt marine ecosystems by:
  o **Reducing biodiversity:** Outcompeting native species for food and habitat.
  o **Collapsing fish and invertebrate populations:** By directly preying on larvae and eggs, and competing for plankton.
  o **Altering food webs and nutrient cycling.**
- **Economic and Operational Challenges:** They also pose significant challenges to human activities:
  o **Fisheries:** Clogging fishing nets, damaging fishing gear, and contaminating catches, leading to economic losses.
  o **Aquaculture:** Damaging farmed fish and other aquatic organisms in net pens.
  o **Power Plants & Desalination Plants:** Blocking water intakes used for cooling or processing, leading to operational disruptions and increased maintenance costs.
  o **Tourism:** Deterring tourists from swimming and water sports due to the presence of large numbers of jellyfish and the risk of painful stings, affecting local economies.

### Kharai Camel

- **Ongoing Threat:** Despite National Green Tribunal (NGT) orders, **illegal salt pans and encroachment of creeks continue to threaten Kachchh's Kharai camels**.
- **Recent Incident:** A recent incident (June 23, 2025) saw four Kharai camels drown in a coastal swamp in Kutch, highlighting the direct and fatal consequences of habitat degradation. This particular area (Jangi village) is a traditional training ground for young camels to learn swimming.
- **Shrinking Mangroves:** Between 2018 and 2023, mangrove cover in Kutch reportedly shrank drastically from 4,084 to 1,312 hectares, while salt pans expanded from 13,681 to 17,918 hectares, impacting the camels' primary food source and traditional routes.

**About Kharai Camel**

- **Indigenous to:** Gujarat, India.
- **Name Origin:** Derives its name from the local Gujarati term "**Khara**," meaning **saline**, reflecting its exceptional adaptability to both desert and coastal (saline) ecosystems. Locally also known as "**Dariyataru**" (sea-swimmer).
- **Unique Abilities:**
    o Known for its **rare ability to swim long distances** in the sea (typically more than 3 km at a time even in deep waters) to reach grazing areas on islands or distant mangrove patches.
    o Possesses the unique dietary habit of **grazing on mangroves** and other saline-tolerant vegetation. Their soft padded hooves also facilitate movement in marshy, coastal terrain.
- **Conservation History:** Has been preserved and managed by the **Rabari and Fakirani Jat tribes** for over 400 years, highlighting a symbiotic relationship and traditional ecological knowledge.
- **Distribution:** Exists primarily in **Kutch district** of Gujarat, with some populations also in Devbhoomi Dwarka and Jamnagar districts.

- **Ecological Role:** Plays a crucial role in local ecosystems, particularly in **maintaining mangrove forests** through their grazing patterns, contributing to the health of the coastal environment.
- **Breed Recognition:** Officially recognized as a distinct breed by the **National Bureau of Animal Genetic Resources (NBAGR)** in 2015, making it India's ninth recognized camel breed.
- **Economic Value (Milk):** Kharai camel milk is not only rich in nutrients but also has therapeutic properties. The milk contains antibodies similar to those found in human milk, making it easier to digest and beneficial for boosting the immune system. It is gaining popularity in health markets.
- **Conservation Status: IUCN: Endangered**.

**Threats to Kharai Camels**

The primary threats to the Kharai camel stem from rapid habitat degradation and shrinking coastal ecosystems, largely due to:

- **Illegal Salt Pans and Industrialization:**
    o Expansion of illegal salt pans and other coastal industries (thermal power, cement, shipyards) leads to the direct destruction and fragmentation of mangrove forests, their primary food source.
    o Construction of jetties and industrial infrastructure often involves clearing mangroves and disrupting tidal creeks.
- **Encroachment of Creeks:** Obstruction and encroachment of tidal creeks disrupt the camels' traditional swimming routes and access to grazing areas.
- **Reduced Mangrove Cover:** The steadily decreasing mangroves, due to human activities, directly impact the availability of fodder and affect the camels' traditional grazing routes.
- **Increased Salinity:** Industrial activities and reduced freshwater inflow can increase salinity in grazing areas beyond even the camels' high tolerance.

- **Lack of Government Support:** Pastoral communities often report a lack of adequate veterinary care or preventive measures from the state government.
- **Climate Change:** Rising sea levels and changing weather patterns pose additional threats to their delicate coastal habitat.

## Litchis



- India has recently dispatched its first-ever consignment of **rose-scented litchis to Qatar**.
- A parallel consignment of 0.5 metric tonne was also sent to Dubai, UAE.
- **Facilitation:** This milestone export was facilitated by the **Agricultural and Processed Food Products Export Development Authority (APEDA)** under the Ministry of Commerce & Industry. The litchis were sourced from a progressive farmer in Pathankot, Punjab.
- **Significance:** This export marks a significant step in India's efforts to expand its horticultural footprint in global markets and diversify its agri-export basket beyond traditional staples like mangoes and bananas.
- It highlights India's growing competitiveness in the high-value fresh fruit segment and opens new opportunities for farmers in litchi-growing regions.
- The "rose-scented" variety is particularly prized for its unique aroma and quality.

**About Litchis**

- **Description:** Litchi (or Lychee) is a delicious, juicy fruit of excellent quality.
- **Botanical Classification:** Botanically, it belongs to the **Sapindaceae family**, which also includes longan and rambutan.
- **Edible Part:** The translucent, flavored aril or edible flesh of the litchi is popular as a table fruit in India.
- **Origin in India:** Litchis are believed to have arrived in India from **China** over 300 years ago.
- China is considered the native home of the litchi.

**Climatic Conditions Required for Litchis**

- **Climate Type:** Litchi is a **sub-tropical fruit** and thrives best under a moist sub-tropical climate.
- **Elevation:** It usually prefers low elevation and can be grown up to an altitude of 800 meters.
- **Soil:** Ideal soil conditions include deep, well-drained loamy soil, rich in organic matter, and having a pH in the range of 5.0 to 7.0.
- **Temperature:**
  o The temperature should **not go beyond 40.5°C in summer** (high heat and dry winds during fruit development can cause fruit drop or cracking).
  o It should **not go below freezing point in winter** (frost is highly detrimental, especially for young trees).
  o Some variation in temperature (a cool, dry winter period) is necessary for proper flowering and fruiting of trees.
- **Rainfall:** Prolonged rain may be harmful, especially at the time of **flowering**, when it interferes with pollination and can lead to flower drop. Good rainfall during the fruit development stage is beneficial.

- **Protection for Young Trees:** Young trees require protection against frost and hot winds for several years until they are firmly established.
- **Limiting Factors:** Frost during winter and dry heat in summer are significant limiting factors for its successful cultivation.

**Distribution of Litchis Cultivation (in India)**

- **Traditional Cultivation Areas:** In India, commercial cultivation was traditionally restricted to the north, in the foothills of the Himalayas (from Tripura to Jammu & Kashmir) and plains of Uttar Pradesh and Madhya Pradesh.
- **Major Producing States:** India is the **second largest producer of litchi in the World after China**.
  - **Bihar:** Is the **largest litchi-producing state in India**, accounting for a significant share (e.g., around 40-48%) of the country's total litchi production. Muzaffarpur in Bihar is particularly famous for its "Shahi Litchi," which has a Geographical Indication (GI) tag for its unique sweetness and aroma. The "rose-scented" variety is also popularly grown here.
  - **West Bengal**
  - **Uttar Pradesh**
  - **Jharkhand**
  - **Uttarakhand**
  - **Punjab:** Emerging as a significant producer, as evidenced by the recent exports from Pathankot.
  - Assam, Tripura, Haryana, Himachal Pradesh are also litchi-growing states.
- **Other Major Producing Countries:** Besides China and India, other major producing countries include Thailand, Australia, South Africa, Madagascar, and Florida in the US.

**EDITORIALS**

**Crux of The Hindu & Indian Express**

**Geography**

**Kalanamak Rice - The "Buddha Rice" of Uttar Pradesh**



**Context:**

- The Uttar Pradesh government, in collaboration with the Union Commerce Ministry, is planning to **boost the export of Kalanamak rice** to countries with significant Buddhist populations.
- This initiative aims to leverage the rice's cultural and historical association with Buddhism to enhance its global market presence.

**I. About Kalanamak Rice:**

- **Traditional Variety:** Kalanamak is a traditional, non-Basmati aromatic rice variety.
- It is characterized by its **black husk** and a **strong, distinctive fragrance**.
- **"Gift from Lord Buddha":** It holds immense cultural and historical significance.
- Local legend holds that it was a **gift from Lord Buddha** to the people of Sravasti (part of the ancient Kosala kingdom) when he visited the region after his enlightenment.
- This spiritual connection is often highlighted in its promotion, sometimes leading to it being called "Buddha Rice."

- **Geographical Indication (GI) Tag:** Kalanamak rice is protected under the **Geographical Indication (GI) tag system**.
- This tag confirms its specific geographical origin and unique qualities attributed to that region.
  - o It is primarily grown in **eastern Uttar Pradesh**, particularly in **Siddharthnagar district**, where it has been designated as an **ODOP (One District One Product) item**.
  - o Its GI tag covers **11 districts** of the **Terai region of north-eastern Uttar Pradesh** (including Gorakhpur, Deoria, Kushinagar, Maharajganj, Sant Kabir Nagar, Basti, Bahraich, Balrampur, Gonda, and Shravasti) and also parts of **Nepal**, which share similar agro-climatic conditions.
- **Lodging Issue:** Historically, this traditional variety has been prone to **'lodging'**, a condition where the plant falls to the ground because the top becomes heavy with grain formation and the stem weakens.
- This has been a reason for its comparatively low yield.
  - o Recent research by institutions like the Indian Agricultural Research Institute (IARI) has led to the development of **dwarf varieties** (e.g., Pusa Narendra Kalanamak 1638 and 1652) to overcome this lodging issue and significantly increase yield.

## II. Nutritional Benefits:

- **Nutritional Powerhouse:** Kalanamak rice is considered a highly nutritious choice.
- **Rich in Micronutrients:** It is rich in essential micronutrients like **iron and antioxidants**. Regular intake is believed to help prevent diseases caused by iron and zinc deficiencies.
- **Low Glycemic Index (GI):** It has a **low glycemic index**, which means it causes a slower and lower rise in blood sugar levels after consumption. This makes it a **healthy dietary choice, especially for diabetics**.
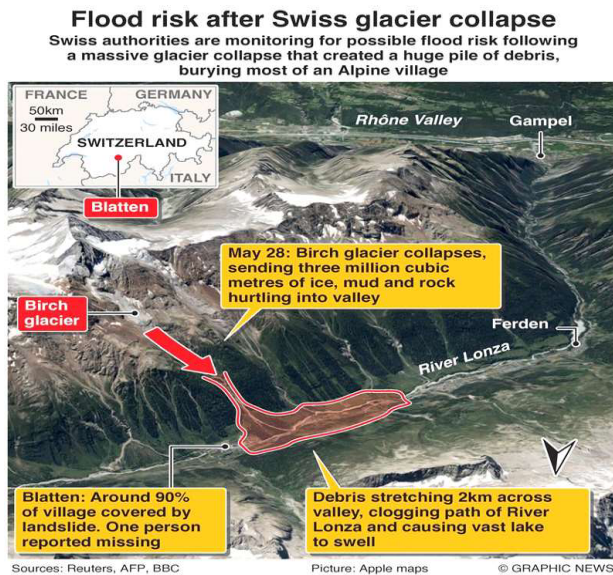- **Naturally Gluten-Free:** It is naturally **gluten-free**, making it suitable for individuals with gluten sensitivity or celiac disease.
- **Other Benefits:** It is also rich in protein (nearly double that of Basmati rice), contains Vitamin A (in the form of Beta Carotene), and is believed to help in preventing Alzheimer's disease and improving skin health.

## III. Export Promotion and Significance:

- **Target Countries:** The Uttar Pradesh government aims to promote its export to countries with majority or large Buddhist populations, including **Thailand, Vietnam, Sri Lanka, Japan, Singapore, and Nepal**.
- **Leveraging Cultural Link:** The strategy is to leverage the rice's historical and spiritual association with Lord Buddha to create a unique market niche and foster "soft power" through cultural diplomacy.
- **Government Support:**
  - o A **special export quota** (e.g., up to 1,000 tonnes) has been allowed by the central government.
  - o Uttar Pradesh is also drafting a **new export policy (2025-30)** to significantly increase exports through diversification and subsidies.
  - o A **Kalanamak Rice Research Centre** is being set up in Siddharthnagar with support from the International Rice Research Institute (IRRI) to boost research, productivity, and cultivation.
  - o The rice's promotion under the **One District One Product (ODOP)** scheme has already earned the district the Prime Minister's Award for Excellence in Public Administration in 2021.
- **Economic Impact:** Promoting Kalanamak rice boosts the income of local farmers and contributes to the agricultural economy of eastern Uttar Pradesh.

**Conclusion:** Kalanamak rice, with its unique aroma, rich history linked to Lord Buddha, and significant nutritional benefits, is more than just a grain; it's a symbol of Uttar Pradesh's agricultural heritage. The concerted efforts by the government to promote its export, especially to Buddhist-majority countries, highlight a strategic approach to leverage both its cultural significance and economic potential on the global stage.

# Flood Risk After Swiss Glacier Collapse



**Flood risk after Swiss glacier collapse**
Swiss authorities are monitoring for possible flood risk following a massive glacier collapse that created a huge pile of debris, burying most of an Alpine village

Sources: Reuters, AFP, BBC    Picture: Apple maps    © GRAPHIC NEWS

**Context:**

- On **May 29, 2025**, a large part of a Swiss glacier broke off and caused a massive landslide, burying nearly an **entire Alpine village.**
- This event highlights the **growing threat from melting glaciers,** largely linked to global warming.

**I. The Event: Glacier Collapse and Its Immediate Impact**

- **What Happened:** A huge mass of rock and ice from the **Birch Glacier** (in the **southern Valais region of Switzerland)** thundered down a mountainside.
- **Location:** Near the village of **Blatten**, in the southern Lötschental valley.
- **Date:** Wednesday, May 29, 2025.
- **Impact on the Village:**
  - The village of Blatten was largely covered in mud and sludge.

- Around **90% of the village** is reported to be "covered or destroyed," described as a "major catastrophe."
  - Homes and buildings were partially submerged.
- **Evacuation:** Authorities had already evacuated about **300 people** and all livestock from the village earlier in May as a precaution, due to fears that the glacier (estimated at **1.5 million cubic meters**) was at risk of collapse.
- **River Impact:** The mudslide also buried the nearby **Lonza River bed**, creating a risk of blocked water flow and potential flooding.

**II. The Broader Threat: Global Warming and Glacial Thaw**

- **Glacier Retreat:** Swiss glaciologists (scientists who study glaciers) have repeatedly expressed serious concerns about the **accelerated retreat of glaciers in Switzerland** in recent years.
- **Cause:** This thaw is largely attributed to **global warming**.
- **Switzerland's Glaciers:** Switzerland has the **most glaciers of any country in Europe**.
- **Significant Decline:**
  - In **2023**, Switzerland lost **4% of its total glacier volume**.
  - This was the second-biggest decline in a single year, after a **6% drop in 2022**.
- **Past Evacuations:** This isn't an isolated incident in Switzerland:
  - In **2023**, residents of **Brienz village** (eastern Switzerland) were evacuated before a massive rockslide, which stopped just short of the community.
  - Brienz was evacuated again last year due to the ongoing threat of further rockslides.

**Conclusion:**

The destruction in Blatten village serves as a stark reminder of the real and immediate dangers posed by rapidly melting glaciers. This event underscores the urgent need for global efforts to combat climate change, as the retreat of glaciers continues to threaten Alpine communities and ecosystems.

## Dissecting the Myth of China's Control Over the Brahmaputra
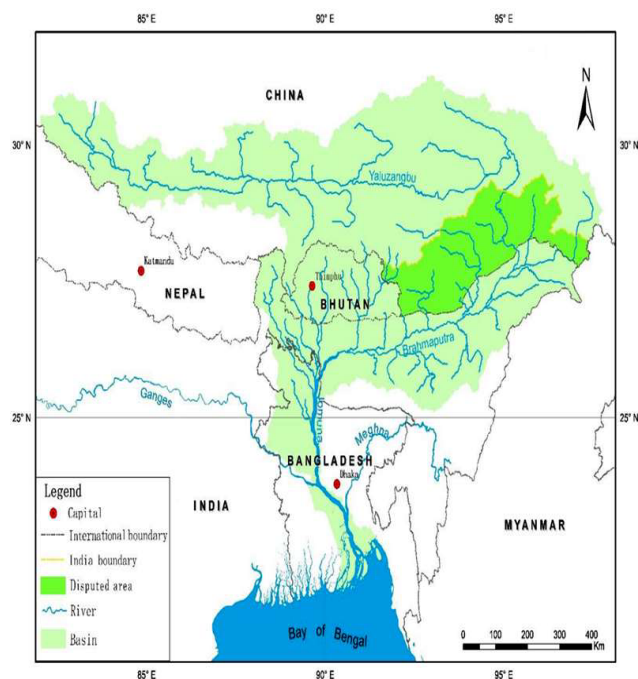


**Context:**

- Following **India's decision to suspend the Indus Waters Treaty with Pakistan,** discussions about water sharing in South Asia have become more intense.

- This has **brought attention to the Brahmaputra River,** with India firmly stating its control over its water resources and rejecting claims that China significantly controls the river's flow.

- There is a common myth, **often spread by Pakistan**, that China's actions on the Brahmaputra could threaten India's water security.

- However, this claim is based on incorrect information about the river's geography and water sources.

**Debunking the Myth of China's Control**

- **The Misconception:**
  - A common myth, often fueled by Pakistan, **suggests that China's actions on the Brahmaputra could threaten India's water security.**
  - Pakistan, having historically benefited disproportionately from the Indus Waters Treaty, is now **trying to create a false narrative of dependency regarding the Brahmaputra as India reasserts control over its water resources.**

- **Reality of Brahmaputra's Flow:**
  - The Brahmaputra is primarily a **rain-fed river system**.
  - Only approximately **30-35%** of its flow comes from China, mostly from Chemayungdung Glacier melt and scanty rainfall in the Tibetan region.
  - This constitutes the base flow.
  - The **majority of the river's water (about 65-70%)** originates within India itself, mainly from monsoon rains over the Northeast's hilly areas and numerous tributaries.

- **India's Water Independence (Flow Rates):**
  - At the **Indo-China border (near Tuting, Arunachal Pradesh)**, the flow rate is around **2,000-3,000 cubic meters per second**.
  - During the **monsoon season**, as the river enters Assam's plains, the flow dramatically increases to **15,000-20,000 cubic meters per second**.
  - These figures clearly show that the river's volume is overwhelmingly sustained within India's climatic and geographical boundaries.
  - India, thus, does not depend on upstream water flow from China to sustain its water needs.

- **Impact of Hypothetical Chinese Water Reduction:**
  - **Minimal Impact on India:**
    * Even in a hypothetical scenario where China reduces its water contribution (which is unlikely as China has never officially threatened such an action), the impact on India's water security would be minimal.

- o **Potential Benefit for Floods:**
    - * A reduced flow from upstream China could actually help **mitigate the severe annual floods** that devastate **Assam and the northeastern region**, displacing hundreds of thousands and destroying livelihoods.
    - * This indicates India's water system is resilient and mainly driven by monsoons and local tributaries.
- **Current Realities and Policy Implications:**
    - o Ironically, while fears about **China's water control persist,** the region is currently facing an **acute flood crisis** driven by heavy monsoon rains.
    - o India's flood mitigation strategies should align with this reality, focusing on improving **infrastructure** and enhancing **resilience** against floods, rather than worrying about largely hypothetical threats.
    - o Assam's Chief Minister Himanta Biswa Sarma has asserted that the **Brahmaputra is mainly shaped by India's geography,** monsoon rains, and the resilience of its people.
    - o Discussions about water sharing and politics in the region should be based on facts and reason, not on myths or politics.

**About the Brahmaputra River :**



- **Names:**
    - o **Yarlung Tsangpo** in Tibet.
    - o **Siang** or **Dihang** in Arunachal Pradesh, India.
    - o **Brahmaputra** in Assam, India.
    - o **Jamuna** in Bangladesh.
    - o Also generally referred to as Tsangpo-Brahmaputra.
- **Length: 6th-longest river in Asia,** approximately **2,900 km**.
- **Origin:** Originates in the **Tibetan Plateau** (specifically, Chemayungdung mountain ranges at 5,150 meters, near Konggyu Tsho lake). The Chemayungdung Glacier is its primary source.
- **Flow:** Flows eastward through the Tibetan Plateau, enters India, then Bangladesh, and finally empties into the **Bay of Bengal**.

**The Brahmaputra River Basin**

- **Total Area:** Spreads across Tibet, Bhutan, India, and Bangladesh, covering a total area of **5,80,000 square kilometers**. It is one of the largest river basins in Asia.
- **In India:** The Brahmaputra basin covers **1,94,413 square kilometers**, which is about **5.9%** of India's total geographical area.
    - o **States Covered:** Arunachal Pradesh (81,424 sq km), Assam (70,634 sq km), West Bengal (12,585 sq km), Meghalaya (11,667 sq km), Nagaland (10,803 sq km), and Sikkim (7,300 sq km).

**Course of the River**

1. **Tibet (Yarlung Tsangpo):**
    - o Flows eastward for about **1600 km** through the Tibetan Plateau, parallel to the Himalayas.
2. **India (Siang/Dihang to Brahmaputra):**
    - o Enters India in **Arunachal Pradesh** as the **Siang or Dihang river**.
    - o Takes an **S-shaped bend** near Bishing village at the Indian border.

- o Further downstream, it is joined by the **Lohit** and **Dibang** rivers to form the mighty **Brahmaputra river**.
- o Flows in a south-easterly direction for about 230 km through Arunachal Pradesh before entering the **Assam valley**.
- o Travels a total distance of **916 km within India** (through Arunachal Pradesh and Assam).

3. **Bangladesh (Jamuna to Meghna):**
   - o After entering Bangladesh, it is known as the **Jamuna river**.
   - o The Jamuna is joined by the Ganga River (known as the **Padma river** in Bangladesh).
   - o Eventually, the Brahmaputra (as Jamuna-Padma) joins the **Meghna River** and finally empties its water into the **Bay of Bengal**.

**Key Tributaries of the Brahmaputra River**

**A. Left Bank Tributaries (Common Features: flatter grades, fine alluvial soils, low silt, deep meandering channels)**

1. **Siang River:** Originates from Kailash Range glaciers; known as Yarlung Tsangpo in Tibet.
2. **Dibang River:** Originates near Indo-Chinese border in Upper Dibang Valley, Arunachal Pradesh; locally called Sikang.
3. **Lohit River:** Originates in eastern Tibet (as Zayu River); known for its reddish color; Dhola-Sadiya Bridge (longest in India) is over it; farthest east tributary.
4. **Burhi Dihing / Dihing River:** Originates in Eastern Himalayas (Patkai Hills); known for tea, rubber, oil fields, diverse flora/fauna.
5. **Dhansiri River:** Originates from Laisang peak in Nagaland; forms boundary with districts; known for rich biodiversity.
6. **Kopili River:** Originates from Saipong Reserve Forest in southeast Meghalaya; largest south bank tributary in Assam; harnessed for irrigation and power projects.

**B. Right Bank Tributaries (Common Features: steep slope, coarse sandy beds, shallow braided channels, heavy silt charge)**

1. **Subansiri River:** Trans-Himalayan (rises in Tibet); largest tributary of Brahmaputra; known for white water rafting; home to Lower Subansiri Hydro-Electric Project.
2. **Kameng River (formerly Bharali River):** Originates from glacial lake near Nyegi Kangsang mountain, Arunachal Pradesh; popular for water sports.
3. **Manas River:** Trans-Himalayan (originates in Tibet); largest river system in Bhutan; flows through Royal Manas National Park (Bhutan) and Manas Wildlife Sanctuary (India).
4. **Sankosh River:** Originates in northern Bhutan (as Puna Tsang Chu); forms border between Assam and West Bengal.
5. **Teesta River:** Originates from Zemu glacier in Himalayas, North Sikkim; lifeline of Sikkim; joins Brahmaputra near Rangpur, Bangladesh.

**Physiography and Climate of the Brahmaputra Basin (in India)**

- **Physiography:** Diverse, including mountains, hills, valleys, and plains (e.g., narrow valleys in Arunachal Pradesh, tea gardens in Assam, fertile plains in Cooch Bihar).
- **Climate (Four Seasons):**
  - o **Winter (Dec-Feb):** 15°C to 17.5°C (lower in Himalayas).
  - o **Summer (Mar-May):** 25°C to 27.5°C (hot with thunderstorms).
  - o **Monsoon (Jun-Sep):** Heavy widespread rainfall (85% of annual precipitation occurs); 27.5°C to 30°C.
  - o **Autumn (Oct-Nov):** 25°C to 27.5°C; some rainfall from retreating monsoons.

**Flooding and Erosion**

- **Annual Flooding:** Prone to annual flooding, especially during monsoon months (June-September), due to Himalayan snowmelt and heavy monsoon rains.

- **Causes:** Coincidence of flood waves in the Brahmaputra and its numerous tributaries.
- **Erosion:** Extensive flooding leads to major damage through erosion along river banks, accelerated by high silt load (especially from north bank tributaries like Subansiri and Manas).
- **Management Efforts:**
  - **Brahmaputra Board (established 1980):** To prepare master plans for flood control and bank erosion prevention.
  - **Flood Forecasting Systems:** Central Water Commission operates 27 flood forecasting stations.

**Significance and Issues**

**A. Significance:**

- **Transportation:** Major waterway in northeastern India and Bangladesh.
- **Irrigation:** Extensively used for agriculture.
- **Ecology:** Home to diverse ecosystems and wildlife (e.g., Kaziranga National Park).
- **Cultural:** Holds important cultural and sacred significance.

**B. Issues and Challenges:**

- **Dam Building:** Activities, especially in China, raise concerns about downstream environmental impacts.
- **Climate Change:** Projected to increase variability in river flows.
- **Water Sharing:** Transboundary river water sharing disputes.
- **Annual Flooding & Erosion:** Causes extensive damage and loss of lives/property.

**C. Future Needs:**

- Better regional cooperation.
- Sustainable dam development.
- Increased disaster preparedness.
- More comprehensive monitoring and data sharing between countries.

# India Plans Rare Earth Magnet Incentives as Supply Threat Mounts



**Context:**

- India is actively pursuing measures to enhance its **domestic rare earth magnet production, including fiscal incentives and long-term stockpiling**.
- This strategic move comes **in response to China's recent April 4, 2025, decision to curb exports of rare earth materials**, which has sent significant shockwaves through global industries, particularly the automotive sector.

**The Challenge: China's Dominance and Supply Threat**

- 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.
- 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.
- **Elements Under Export Control:**
- The suspended exports include:
  - Samarium
  - Gadolinium

- o Terbium
- o Dysprosium
- o Lutetium
- o Scandium
- o Yttrium-related items
- o These are classified under medium and heavy rare earth categories.

What are 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:
  - o **Smartphones**
  - o **Electric vehicles**
  - o **Wind turbines**
  - o **LED lights**
  - o **Flat-screen TVs**
- **2. Defense and Aerospace Use**
- REEs are integral to the production of advanced military and aerospace equipment:
  - o **Precision-guided missiles**
  - o **Jet engines**
  - o **Radar systems**
  - o **Other critical military technologies**
- **3. Green Energy Transition**
- REEs are essential for the development of **clean energy technologies**, such as:
  - o **Solar panels**
  - o **Batteries** (especially for electric vehicles and energy storage systems)
  - o **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**.

**But China's recent export restrictions on rare earth materials have led to:**

- **Imminent Disruptions:** Global auto companies are flagging risks of supply disruptions within days, with some fearing production could **"come to a grinding halt" by late May or early June.**
- **Real-world Impact:** Suzuki Motor in Japan has already suspended production of its Swift car due to these curbs.
- **Indian Vulnerability:** Indian auto industry body SIAM has privately warned the government of potential production halts.
- **Complex Approval Process:** Indian automakers face a cumbersome certification process, with many applications for import licenses endorsed by the Indian government still awaiting final approval from China's Ministry of Commerce.
- This process involves numerous steps, including notarized documents and Chinese embassy endorsements, taking at least 45 days.

**India's Strategic Response: Boosting Domestic Production**

In response to this mounting supply threat and to reduce dependence on China, Prime Minister Narendra Modi's government is taking significant steps:

- **Fiscal Incentives for Domestic Production:**
  - o The Ministry of Heavy Industries is drafting a scheme to offer **production-based fiscal incentives** to companies.
  - o The scheme envisions **partly funding the difference between the final price of a 'made-in-India' rare earth magnet and the cost of Chinese imports** to help achieve cost parity and boost local demand.

- **Long-Term Stockpiling:** Talks are underway with companies to establish **long-term stockpiles of rare earth magnets**.
- **National Critical Mineral Mission (NCMM) - Launched April 2025:**
    - **Core Objective:** To establish a **self-reliant framework in the critical mineral sector**.
    - This aligns with India's broader 'Atmanirbhar Bharat' (Self-Reliant India) vision and its commitment to Net Zero 2070 goals.
    - **Exploration Mandate:** The Geological Survey of India (GSI) will oversee **1,200 exploration projects from 2024–25 to 2030–31**.
    - **Identified Minerals: 30 critical minerals** were identified, with **24 included in Schedule I of the Mines and Minerals Development and Regulation (MMDR) Act, 1957**, granting the Central Government exclusive authority to auction mining leases for these minerals.
    - **Institutional Support:** A **Centre of Excellence on Critical Minerals (CECM)** will be set up to update the mineral list and guide strategies.
    - **"Whole-of-Government" Approach:** The NCMM will adopt a collaborative approach, working closely with various ministries, Public Sector Undertakings (PSUs), private companies, and research institutions.
    - An Empowered Committee on Critical Minerals, chaired by the Cabinet Secretary, will coordinate implementation.
- **High-Level Government Review:** The Prime Minister's Office (PMO) recently discussed the impact of the magnet crisis on India's small but rapidly growing EV sector.

- **Potential Tariff Exemptions:** The government is also weighing the possibility of **tariff exemptions for imports of machinery** required by domestic rare earth magnet manufacturers.

**Objectives of the NCMM :**

- **Secure the supply chain** for critical minerals from domestic and foreign sources.
- **Strengthen the value chains** with:
    - Technological innovation and Research & Development (R&D).
    - Regulatory and financial support.
    - Skill development.
    - Global competitiveness in mineral exploration, mining, beneficiation, processing, and recycling.
- **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**.

**Key Components and Strategies of the NCMM**

The mission employs a multi-pronged strategy to achieve its objectives:

- **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.

- **Acquisition of Assets Abroad (Global Sourcing):**
  - 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.

**India's Key Players and Reserves**

- **IREL (India) Limited:**
  - A state-run firm that has been mining rare earth materials for years.
  - Possesses a processing capacity of 6 lakh tons/year and produces various heavy minerals.
  - Operates a **Rare Earth Extraction Plant in Odisha** and a **Refining Unit in Kerala**.
  - Despite its operations, its current output of rare earth materials is primarily used by atomic energy and defense units, with most other rare earth supplies for general industry still being imported from China.
  - Significantly, India currently **exports neodymium to Japan** for lack of sufficient domestic processing capability.

- **India's Rare Earth Reserves and Potential:**
  - **Third-Largest Reserves:** India possesses the **world's third-largest reserves of rare earths, estimated at 6.9 million tons** (U.S. Geological Survey).

  - **Untapped Potential:** Despite significant reserves, India currently mines only a fraction due to limited private investments and insufficient domestic processing capabilities.
  - **Goal of Self-Reliance:** The current crisis is a strong catalyst for India to accelerate its efforts towards self-reliance in this critical sector, aligning with the objectives of the National Critical Mineral Mission.

## ICDRI 2025 : Strengthening Global Disaster Resilience



**Context :**

- **In June 2025**, **7th ICDRI (2025) in France, co-chaired by India's CDRI**, emphasized global cooperation, early warning, and resilient infrastructure, particularly for vulnerable coastal regions and **Small Island Developing States (SIDS).**

**I. ICDRI 2025: Key Features & Context**

- **What:** 7th International Conference on Disaster Resilient Infrastructure (ICDRI).
- **Where & When:** Nice, France (June 6-7, 2025) – *First time in Europe.*
- **Organizer:** Coalition for Disaster Resilient Infrastructure (CDRI) – Headquartered in New Delhi.
- **Theme:** "Shaping a Resilient Future for Coastal Regions."
  - **Rationale:** Coastal regions **(37% global population within 100km, double average density)** are critical economic

hubs **(~$1.5T GDP, projected $3T by 2030)** and highly vulnerable to climate change/disasters.

## II. PM Modi's Vision & India's Leadership

- PM Modi outlined five key priorities for strengthening disaster resilience, especially for vulnerable coastal and island regions:
  - o **Education and Skill Development**

    Integrate disaster resilience courses, modules, and skill development programs into higher education to build a skilled workforce for future challenges
  - o **Global Digital Repository**

    Create a global digital repository to document best practices and learnings from countries that have faced disasters and rebuilt with resilience
  - o **Innovative Financing**

    Disaster resilience requires innovative financing. Develop actionable programs to ensure developing nations have access to necessary funds
  - o **Special Attention to SIDS**

    Recognize SIDS as **"Large Ocean Countries" and address their unique vulnerabilities** with targeted support
  - o **Strengthening Early Warning Systems and Coordination**

    Enhance early warning systems and coordination for timely decision-making and effective last-mile communication during disasters
- Major Recent Disasters Highlighted :
  - o **Cyclone Remal (India, Bangladesh):** Severe wind, flooding, and displacement, with thousands of homes damaged and tens of thousands displaced
  - o **Hurricane Beryl (Caribbean):** 90% of homes on Union Island destroyed, catastrophic infrastructure loss, widespread power and water outages

  - o **Typhoon Yagi (Southeast Asia):** Over 20 million affected, nearly 300 casualties or missing, massive destruction of homes and farmland, severe impact on food security and supply chains
  - o **Hurricane Helene (USA):** Over 230 deaths, major flooding, and infrastructure damage across multiple states
  - o **Typhoon Usagi (Philippines):** ( cited as a major recent disaster).
  - o These events underline the urgent need for **resilient infrastructure and proactive disaster management**
- **India's Experience & Contribution:**
  1. Learnings from **1999 Super-cyclone & 2004 Tsunami.**
  2. **Adaptation:** Built cyclone shelters.
  3. **Global Impact:** Contributed to **Tsunami Warning System** benefiting 29 countries.

## III. CDRI's Role & Initiatives

- **Genesis:** Launched by PM Modi at **UN Climate Action Summit (Sept 2019).**
- **Mission:** Global leadership in climate change and disaster resilience.
- **Membership Growth: 54 members (countries),** including newly joined **African Union Commission**.
- **Focus on SIDS:**
  - o Working with **25 SIDS** to build resilient homes, hospitals, schools, energy, water security, and early warning systems.
  - o **IRIS Programme:** Supporting **24 projects across 25 SIDS** for sustainable, inclusive infrastructure.
  - o **Released working paper:** "Infrastructure Resilience in Small Island Developing States" (assessment, policy guidance, resilience framework).

- **Conference Outputs:** Awarded **research grants (53 projects, 21 countries);** call to action for accelerating SIDS infrastructure resilience; emphasis on global collaboration & investment.

# Heeng (Asafoetida) Cultivation in India



**Context:**

- India, the **world's largest consumer of Heeng (*Ferula assa-foetida*)**, has historically been import-dependent.
- Recent successful indigenous cultivation, especially the **1st flowering and seed set in India (May 2025), marks a significant progress towards self-reliance.**

## I. Heeng (Asafoetida): An Overview

- **Importance in India:**
  - Essential ingredient in diverse Indian cuisines.
  - Mentioned in ancient Indian texts like **Mahabharata and Ayurveda.**
  - Ayurveda recommends it for refreshing senses; **Charaka Sanhita mentions its benefits for abdominal pain, digestion, and taste enhancement.**
- **Botanical Source:**
  - Derived from an **oleo-gum resin** extracted from the thick, fleshy **taproot and rhizome** of the perennial *Ferula assa-foetida* plant.
  - The resin constitutes 40-64% of the dried gum.
  - Takes approximately **5 years to mature** and begin flowering.
  - Resin obtained by making incisions in the taproot, allowing milky latex to exude and harden.

- **Ideal Growing Conditions:**
  - **Climate:** Cold, arid/semi-arid environments.
  - **Soil:** Sandy, well-drained, low moisture.
  - **Rainfall:** Ideally d" 200 mm annually (tolerates up to 300 mm in cultivated areas). **Excessive rainfall or high soil moisture hinders growth.**
  - **Temperature:** Flourishes at 10-20°C; tolerates up to 40°C and winter lows down to −4°C.
  - **Survival Mechanism:** Becomes dormant in extremely dry and cold weather.
  - **Suitable Indian Regions:** High-altitude, semi-arid areas like **Lahaul-Spiti and Uttarkashi** (Himachal Pradesh & Uttarakhand).

## II. India's Journey Towards Indigenous Cultivation (Cutting Import Dependence)

- **The Challenge:**
  - Despite being the **world's largest consumer,** India was entirely dependent on imports from **Afghanistan, Iran, Uzbekistan, etc.**
- **National Initiative:**
  - Government launched a national effort to promote indigenous cultivation.
  - **Lead Institution: CSIR-Institute of Himalayan Bioresource Technology (IHBT)**, Palampur, Himachal Pradesh.
- **Seed Procurement (2018-2020):**
  - Rigorous multi-layered international search for viable seeds.
  - IHBT scientists communicated with agencies and **over 20 suppliers in Iran, Afghanistan, Uzbekistan, Tajikistan, South Africa.**

- o Seeds finally procured from Iran, and later from Afghanistan.
- **Legal & Phytosanitary Compliance:**
  - o **ICAR-National Bureau of Plant Genetic Resources (NBPGR)**, New Delhi: Designated nodal agency for plant germplasm import and quarantine.
  - o Issued import permits and conducted mandated quarantine inspections.
  - o Cleared seeds handed over to IHBT for research.
- **Initial Research & Challenges:**
  - o **First import:** Six seed accessions from Iran (October 2018).
  - o **Biological Challenges:** High dormancy and low germination rate of seeds.
  - o **IHBT's Work:** Developed germination protocols, identified altitude-specific cultivation locations, formulated agronomic practices for Indian conditions.
  - o **Controlled Trials:** Conducted at IHBT Palampur and its Centre for High Altitude Biology in Ribling (Lahaul & Spiti).

## III. Ground-Level Implementation & Expansion

- **First Planting (October 15, 2020):**
  - o First heeng seedling planted in a farmer's field at **Kwaring village, Lahaul Valley**, Himachal Pradesh.
  - o **Officially marked the start of indigenous heeng cultivation in India.**
- **Expansion to Mid-Hills (November 8, 2020):**
  - o Planted at **Janjheli, Mandi district**, Himachal Pradesh.
  - o First extension of cultivation into mid-hill regions, exploring potential beyond high-altitude cold deserts.
- **Institutional Support:**
  - o **Heeng Germplasm Resource Centre** established at IHBT Palampur (March 5, 2022).

- o Serves as national hub for conservation, research, training, seed production, and plant propagation.
- **Technological Support:**
  - o Dedicated **tissue culture unit** (funded by Himachal Pradesh govt.) developed by CSIR-IHBT for large-scale propagation.
  - o Researchers used **ecological niche modelling** (GPS-tagged data, environmental parameters) to map favorable cultivation zones.

## IV. Implications & Future Outlook

- **Reduced Import Dependence:** Paves the way for India to significantly cut down on its heeng imports.
- **Farmer Income Enhancement:** Offers a new high-value cash crop for farmers, especially in challenging high-altitude and semi-arid regions.
- **Self-Reliant Supply Chain:** Contributes to building an 'Atmanirbhar Bharat' (self-reliant India) for this culturally important spice.
- **Collaborative Success:** A testament to the synergistic efforts of scientific institutions (CSIR-IHBT, ICAR-NBPGR), state governments (Himachal Pradesh), and progressive farmers.
- **Research & Development:** Opens avenues for further research into plant adaptability, genetic improvement, and sustainable cultivation practices.

## Agarwood : India's Cultural, Ecological, and Economic Asset

# 1. Introduction: Why in News

- Agarwood—also known as *Oud*, *Gaharu*, or *Agar*—is increasingly recognized as an important **cultural, ecological**, and **economic resource** for India.
- However, rising global demand, overharvesting, and unregulated trade have placed immense pressure on natural populations.
- In response, the Government of India has launched a series of initiatives aimed at promoting **sustainable cultivation**, **regulated exports**, and the **conservation of wild stocks**.

# 2. Significance of Agarwood

## 2.1 Cultural and Religious Importance

- Agarwood is often described as the **"world's most valuable incense"**.
- It has been used for millennia in **Hinduism, Islam, Christianity, and Buddhism** during rituals, meditation, and spiritual ceremonies.

## 2.2 Medicinal Value

- Agarwood is mentioned in **Ayurvedic classics** such as the *Charaka Samhita* and in **classical Sanskrit literature**, including the works of *Kalidasa* (5th century CE).
- It also features in **Traditional Chinese Medicine** and the **Unani system**.
- Scientific studies have identified over **150 bioactive compounds**, including **sesquiterpenoids** and **chromones**, which exhibit **anti-inflammatory, antioxidant**, and **anti-diabetic** properties.

## 2.3 Economic and Commercial Importance

- Agarwood is a high-value product in **West Asia**, especially in **Saudi Arabia, the UAE**, and other **Gulf countries**, where it is used in the form of oils, wood chips, *attars*, and *bakhoors*.
- International luxury perfume brands such as **Gucci**, **Tom Ford**, and others prominently feature *Oud* in their fragrance lines.
- Its trade contributes significantly to the **rural economy**, especially in **Northeast India**.

# 3. Origin and Production

## 3.1 Biological Source

- Agarwood is formed in trees of the **Aquilaria** and **Gyrinops** genera (family: *Thymelaeaceae*).
- The resin is a **defense response** to infection by specific molds (*e.g.*, *Phaeoacremonium* or *Phialophora parasitica*) or physical damage.

## 3.2 Natural Occurrence and Yield

- Only **2–7%** of wild trees naturally develop resin suitable for commercial use.
- This rarity contributes to its high market value.

## 3.3 Geographic Distribution

- Agarwood is found in **India, Cambodia, Vietnam, Malaysia, Indonesia, Laos**, and **Bhutan**.
- In India, species such as *Aquilaria malaccensis* and *Aquilaria khasiana* grow predominantly in **Northeast India**—in states like **Assam, Tripura, Arunachal Pradesh, Nagaland, Mizoram**, and **Manipur**.
- The capital of Tripura, **Agartala**, is named after the historical prevalence of agarwood.
- Indigenous communities possess **traditional knowledge** for identifying and utilizing resin-producing trees.

# 4. Challenges and Conservation Concerns

## 4.1 Overharvesting and Risk of Extinction

- Due to escalating global demand, **overexploitation** has nearly eradicated wild agarwood in India by the **20th century**.
- Wild populations are now on the **brink of extinction**.

## 4.2 Unsustainable Harvesting Practices

- Traditional methods involve **felling trees** to inspect the heartwood, causing significant ecological damage.
- Natural resin takes nearly **10 years** to develop, making premature harvesting unsustainable.

## 4.3 Legal and Conservation Status

| Framework | Status |
|---|---|
| **CITES** (Convention on International Trade in Endangered Species) | Appendix II |
| **IUCN Red List** | Critically Endangered |
| **Wildlife (Protection) Act, 1972** | Schedule IV |

## 5. Government Initiatives and Policy Recommendations

### 5.1 Promotion of Cultivation

- The government is promoting cultivation in both **Northeast India** and **Southern states** such as **Kerala, Tamil Nadu**, and **Telangana**.
- These efforts aim to increase supply through **sustainable agroforestry models**, thereby reducing pressure on wild populations.

### 5.2 CITES Non-Detriment Finding (NDF)

- India submitted a **Non-Detriment Finding (NDF)** to prevent inclusion of agarwood in the **Review of Significant Trade (RST)** under CITES.
- This submission enables India to announce a new **export quota** for agarwood products, allowing **regulated international trade**.

### 5.3 Conservation of Wild Populations

- The government has introduced safeguards:
  - **Prohibition** on seed/sapling collection from **wild forests** and **protected areas**.
  - **Harvesting** is permitted only from **home gardens, community plantations**, or **private agroforestry plots**.

### 5.4 Proposal for an Agarwood Board

The establishment of a **dedicated Agarwood Board**—similar to boards for coffee or turmeric—is recommended. Its functions would include:

- **Trade regulation** and elimination of malpractice.
- Setting **quality standards** for harvesting and **inoculation protocols**.

- **Overseeing nurseries** and ensuring sapling availability.
- Protecting **farmers and small cultivators** from exploitative practices.
- Facilitating **scientific research**, **traditional knowledge protection**, and **community participation**.

### 5.5 Research and Technology Development

- India is encouraged to:
  - Initiate R&D on **sustainable harvesting**, **inoculation methods**, and **genetic enhancement**, drawing inspiration from projects such as the **University of Minnesota Agarwood Initiative**.
  - Develop **AI-based wood identification tools** (e.g., Xylotron), **DNA fingerprinting**, and **isotope analysis** for traceability and enforcement.
  - Validate medicinal applications of agarwood through national programs like **BioE3** and the **Anusandhan National Research Foundation**.

## Strait of Hormuz
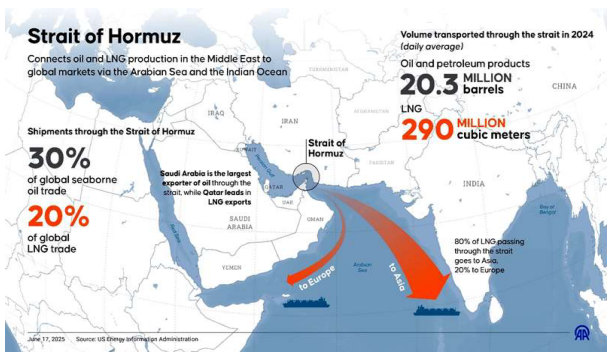


**Context: June 2025**

**Trigger**: U.S. airstrikes on Iran's nuclear facilities

**Reaction**: Iran's Parliament passed a motion recommending closure of the Strait of Hormuz

### I. Why Is This In News?

- In June 2025, following U.S. military strikes on Iran's nuclear facilities, **Iran's Parliament approved a resolution** to close the **Strait of Hormuz** as retaliation.

- The final decision rests with Iran's **Supreme National Security Council**, which operates under the **Supreme Leader**.
- This move has raised **global concerns** about oil supply disruptions and economic instability.

## II. What is the Strait of Hormuz?

| Feature | Details |
|---|---|
| Location | Between **Iran (north)** and **Oman & UAE (south)** |
| Width | ~50 km at entrance; ~33 km at narrowest point |
| Function | Connects **Persian Gulf** to **Gulf of Oman** and **Arabian Sea** |
| Legal Status | Lies within **territorial waters of Iran and Oman** |
| Importance | World's **busiest oil transit chokepoint** |
| Volume of Trade | **~20 million barrels/day** (~20% of global oil supply) |
| Annual Value | ~$600 billion in oil and gas trade (U.S. EIA estimate) |
| Main Exporters | Iran, Iraq, Saudi Arabia, UAE, Kuwait, Qatar |
| Main Importers | India, China, Japan, South Korea |

## III. What Could Happen If the Strait Is Closed?

### 1. Oil Prices Could Surge

- Oil prices may jump from **$77 to $120–$150 per barrel**.
- This would raise fuel costs globally and affect domestic inflation in many countries.

### 2. Stock Markets and Trade Would Suffer

- Global stock markets may react negatively due to uncertainty.
- Central banks could revise **inflation** and **interest rate outlooks**.

### 3. Global Supply Chains Will Be Affected

- Increased shipping times (**10–14 days longer via Cape of Good Hope**).
- Higher freight and insurance costs, especially for oil shipments.

### 4. Higher Costs for Manufacturing Countries

- Countries like **India, China, Japan, and South Korea** will face higher energy and manufacturing costs.

- These costs will be passed on to consumers, increasing global **inflation**.

## IV. Impact on India

### India's Oil Dependency

- India imports **~88% of its crude oil needs**.
- India consumes **~5.5 million barrels per day (bpd)**.
  - **1.5 to 2 million bpd** comes through the **Strait of Hormuz**.
  - **~4 million bpd** comes via other global routes.

### Breakdown of Import Routes (Kpler Estimate)

| Route | Share of Imports | Main Source Countries |
|---|---|---|
| **Strait of Hormuz** | ~40% | Iraq, Saudi Arabia, UAE, Kuwait |
| **Suez Canal** | ~33% | Russia |
| **Cape of Good Hope** | ~17% | West Africa, Americas |
| **Other Routes** | ~10% | Southeast Asia, Far East |

### Key Risks for India

| Risk Category | Specific Effects |
|---|---|
| **Oil Price Hike** | Increased import bill, inflation, fiscal burden |
| **Freight & Insurance** | Longer routes → Higher transport costs and delivery delays |
| **Currency Depreciation** | Pressure on rupee → Wider current account deficit |
| **Trade Disruption** | Container shortages may affect exports and imports (esp. Europe-Asia corridor) |

## V. What Did India's Oil Minister Say?

**Minister Hardeep Singh Puri (June 23, 2025)**:

- "We have diversified our oil sources in the past few years.
- A large volume of our supplies **no longer come through the Strait of Hormuz**.
- Our Oil Marketing Companies have **supplies for several weeks** and continue to receive energy through several routes."

**The Minister also:**

- Held a **high-level security review** with officials from the Navy, Coast Guard, ONGC, and Defence Ministry.

- Reaffirmed the government's commitment to ensure **uninterrupted fuel supply**.

## VI. How Could Iran Block the Strait?

| Method | Description |
|---|---|
| **Naval Mines** | Laid using submarines or small attack boats |
| **IRGC Fast Boats** | Swarm attacks using speedboats with anti-ship missiles |
| **Submarine Warfare** | Attacks on commercial or military vessels using submarines |
| **Semi-submersibles** | Hard-to-detect vessels targeting oil tankers |

**Historical Reference**: In the 1980s, **during the Iran–Iraq war,** similar tactics led to the **"Tanker War"** where both nations attacked commercial oil shipments.

**U.S. Response**:

- **Fifth Fleet** is stationed in Bahrain.

- Past success: **Operation Earnest Will** (1987–88) safely escorted Kuwaiti oil tankers.

## VII. Will Iran Actually Close the Strait?

| Factor | Explanation |
|---|---|
| **Loss of Own Oil Revenue** | Iran earns ~$67 billion from oil exports (FY 2024–25) |
| **China is a Key Buyer** | China buys ~90% of Iranian oil – would be negatively impacted |
| **Diplomatic Isolation** | Gulf countries (Saudi Arabia, UAE) may turn hostile |
| **U.S. and Allied Response** | Risk of direct military conflict |
| **Gulf Normalization Setback** | Iran's recent regional diplomacy could collapse |

## VIII. Are There Alternative Export Routes?

| Country | Pipeline Name | Capacity (approx.) |
|---|---|---|
| **Saudi Arabia** | East–West Pipeline (Petroline) | 5 million barrels/day |
| **UAE** | Habshan–Fujairah Pipeline | 1.5 million barrels/day |
| **Iran** | Goreh–Jask Pipeline | ~350,000 barrels/day |

**Limitation**: These **can handle ~3.5 million bpd**, while the Strait handles **~20 million bpd**.

### History of the Strait of Hormuz

- In ancient times, the Strait of Hormuz was a crucial part of maritime trade routes linking India, Persia, East Africa, and the Mediterranean.

- The region was under the control of powerful Persian empires such as the Achaemenid, Parthian, and Sassanid dynasties.

- The strait facilitated connections between the Silk Road and Indian Ocean trade networks.

**European Colonial Period (1500s–1800s)**

- In 1507, the Portuguese Empire occupied the strategic Hormuz Island and established a fort to control maritime trade.

- The Portuguese dominated the area for over a century, taxing and managing shipping between Europe and Asia.

- In 1622, Shah Abbas I of Persia, supported by the British East India Company, expelled the Portuguese from Hormuz.

- Over the next few centuries, Persian control remained, but British naval power in the Gulf increased steadily to protect trade routes to British India.

**Early 20th Century and the Rise of Oil (1900s–1970s)**

- The discovery of oil in Iran (1908) and other Gulf countries increased the strategic value of the Strait of Hormuz.

- During World War I and World War II, the strait was vital for military logistics and oil transportation.
- After the 1973 oil crisis, the vulnerability of oil supply routes through Hormuz gained global attention.
- Western powers began monitoring the region more closely due to its economic and strategic significance.

**Iran-Iraq War and the "Tanker War" (1980–1988)**

- During the Iran-Iraq War, both sides targeted oil tankers and shipping in the Persian Gulf to hurt each other economically.
- Iran threatened to block the Strait of Hormuz, laying naval mines and attacking oil tankers.
- The United States responded with Operation Earnest Will (1987–1988), escorting Kuwaiti tankers under U.S. flags.
- In 1988, a U.S. Navy missile mistakenly shot down Iran Air Flight 655, killing 290 civilians and escalating tensions.

**Post-2000 Tensions and Sanctions**

**2000s to Early 2010s**

- Iran frequently threatened to block the strait during times of tension with the United States and its allies.
- The threats intensified around 2011–2012 as international sanctions over Iran's nuclear program increased.
- The U.S. and other Western nations reinforced naval patrols in the region to deter any closure attempt.

**2019 Incidents**

- In 2019, attacks on oil tankers near the strait and the seizure of a British tanker by Iran raised fears of a major disruption.
- The U.S. blamed Iran for several incidents involving mined tankers, though Iran denied responsibility.
- The situation escalated following the U.S. withdrawal from the Iran nuclear deal (JCPOA) in 2018 and renewed sanctions on Iran.

**2025: Renewed Threats After U.S. Airstrikes**

- In June 2025, after U.S. airstrikes targeted Iranian nuclear facilities, Iran's Parliament passed a resolution recommending the closure of the Strait of Hormuz.
- Though the final decision lies with Iran's Supreme National Security Council, the recommendation has significantly increased global concern.
- A closure would not only impact Western economies but also affect Iran's own oil exports, especially to China, its top buyer.

**Legal and Military Dimensions**

- According to UNCLOS (United Nations Convention on the Law of the Sea), countries have sovereignty over waters 12 nautical miles from their coastlines.
- The Strait of Hormuz lies entirely within the territorial waters of Iran and Oman at its narrowest point.
- However, international law allows for "transit passage" through such international straits.

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## Internal Security

### Shahed Drones



**Context:** Shahed drones have gained significant international attention due to their widespread use in recent conflicts, particularly in Ukraine, highlighting their effectiveness as a cost-efficient weapon for various military objectives. Their proliferation and the

involvement of multiple actors in their development and deployment continue to be a subject of global concern.

# 1. About Shahed Drones:

- **Origin:** Shahed drones are **Iranian-made** unmanned combat aerial vehicles (UCAVs) and loitering munitions. They are primarily developed by **Shahed Aviation Industries**, an Iranian aerospace company associated with the Islamic Revolutionary Guard Corps Aerospace Force (IRGC-ASF) and Iran Aircraft Manufacturing Industries Corporation (HESA).

- **Nomenclature:** Russia refers to the Shahed-136 as **"Geran-2"** and the smaller Shahed-131 as "Geran-1", often with some modifications or indigenous production.

- **Design and Capabilities:**
  - Designed primarily for **one-way attack missions**, meaning they are intended to detonate upon impact and are not recovered. This is why they are often called "kamikaze drones" or "suicide drones."
  - They carry **explosive warheads** that detonate upon impact, maximizing damage to targets.

- **Shahed-136 (Most Widely Used Variant):**
  - **Design:** Features a distinctive **delta-wing design** with a central fuselage blending into the wings and stabilizing rudders at the tips.
  - **Dimensions:** Approximately 3.5 meters (11 ft) long, with a wingspan of 2.5–3 meters (8.2 - 9.8 ft).
  - **Weight:** Weighs around 200 kg (440 lb).
  - **Propulsion:** Launched via **disposable rocket boosters** for initial takeoff, after which it is powered by a **piston engine**. This engine gives it a characteristic and often audible **"moped-like" or lawnmower sound** during flight.
  - **Range:** Can travel long distances, with estimated ranges varying between **1,000 and 2,500 km**.

  - **Speed:** Flies at speeds up to approximately **185 km/h (115 mph)**.

- **Guidance System:**
  - Primarily uses **pre-programmed GPS or GLONASS coordinates** for navigation. This reliance on satellite navigation makes them relatively **resistant to basic electronic warfare and jamming** techniques, as they don't rely on real-time operator control beyond initial programming.
  - Recent variants reportedly incorporate **advanced algorithms and Artificial Intelligence (AI)** for improved navigation and targeting, allowing for more autonomous target recognition and selection. Ukrainian intelligence, for example, has reported finding high-speed Nvidia Jetson Orin minicomputers in downed Shahed-136 drones (MS series), capable of AI and video processing, as well as an upgraded jam-resistant satellite navigation system (Nasir).

- **Warhead Types:** Shahed drones can be equipped with various types of warheads, depending on the mission and target, including:
  - High-explosive fragmentation (HE-FRAG)
  - Thermobaric (fuel-air explosives)
  - Shrapnel-filled munitions These different warhead types are designed to maximize damage to both personnel and equipment.

# 2. Loitering Munitions vs. Unmanned Combat Aerial Vehicles (UCAVs):

- **Loitering Munitions (Kamikaze Drones/Suicide Drones):**
  - Designed to **loiter (fly around) in a target area** for a period, searching for targets.
  - Upon identifying a target, they **self-destruct by crashing into it**, utilizing a

built-in warhead. They are typically **one-time use** weapons.

- o They fill a niche between cruise missiles (which follow a pre-determined path to impact) and traditional UCAVs.
- o Often relatively **cheaper to produce** than multi-use UCAVs.
- o Shahed-136 falls into this category.

- **Unmanned Combat Aerial Vehicles (UCAVs or "Drones"):**
  - o These are **reusable aircraft** that can perform various missions beyond a single attack, including **reconnaissance, surveillance, intelligence gathering, and armed strikes** using guided missiles or bombs that are *launched from* the drone, rather than the drone itself being expended.
  - o Examples include the US MQ-1 Predator or MQ-9 Reaper, or Iran's own Shahed-129 or Shahed-149 Gaza, which are designed for multi-mission use.
  - o Shahed drones, particularly the Shahed-136 and Shahed-131, are primarily classified as loitering munitions due to their one-way attack design. However, the broader "Shahed" family developed by Shahed Aviation Industries includes a range of UCAVs (like the Shahed-129, Shahed-149) designed for combat and reconnaissance without being expended in an attack.

### 3. International Implications:

- **Role in Conflicts:** Shahed drones have been extensively used by Russia in the war against Ukraine, targeting critical infrastructure and civilian areas. This has demonstrated their effectiveness as a relatively low-cost, long-range attack weapon.

- **Sanctions:** Due to their use in conflicts and military proliferation, Iran and entities like Shahed Aviation Industries have faced sanctions from the United States, European Union, Canada, and other nations.

- **Supply Chains:** Despite sanctions, the production and continued use of these drones highlight challenges in controlling the supply chains for dual-use components (parts that have both civilian and military applications), which are often sourced from various countries globally.

- **Technological Evolution:** The reported inclusion of AI and advanced navigation systems in newer variants signifies ongoing technological development and adaptation, making them potentially more sophisticated and challenging to counter.

## Exercise Khaan Quest



**Context:** The Indian Army contingent recently arrived in Ulaanbaatar, Mongolia, to participate in the multinational military exercise **KHAAN QUEST**, scheduled from **June 14th to 28th, 2025**. This exercise aims to bolster peacekeeping capabilities among military forces worldwide.

**1. About Exercise Khaan Quest:**

- **Nature:** It is an annual **multinational military exercise**, specifically focused on **peacekeeping operations**.

- **Host Nation:** Hosted by **Mongolia** in Ulaanbaatar, co-hosted with the **U.S. Indo-Pacific Command**.

- **Purpose:** The exercise brings together military forces from around the world to **collaborate and enhance their peacekeeping capabilities** in a multinational environment. It promotes joint planning, tactical drills, and the sharing of best practices.
- **Frequency:** It is an **annual** exercise.
- **Latest Edition:** The **2025 edition** marks the **22nd iteration** of the exercise.
- **Previous Edition:** The last edition of Exercise KHAAN QUEST was conducted in Mongolia in **2024 (from July 27 to August 9)**.
- **Background:**
  - It first began as a **bilateral event between the USA and Mongolian Armed Forces in 2003**.
  - From **2006 onwards**, the exercise evolved and graduated into a **Multinational Peacekeeping Exercise**, expanding its scope and participation to include various countries.
- **Participating Nations:** Khaan Quest 2025 involves troops from **24 countries**, training under the UN peacekeeping framework.

## 2. Indian Army's Participation in Khaan Quest 2025:

- **Contingent Size:** The Indian Army contingent comprises **40 personnel**.
- **Representation:** The contingent is primarily represented by troops from a Battalion of the **KUMAON REGIMENT**, along with personnel from other Arms and Services.
- **Gender Inclusion:** Notably, the contingent includes **one Woman Officer and two Women Soldiers**, reflecting India's commitment to gender inclusivity in its armed forces and peacekeeping roles.
- **Performance:** The Indian Army contingent delivered a standout performance in Khaan Quest 2025, securing the fastest timing among all participating nations in a physically demanding course.

## 3. Aim and Focus of the Exercise:

- **Core Aim:** To prepare the Indian Armed Forces for **peacekeeping missions** while operating effectively in a **multinational environment**. This directly contributes to increasing interoperability and military readiness in peace support operations.
- **UN Mandate:** The exercise is conducted under **Chapter VII of the United Nations Charter**, which deals with action regarding threats to peace, breaches of peace, and acts of aggression. This underscores its alignment with global peacekeeping efforts.
- **Key Training Areas:** The exercise focuses on:
  - A high degree of **physical fitness**.
  - **Joint planning** (strategizing and coordinating operations with multiple nations).
  - **Joint tactical drills** (practical execution of maneuvers and procedures together).
- **Specific Drills:** Tactical drills practiced include:
  - Establishment of static and mobile checkpoints.
  - Cordon and search operations in simulated hostile environments.
  - Patrolling.
  - Civilian evacuation from conflict zones.
  - Counter-Improvised Explosive Device (IED) drills.
  - Combat First Aid and Casualty Evacuation.
- **Knowledge Exchange:** It provides a crucial platform for participating countries to **share their best practices** in Tactics, Techniques, and Procedures (TTPs) for conducting joint operations.
- **Relationship Building:** The exercise facilitates developing **inter-operability, bonhomie, and camaraderie** between soldiers of the participating countries, which is vital for effective multinational operations.

## 4. Significance for India:

- **Enhanced Peacekeeping Capabilities:** Participation in Khaan Quest directly enhances the Indian Army's preparedness and capabilities for its significant contributions to UN peacekeeping missions worldwide.
- **Global Role:** Reaffirms India's strong commitment to global peace, stability, and international cooperation.
- **Interoperability:** Improves the ability of Indian forces to work seamlessly with militaries from diverse nations, which is essential for complex multilateral operations.
- **Defense Diplomacy:** Strengthens India's defense ties with Mongolia and other participating nations, fostering mutual trust and understanding.

## Rudrastra



**Context:** The Indian Army recently successfully tested **Rudrastra**, a new battlefield technology developed in India.

### 1. About Rudrastra:

- **Type:** Rudrastra is a **hybrid Vertical Take-Off and Landing (VTOL) drone**.
- **Developer:** It was developed by **Solar Aerospace and Defence Limited (SDAL)**, an Indian company.

### 2. Features of Rudrastra:

- **VTOL Capability:** It can take off like a helicopter and then fly like an aircraft. This makes it flexible and difficult to detect.
- **Weaponry:** The drone has smart warheads designed for anti-personnel roles, meaning it can target enemy soldiers and positions accurately.

- **Range:** It can hit targets over 50 km away. During tests, it showed a full range of 170 km.
- **Endurance:** It can stay in the air for about 90 minutes, sending live video, and then return on its own.
- **Munition:** It can drop an airburst munition. This munition explodes low to the ground, causing damage over a wide area. This is useful for enemy camps or artillery.
- **Purpose:** It is intended for deep strikes, for example, against enemy artillery or terrorist hideouts far inside enemy territory.
- **Safety:** The drone can operate quietly, strike, and return without risking human lives. This makes it a "stand-off weapon" that works from a safe distance.

## 3. Significance:

- This development helps India's self-reliance in defense technology.
- It gives the Indian Army a new way to conduct precise strikes and surveillance.
- It allows for operations in different types of terrain, like mountains and deserts, without needing runways.

## Extended Trajectory-Long Duration Hypersonic Cruise Missile (ET-LDHCM)



**Context:**

India is currently preparing to test its most advanced indigenously developed hypersonic missile, the **Extended Trajectory-Long Duration Hypersonic Cruise Missile (ET-LDHCM)**. This marks a significant step in strengthening India's defense capabilities.

## 1. About Extended Trajectory-Long Duration Hypersonic Cruise Missile (ET-LDHCM):

- **Type:** It is a **long-range hypersonic cruise missile**.
- **Indigenous Development:** It has been **developed entirely in India** by the **Defence Research and Development Organisation (DRDO)**.
- **Project Name:** Its development is part of a classified (secret) initiative known as **'Project Vishnu'**. Project Vishnu is a top-secret DRDO initiative focused on developing hypersonic missile technologies.
- **Launch Platforms:** The missile is designed to be launched from **land, sea, or air platforms**. This multi-platform capability increases India's flexibility in striking targets and carrying out different types of missions.
- **Global Standing:** Once this missile becomes operational, India will join a small group of nations, including the **United States, China, and Russia**, that possess operational hypersonic weapon systems.

## 2. Features of Extended Trajectory-Long Duration Hypersonic Cruise Missile (ET-LDHCM):

- **Speed:** The ET-LDHCM system is reported to reach speeds of up to **Mach 8**, which is approximately **11,000 kilometers per hour (kmph)**. Mach 8 means eight times the speed of sound.
- **Warhead Capability:** It is designed for both **conventional and nuclear missions**. It can carry warheads weighing between **1,000 kg and 2,000 kg**.
- **Range:** The missile has an approximate strike range of **1,500 km**.
- **Flight Profile and Maneuverability:**
  - Unlike traditional ballistic missiles, which follow a predictable, arcing trajectory, the ET-LDHCM flies at **low altitudes**.
  - It is capable of **course correction mid-flight**, meaning it can change its path during its journey.
  - Its combination of high speed, low-altitude flight, and in-flight maneuverability makes it extremely difficult for modern radar and air defense systems to detect, track, and intercept. This allows for deep strikes into enemy territory.

- **Propulsion:** It is powered by a **scramjet engine**.
  - A scramjet (supersonic combustion ramjet) is an advanced type of air-breathing jet engine.
  - It operates by compressing incoming air at supersonic speeds without using rotating parts like compressors.
  - Crucially, it uses **atmospheric oxygen** for fuel combustion. This allows it to carry less oxidizer than a rocket, making it lighter and enabling it to sustain high speeds for longer durations, marking a major breakthrough in propulsion technology for India.

- **Materials:** The missile is built with **heat- and oxidation-resistant materials**. This allows it to withstand the extreme temperatures, exceeding **2,000 degrees Celsius**, generated during hypersonic flight. This also ensures its durability in harsh environments, including potential exposure to saltwater and intense sunlight.

## Synthetic Aperture Radar (SAR)
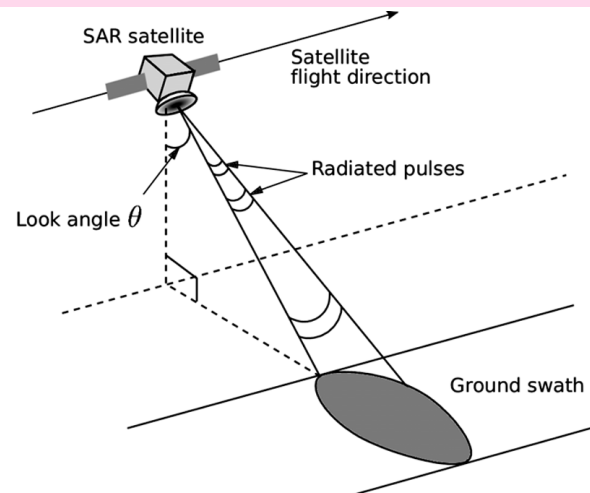
**Context:** NASA recently announced that the **NASA-ISRO SAR (NISAR) mission** satellite has arrived at ISRO's spaceport in Sriharikota, India. This mission will use advanced Synthetic Aperture Radar technology to study Earth.

**1. About Synthetic Aperture Radar (SAR):**

- **Nature:** SAR is an **active data collection** method in remote sensing.
    - Unlike optical sensors (like cameras), which passively capture light reflected from the sun, SAR actively sends out its own energy pulses.
- **Working Principle:** An instrument sends out a pulse of energy (microwaves) and then records the amount of that energy that is reflected back after interacting with the Earth's surface.
- **Image Creation:** SAR images are formed from how the emitted energy pulse reacts with physical structures (like mountains, forests, sea ice) and conditions (like soil moisture).
- **Key Advantage:** It can produce **sharp images even when it's dark or cloudy**, as microwaves can penetrate clouds, smoke, and even light rainfall. This allows for data collection 24 hours a day, in all weather conditions.

**2. How Synthetic Aperture Radar Works:**

- **Pulse Emission and Echo Reception:** SAR systems transmit microwave pulses and then record the echoes (backscatter) that bounce back from the ground, ocean, ice, or buildings.
- **Synthetic Aperture Creation:**
    - Normally, a larger antenna is needed for better image resolution. However, a very large physical antenna is impractical for a satellite.
    - SAR overcomes this by using a **small antenna carried on a moving platform (like a satellite or aircraft)**.
    - As the platform moves, each echo is recorded from a slightly different position.
    - By combining these multiple echoes with precise timing and phase information using advanced signal processing software, it can **mimic a much larger antenna (a "synthetic aperture")** that is hundreds of meters long. This "synthetic aperture" allows for high-resolution imaging from a relatively small physical antenna.
- **All-Weather Capability:** Since microwaves can penetrate clouds, smoke, and light rain, SAR can collect data continuously, regardless of weather or daylight.
- **Wide Coverage:** If a SAR unit is on an orbiting satellite, it can map large areas of land (swaths hundreds of kilometers wide) in a single pass.
- **Material Differentiation:** Different materials (like soil, vegetation, water, and metals) reflect microwaves differently. This property allows SAR to detect subtle changes on the Earth's surface that are invisible to regular optical sensors. For instance, smooth surfaces like calm water appear dark, while rougher surfaces appear brighter.

**3. Applications and Significance:**

- **Earth Observation:** SAR is crucial for monitoring Earth's dynamic surfaces, changing ecosystems, and ice masses.
- **Environmental Monitoring:** Used to study changes in forests, wetlands, soil moisture, and to track oil spills.
- **Natural Hazards:** Helps in observing and understanding natural processes like earthquakes (ground deformation), volcanic activity, landslides, and floods.
- **Cryosphere Studies:** Essential for monitoring glaciers, ice sheets, and sea ice characteristics.
- **Urban Planning:** Can detect urban growth and changes in infrastructure.
- **Defense and Intelligence:** Used for persistent monitoring of military objects, activities, and maritime security.

- **Complementary to Optical Sensors:** SAR provides information that optical sensors cannot, especially in challenging weather conditions or for penetrating vegetation or dry soil.
- **NISAR Mission:** The NASA-ISRO SAR (NISAR) mission is a prime example. It is a joint Earth-observing satellite mission carrying two SAR instruments (L-band and S-band). It will map the entire globe every 12 days, providing data for understanding changes in Earth's ecosystems, ice mass, vegetation, sea level rise, groundwater, and natural hazards.

## Fattah 2



**Context:** Iran has recently unveiled and is developing advanced missile systems, including the **Fattah 2**, a new version of its domestically produced hypersonic ballistic missile. This development signifies Iran's efforts to enhance its military capabilities in the field of high-speed, maneuverable weaponry.

**1. About Fattah 2 Missile:**

- **Name Origin:** "Fattah" means "conqueror" in Farsi (Persian).
- **Type:** It is classified as a **hypersonic ballistic missile**. This means it achieves hypersonic speeds (Mach 5 or greater) and follows a ballistic trajectory for a part of its flight, but also has significant maneuverability.
- **Developer:** It has been developed by **Iran**.
- **Evolution:** Fattah 2 is an upgraded version of Iran's first domestically made hypersonic ballistic missile, known as 'Fattah' (sometimes referred to as Fattah-1).

**2. Fattah 2 Missile Features:**

- **Warhead Type: Hypersonic Glide Vehicle (HGV):**
  - o Fattah 2 is equipped with a **hypersonic glide vehicle (HGV)** warhead.
  - o An HGV is a type of warhead that, after being launched by a rocket booster, separates and then glides through the upper atmosphere at hypersonic speeds.
  - o Crucially, HGVs can **maneuver** during their atmospheric flight, making their trajectory unpredictable and extremely difficult for conventional missile defense systems to intercept.
- **Propulsion:**
  - o It uses a **liquid-fuel rocket propellant**.
  - o A key feature of its liquid fuel engine is the **ability to adjust the thrust force** during flight, which contributes to its maneuverability.
- **Performance:**
  - o **Precision-Guided:** It is a precision-guided missile, indicating high accuracy in hitting its targets.
  - o **Two-Stage Missile:** It operates in two stages, likely involving a booster stage to achieve initial speed and altitude, followed by the separation and glide phase of the HGV.
  - o **Range:** It can hit targets within a range of **1500 kilometers**.
  - o **Velocity:** It can reach a velocity of up to **Mach 15** (fifteen times the speed of sound, which is approximately 18,522 km/hr).
- **Dimensions and Payload:**
  - o It measures **12 meters in length**.
  - o It can carry a warhead (explosives) weighing **200 kilograms**.

- **Evasion Capabilities:**
    - It is capable of **significant trajectory changes during flight**. This maneuverability is its primary defense against modern missile defense systems.
    - While the missile can accelerate **outside the Earth's atmosphere** (like a ballistic missile), its **aerodynamic control surfaces** also allow for precise steering and maneuvering **within the atmosphere**. This combination of exo-atmospheric and endo-atmospheric maneuverability makes it a formidable weapon.

### 3. Strategic Implications:

- The development of Fattah 2 places Iran among a select few nations (including the US, China, and Russia) that possess or are actively developing operational hypersonic weapons.
- Hypersonic missiles, with their extreme speed and maneuverability, pose a significant challenge to existing air and missile defense systems, potentially altering the balance of power in regional conflicts.
- For Iran, this represents a major leap in its indigenous missile program, potentially enhancing its deterrence capabilities.

## Cluster Bombs



**Context:** Recent reports indicate Iran's alleged use of a cluster bomb during a missile strike on Israel, triggering renewed international concerns over the inherent dangers and humanitarian impact of these controversial weapons.

### 1. About Cluster Bombs (Cluster Munitions):

- **Definition:** Cluster bombs, or cluster munitions, are **explosive weapons that are designed to disperse a large number of smaller explosive submunitions (also known as bomblets or grenades)** over a wide area.
- **Deployment:** They can be **air-dropped** from aircraft (as bombs) or **ground-launched** (as artillery shells, rockets, or missiles).
- **Mechanism:** The main container (bomb, shell, or missile warhead) opens in mid-air at a predetermined altitude, scattering the individual bomblets across a broad target zone. These bomblets are typically designed to explode upon hitting the ground or after a short delay.
- **Area Saturation:** Cluster bombs can saturate an area as large as several football fields, making them highly indiscriminate and particularly lethal in densely populated civilian areas.
- **Submunitions:** The individual bomblets are often grenade-sized and may have fins or streamers for stabilization during their fall. They are designed to cause damage to both **personnel (through fragmentation)** and **unarmoured vehicles (through shaped charges)**. Some modern versions, like the US-made Dual-Purpose Improved Conventional Munitions (DPICM), feature dual-purpose charges for enhanced effect against various targets.

### 2. Key Controversies and Dangers:

- **High "Dud Rate":** The most significant humanitarian concern and source of controversy is their **high "dud rate" – the failure of a significant percentage of submunitions to explode upon impact**.
    - Estimates of dud rates vary widely, from as low as 2% to as high as 40% in real-world combat scenarios, depending on the munition type, age, and environmental factors.

o These unexploded bomblets remain live and lethal for months, years, or even decades after a conflict, effectively turning them into **de facto landmines**.

- **Indiscriminate Nature:** When deployed over a wide area, these explosive bomblets **cannot distinguish between legitimate military targets and civilians or civilian infrastructure**. This inherent indiscriminateness is a primary reason for their condemnation by humanitarian organizations and makes their use in populated regions particularly devastating.

- **Long-term Civilian Harm:** Unexploded ordnance (UXO) from cluster bombs poses a severe, long-term threat to civilian populations, especially children who may mistake them for toys. They impede post-conflict reconstruction, agricultural activities, and the return of displaced populations, prolonging suffering and hindering recovery.

- **Environmental Contamination:** The widespread scattering of UXO contaminates large areas of land, making them unsafe and unusable for years.

## 3. International Law and Convention on Cluster Munitions (CCM):

- **The 2008 Convention on Cluster Munitions (CCM):** This is a legally binding international treaty that **bans the use, development, production, acquisition, stockpiling, and transfer of cluster munitions**. It also mandates the destruction of existing stockpiles and assistance to victims.

- **Entry into Force:** The CCM entered into force on **August 1, 2010**.

- **Signatories and States Parties:** As of recent reports (June 2025), **111 countries and 12 other entities have become States Parties** (ratified or acceded) to the treaty. More than 120 states are committed to its goals.

- **Non-Signatories:** However, several **key nations with significant military capabilities and**

**stockpiles of cluster munitions have not joined the treaty**. These include:

- o **Israel**
- o **Iran** (alleged recent user)
- o **The United States**
- o **Russia** (known user in recent conflicts)
- o **China**
- o **India**
- o Other notable non-signatories include Brazil, Egypt, North Korea, Pakistan, Poland, Romania, Singapore, South Korea, and Turkey.

- **Stockpile Destruction:** As per the United Nations, a significant achievement of the treaty is that **99% of declared global stockpiles** have reportedly been destroyed by States Parties.

## 4. Recent Use and Concerns:

- The alleged use of a cluster bomb by Iran in a missile strike on Israel in June 2025, which reportedly scattered bomblets over a wide radius in a populated area, has intensified calls for universal adherence to the CCM.

- This incident, along with documented uses by Russia and Ukraine in their ongoing conflict, highlights the continuing humanitarian challenge posed by these weapons and the urgent need for wider international adherence to the ban.

## Ottawa Convention



**Context:**

Finland's Parliament recently voted to withdraw from the **Ottawa Convention**, citing increased military threats from neighboring Russia. This decision, alongside similar moves by other European nations bordering Russia, highlights the complex interplay between humanitarian

disarmament efforts and evolving geopolitical security concerns.

## 1. About the Ottawa Convention:

- **Official Name:** The Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction.

- **Other Names:** It is commonly known as the **Anti-Personnel Mine Ban Convention** or simply the **Mine Ban Treaty**.

- **Purpose:** It is the **cornerstone of the international effort to end the suffering and casualties caused by anti-personnel mines**. Its primary aim is to comprehensively ban these weapons worldwide due to their indiscriminate nature and devastating long-term humanitarian impact on civilians.

- **Prohibitions:** The Convention explicitly prohibits:
  - The **use** of anti-personnel mines.
  - The **stockpiling** of anti-personnel mines.
  - The **production** of anti-personnel mines.
  - The **transfer** of anti-personnel mines (directly or indirectly).
  - States Parties also commit to **never developing or otherwise acquiring** them, or assisting anyone in these prohibited activities.

- **Adoption and Entry into Force:**
  - Adopted on **18 September 1997 in Oslo, Norway**.
  - Opened for signature in **Ottawa, Canada**, on 3 December 1997.
  - Entered into force on **1 March 1999**, following the 40th ratification.

- **Global Membership:** As of recent reports, there are **165 States Parties** to the Convention, representing a vast majority of the world's nations. It is considered one of the most widely supported disarmament treaties.

- **India's Status: India is NOT a member** of this convention. Other significant non-signatories include the United States, Russia, China, Pakistan, and others.

## 2. Key Commitments of States Parties to the Ottawa Treaty:

States Party to the Ottawa Treaty commit to a range of obligations aimed at eliminating anti-personnel mines and addressing their consequences:

- **Never Use or Engage in Prohibited Activities:** To never use, develop, produce, otherwise acquire, stockpile, retain, or transfer anti-personnel mines.

- **Stockpile Destruction:** To **destroy their entire stockpiled anti-personnel mines within four years** after their accession to the Convention. States may retain a "minimum number absolutely necessary" for the development of and training in mine detection, mine clearance, or mine destruction techniques.

- **Mine Clearance:** To **clear all mined areas in their territory within 10 years** of becoming a State Party. If a State Party believes it cannot meet this deadline, it can submit a request for an extension to a Meeting of the States Parties or a Review Conference.

- **Mine Risk Education (MRE):** In mine-affected countries, to conduct mine risk education programs to raise awareness among affected communities, especially children, about the dangers of landmines.

- **Victim Assistance:** To ensure that **mine survivors, their families, and communities receive comprehensive assistance**, including medical care, rehabilitation, and social and economic reintegration.

- **International Cooperation and Assistance:** To offer assistance to other States Parties, for example, by providing for survivors or contributing to clearance programs, and to cooperate in facilitating the implementation of the Convention.

- **National Implementation Measures:** To adopt national legislation and other measures to ensure that the terms of the treaty are upheld within their territory, including penal sanctions for violations.
- **Transparency:** To provide annual reports to the United Nations on their progress in implementing the Convention.

**3. Latest Developments: Finland's Withdrawal:**

- **Reason for Withdrawal:** Finland's parliament voted to withdraw from the Ottawa Convention primarily due to **concerns over the military threat posed by neighboring Russia**.
  - The Finnish government's decision is based on analyses by the Defence Forces, Ministry of Defence, and Ministry for Foreign Affairs.
  - Finland, which shares a long border with Russia and recently joined NATO, views anti-personnel mines as a "simple and cost-effective weapon" that can significantly **supplement its defensive capabilities** in its rugged terrain.
  - The move is seen as a strategic response to the changed security environment in Europe following Russia's actions in Ukraine, where landmines have been extensively used.
- **Implications:**
  - Finland's withdrawal will allow it to once again **use, stockpile, and potentially produce anti-personnel landmines** for its national defense.
  - The withdrawal process typically takes six months after formal notification to the UN Secretary-General.
  - Finland has stated its intention to continue supporting humanitarian mine-clearing efforts globally despite its withdrawal from the Convention.
- **Broader Trend:** Finland is not the only European nation bordering Russia considering or having

taken similar steps. Other NATO members like **Estonia, Latvia, Lithuania, and Poland** have also indicated or acted on withdrawing from or re-evaluating their commitments to the treaty, citing similar security concerns.

- **Humanitarian Concerns:** These withdrawals are a significant concern for humanitarian organizations and the international community dedicated to a mine-free world, as they risk reversing decades of progress in curbing the use of these indiscriminate weapons. The UN Secretary-General has expressed grave concerns regarding such announcements.



**THAAD Missile System**
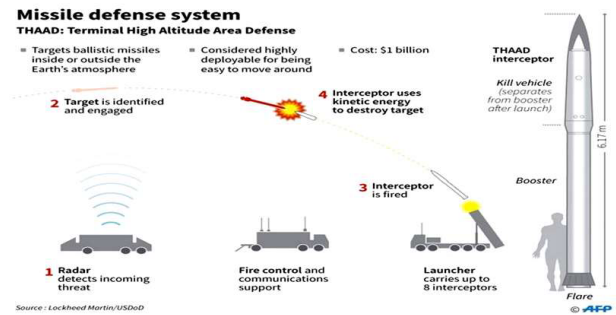
- **Recent Deployment and Usage:** The United States reportedly used up a total of **15 to 20 percent of its THAAD missile system** to bolster defense against Iran's aerial strikes during a 12-day conflict (referring to a conflict in which Israel and the US struck nuclear facilities).
- This intense engagement indicates the system's vital role in active combat scenarios.

**About THAAD Missile System**

- **Full Form:** THAAD stands for **Terminal High Altitude Area Defense**.
- **Nature:** It is an advanced, ground-based **missile defense system** developed by the United States.
- **Purpose:** Designed to intercept and destroy short-, medium-, and intermediate-range ballistic missiles (SRBM, MRBM, IRBM) during their **terminal phase** (the last phase of their flight, as they descend towards the target).
- **Origin:** Developed by the U.S. after their experience of Iraq's Scud missile attacks during

the **Persian Gulf War in 1991**, which exposed vulnerabilities in existing air defenses against ballistic missile threats.

- **Role in BMD:** It is a key element of the **U.S. ballistic missile defense (BMD) system**, designed to provide an upper-tier, regional defense capability. It complements lower-tier systems like Patriot and naval Aegis BMD systems in a layered defense approach.

- **Interception Capability:** THAAD is unique among U.S. ground-based systems as it is the **only U.S. system capable of intercepting targets both within (endoatmospheric) and outside (exoatmospheric) the Earth's atmosphere**. This allows for a broad engagement envelope.

**Features**

- **Battery Composition:** Each THAAD battery is a self-contained unit typically made up of five main components:
  - **48 interceptor missiles** (usually 8 per launcher).
  - **Six truck-mounted launchers** (Heavy Expanded Mobility Tactical Truck - HEMTT).
  - A powerful **radar** (AN/TPY-2).
  - A **command-and-control platform** (Fire Control and Communications - TFCC).
  - Approximately **95 soldiers** to operate the system.

- **Interceptor Missile:**
  - **Length:** 6.17 meters.
  - **Propulsion:** Equipped with a single-stage solid-fuel rocket motor with thrust vectoring for maneuverability.
  - **Warhead:** There is **no explosive warhead** on the missile. It destroys its targets by the sheer **force of its kinetic impact** (hit-to-kill technology), minimizing collateral damage from an exploding conventional or WMD warhead.

- **Launch Weight:** Approximately 900 kg.
- **Guidance:** Uses an indium-antimonide imaging infrared seeker head for terminal guidance. Target data and predicted intercept points are downloaded pre-launch and continuously updated in flight via radar.
- **Speed:** Travels at hypersonic speeds, typically over Mach 8 (over 9,800 km/h or 6,000 mph).
- **Range and Altitude:** Can destroy aerial targets at ranges from **150 to 200 km** and can reach a maximum altitude of **150 km**.

- **THAAD Radar (AN/TPY-2):**
  - An **X-band radar**, it is the world's largest ground/air-transportable X-band radar.
  - **Capabilities:** Possesses the capability to acquire missile threats at ranges up to **1,000 km** (some reports indicate detection ranges up to 2,300-3,000 km in forward-based mode).
  - **Discrimination:** A key capability is its ability to distinguish between a true warhead and decoys or debris, providing precise tracking data for the interceptor.
  - **Modes:** Operates in two primary modes: a forward-based mode (FBM) for early detection and tracking of missiles in their ascent phase, and a terminal mode (TM) for guiding THAAD interceptors.

- **Interoperability:** It is highly interoperable with other Ballistic Missile Defense (BMD) systems, such as the Aegis BMD (sea-based) and Patriot (lower-tier), enabling a comprehensive, layered defense architecture.

- **Mobility:** Highly mobile and rapidly deployable worldwide via air, sea, or land.

# Pakistan's Drone Fiasco – India's Akashteer Exposes Turkish Tech



**Pak's arsenal: Turkish drones to Chinese missile**

Long-range rockets, loiter munitions, Turkish-origin **Bayraktar Akinci Yiha** drones neutralised Pakistan Air Force received initial batch of Bayraktar Akinci drones from Turkey in April 2023

Pakistan recently acquired **PL-15 missiles** with a significantly reduced operational range of 145 km — less than half the esti mated 300 km range of indigenous PL-15 model

Chinese-made **J-10** and **J-17 fighters** received significant damages

**Fateh-1 missile** has proven to be a complete disaster. It failed multiple times — crashed, veered off course, or simply failed to launch: **An Official**

**Context:**

- Turkey's well-known Bayraktar TB2 drones, once praised for their effectiveness in various conflicts, faced a major failure in **Pakistan's "Operation Sindoor"** (May 2025).

- India's own **Akashteer air defense systems** successfully shot down all Turkish-origin drones used by Pakistan.

- This event raises serious questions about Turkish drones' reliability in real battle and affects Turkey's defense goals, potentially changing the global drone market.

## I. The "Bayraktar Busted": Turkish Drones Fail in Operation Sindoor

- **The Incident:** In May 2025, during Pakistan's "Operation Sindoor," India's forces, using their indigenously developed **Akashteer air defense systems**, shot down **every single Turkish-origin drone** used by Pakistan.

- **Scale of Failure:** Indian Air Defence officers confirmed that **300-400 Turkish drones** were destroyed mid-air before they could hit Indian targets.

- These included **Byker YIHA III kamikaze drones** and smaller **Songatri and eYatri micro-drones**.

- **Pakistani Objective:** Pakistan had imported hundreds of Turkish drones, hoping to overwhelm Indian air defenses and show Turkish technology as a powerful tool in the region.

- **Outcome:** The attack ended in a "humiliating defeat" for Pakistan.

- A senior Indian officer stated, "not a single drone achieving its objective."

- **Failed Purpose:** A Pakistani source mentioned that the drones were supposed to provide cover for manned aircraft and artillery, but they "failed to reach targets" due to India's strong air defenses.

## II. Why It Matters: Impact on Turkey's Defense Ambitions

- **Erdogan's Vision:** Turkish President Recep Tayyip Erdogan has often presented **Turkish-made drones as a symbol of his "Islamist vision"** and a key part of Turkey's defense ambitions.

- **Diplomatic Tool:** These drones were not just weapons **but also a way for Turkey to increase its influence in Africa**, the Middle East, and Central Asia.

- **Reputational Blow:** Akashteer's **100% accuracy** in intercepting Pakistani drones delivered a direct hit to Turkey's arms export goals.

- **Credibility Doubts:** This failure, described as a "**collapse of performance**," has created serious doubts about the actual battle credibility of Turkish drones and the overall promise of Turkey's defense industry.

## III. The Real Star: India's Homegrown Akashteer System



**INDIA'S AD ARSENAL**

**S-400 Triumf Surface-to-Air Missile System**
- 380-km range
- 3 squads deployed under Rs 40,000cr deal with Russia in Oct 2018
- 2 squads delayed to 2026-27 due to Russia-Ukraine war

S-400 TRIUMF RANGE: **380km**

**Akash**
- 25-km range
- IAF has inducted the bulk of 15 squads of Akash 1 & 2 systems ordered for Rs 10,900cr
- Army has 4 regiments for Rs 22,340cr. More in pipeline

**Spyder**
- 15-km range
- Israeli low-level quick-reaction anti-aircraft missile system
- Several units inducted by IAF & Army

**Barak-8 MR-SAM**
- Over 70-km range
- Jointly developed with Israel under projects initially worth Rs 30,000cr
- A large no. of units being progressively inducted by IAF, Navy & Army

**Shorter Range**
- Newer Russian shoulder-fired Igla-S (6-km) systems
- Older Russian Igla-1M (5-km), OSA-AK-M (10-km), Pechora missiles & upgraded L-70 anti-aircraft guns (3.5-km)

India's Akash ADS in action (File pic)

- **Developer:** The Akashteer system was developed by **Bharat Heavy Electricals Limited (BHEL)**, an Indian company.
- **Integration:** It works smoothly with Indian Army and Air Force radars.
- **Key Capabilities:** Akashteer automates:
  - Threat detection (finding incoming threats).
  - Tracking targets.
  - Assigning weapons in real-time.
- **Decisive Performance:** This ability was crucial against Pakistan's large drone attack.
- An official stated, "**It didn't roar or flash - it listened, calculated and struck with precision.**.. Every threat was intercepted, every target neutralised."
- **Comparison to Iron Dome:**
  - Indian officers compared Akashteer's precision to Israel's Iron Dome.

- While Iron Dome focuses on missile defense, Akashteer showed "exceptional versatility" against low-flying drones and "loitering munitions" (drones that can hover and then attack).

### Strategic Integration with Armed Forces

1. Forms the **core of Indian Army's Air Defence (AAD)** command.
2. Fully interoperable with:
   - **IACCS (Integrated Air Command and Control System)** – Indian Air Force
   - **TRIGUN System** – Indian Navy
3. Facilitates **tri-service integration** and **situational awareness**, ensuring real-time threat analysis and coordinated defence.

### Comparison with Adversaries

| Country | System | Observations |
|---------|--------|--------------|
| **India** | **Akashteer** | Indigenous, automated, real-time system. Demonstrated success in actual combat. |
| **Pakistan** | **HQ-9 and HQ-16 (imported from China)** | Reportedly failed to detect or intercept Indian strikes during recent engagements. |

### Strategic Importance

1. Enables India to **shift from reactive to proactive air defence** strategy.
2. Reduces dependence on foreign platforms, aligning with **Atmanirbhar Bharat** vision.
3. Demonstrates India's ability to **lead in next-generation warfare systems**.
4. Reduces **human error** and **response delays** during real-time combat operations.

### Indigenous Defence Ecosystem Supporting Akashteer

1. Akashteer is part of a broader indigenous defence platform ecosystem developed under the **Make in India** and **Atmanirbhar Bharat** initiatives.
2. Notable Indigenous Systems and Platforms:
   a. **Dhanush**, **ATAGS**, **MBT Arjun** – Artillery and Main Battle Tanks

b. **LCA Tejas**, **ALH**, **LUH** – Light combat and utility aircraft and helicopters

c. **Weapon Locating Radar**, **3D Tactical Control Radar**, **SDR** – Advanced sensor and communication systems

d. Naval assets: Indigenous aircraft carriers, destroyers, frigates, corvettes, fast patrol vessels

**Defence Industrial Growth (as of 2025)**

| Parameter | Data |
|---|---|
| **Target for Defence Production by 2029** | ₹3 lakh crore |
| **Contribution of Private Sector** | 21% of total defence output |
| **Indigenous Manufacturing (Current)** | 65% of defence equipment (earlier import dependency: 65–70%) |
| **Defence Public Sector Units (DPSUs)** | 16 |
| **Licensed Private Companies** | Over 430 |
| **MSMEs in Defence Sector** | Approx. 16,000 |

**IV. Broader Implications and What's Next**

- **Cracks in Bayraktar's Reputation:**
  o The **Bayraktar TB2 gained fame in the 2020 Nagorno-Karabakh war** and early stages of the **Russia-Ukraine conflict.**
  o However, signs of weakness were already appearing; Ukrainian President Volodymyr Zelensky noted last year that these drones "do not affect the result" against Russia's electronic warfare systems.

- **Vulnerability Exposed:**
  o The India-Pakistan conflict clearly showed these weaknesses, revealing Turkish drones to be ill-suited for modern battlefields with strong electronic warfare and radar systems.

- **Historical Echoes:**
  o Analysts compare this to 1982, **when Israeli F-15s and F-16s shot down over 80 Soviet-built Syrian MiGs** without any losses, shattering the myth of Soviet air power. Turkey is now facing a similar reality check.

- **Risk for Buyers:** Michael Rubin warned that countries in Africa and Central Asia still buying Turkish hardware "**risk wasting hundreds of millions of dollars.**"

- **Consequences for Turkey:**
  o This is more than just a marketing setback for President Erdogan and Baykar.
  o It's a big blow to Turkey's story of being self-sufficient in defense and its regional influence.
  o Countries that once relied on Turkish drones as cheaper alternatives to Western systems may now reconsider, fearing they might be "paper tigers" (seemingly strong but actually weak).
  o This opens doors for rivals like China and the U.S. in the global drone market.

- **India's Advantage:** India's success with Akashteer has boosted its efforts in indigenous defense technology.

- Drone Federation India stated that India plans to **triple its drone investments in the next two years**, using the lessons from Operation Sindoor to build a strong local drone and anti-drone ecosystem.

## FPV Drones – Ukraine's Deep Strikes and Modern Warfare

**Context:**

- On **June 1, 2025**, **Ukrainian drone attacks on Russia resulted in significant damage, destroying over 40 planes and marking the deepest strikes** into Russian territory since the conflict began.

- These attacks, reportedly carried out using **First-Person View (FPV) drones**, highlight the evolving nature of modern warfare and the growing importance of drone technology.

## I. The Ukrainian Drone Attack (June 1, 2025)

- **Target:** Russian military facilities, deep within Russian territory **(over 4,000 kilometres from Ukraine, including the country's far east).**

- **Outcome:** Destroyed over 40 planes; confirmed attacks on **5 locations by the Russian Defence Ministry.**

- **Ukrainian Operation:** Ukrainian President Volodymyr Zelenskyy called it **"Operation Spider's Web,"** stating it was planned over 18 months and involved 117 drones targeting only military facilities.

- **Method of Deployment:** According to Associated Press, FPV drones were reportedly smuggled into Russia, placed in "mobile wooden houses," hidden under roofs, and then remotely launched to hit targets.

- **Timing:** The attack occurred just a day before peace talks between Ukraine and Russia were scheduled in Istanbul.

## II. What are FPV Drones?

- **Definition: "First-person view" means the drone operator sees a live video** feed from a camera on the drone's body.

- **Operation:** This live video is viewed through specialized goggles, smartphones, or other screens, allowing the operator to remotely maneuver the drone as if they were inside it.

- **Applications:** FPV drones are also used for non-defense purposes like filming.

- **Challenges (European Union Aviation Safety Agency):**
  - The operator cannot see the drone's physical movement through its surroundings, which can limit situational awareness and lead to disorientation.
  - Sometimes, a "visual observer" is needed to guide the drone controller.

- **Pre-Deployment:** Before FPV drones are used, a reconnaissance drone with a larger range typically surveys the area to pinpoint targets. FPV drones have a much smaller range, usually a few kilometers.

## III. Advantages of FPV Drones in Combat

- **Cost-Effectiveness:**
  - A major advantage is their low cost. A Reuters report estimates an FPV drone with an explosive payload can cost as little as **$500 (around Rs 42,000)**.
  - This makes them attractive alternatives to more conventional artillery systems, which are significantly more expensive.

- **Deep Strike Capabilities:** FPV drones can reach targets deep within enemy territory.

- **Evasion:** They can remain largely undetected due to their small size and flight profile.

- **Potent Weapon:** FPV drones have become one of the "most potent weapons" in the Ukraine conflict, especially where conventional warplanes are less effective due to dense anti-aircraft systems near front lines.

- **Minimizing Risk to Human Life:** Drones in general reduce the number of soldiers needed on the ground, thereby minimizing human casualties.

- **Improved Precision:** Technological advancements have made drones cheaper while improving precision.

- **Global Adoption:** All major defense powers use Unmanned Aerial Vehicles (UAVs) (e.g., Israel's HAROP "kamikaze" drones, Iran's Shahed drones).

## IV. Ukraine's Prior Use and Domestic Production

- **Long-standing Use:** Ukraine has been using FPV drones against Russia for some time.
- A November 2023 Reuters report called their use **"one of the most successful of the various low-cost strategies" for Ukraine.**
- **Attrition Strategy:** FPV drones are part of an attrition strategy, aiming to gradually wear down the enemy's resources.
- **Increased Domestic Production:** Both Ukraine and Russia have ramped up their indigenous drone production.
    - A NATO official stated in 2024 that **over two-thirds of Russian tanks** destroyed by Ukraine recently were thanks to FPV drones.
    - Forbes reported that Ukrainian makers Vyriy Drone delivered their first batch of 1,000 "all-Ukrainian" FPV drones in March of the current year (2025).
    - Ukraine is on track to produce **over four million drones** this year.
- **Importance of Domestic Capabilities:** Relying on domestic production is crucial for protecting a country's defense system from external shifts (e.g., China's potential export controls on drone chips).
- **China's Dominance in Components:** The Center for Strategic & International Studies (CSIS) noted that China is the "undisputed leader in commercial drone production" and essential components like small lithium-ion batteries.
- DJI Technology Company holds a remarkable 90% share of the U.S. commercial drone market and 80% of the global consumer drone market.

## Conclusion

The successful deep strikes by Ukrainian FPV drones against Russia underscore the transformative impact of low-cost, high-precision drone technology in modern warfare. While offering significant tactical advantages in terms of cost and risk reduction, their increasing use also highlights global dependencies on component supply chains and the evolving challenges for traditional air defense systems.

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## India-U.K. Naval Cooperation : Passage Exercise in North Arabian Sea



**Context:**

- **On June 9-10, 2025, the Indian Navy and the United Kingdom's Royal Navy conducted a passage exercise (PASSEX) in the North Arabian Sea.**
- This joint drill shows the deepening defense cooperation and shared commitment to maritime security between the two nations.

### I. Overview of the Passage Exercise (PASSEX)

1. **What is PASSEX?**
    - It Refers to **joint naval drills** conducted between friendly navies.
    - It Occurs when naval units **cross each other during deployments**.
    - **Purpose:** Primarily to enhance interoperability, communication, and strategic cooperation at sea without necessitating full-scale, complex maneuvers.

2. **Location:**
    - **Host Location: North Arabian Sea.**
      *Geostrategic Importance:* This region is vital for global maritime trade and security, lying on key shipping lanes.

3. **Participating Naval Assets:**
    - **Indian Navy:**
        * **INS Tabar:** A stealth frigate.

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* A **conventional submarine**.
* **P-8I maritime patrol aircraft:** Long-range surveillance and **anti-submarine warfare (ASW) aircraft.**
  o **United Kingdom Royal Navy (UK Carrier Strike Group):**
    * **HMS Prince of Wales:** An aircraft carrier (flagship of the Carrier Strike Group).
    * **HMS Richmond:** A frigate.

## II. Objectives of the Exercise

* **Strengthen Interoperability:** Enhance the ability of Indian and Royal Navies to operate together seamlessly.

* **Enhance Anti-Submarine Warfare (ASW) Coordination:** Improve joint capabilities in detecting, tracking, and neutralizing submarines.

* **Tactical Manoeuvres & Maritime Domain Awareness (MDA):** Conduct coordinated fleet movements and improve shared understanding of the maritime environment.

* **Professional Exchange:** Facilitate sharing of expertise and best practices between officers and personnel.

* **Demonstrate Commitment:** Showcase mutual dedication to Indo-Pacific maritime security and a stable maritime environment.

## III. Strategic Importance for India

This joint exercise holds significant strategic importance for India's foreign and defense policy:

1. **Strengthens India's Defence Diplomacy in Indo-Pacific:**
   o Showcases India's expanding **naval reach and capabilities**.
   o Highlights India's strategic alignment with key partners like the U.K., promoting a rules-based order in the Indo-Pacific.

2. **Advances India-UK 2030 Roadmap Goals:**
   o Directly contributes to the **"Comprehensive Strategic**

**Partnership"** framework agreed upon in the **India-U.K. 2030 Roadmap.**
   o Deepens defense cooperation, which is a key pillar of this roadmap.

3. **Supports SAGAR Vision (Security and Growth for All in the Region):**
   o Promotes India's overarching vision for inclusive maritime security.
   o Emphasizes collaborative regional engagement to address common maritime challenges (e.g., piracy, terrorism, disaster relief).

4. **Enhances Maritime Security:**
   o Collaboration with advanced navies like the Royal Navy helps India bolster its capabilities and readiness to maintain a secure and stable maritime environment in the Indian Ocean Region and beyond.

5. **Capability Enhancement:**
   o Provides invaluable experience and learning opportunities for the Indian Navy from the operational doctrines and technological advancements of the Royal Navy, particularly with a Carrier Strike Group.

## India-France Joint Military Exercise 'Shakti 2025' : Deepening Defence Ties



**Context:**

* The **8th edition of "Exercise Shakti," a biennial joint military exercise between India and France,** is scheduled to be held from June 18 to July 1, 2025, at **La Cavalerie in France.**

- This exercise underscores the deepening strategic partnership and defence cooperation between the two nations.

## I. Exercise Shakti 2025: Key Details

1. **Participants:** Indian Army and French Army.
2. **Edition:** 8th edition.
3. **Dates:** June 18 to July 1, 2025.
4. **Location:** La Cavalerie, France (Host nation for this edition).
   - *Note:* **Exercise Shakti is a biennial exercise, alternately hosted by India and France.**
   - The **7th edition was held in Umroi, Meghalaya (India) from May 13-26, 2024.**
5. **Aim of the Exercise:**
   - To enhance the **joint military capability** of both sides.
   - Focus on undertaking **Multi-Domain Operations** in a **Sub-Conventional scenario**.
     *Sub-Conventional Scenario:* Refers to dealing with terrorism and conducting counter-terrorism operations, as defined by armed forces globally.
   - To strengthen **interoperability, bonhomie, and camaraderie** between the Army personnel of both nations.

## II. India-France Military Ties: A Comprehensive Partnership

France is a **major defence partner** for India, characterized by robust cooperation across various domains:

1. **Defence Procurement & Technology Transfer:**
   - **Fighter Aircraft:** India has procured advanced fighter planes like **Mirage 2000** and **Rafale** from France.
   - **Submarines:** France has licensed the production of **6 Scorpene submarines** (Project 75) in India, under a technology transfer agreement.
   - **Engine Manufacturing:** India is actively negotiating with the French company **Safran** to build engines for its fighter aircraft (e.g., for the Advanced Medium Combat Aircraft - AMCA).
   - **Joint Manufacturing: Dassault Aviation** (French) and **Tata Advanced Systems Limited** (Indian) have an agreement to manufacture Rafale fuselages in India, aligning with the 'Make in India' initiative.
2. **Regular Bilateral & Multilateral Exercises:**
   - **Bilateral Army-level Exercises:**
     **Exercise Shakti:**
     * **First held:** 2011.
     * **Frequency:** Biennial, alternately hosted by India and France.
     * **Latest:** 8th edition in France (2025), 7th edition in India (2024).
     **Frinjex Exercise:**
     * **First held:** 2023.
     * **Focus:** Joint humanitarian assistance and disaster relief (HADR) operations.
     * **Location:** Held at Pangode Military Station, Thiruvananthapuram, Kerala (March 2023).
   - **Bilateral Air Force-level Exercises:**
     **Garuda Exercise:**
     * Conducted between the Indian Air Force (IAF) and the French Air and Space Force.
     * **First held**: 2003.
     * **Frequency:** Biennial, alternately hosted by India and France.
     * **Latest:** 7th edition at Air Force Station Jodhpur (Oct-Nov 2022).
   - **Bilateral Naval Exercises:**
     **Varuna Exercise:**
     * Conducted jointly by the Indian Navy and the French Navy.

* **First held:** 1993 (named Varuna in 2001).
* **Frequency:** Annual.
* **Latest:** 23rd edition in the Arabian Sea, hosted by Indian Navy (March 19, 2025).
o **Multinational Exercises (with French Participation/Hosting):**
**Exercise ORION:**
* Conducted by the French Air and Space Force in France.
* **Significance: First time the Indian Air Force participated in 2023, showcasing** extended reach and interoperability with NATO standards.
**Tarang Shakti:**
* Largest-ever multinational air exercise hosted by the Indian Air Force (August-September 2024).
* French Air and Space Force participated.
**La Pérouse Exercise:**
* Multinational naval exercise hosted by the French Navy in the Indo-Pacific.
* **India first participated in 2021**, signifying India's growing engagement in Indo-Pacific maritime security.
* **5th edition held in Indo-Pacific (January 2025).**

## III. Strategic Significance of India-France Defence Cooperation

* **Pillar of Strategic Partnership:** Defence cooperation is a cornerstone of the India-France Strategic Partnership, which dates back to 1998.
* **Geopolitical Alignment:** Both nations share converging views on Indo-Pacific security, strategic autonomy, and multilateralism.
* **Technology Sharing:** France has been a more willing partner in sharing critical defence

technology compared to some other countries.

* **Interoperability:** Regular exercises enhance the ability of their armed forces to operate together effectively in various scenarios, from humanitarian aid to complex multi-domain operations.
* **Regional Stability:** Collaboration contributes to stability and security in the Indian Ocean Region and beyond.

EDITORIALS

**Crux of The Hindu & Indian Express**

## Internal Security

### India's Nuclear Edge and Missile Tech Advancement (SIPRI Report 2025)

**WORLD NUCLEAR FORCES, JANUARY 2025**

| | Military stockpile[a] | | | | |
|---|---|---|---|---|---|
| | Deployed warheads[b] | Stored warheads[c] | Total | Retired warheads[d] | Total inventory[e] |
| USA | 1 770 | 1 930 | 3 700 | 1 477 | 5 177 |
| Russia | 1 718 | 2 591 | 4 309 | 1 150 | 5 459 |
| UK | 120 | 105 | 225 | – | 225 |
| France | 280 | 10 | 290 | .. | 290 |
| China | 24 | 576 | 600 | – | 600 |
| India | – | 180 | 180 | .. | 180 |
| Pakistan | – | 170 | 170 | .. | 170 |
| North Korea | – | 50 | 50 | .. | 50 |
| Israel | – | 90 | 90 | .. | 90 |
| **Total** | **3 912** | **5 702** | **9 614** | **2 627** | **12 241** |

**Why in News?**

* The Stockholm International Peace Research Institute (SIPRI) released its **Yearbook 2025** on **June 16, 2025**.
* The report highlights a significant trend of **nuclear modernization** by all nine nuclear-armed countries.
* It notes that **India has widened its nuclear lead over Pakistan** in terms of warhead numbers.
* India is also making **notable advancements in missile systems and delivery capabilities**, strengthening its nuclear deterrence.

**I. Global Nuclear Landscape: A New Arms Race**

* All nine nuclear-armed states are currently **upgrading their nuclear arsenals** and adding new weapon systems.

- SIPRI warns that the world is entering a **new and dangerous nuclear arms race**, as arms control regimes weaken.

- As of January 2025, the **total global nuclear warhead inventory** is estimated at **12,241 warheads**.

- Out of these, **9,614 warheads are in military stockpiles** and considered usable.

- Around **3,912 warheads are deployed** on missiles and aircraft.

- Approximately **2,100 warheads** are on high operational alert, mainly in the United States and Russia.

- The **post-Cold War decline in nuclear weapons** is now reversing as dismantlement slows.

- The **New START Treaty between the US and Russia** is set to expire in **February 2026**, with no new agreement in place.

- **China is unwilling to engage in arms control talks**, further complicating the global security environment.

- Emerging technologies like **Artificial Intelligence and advanced missile defense systems** are destabilizing traditional nuclear deterrence models.

## II. India's Nuclear Status and Technological Advancements

- As of January 2025, **India is estimated to possess 180 nuclear warheads**, an increase from 172 in 2024.

- This places India ahead of **Pakistan, which has 170 warheads** according to SIPRI.

Missile Technology and Delivery Capabilities

- India is developing **canisterised missile systems**, which allow nuclear warheads to be stored and transported already mounted in sealed containers.

- If India adopts a posture where these missiles are deployed with warheads mated, it would reflect a shift towards **faster launch readiness** and **enhanced deterrence flexibility**.

- This shift may indicate a movement away from India's traditional **de-alerted posture**, where warheads and delivery systems are kept separate.

- SIPRI also notes growing speculation that India may soon equip some missiles with **Multiple Independently Targetable Reentry Vehicles (MIRVs)**.

- MIRVs would enable a single missile to deliver **multiple warheads to separate targets**, significantly enhancing India's **strike capabilities and survivability** in case of a first strike.

Maturing Nuclear Triad

- India's nuclear posture continues to evolve with the strengthening of its **nuclear triad**, consisting of:
  - Land-based ballistic missiles,
  - Air-delivered nuclear weapons, and
  - Nuclear-powered ballistic missile submarines (SSBNs).

- India's focus is no longer solely on Pakistan, as it is also developing **longer-range delivery systems** to deter China in response to Beijing's expanding nuclear arsenal.

## III. Pakistan's Nuclear Posture and Strategic Risks

- Pakistan is estimated to have **170 nuclear warheads**, maintaining a stable count from the previous year.

- Despite the stable number, Pakistan continues to **develop new delivery systems and produce fissile material**, suggesting active expansion efforts.

- Unlike India, Pakistan does not follow a declared **No First Use (NFU) policy** and maintains **strategic ambiguity** in its doctrine.

- It places significant emphasis on **tactical nuclear weapons**, designed for battlefield use against India's conventional superiority.

- This approach is seen as highly destabilizing because it **lowers the threshold for nuclear use** and increases the risk of early escalation in a conflict.

- Pakistan's **political instability, lack of transparency**, and previous nuclear proliferation links raise serious regional and global concerns.
- SIPRI cites an incident in early 2025 where India and Pakistan briefly entered armed conflict, involving **strikes on nuclear-linked military sites**, and were affected by **disinformation campaigns**, raising fears of nuclear escalation.

**IV. Nuclear Status of Other Major Powers**

Russia

- Russia has the world's largest arsenal, with **approximately 5,880 nuclear warheads**.
- Around **2,100 of these warheads are on high operational alert**.
- Modernization continues but faces setbacks, including delays in the **Sarmat ICBM** programme.
- Once the **New START Treaty expires**, Russia is expected to **rearm empty silos and increase deployed warheads**.

United States

- The US holds around **5,244 nuclear warheads**.
- It is undertaking a **comprehensive modernization** of its nuclear triad, including new ICBMs, SSBNs, and air-launched cruise missiles.
- Budget and planning issues caused delays and cost overruns in 2024.
- The US is also developing **new tactical nuclear weapons**, which experts see as destabilizing.
- There is rising internal pressure to rearm **deactivated missile launchers** in response to China's growing arsenal.

China

- China now possesses over **600 nuclear warheads**, up from around 500 in 2024.
- It has built over **350 new ICBM silos**, especially in remote regions, indicating a focus on **second-strike survivability**.
- China may now be **keeping some warheads mounted on missiles during peacetime**, marking a significant doctrinal shift.

- By 2035, China could possess **1,500 warheads**, potentially rivaling the US and Russia.

France

- France maintains about **290 warheads**, with minimal fluctuation.
- It is investing in the **third generation of SSBNs** and **new air-launched cruise missiles**.
- President Macron has proposed extending **French nuclear protection** to EU allies, which could affect NATO dynamics.

United Kingdom

- The UK is estimated to have **225 warheads**, with plans to increase this number.
- It is building **four new SSBNs** to ensure continuous at-sea deterrence.
- This marks a shift away from earlier disarmament policies.

Israel

- Israel is believed to have between **80 and 90 nuclear warheads**, maintaining official ambiguity.
- It continues to upgrade its missile capabilities and nuclear infrastructure.
- These developments are particularly important amid tensions with Iran, which has made **notable progress in uranium enrichment**.

North Korea

- North Korea has around **50 assembled nuclear warheads**, with material for up to 90 in total.
- It is actively developing **tactical nuclear weapons** and short-range delivery systems.
- Leader Kim Jong Un has called for **"limitless" expansion** of the nuclear programme.
- The absence of crisis communication channels makes the region highly vulnerable to **miscalculation and unintended escalation**.

**V. Why These Numbers Matter in 2025**

Breakdown of Global Norms

- The erosion of long-standing **arms control frameworks** has created a more volatile global security environment.

- The focus of major powers has shifted from disarmament to **modernization and expansion**.

India-Pakistan Dynamics

- India's growing nuclear lead and advanced technologies **strengthen its credible deterrence posture**.
- The development of canisterised systems and MIRVs may signal a shift toward a **quicker response doctrine**.
- Pakistan's continued reliance on tactical nukes **raises the risk of early use and nuclear escalation**.

India-China Strategic Competition

- China's rapid nuclear expansion forces India to **modernize and expand its long-range capabilities**.
- India must prepare for a **two-front deterrence strategy**, maintaining stability with both Pakistan and China.

Escalation and Technology Risks

- Regional conflicts (like Israel-Iran or India-Pakistan) risk triggering **nuclear confrontation**.
- The development and deployment of tactical nuclear weapons **lower the threshold for use**.
- The integration of **AI and automated systems** into nuclear command structures could reduce decision-making time and increase the chance of **miscalculation**.

Challenges to Disarmament

- SIPRI notes that global disarmament efforts are being undermined by a **renewed focus on nuclear buildup**.
- The credibility of the **Nuclear Non-Proliferation Treaty (NPT)** is increasingly under threat.

India's Responsible Role

- India continues to follow its **No First Use policy** and aims to maintain **Credible Minimum Deterrence**.
- However, its evolving posture and new technologies show a **more flexible and responsive strategy**, balancing national security with global responsibility.

**Conclusion:**

SIPRI's 2025 Yearbook paints a grim picture of the global nuclear landscape, characterized by modernization, expansion, and a dangerous erosion of arms control. For India, the report highlights its growing nuclear capabilities and technological advancements, positioning it with a significant edge over Pakistan, while also pointing to the substantial challenge posed by China's rapid nuclear build-up. The increasing risks of nuclear conflict, especially in regional hotspots, underscore the urgent need for renewed diplomatic efforts, robust risk reduction measures, and greater transparency to prevent catastrophic miscalculation.

## 'Cyber Suraksha' Exercise – Boosting National Cyber Security Preparedness



**Why in News?**

- The **Defence Cyber Agency (DCA)**, operating under the aegis of the Headquarters Integrated Defence Staff, launched a national-level cyber security exercise titled **'Cyber Suraksha'** from **June 16 to June 27, 2025**.
- This multi-phased initiative signifies a proactive step towards enhancing India's cyber resilience, particularly within the national defence infrastructure.

**I. Overview of 'Cyber Suraksha' Exercise:**

- **Organizer:** Defence Cyber Agency (DCA), under the Headquarters Integrated Defence Staff, Ministry of Defence.
- **Duration:** June 16 - June 27, 2025 **(12-day multi-phased exercise).**
- **Participants:** Over 100 participants from various national-level agencies and defence

stakeholders (including Indian Army, Navy, Air Force, National Security Agency, CERT-In, etc.).

- **Primary Objective:** To enhance cyber resilience and defensive posture at the national level.
- **Approach:** Simulating real-world cyber threats in a dynamic, gamified environment to test and sharpen participants' analytical and defensive skills.

## II. Key Features and Components:

- **Simulated Real-World Cyber Threats:**
  o The exercise is designed to copy actual cyber-attack scenarios, including phishing, ransomware, supply-chain breaches, and other sophisticated threats.
  o This hands-on approach allows participants to practice response mechanisms in a safe, controlled environment.
- **Gamified Environment:**
  o Incorporates game mechanics such as points, challenges, rewards, and competition.
  o **Significance of Gamification:**
    * **Increased Engagement:** Makes learning more interactive and enjoyable, boosting participation.
    * **Improved Knowledge Retention:** Reinforces key security concepts through active participation, repetition, and immediate feedback, leading to better long-term retention.
    * **Real-World Application:** Allows practice in simulated environments, building confidence and understanding of how to apply knowledge under pressure.
    * **Fosters Security Culture:** Encourages continuous learning and a proactive security mindset across the organization.

- * **Measurable Progress:** Provides metrics for tracking performance and effectiveness of training.
- **Chief Information Security Officers (CISOs) Conclave:**
  o **Purpose:** Integrated to bridge the gap between technical execution and strategic leadership in cybersecurity.
  o **Components:**
    * Discussions led by eminent speakers in the cyber security domain.
    * Culminates in an **immersive Table-Top Exercise (TTX)**.
  o **Role of CISOs:** CISOs are senior executives responsible for establishing and maintaining an enterprise's vision, strategy, and program to protect information assets and technologies. Their role involves:
    * Developing and implementing information security strategies.
    * Managing security operations and incident response.
    * Conducting risk assessments and ensuring regulatory compliance.
    * Making strategic decisions during cyber crises and providing guidance to leadership.
    * Fostering a security-first culture across the organization.
  o **TTX Significance:** Enhances the strategic readiness of senior leadership by simulating crisis decision-making in a high-pressure, collaborative setting without real-world consequences.
- **Multi-Phased Initiative:** Combines structured training modules, dynamic hands-on challenges, and evaluation sessions to reinforce secure practices and sharpen skills.

## III. Strategic Importance and Objectives:

- **Enhanced Cyber Resilience:** Directly aims to strengthen national cyber resilience and

defensive posture against evolving and sophisticated cyber threats.

- **Proactive Approach:** Reflects the Defence Cyber Agency's commitment to continuous cyber vigilance rather than a reactive response.
- **Security-First Culture:** Fosters a security-first culture across all levels of the national defence infrastructure, ensuring cybersecurity is embedded in daily operations and strategic planning.
- **Skill Development:** Improves the analytical, forensic, and response skills of cyber warriors and decision-makers.
- **Inter-Agency Collaboration:** Brings together participants from various national-level agencies and defence stakeholders, promoting crucial coordination and information sharing in the event of a national cyber crisis.
- **Sustained Preparedness:** The plan to make such exercises a regular feature emphasizes a commitment to maintaining a high level of preparedness and promoting collaborative defence in the ever-evolving cyber landscape.

## IV. Challenges in India's Cyber Security Landscape (Contextual Understanding):

- **Sophisticated Threat Actors:** India faces persistent threats from state-sponsored actors (e.g., cyber espionage, APTs) and non-state actors (e.g., ransomware, hacktivism).
- **Critical Infrastructure Vulnerabilities:** Key sectors like defence, energy, finance, and communication are increasingly digitized and interconnected, making them prime targets.
- **Supply Chain Attacks:** Vulnerabilities in global and domestic supply chains can be exploited to inject malware or compromise systems (e.g., the SolarWinds breach globally, relevant to defence procurement).
- **Insider Threats:** Both intentional and unintentional actions by employees or contractors can compromise sensitive defence data.

- **Shortage of Skilled Professionals:** A significant demand-supply gap exists for qualified cybersecurity professionals across various levels.
- **Public Awareness & Digital Literacy:** A general lack of basic cybersecurity awareness among the broader population can lead to successful phishing attacks and data breaches.
- **Evolving Technologies:** Rapid adoption of IoT, AI, 5G, and cloud computing introduces new attack surfaces and complexities.
- **Attribution Challenges:** Difficulty in definitively attributing cyber-attacks to specific perpetrators complicates diplomatic and retaliatory measures.

**Conclusion:**

The 'Cyber Suraksha' exercise is a timely and critical initiative by the Defence Cyber Agency. By combining advanced simulation techniques, a gamified learning environment, and strategic leadership engagement, it aims to fortify India's national cyber security preparedness against the increasingly sophisticated and pervasive threats in the digital domain. Its planned regular recurrence underscores a long-term commitment to fostering a resilient, security-first culture essential for protecting India's vital digital assets.

## Government Launches 'Operation Sindhu' to Evacuate Indian Nationals from Iran



**Why in News?**

- In June 2025, **India initiated 'Operation Sindhu'** to evacuate its nationals from Iran due to the escalating conflict between Iran and Israel.

## I. Operation Sindhu: Key Details

- **Launch:** initial phases: June 17-18, 2025
- **Objective:** Ensure safety and facilitate evacuation of Indian nationals from conflict areas in Iran.
- **Context:** Worsening security due to ongoing **Israel-Iran conflict, including missile and drone attacks.**
- **Nodal Ministry:** Ministry of External Affairs (MEA).
- **Indian Presence:** Over 4,000 Indian nationals, approximately half of whom are students, reside in Iran.

## II. Execution and Coordination

- **First Batch (June 17-19, 2025):** 110 Indian students from **northern Iran were evacuated by road to Armenia, then flown to New Delhi.** Indian Missions in Iran and Armenia supervised the transfer.
- **Ongoing Efforts:** The Indian Embassy in Iran continues to assist nationals in moving to safer zones and arranging further evacuations.
- **Iranian Cooperation: Iran notably eased airspace restrictions for Indian evacuation flights,** making a humanitarian exception.
- **Support Channels:** Indian nationals are advised to contact the Indian Embassy in Tehran's emergency helpline or the **MEA's 24x7 Control Room in New Delhi.**
- **Future Phases:** The government is planning additional evacuation phases for other vulnerable groups.
- **Broader Evacuation:** India also requested its nationals to leave Israel concurrently, indicating a wider evacuation effort across the conflict zone.

## III. Diplomatic Challenges and Regional Dynamics

- **Complex Geopolitics:** India navigates sensitive regional relationships due to the conflict.
- **Transit Nations:** Armenia, Turkmenistan, and Iraq are key neighbors with amicable ties, providing potential evacuation routes.
- **Difficult Relations:** India faces challenges with **other bordering countries like Turkey, Azerbaijan, and Pakistan; lacks formal diplomatic ties with Afghanistan.**
- **Alternative Routes:** The Persian Gulf route (via ships or Saudi Arabia/Kuwait) is also being considered.
- **Diplomatic Leveraging:** India is actively using its diplomatic relationships to facilitate safe evacuations.

## IV. India's Humanitarian Evacuation Policy and Precedents:

- **Highest Priority to Citizens' Safety:** The Government of India consistently accords the **"highest priority to the safety and security of Indian nationals abroad."**
- **"No Indian Left Behind" Policy:** Operation Sindhu reinforces India's global policy of **"No Indian Left Behind"** during crises, a cornerstone of its citizen-first diplomacy.
- **Track Record of Evacuation Missions:** India has a strong track record of successful humanitarian evacuation missions, including:
  - **Operation Ganga (2022):** Evacuation from Ukraine during the Russia-Ukraine conflict.
  - **Operation Kaveri (2023):** Evacuation from Sudan during civil unrest.
  - **Operation Devi Shakti (2021):** Evacuation from Afghanistan after the Taliban takeover.
  - **Operation Raahat (2015):** Evacuation from Yemen.
  - **Operation Sukoon (2006):** Evacuation from Lebanon.
- **Rapid Response Capability:** These operations showcase India's robust crisis response system, logistical strength, and ability to protect its citizens in geopolitical flashpoints.
- **Strengthening Diplomatic Image:** Such missions significantly strengthen India's diplomatic image and soft power globally.

**Conclusion:**

'Operation Sindhu' is a critical humanitarian mission by the Government of India to ensure the safety and swift evacuation of its nationals from conflict-ridden Iran. It reflects India's proactive foreign policy, strong commitment to its diaspora, and enhanced capabilities in complex crisis management. The operation also highlights the intricate diplomatic challenges in navigating the volatile West Asian geopolitical landscape, emphasizing the importance of strong bilateral relations and strategic partnerships for effective citizen protection abroad.

## B-2 Spirit Bomber
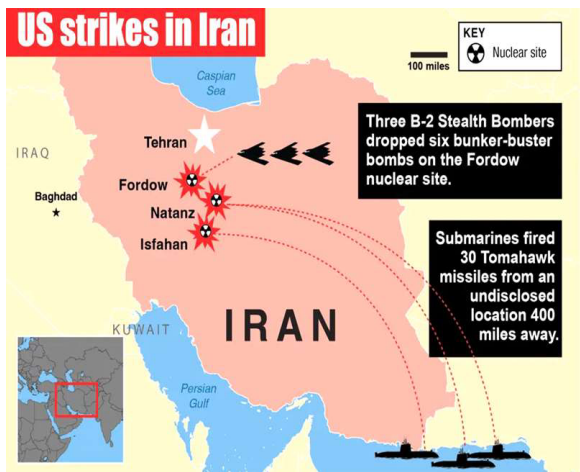


*Date of Event:* June 22, 2025

*Context:* U.S. airstrikes on Iran's nuclear infrastructure using B-2 Spirit stealth bombers

**Why in the News?**

- The United States, under President Donald Trump, launched a **precision airstrike** on **Iranian nuclear facilities**, targeting 3 key sites including the **Fordow Enrichment Facility**.
- The attack involved the deployment of the **B-2 Spirit stealth bomber**, highlighting its strategic role in U.S. military operations.

**What is the B-2 Spirit?**

- **Type:** Long-range stealth bomber
- **Manufacturer:** Northrop Grumman
- **First Flight:** 1989
- **Total Units Produced:** 21
- **Cost:** ~$2.1 billion per unit
- **Crew:** 2 pilots

Key Features:

- **Stealth Capability:** Bat-wing design + radar-absorbing material '™ near-invisible to radar
- **Automation:** High automation reduces human workload and increases mission survivability
- **Radar Cross-Section:** Comparable to a small bird

**Why Was It Used in the Iran Strikes?**

- **Mission Objective:** Destroy deeply buried and fortified nuclear facilities (e.g., Fordow)
- **Weapon Used:**
  - **GBU-57A/B Massive Ordnance Penetrator (MOP)**
    - Weight: 30,000 lbs (~13,600 kg)
    - Purpose: Designed to penetrate hardened underground bunkers
- **Strategic Advantage:**
  - Only aircraft in U.S. fleet capable of carrying MOP
  - Precision strike capability + stealth = essential for bypassing Iran's air defences

**Specifications & Capabilities**

| Feature | Details |
|---------|---------|
| **Range** | 6,000+ nautical miles (11,000+ km) |
| **Payload Capacity** | 40,000+ lbs (18,144 kg) |
| **Speed** | High subsonic |
| **Refuelling** | Capable of mid-air refuelling for extended missions |

**Armament Capabilities:**

- **Conventional Bombs:**
  - **JDAMs (Joint Direct Attack Munitions):** GPS-guided, high accuracy
  - **JSOW (Joint Standoff Weapons):** Glide bombs; long-range engagement
  - **JASSM / JASSM-ER (Cruise Missiles):** Range up to 805 km

- **Nuclear Bombs:**
  - Can carry up to 16 **B83 nuclear bombs**

**Significance in Modern Warfare**

- Offers strategic deterrence and operational flexibility
- Plays a vital role in **first-strike capabilities** and **deep-strike missions**
- Reinforces U.S. **nuclear triad** (Land-based missiles, Submarine-launched missiles, Strategic bombers)

# Indian Navy to Commission Stealth Frigate 'Tamal' in Russia



**Why in News?**

- The **Indian Navy is set to commission its latest stealth multi-role frigate, INS "Tamal",** on July 1, 2025, at **Kaliningrad, Russia.**

**I. INS Tamal: A Modern Stealth Frigate**

- **Class and Lineage:**
  - **Krivak Class Series:** "Tamal" is the **8th in the series of Krivak class frigates** inducted from Russia over the past two decades.
  - **Tushil Class:** It is the **2nd ship of the "Tushil Class,"** which represents an upgraded version of the earlier **"Talwar" and "Teg" classes** (each having three ships).
  - The **1st ship of the Tushil class, INS Tushil,** was commissioned in December 2024.
  - **Triput Class:** As part of the broader contract for the Tushil class, India is also building **2 similar frigates, the "Triput**

**Class," at Goa Shipyard Limited (GSL)** with transfer of technology and design assistance from Russia.
  - **Fleet Strength:** With the conclusion of this series, the Indian Navy will operate a total of ten ships with similar capabilities and commonality in equipment, weapon, and sensor fit across four different classes.

- **Construction and Oversight:**
  - **Shipyard:** Built at Yantar Shipyard in Kaliningrad, Russia.
  - **Oversight:** Construction was closely monitored by an Indian team from the Warship Overseeing Team stationed at Kaliningrad, under the Embassy of India, Moscow.
  - The project at Naval Headquarters was steered by the Directorate of Ship Production.

- **Significance for "Aatmanirbhar Bharat":**
  - **Last Foreign Induction: "Tamal" is the last warship to be fully inducted from a foreign source,** aligning with the Government of India's focus on 'Aatmanirbhar Bharat' (self-reliant India) and 'Make in India' initiatives in defence.
  - **Indigenous Content:** The **ship has a significant 26% indigenous components,** with the number of made-in-India systems having more than doubled to 33.
  - Key Indian OEMs involved include **BrahMos Aerospace Private Limited**, Bharat Electronics Limited, Keltron, Nova Integrated Systems (Tata), Elcome Marine, and Johnson Controls India.

- **Key Features & Capabilities:**
  - **Stealth Design:** Measures 125 meters long, displaces 3900 tons, and features enhanced stealth characteristics and greater stability due to its new design,

including sloped superstructures and infrared suppression.

o **Armament:** Packs a lethal punch with significant upgrades compared to its predecessors:

* **BrahMos Missile:** Equipped with the BrahMos supersonic cruise missile system for long-range anti-ship and land-attack capabilities.

* (The BrahMos is a **joint Indo-Russian venture, capable of Mach 2.8,** with land, sea, air, and submarine-launched variants).

* **Air Defence:** Vertically launched Shtil-1 surface-to-air missiles (with 24 missiles and enhanced range of 50 km).

* **Gun Systems:** Improved 100 MM main gun and standard 30 MM Close-In Weapon Systems (CIWS).

* **Anti-Submarine Warfare (ASW):** Heavyweight torpedoes, urgent-attack anti-submarine rockets **(RBU-6000), and HUMSA NG Mk II sonar** with an anti-submarine weapon firing complex.

o **Sensors & Electronics:** New-age Electro-Optical/Infrared (EO/IR) systems, Surface Surveillance Radar complex, modern communication and data-link systems, navigation equipment, a host of surveillance and fire control radars and systems, Network Centric Warfare capabilities, and advanced Electronic Warfare suite.

o **Propulsion & Performance:** Powered by gas turbines (COGAG configuration), achieving a top speed in excess of 30 knots, and offering extended endurance.

o It has a very high tonnage-to-firepower ratio.

o **Aviation Facilities:** Features a flight deck and hangar capable of operating Air Early Warning and Multi-Role helicopters **(like Ka-28 Helix-A, Ka-31 Helix B or HAL Dhruv) as force multipliers.**

• **Crew Training and Trials:** Over 250 personnel underwent rigorous ashore and afloat training in challenging winter conditions in St. Petersburg and Kaliningrad.

• The ship successfully completed extensive sea trials over 3 months.

**II. Naming, Mascot, and Motto**

• **Name:** "Tamal" symbolizes the **mythical sword used for combat by Indra, the King of the gods.**

• **Mascot:** Inspired by the convergence of **'Jambavant' (जाम्बवन्त) – the Immortal Bear King of Indian Mythology** – and the **Eurasian Brown Bear (Russian National Animal). The crew proudly calls themselves 'The Great Bears'.**

• **Motto:** 'Sarvada Sarvatra Vijaya' (Victorious Always Everytime), complementing the Indian Navy's broader motto: **'Combat Ready, Credible, Cohesive and Future Ready Force Safeguarding National Maritime Interests – Anytime, Anywhere'.**

**III. Strategic Significance**

• **Strengthening Western Fleet:** Upon commissioning, **"Tamal" will join the 'Sword Arm' of the Indian Navy, the Western Fleet,** under the Western Naval Command, headquartered in Mumbai.

• This significantly augments the Navy's capabilities in the Arabian Sea and the Indian Ocean Region.

• **Indo-Russian Defence Cooperation:** "Tamal" stands as a testament to the long-standing Indo-Russian cooperation and friendship in defence, a relationship that has endured for decades.

o **Russia remains India's largest defence supplier.**

- **Self-Reliance in Defence:** The commissioning marks a crucial transition for the Indian Navy from being primarily a "buyer's navy" to increasingly a "builder's navy," with future surface combatants primarily sourced from Indian shipyards.
- This supports India's strategic goal of reducing reliance on foreign suppliers and boosting its domestic defence industrial base.
- **India currently has 59 warships and vessels under construction in Indian shipyards** (worth approx. ₹ 1.2 lakh crore) **and aims to achieve ₹ 3 lakh crore in defence production by 2029.**
- **Maritime Security:** The advanced capabilities of "Tamal" enhance the Indian Navy's ability to conduct multi-domain operations (air, surface, subsurface, electromagnetic), contribute to maritime and energy security, and reinforce India's position as a net security provider in the Indian Ocean Region.

# Operation Midnight Hammer



**Why in News?**

- The Pentagon recently announced details of **"Operation Midnight Hammer," a covert U.S.–led military strike on Iranian nuclear facilities carried out around midnight on June 21–22, 2025.**
- This operation aimed to significantly degrade Iran's nuclear program.

## I. Operation Midnight Hammer: Overview and Objectives

- **Codename:** Operation Midnight Hammer.
- **Nature of Operation:** A covert, U.S.-led military strike on Iran's nuclear facilities.

- **Timing:** Carried out around midnight on June 21–22, 2025.
- **Primary Objective:** To cripple Iran's nuclear program, specifically to severely degrade its nuclear weapon infrastructure and prevent it from enriching uranium to weapons-grade levels.
- **Scale of Assault:** A complex and highly coordinated assault involving:
    - Over **125 military aircraft**, including B-2 stealth bombers and various escort/support aircraft.
    - Deployment of **14 GBU-57 Massive Ordnance Penetrator (MOP) bunker-buster bombs**.
    - More than **30 Tomahawk missiles** launched from US submarines in the Persian Gulf and Arabian Sea.

## II. Targeted Sites and Their Significance

The operation targeted Iran's key nuclear infrastructure:

1. **Fordow Uranium Enrichment Facility:**
    - **Location:** Deep within a mountain, 29 kilometers north of the Iranian city of Qom.
    - **Strategic Importance:** It is a highly protected and strategically central site due to its **subterranean placement**, providing significant protection against conventional aerial bombardment.
    - It is believed to be buried **80-110 meters deep** within a mountain.
    - **Capacity:** Approximately 54,000 square feet, believed to house 3,000 centrifuges.
    - It had been producing uranium enriched to **60% purity**, far exceeding civilian needs (3.67%).
    - **JCPOA Violation:** Under the 2015 Joint Comprehensive Plan of Action (JCPOA), Iran was explicitly prohibited from conducting enrichment activities at Fordow.

- However, following the U.S. withdrawal from the agreement in 2018, Iran resumed enrichment activities at the site.
- It is also the **only Iranian facility where IAEA inspectors found uranium particles purified to near weapons-grade purity (83.7%)** during an unannounced inspection in 2023.
- **Attack Method:** Struck with **B-2 bombers equipped with GBU-57 MOPs**.

2. **Natanz Nuclear Facility:**
   - **Location:** Iran's largest and most central uranium enrichment complex.
   - **Operational Status:** Along with Fordow, it is one of the only two operational enrichment facilities in Iran.
   - **Capacity:** Contains vast halls of centrifuges, some underground. It's believed to have much greater centrifuge capacity (approx. 50,000) than Fordow.
   - **Attack Method:** Attacked with **B-2 bombers equipped with GBU-57 MOPs**.

3. **Isfahan Nuclear Technology Center:**
   - **Location:** Isfahan.
   - **Activities:** Conducts several key activities related to Iran's nuclear program, including a uranium conversion plant (to prepare uranium for enrichment), a chemical laboratory, a fuel manufacturing plant, and a centrifuge manufacturing facility.
   - **Attack Method:** Attacked **only with Tomahawk cruise missiles**. These were considered a "surprise element" as they were the last to strike their targets.

**III. Key Military Technologies Employed**
- **B-2 Spirit Stealth Bombers:**
  - **Role:** The primary platform for delivering the GBU-57 MOPs. Seven B-2s were part of the main strike package.
  - **Capability:** Known for its "low-observable" (stealth) characteristics, making it difficult to detect by radar, infrared, and other means, crucial for penetrating Iranian air defenses. It has intercontinental range and can carry a diverse payload.
- **GBU-57 Massive Ordnance Penetrator (MOP):**
  - **Significance:** This operation marked the **first-ever operational combat use of the GBU-57 MOP**.
  - **Description:** A 30,000-pound (approximately 13,600 kg) precision-guided "bunker-buster" bomb.
  - **Penetration Capability:** Designed to penetrate deeply buried and hardened targets. It can reportedly penetrate up to 200 feet of earth or 60 feet of reinforced concrete before detonating.
  - **Carrier:** Only the B-2 Spirit bomber (and potentially the future B-21 Raider) is capable of carrying this massive bomb.
- **Tomahawk Land Attack Cruise Missiles (TLAMs):**
  - **Role:** Used for precision strikes on surface infrastructure targets at Isfahan, providing a coordinated multi-platform attack.
  - **Launch Platform:** Launched from US submarines (e.g., Ohio-class guided missile submarines) operating in the Central Command (CENTCOM) area of responsibility (Persian Gulf and Arabian Sea).
  - **Capability:** Long-range, precision-guided, subsonic cruise missiles capable of striking targets precisely

from up to 1,000 miles away, even in heavily defended airspace, by flying at extremely low altitudes to evade radar.

## IV. Operational Details & US Capability Demonstration

- **Tactical Surprise and Deception:** The operation was highly classified.
- B-2s launched from the continental US, with a decoy package heading west, while the main strike package proceeded east with minimal communication to maintain surprise.
- **In-Flight Refueling:** The 18-hour flight into the target area required multiple in-flight refuelings, showcasing the logistics and reach of the US Air Force.
- **Complex Synchronization:** Once over land, B-2s linked up with escort and support aircraft (4th and 5th generation fighters, tankers, ISR aircraft) in a tightly timed, complex maneuver in a narrow airspace, demonstrating exceptional joint force integration.
- **Suppression of Enemy Air Defenses (SEAD):** Fighter assets employed pre-emptive suppressing fires against potential Iranian surface-to-air threats to ensure safe passage for the strike package. The Pentagon reported no shots fired at US aircraft during ingress or exit.
- **Precision:** All three Iranian nuclear infrastructure targets were struck within a short window (6:40 PM - 7:05 PM EST), demonstrating high precision.

## V. Background :

- **Underground Location:** Fordow's deep subterranean placement makes it extremely difficult to destroy with conventional ordnance, indicating its strategic importance to Iran for a clandestine or protected enrichment program.
- **JCPOA Restrictions & Iranian Violations:** The 2015 JCPOA specifically prohibited enrichment at Fordow and aimed to convert it into a nuclear physics and technology center.
- Iran was only permitted to maintain a limited number of IR-1 centrifuges for stable radioisotope production, without fissile material.

- However, after the US withdrawal from the JCPOA in 2018, Iran resumed enrichment activities and significantly ramped up its operations at Fordow, including advanced centrifuges and enrichment levels far exceeding the JCPOA limits.
- **Proliferation Concern:** Fordow has been a persistent source of international concern because its deep location makes it ideal for covert activities.
- The discovery of uranium enriched to 83.7% purity (very close to weapons-grade 90%) at Fordow by the IAEA in 2023 further heightened these concerns, as such a level has no civilian purpose.

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# History, Art & Culture

## Neolithic Age



**Why in News**

The Archaeological Survey of India (ASI) recently found one of the first **rock grooves** from the Neolithic Age in the Kanniyakumari district, Tamil Nadu. These grooves were used by people to sharpen their weapons.

**About the Neolithic Age**

- **Also Called:** The New Stone Age.
- **Time Period:** It's the last part of the Stone Age. It generally began around **10,000 BCE** and occurred during the **Holocene Epoch** (the last 11,700 years of Earth's history).

- **Key Change:** This period marks a huge shift for humans. Instead of constantly moving around and hunting/gathering for food (like in the previous Paleolithic Age), people started to **settle down**. They learned to **grow plants (farming)** and **tame animals (domestication)** for food.
- **Origin:** This "Neolithic Revolution" began in the **Fertile Crescent** (Middle East) and then spread to places like India and Europe.

**Features of the Neolithic Age**

- **Tools:** Stone tools were no longer just chipped but were **shaped by polishing or grinding**, making them more refined and effective.
- **Food:** People relied on **domesticated plants and animals** for food.
- **Settlements:** People lived in **permanent villages**, not nomadic camps.
- **Houses:** Houses were built of mud and reed, often in rectangular or circular shapes.
- **Crafts:** New crafts appeared, like **pottery** (for storing food) and **weaving** (for clothes).
- **Other Innovations:**
  o Alcohol was first produced.
  o Early forms of architecture and decoration appeared.
- **Social Changes:**
  o **Belief in Afterlife:** Elaborate pottery and carved jade objects found in tombs suggest people believed in life after death.
  o **Social Classes:** Burying important and wealthy individuals with precious objects indicates the emergence of different social levels.

**Effects of the Neolithic Revolution**

- **Permanent Settlements:** Many people started living in fixed villages, supported by farming.
- **Foundation for Future:** This period laid the groundwork for major innovations in the later Bronze Age and Iron Age, including better tools, trade, and the rise of civilizations.

**End of the Neolithic Age**

- **Copper:** Towards the end, people started using **copper** (this transition period is called the Chalcolithic or Eneolithic Era).
- **Bronze Age:** Eventually, **bronze** (a mix of copper and tin) became the main material for tools and weapons, making most stone tools obsolete and marking the end of the Neolithic Age and the entire Stone Age.

**Neolithic Sites in India**

Some important sites in India include:

- **Burzahom** (Kashmir)
- **Chirand** (Bihar)
- **Utnur** (Andhra Pradesh)
- **Edakkal caves** (Kerala)
- **Mehrgarh** (now in Pakistan, but a key early site in the Indian subcontinent)

## Kheer Bhawani Temple
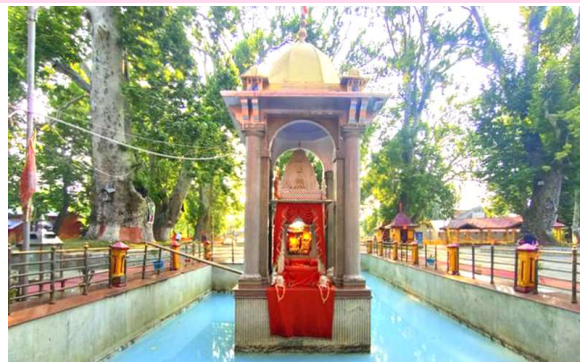


**Why in News**

Recently, prominent leaders from Jammu and Kashmir, along with hundreds of **Kashmiri Pandits**, paid their respects at the Mata Kheer Bhawani temple on the occasion of **Jyeshta Ashtami**. This annual festival is a significant event for the Kashmiri Pandit community.

**About Kheer Bhawani Temple**

- **Location:** It is a revered Hindu temple located in the **Tulla Mulla village near Srinagar, Jammu and Kashmir**.
- **Deity:** It is dedicated to **Hindu Goddess Ragnya Devi**, who is considered an incarnation of Goddess Durga.
- **Construction:** The temple was originally built by **Maharaja Pratap Singh in 1912** and later renovated by **Maharaja Hari Singh**.

- **Name Origin:** The temple was initially called Bhawani Mandir. It acquired the name "Kheer Bhawani" because the famous Indian dessert **Kheer (milk and rice pudding)** is the main offering made to the goddess.
- **Significance for Kashmiri Pandits:** Goddess Ragnya Devi is widely worshipped as **Kuldevi (family deity) or the patron deity** by the Kashmiri Pandits, holding immense spiritual importance for the community.
- **Annual Festival:** The most important event at the temple is the annual festival of **Mela Kheer Bhawani**, which is celebrated on **Jyeshta Ashtami** (eighth day of the waxing moon in the Hindu month of Jyeshta), usually falling in May or June. This festival sees a large congregation of Kashmiri Pandits.

**Kheer Bhawani Temple Architecture**

- **Simple yet Beautiful:** The temple features a simple, yet aesthetically pleasing architecture, constructed using smooth grey stones.
- **Main Altar:** The central altar of the temple is uniquely built **amidst a pond**.
- **Sanctum Sanctorum:** This structure houses a marble platform where the idol of the goddess is placed in the sanctum sanctorum.
- **Pillar Structure:** Four stone pillar-like structures bracket and roof the statue.
- **Holy Spring:** A holy spring flows from the western end of the temple. This spring is famous for its waters that are believed to **change colors**. There is a long-held belief that if the water turns black, it serves as a warning of an impending calamity or inauspicious times for the region.

## Raja Bhabhut Singh



KORKU RAJA BHABHUT SINGH: SHIVAJI OF SATPURA

**Why in News**

The Madhya Pradesh government recently held a special Cabinet meeting to honour the 19th-century tribal icon **Raja Bhabhut Singh**, by **renaming the Pachmarhi Wildlife Sanctuary after him**. This move is part of a broader effort to recognize the contributions of unsung tribal heroes to India's freedom struggle.

**About Raja Bhabhut Singh**

- **Lineage and Background:** Raja Bhabhut Singh was born into the Jagirdar family of the Harrakot Raikheri branch, tracing his lineage to Thakur Ajit Singh ji, the owner of the historic Pachmarhi Jagir. His grandfather, Thakur Mohan Singh, had famously supported Peshwa Appa Saheb Bhonsle of Nagpur against the British in 1819-20, indicating a long history of resistance within his family.
- **Gond King:** He was a significant king of the **Gond tribe**, with his realm encompassing parts of Jabalpur and the rugged terrain of the **Satpura hills**.
- **Role in 1857 Revolt:** During the **1857 Revolt**, Raja Bhabhut Singh emerged as a formidable opponent of the British. He leveraged his **intimate knowledge of the Satpura forests and mountain paths** to lead a series of highly successful **guerrilla attacks** against the colonial forces.
- **Ally of Tatya Tope:** He was a **close ally of the renowned freedom fighter Tatya Tope**. They collaborated on strategies and operations, with Tatya Tope and his forces reportedly encamping with Raja Bhabhut Singh in Pachmarhi for eight days to plan their campaigns.
- **Guerrilla Warfare:** Raja Bhabhut Singh's guerrilla warfare tactics in the Satpura ranges demonstrated a sophisticated and effective military strategy that allowed him to keep the British at bay until as late as **1860**. His ability to ambush and evade British forces, who were unfamiliar with the rugged terrain, was legendary.

- **"Shivaji of Narmadanchal":** Due to his mastery of guerrilla warfare and his sustained resistance against the British, Bhabhut Singh is affectionately called **"Shivaji of Narmadanchal"**, drawing parallels with the Maratha warrior king Shivaji Maharaj's strategic use of terrain.

- **Martyrdom:** The British eventually had to deploy the specialized **Madras Infantry** specifically to capture him, underscoring the challenge he posed. He was later captured and executed by the British in **1860**, making him a martyr.

- **Legacy:** His memory has been preserved through **Korku folk traditions**, including folk songs and hymns, which celebrate his bravery and sacrifice. The renaming of the Pachmarhi Wildlife Sanctuary aims to bring his legacy to wider national recognition.

**Pachmarhi Wildlife Sanctuary**

- **Location:** The Pachmarhi Wildlife Sanctuary is part of the larger **Pachmarhi Biosphere Reserve**, located in the **Satpura mountain range** in Madhya Pradesh.

- **Ecological Significance:** It lies within the Deccan Peninsula biogeographic zone and is part of the Biotic Province of Central India. The region is known for its rich biodiversity and unique flora and fauna.

- **Highest Peak:** The tallest point in the reserve is **Dhoopgarh**, which rises to 1,352 meters above sea level.

- **Part of Satpura Tiger Reserve:** The Pachmarhi Biosphere Reserve includes three major protected areas: Bori Wildlife Sanctuary, Satpura National Park, and Pachmarhi Sanctuary itself. These three together form the **Satpura Tiger Reserve**, a significant conservation landscape for central India.

## Sree Padmanabhaswamy Temple



**Context:** A 'Maha Kumbhabhishekam' was recently performed at the famed Sree Padmanabhaswamy temple in Thiruvananthapuram after 270 years. This significant ritual signifies the comprehensive re-consecration and spiritual revitalization of the temple following extensive renovations.

**1. About Sree Padmanabhaswamy Temple:**

- **Deity:** A prominent Hindu temple dedicated to **Lord Vishnu**, specifically in his form as Padmanabhaswamy.

- **Location:** Situated in **Thiruvananthapuram (Trivandrum), Kerala**. The city's name itself translates to "The City of Lord Ananta," referring to the temple's presiding deity (Ananta being the serpent Adisheshan on whom Vishnu reclines).

- **Historical Significance:**
  - The earliest recorded mention of the temple dates back to the **8th or 9th century CE**, though the temple is believed to be even older, with some legends tracing its origin to the first day of Kali Yuga (over 5000 years ago).
  - The temple was built and rebuilt over centuries. The most significant reconstruction and renovation were undertaken by **Martanda Varma, the King of Travancore**, in the 18th century.
  - In a pivotal act in **1750 CE**, Martanda Varma famously **donated his entire kingdom (Travancore) to the deity, Lord Padmanabha**, adopting the title

of "Padmanabha Dasa" (servant of Lord Padmanabha). This tradition of the Travancore rulers administering the kingdom as servants of the deity continued until India's independence.

- **Religious Significance:** Considered one of the **108 Divya Desams**, the holy abodes of Lord Vishnu mentioned in the works of the Alvars (Tamil Vaishnavite saints).

## 2. Architecture:

- **Architectural Style:** A unique and intricate blend of **Kerala and Dravidian styles of architecture**. It features typical Kerala wooden architecture elements along with the grand stone structures influenced by Dravidian temple building.

- **Main Deity Idol:** The central idol of Lord Vishnu is in the **Anantha Shayanam posture**, depicting him in an eternal yogic rest, reclining on his multi-headed serpent, **Adisheshan**. The idol is exceptionally large, made of 12,008 *Saligramams* (sacred stones) brought from the Gandaki River in Nepal, and covered with a special Ayurvedic paste called *Katusarkara yogam*.

- **Gopuram:** Features a magnificent **seven-tier-high gopuram** (ornate towering entrance gateway), characteristic of Dravidian architecture, adorned with delicate designs and intricate carvings.

- **Interiors:** The interior of the temple boasts exquisite and intricate works on stone and bronze. It is also adorned by magnificent **paintings and murals**, many of which are life-sized depictions of Lord Vishnu in his reclining posture, Lord Ganapati, Gaja Lakshmi, and Narasimha Swamy (the half-lion, half-man incarnation of Lord Vishnu).

- **Dhwaja Stambha (Flag Post):** The temple's flag post is impressive, covered with **gold-plated copper sheets** and stands approximately **80 ft high**.

- **Ottakkal-mandapam:** A remarkable feature is the "Ottakkal-mandapam" (single-stone platform) in front of the sanctum sanctorum, carved from a single massive stone slab. Only the head of the Travancore royal family is traditionally permitted to prostrate on it, symbolizing their surrender of everything to the deity.

## 3. Mathilakam Records:

- The temple is a custodian of approximately **3 million palm leaf manuscripts** known as **"Mathilakam records"**.

- These records date back to the **14th century CE** and provide invaluable insights into the **administrative, financial, and social details of the temple town and the erstwhile Travancore kingdom** spread over six centuries. They are considered one of the largest and most detailed archives of palm-leaf manuscripts in Asia.

## 4. Temple Vaults and Treasures:

- In **2011**, the temple gained international attention when an exploration of its **subterranean vaults (known as Kallaras)**, mandated by the Supreme Court, revealed an astonishing wealth of jewels, precious metals, and other treasures.

- These treasures include gold coins (some dating to the Napoleonic era), diamonds, golden idols, crowns, and other artifacts, accumulated over centuries from offerings by devotees and the royal family.

- It is widely believed to be the **world's richest temple**, with the estimated value of the revealed treasures (excluding the unopened Vault B) running into several lakhs of crores of Indian Rupees (billions of USD). The security and management of this wealth have been subjects of legal and public discourse.

## 5. Maha Kumbhabhishekam:

- **Meaning:** A **Hindu temple ritual of consecration** (also known as *Samprokshanam*) that is performed to homogenize, synergize, and unite the mystic powers of the deity and

the temple structure. It involves elaborate ceremonies to renew the sanctity and spiritual energy of the shrine.

- **Significance at Sree Padmanabhaswamy Temple:** The recent Maha Kumbhabhishekam, performed after **270-275 years**, marked a historic event. It followed extensive renovation work on the temple structures, including the installation of new *thazhikakkudams* (decorative pots/domes) above the sanctum sanctorum and the reinstallation of a 300-year-old idol of Vishwaksena (a form of Maha Vishnu).

- The ritual aims to overcome deprivation and usher in prosperity, representing a once-in-a-lifetime spiritual experience for devotees and a recommitment to the temple's sacred traditions.

## Keeladi Excavation Findings



**Context:** Union Culture Minister Gajendra Singh Shekhawat recently stated that the report on the Keeladi excavations, submitted by archaeologist Amarnath Ramakrishna, is not yet "technically well-supported" and requires further scientific studies. This statement has sparked a debate, particularly in Tamil Nadu, regarding the dating and interpretation of the findings.

**1. About Keeladi Findings:**

- **Location:** Keeladi is a village located in the **Sivaganga district of Tamil Nadu**, situated along the **Vaigai River**, approximately 12 km southeast of Madurai.

- **Excavation History:**
  - Excavations at Keeladi began in **2015**.
  - Initially, the excavations were led by the **Archaeological Survey of India (ASI)**.
  - Later, after a period of administrative dispute and the transfer of the lead archaeologist, the excavations were taken over and continued by the **Tamil Nadu State Department of Archaeology (TNSDA)**. Several phases of excavation have been conducted to date.

- **Artefacts Unearthed:** Over **18,000 artefacts** have been discovered across the various phases of excavation. These include a wide range of objects providing insights into the ancient civilization:
  - **Pottery:** Heaps of pottery, including black and red ware, which indicates advanced pottery-making techniques (some containing carbon nanomaterials).
  - **Inscribed Potsherds:** Over **120 potsherds with Tamil Brahmi inscriptions**, demonstrating the prevalence of literacy and the long survival of the script in the region. Names like 'Sathan', 'Esiri', 'Kathiran', and 'Ilabu' have been found.
  - **Ornaments:** Gold ornaments, copper articles, semi-precious stones (like agate and carnelian beads), shell and ivory bangles.
  - **Tools & Utensils:** Copper needles, spindle whorls, terracotta seals, bone tip tools, iron objects (including knives and daggers), and earthen vessels.
  - **Miscellaneous:** Glass beads, terracotta human and animal figurines, gamesmen (dice, hopscotch pieces), and ring wells (indicating water management).

- **Urban Settlement:** The findings strongly suggest that Keeladi was a **well-planned urban settlement** with evidence of flourishing industries such as:
    - **Pottery making:** Indicated by large quantities of pottery and kilns.
    - **Weaving:** Supported by the discovery of spindle whorls, copper needles, and other weaving tools.
    - **Dyeing:** Evidence of a dyeing industry.
    - **Bead-making:** Indicated by glass beads and raw materials.
- **Trade and Lifestyle:**
    - Artefacts like agate and carnelian beads (whose origins are in Maharashtra and Gujarat) and some Roman pottery fragments (like Arretine and imitated rouletted sherds) suggest extensive **trade networks**, both internal and external (possibly with Roman connections through port towns like Alagankulam).
    - Items such as dice, gamesmen, and hopscotch pieces reveal aspects of the leisure activities and a culturally rich lifestyle of the inhabitants.
- **Chronology and Significance:**
    - The most significant implication of the Keeladi findings relates to the **dating of the Sangam Age**.
    - Previous estimations placed the Sangam Age from around 300 BCE to 300 CE.
    - However, **carbon dating of samples from Keeladi (e.g., one sample at 353 cm depth dated to 580 BCE)** has pushed the Sangam Age in Tamil Nadu back to around **600 BCE**, and some archaeologists, including Amarnath Ramakrishna, suggest it could extend to **800 BCE**.
    - This indicates a **much older and advanced civilization** in South India than previously thought, suggesting a "second urbanization" in the Vaigai plains mirroring the developments in the Gangetic plains.
- **Link to Other Civilizations:** Some symbols and graffiti marks found on Keeladi artefacts bear a **resemblance to those of the Indus Valley Civilization**. While a cultural gap of about 1,000 years remains, scholars hope that further studies will clarify these potential connections and provide crucial missing links between the Iron Age and the Early Historic Period in South India.

**2. Sangam Age:**
- **Definition:** The Sangam Age, also referred to as the Tamil Sangam period, marks an important chapter in **South Indian history**, particularly in ancient Tamil Nadu.
- **Name Origin:** Named after the **"Sangam"** (assembly or academy) of Tamil poets and scholars that flourished under the patronage of the Pandyan kings in Madurai.
- **Period:** Traditionally estimated to have spanned from around **300 BCE to 300 CE**. However, the Keeladi findings are challenging and potentially extending this timeline.
- **Characteristics:** This era witnessed a **rich cultural and literary flourishing**, producing a vast corpus of Tamil literature (Sangam Literature) that provides invaluable insights into the social, economic, political, and cultural life of ancient Tamils, including information about the Chera, Chola, and Pandya dynasties (collectively known as Muvendars).

### Poson Poya

**Context:** Sri Lanka celebrated Poson Poya on June 10–11, 2025, commemorating over 2,000 years since the historic arrival of Buddhism on the island. This annual festival holds immense religious and cultural significance for the nation.

**1. About Poson Poya:**

- **Definition:** Poson Poya is an **annual Buddhist festival** of great importance in Sri Lanka, celebrated on the **full moon day of June**. It is considered **second only to Vesak (Buddha Purnima)** in terms of its significance in the Sri Lankan Buddhist calendar.

- **Historical Significance:** It marks the **introduction of Buddhism to Sri Lanka in the 3rd century BCE**. This pivotal event occurred when **Arahat Mahinda**, the son of Emperor Ashoka of India, preached to King Devanampiyatissa at **Mihintale**.

- **Turning Point:** The arrival of Buddhism is considered a profound **turning point in Sri Lankan history**, leading to significant and lasting religious, cultural, and social transformations that shaped the identity of the Sinhalese people and the nation.

- **Celebrations:**
  - The festival is celebrated throughout Sri Lanka, but the **main ceremonies and largest gatherings are held at Mihintale** (the historical site of the first sermon) and **Anuradhapura** (the ancient capital, which was among the first cities to embrace Buddhism).
  - Thousands of pilgrims converge on these sacred sites.
  - **Devotees dress in white** (symbolizing purity), make **offerings at temples**, engage in **meditation**, and participate in various community activities.
  - **Dansals:** A unique and popular aspect of the celebration are "dansals," which are **free food and drink stalls** organized by communities, providing meals, beverages, and sometimes even

essentials to pilgrims and the public, embodying the Buddhist virtue of generosity (*dana*).
  - Other festive activities include **lantern displays, illuminated pandols (decorative structures), and religious pageants**.

- **Values Promoted:** The festival promotes core Buddhist values such as **non-violence (ahimsa), kindness, compassion, generosity, and unity**.

**2. Buddhism in Sri Lanka:**

- **Origin of Buddhism:** Buddhism is a spiritual tradition founded by **Siddhartha Gautama (the Buddha)** in the **6th century BCE in India**. It emphasizes the path to enlightenment (Nirvana) through ethical living, meditation, and wisdom. Its core teachings revolve around the **Four Noble Truths** and the **Eightfold Path**, guiding individuals to overcome suffering (*dukkha*).

- **Arrival in Sri Lanka:**
  - Buddhism arrived in Sri Lanka over **2,300 years ago** (circa 236 BCE) during the reign of **King Devanampiyatissa** of Anuradhapura.
  - It was introduced by **Arahat Mahinda Thera**, the son (or, in some traditions, brother) of the great Indian **Emperor Ashoka** of the Mauryan dynasty. Emperor Ashoka was a fervent patron of Buddhism who played a crucial role in its spread across ancient Asia.
  - The momentous event took place on **Poson Poya day at Mihintale**, a sacred mountain peak near Anuradhapura.

- **Royal Conversion and Spread:** King Devanampiyatissa embraced Buddhism after hearing Mahinda's sermon, leading to its widespread acceptance across the island. This royal patronage facilitated the establishment of temples, stupas (dagobas), and a robust monastic tradition.

- **Theravâda Buddhism:** Sri Lanka became and remains a major center of **Theravâda Buddhism**, which is the oldest surviving branch of Buddhism. Theravâda means "School of the Elders" and adheres closely to the original doctrines and practices taught by the Buddha, preserving its scriptures in the Pâli Canon.
- **Long-term Impact:** The arrival of Buddhism profoundly transformed Sri Lankan society, influencing its art, architecture, literature, governance, and daily life, forging a deep and enduring link between the religion and the national identity. The planting of a sapling from the sacred Bodhi tree (under which the Buddha attained enlightenment) brought by Arahat Mahinda's sister, Sanghamitta, at Anuradhapura, further solidified this bond.

## Servants of India Society



**Context:**

Recent news highlights renewed tensions between the **Pune-based Gokhale Institute of Politics and Economics (GIPE)** and its parent body, the **Servants of India Society (SIS)**. Both organizations are trading allegations regarding control over a key bank account, pointing to deeper issues of financial management and governance.

**1. About Servants of India Society (SIS):**

- **Founding:** The Servants of India Society (SIS) was founded by **Gopal Krishna Gokhale** on **June 12, 1905**, in Pune, Maharashtra. He was joined by co-founders like G.K. Devadhar, A.V. Patwardhan, and N.A. Dravid.
- **Objective/Mission (Gokhale's Vision):** According to Gokhale, the society's core objectives were:

  - To **train individuals** who were willing to dedicate their lives to the service of India in a selfless and patriotic spirit.
  - To promote **political education and constructive agitation** through **constitutional means**.
  - To further the **national interest of the Indian people**.
  - It aimed to create a cadre of "national missionaries" who would serve the nation with high ideals and discipline.
- **Nature:** It was conceived as a non-political, non-sectarian, and secular organization dedicated to social reform and national service, distinct from direct political parties. It was India's first secular organization focused on social issues.
- **Members:** Members of the society were considered "young missionaries of Indian nationalism." Several prominent young Indian nationalists, including **V.S. Sreenivasa Sasthri, Hriday Nath Kunzru, and A.V. Thakkar**, enrolled as members. Mahatma Gandhi also considered Gokhale his political guru and was influenced by the Society's ideals.
- **Membership Commitment:** Members undergo a rigorous **five-year training period** and commit to serving on extremely modest salaries, taking vows of simple living and dedication to public service.
- **Leadership:** Gopal Krishna Gokhale served as its first president. In 1915, after Gokhale's passing, he was succeeded by **Srinivasa Sastri**.
- **Headquarters and Branches:** The organization has its headquarters in **Pune (Poona)**, Maharashtra. It also established branches in other major cities like Chennai (Madras), Mumbai (Bombay), Allahabad, and Nagpur.
- **Publications:** The Society began publishing **The Hitavada**, an English-language journal, from Nagpur in 1911.
- **Legacy:** Though the number of active members has decreased over time, the society has been historically influential in demonstrating the

ideals of selfless social service and continues to operate various educational and social welfare programs across India.

## 2. Relationship with Gokhale Institute of Politics and Economics (GIPE):

- The **Gokhale Institute of Politics and Economics (GIPE)** in Pune is a prestigious academic institution in India.

- It was **established by the Servants of India Society in 1930** and functions as its parent body. GIPE is a deemed university affiliated with the University Grants Commission (UGC).

- The current dispute between GIPE and SIS centers on issues of financial control and alleged mismanagement within SIS, leading to calls from GIPE for a neutral administrator for its parent body and accusations of SIS misusing GIPE's funds for personal legal expenses and other irregular activities.

## 3. Significance of Servants of India Society:

- **Pioneer of Social Service:** It was one of the earliest organizations in India to formally train individuals for dedicated public service and social reform, emphasizing selfless work for the nation's welfare.

- **Moderates' Ideals:** It embodied the ideals of the moderate faction of the Indian National Congress, advocating for social and political reforms through constitutional and peaceful means.

- **Nation Building:** The society engaged in various constructive activities aimed at nation-building, including promoting education, sanitation, healthcare, and fighting social evils like untouchability, discrimination, and poverty.

- **Ethical Leadership:** Gokhale's emphasis on spiritualizing public life and instilling discipline and high ethical standards among its members left a lasting legacy on Indian public service.

- **Influenced Leaders:** Its ideals and practices influenced future leaders, including Mahatma Gandhi, who considered Gokhale his political mentor.

- **Enduring Legacy:** Despite challenges and dwindling membership, the Servants of India Society continues to run educational institutions (especially for tribal and underprivileged communities), rural development centers, and child welfare initiatives, preserving its foundational values of service.

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### PRASHAD Scheme



PRASAD Scheme
Pilgrimage Rejuvenation and Spiritual Augmentation Drive

सत्यमेव जयते

**Context:**

After years of delay, there is now progress on the development of **Chamundi Hills** in Karnataka under the Central government's **Pilgrimage Rejuvenation and Spiritual Heritage Augmentation Drive (PRASHAD) scheme**.

## 1. About the PRASHAD Scheme:

- **Full Form:** PRASHAD stands for **Pilgrimage Rejuvenation and Spiritual Heritage Augmentation Drive**.

- **Launch:** The scheme was launched in the financial year **2014-2015** by the **Ministry of Tourism**, Government of India. (It was initially named PRASAD and later renamed PRASHAD in 2017 to include "Heritage" in its scope).

- **Nature:** It is a **Central Sector Scheme**, meaning it is 100% funded by the Central Government for the eligible components of the projects.

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- **Objective:** The primary objective is the **integrated development of identified pilgrimage and heritage destinations** across India. This aims to:
    - Rejuvenate and augment the spiritual and heritage experience for pilgrims and tourists.
    - Provide world-class tourism infrastructure at these sites.
    - Harness pilgrimage tourism for its positive effects on economic growth and employment generation.
    - Promote sustainable and responsible tourism.
- **Implementation:** The Ministry of Tourism provides financial assistance to State Governments and Union Territory (UT) Administrations for the development of tourism infrastructure at these identified sites. Projects are executed by state-level agencies.
- **Funding Model:** While primarily centrally funded, the scheme also encourages **voluntary contributions through Corporate Social Responsibility (CSR) initiatives and Public-Private Partnerships (PPP)** to ensure better sustainability and community involvement.

**2. Infrastructure Development under PRASHAD Scheme:**

The scheme aims for holistic infrastructure development at these sites, including:

- **Connectivity:**
    - Improved entry points (road, rail, and water transport).
    - Last-mile connectivity to sites.
- **Basic Tourist Facilities:**
    - Information and interpretation centers.
    - ATMs/money exchange facilities.
    - Eco-friendly modes of transport within the complex.
    - Area lighting and illumination, with an emphasis on renewable energy sources.

    - Parking facilities.
    - Clean drinking water provisions.
    - Toilets and cloakrooms.
    - Waiting rooms and rain shelters.
    - First aid centers.
- **Commercial and Amenity Spaces:**
    - Craft bazaars, haats (markets), and souvenir shops.
    - Cafeterias.
- **Communication:**
    - Telecom facilities and internet connectivity (e.g., Wi-Fi hotspots).
- **Conservation:** Restoration, illumination, and conservation of historic structures and monuments.
- **Community Empowerment:** Skill training for local communities and promoting local arts, crafts, and cuisine to generate livelihoods.

**3. Chamundi Hills and PRASHAD:**

- **Chamundi Hills Location:** Chamundi Hills is a prominent hill feature near Mysuru (Mysore) city in Karnataka.
- **Significance:** It is primarily known for the **Sri Chamundeshwari Temple** located at its summit, dedicated to Goddess Chamundeshwari (a fierce form of Durga), who is the titular deity of the Mysore Royal Family. It is a major pilgrimage site in Karnataka and offers panoramic views of Mysuru city. The iconic monolithic Nandi statue is also a key attraction on the hill.
- **Project Under PRASHAD:** The development of Chamundi Hills under the PRASHAD scheme aims to enhance the pilgrim experience by upgrading facilities and infrastructure around the temple and the hill.
- **Challenges:** The project faced "years of back and forth" between the Karnataka state government and the Central government, indicating coordination and approval challenges that often affect large-scale infrastructure projects. The current progress signifies a breakthrough in these discussions.

## Captain James Cook



**Context:** After 250 years, the long-lost ship of Captain James Cook, **HMS Endeavour**, has reportedly been discovered off the coast of Newport Harbour, Rhode Island, bringing a significant maritime mystery to a close.

### 1. About Captain James Cook:

- **Who He Was:** James Cook (1728-1779) was a renowned **British naval captain, navigator, and explorer**.

- **Early Life & Naval Career:**
  - Born on October 27, 1728, in Marton, Yorkshire, England.
  - At age 18, he became a sailor on the North Sea, where he also studied mathematics.
  - Joined the British Royal Navy in 1755 and quickly rose through the ranks, taking command of a ship at age 29.
  - Participated in battles in what is now Canada during the **French and Indian War** (Seven Years' War).
  - After the war, he gained recognition for meticulously charting the coast of **Newfoundland**, demonstrating exceptional surveying and cartographic skills.
  - In 1766, he gained fame as a scientific observer for a paper he wrote about an **eclipse of the Sun**.

- **Major Expeditions:** He sailed extensively in the Canadian seaways and coasts (1759 and 1763–67) and is most famous for his **three pioneering expeditions to the Pacific Ocean** (1768–71, 1772–75, and 1776–79).

- These voyages spanned vast areas, from the Antarctic ice fields to the Bering Strait and from the coasts of North America to Australia and New Zealand.

### 2. Three Voyages of Discovery:

- **The First Voyage (1768–1771): A Scientific Expedition**
  - **Objective:** Commissioned by the **Royal Society of London** (an organization of scientists), its primary public goal was to observe the 1769 **transit of Venus** from Tahiti.
  - Secret instructions also mandated a search for the hypothesized great southern continent, "Terra Australis Incognita."
  - **Ship: HMS Endeavour**.
  - **Key Achievements:**
    * Thoroughly **charted the entire coastline of New Zealand**, confirming it as two major islands.
    * Reached the southeastern coast of **Australia in 1770**, becoming the first known European to extensively explore its eastern coastline.
    * Named the continent **New South Wales** and **claimed it for Great Britain**.
    * Conducted significant scientific observations and collected numerous botanical and zoological specimens, notably with botanist Joseph Banks.
  - **Outcome:** Returned to England in 1771, having significantly expanded European geographical and scientific knowledge of the South Pacific.

- **The Second Voyage (1772–1775): The Quest for Terra Australis**
  - **Objective:** To circumnavigate the world from west to east at high southern latitudes, specifically seeking to confirm or disprove the existence of a vast southern continent (Terra Australis).
  - **Ships:** HMS Resolution (Cook's primary ship) and HMS Adventure.
  - **Key Achievements:**
    - Became the **first European to cross the Antarctic Circle**.
    - Though he did not reach the Antarctic mainland, he largely dispelled the myth of a temperate, populated southern continent.
    - Discovered and accurately mapped many island groups across the Pacific, including New Caledonia, the South Sandwich Islands, and South Georgia.
    - Pioneered methods for preventing **scurvy** among his crew, leading to remarkably healthy voyages.
  - **Outcome:** Returned to England, having significantly expanded knowledge of the Southern Ocean and Pacific geography.
- **The Third Voyage (1776–1779): Search for the Northwest Passage & Death**
  - **Objective:** To find a **Northwest Passage** (a sea route) from the Pacific to the Atlantic across the top of North America.
  - **Ships:** HMS Resolution and HMS Discovery.
  - **Key Achievements:**
    - Did not succeed in finding a navigable Northwest Passage but explored extensive parts of the North American Pacific coastline (Alaska).
    - Became the **first European to visit the Hawaiian Islands** (which he named the Sandwich Islands).
  - **Tragic End:** While revisiting the Hawaiian Islands on his way back from the Arctic, Cook was **killed by Hawaiians** in a confrontation at Kealakekua Bay on **February 14, 1779**. The circumstances surrounding his death are complex, involving cultural misunderstandings and escalating tensions.

**3. Legacy:**
- Captain Cook's voyages revolutionized global cartography, filling in vast unknown areas on world maps with remarkable accuracy.
- His meticulous records, scientific observations, and innovations in navigation and ship health (especially against scurvy) set new standards for exploratory expeditions.
- However, his legacy also carries the complex implications of European colonial expansion and its impact on indigenous populations.

## Ambubachi Mela



- **Annual Gathering:** Thousands of devotees have recently arrived in Assam for the **Kamakhya Temple's annual Ambubachi Mela**.
- **Scale:** It is one of the **largest religious gatherings in Northeast India**.
- **Significance:** The Mela is a unique celebration of fertility, the divine feminine, and the Earth's

regenerative power, deeply rooted in Tantric traditions. It also serves as a significant cultural and social event, drawing pilgrims and tourists from across India and abroad, and contributing to local economy and cultural exchange.

**About Ambubachi Mela**

- **Timing:** Held during the monsoon, generally in **June** (specifically the Assamese month of Ahaar, usually from June 22nd to June 26th in recent years).
- **Location:** At the **Kamakhya Temple in Guwahati, Assam**.
- **Deity & Philosophy:**
    o Kamakhya Temple is a shrine to **Goddess Kamakhya** and one of the most important centers of **Tantrik Shaktism**.
    o The Mela is a unique celebration of the **goddess's annual menstruation**.
- **Rituals & Beliefs during the Mela:**
    o The period of Ambubachi is believed to be the period of the goddess's annual menstruation, and the shrine is **closed for three to four days** during this time.
    o It is believed that during this period, the creative and nurturing power of the 'menses' of Mother Earth becomes accessible to devotees.
    o During these days, agricultural activities like ploughing and sowing are typically ceased.
    o Many sadhus, tantrics, and devotees observe austerities.
    o At the end of the period, the shrine's doors are opened ceremonially.
    o Devotees flock for *darshan* (sacred viewing) of the deity.
    o Fragments of red cloth (*Rakta Bastra*) believed to be stained with the goddess's menstrual blood are distributed as *prasad*, which are highly revered as protective amulets.

- **Symbolism:**
    o The festival is associated with **fertility**, with the onset of the monsoon, and the common historical association across cultures of the Earth as a fertile woman.
    o The name 'Ambubachi' itself translates to "water flowing" or "spoken with water," signifying the Earth's readiness for reproduction due to the rains.
    o It challenges social taboos around menstruation by celebrating it as a sacred and powerful event.

**Key Facts About the Kamakhya Temple**

- **Location:** Situated on **Nilachal Hill** and adjoining the southern bank of the **Brahmaputra River** in Guwahati, Assam.
- **Significance:**
    o One of the most revered centers of **Tantric practices**.
    o Regarded as one of the oldest of the **51 Shakti Peethas** in India. (Legend states Sati's *yoni* (womb/vulva) fell here).
    o Unique in that it has **no idol** of the presiding deity; instead, a **yoni-shaped stone** with a natural spring flowing over it is worshipped as the goddess herself.

**Temple Architecture of Kamakhya Temple**

- **Style:** Modelled out of a combination of two different styles:
    o Traditional **Nagara style** (North Indian temple architecture).
    o **Saracenic or Mughal style** of architecture.
- **Architectural Name:** This unusual combination has been named the **Nilachala Style of Architecture**.
- **Ground Plan:** This is the **only temple of Assam having a fully developed ground plan**.
- **Chambers:** Consists of five chambers, aligned from east to west:

o **Garbhagriha (Sanctum Sanctorum):** The inner sanctum, which is a cave below ground level with the yoni-shaped rock.

o **Antarala (Vestibule):** Connects the Garbhagriha to the next chamber.

o **Jaganmohan (Principal Chamber):** The main assembly hall.

o **Bhogmandir (Ritual Chamber):** Used for offerings and rituals.

o **Natmandir (Opera Hall):** For performing traditional dance and music associated with Shakti temples.

- **Superstructure Features:** The superstructure of each chamber exhibits different architectural features:

  o The main temple (over the Garbhagriha) contains a modified **Saracenic dome** (often described as beehive-like).

  o The Antarala carries a **two-roofed design**.

  o The Bhogmandir has **five domes** similar in appearance to the main temple.

  o The Natmandir has a **shell-roof with an apsidal end**, similar to some impermanent *namghars* (Assamese prayer halls).

- **Material:** The lower part of the temple is made of stone, while the upper parts, including the octagonal dome, are made of bricks.

**Tansen**
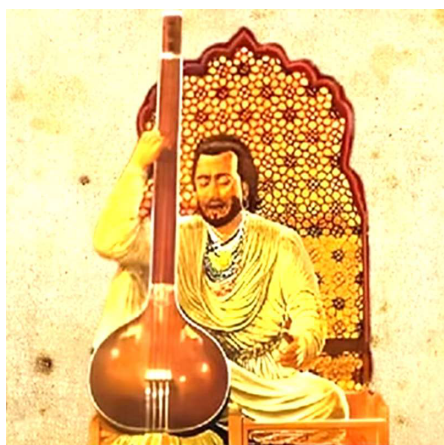


- **Madhya Pradesh High Court Ruling:** The Madhya Pradesh High Court recently dismissed an appeal seeking permission to perform religious and cultural activities at the tomb of Hazrat Sheikh Muhammad Ghaus in Gwalior.

- **Co-located Grave:** This premise also houses the grave of the musical maestro Tansen.

- **Court's Reasoning:** The court emphasized that the monument, declared a protected monument of national importance in **1962 under the Ancient Monuments and Archaeological Sites and Remains Act, 1958,** deserves **"utmost care and caution"** and protection of its **"originality, sanctity, and vitality."**

- It stressed that constitutional vision and morality must prevail over personal and vested interests.

- **Significance:** The ruling highlights the ongoing legal and cultural debates surrounding the preservation of historical monuments and the balance between heritage conservation and religious/cultural practices.

- It reaffirms the Archaeological Survey of India's (ASI) role in protecting such sites from activities that might compromise their integrity.

**About Tansen**

- **Identity:** A prominent Indian classical music composer, musician, and vocalist, known for a large number of compositions.

- **Instrumentalist:** Also an instrumentalist who popularized and improved the **plucked rabab** (of Central Asian origin).

- **Early Patronage:**

  o First stayed under the shelter of **Daulat Khan**, son of Sher Shah Suri.

  o Later appointed as the court singer of **King Ramchandra of Bandhavgarh (Rewa)**, where he gained significant fame.

- **Mughal Court:** Among the **Navaratnas (nine jewels)** at the court of the Mughal Emperor **Jalal ud-din Akbar**.

- He joined Akbar's court around 1562, already a mature musician.
- **Title:** Akbar bestowed upon him the honorific title **Mian**, meaning "learned man" or "master," leading to his popular name "Mian Tansen."
- **Historical vs. Legend:** Tansen as a historical personality is difficult to fully separate from the extensive legends and myths that surround him **(e.g., stories of him causing rain with Raga Megh Malhar or lighting lamps with Raga Deepak).**
- He is widely regarded as a foundational figure for many Hindustani classical music *gharanas* (schools).
- **Spiritual Connection:** Believed to have been spiritually influenced by the Sufi saint **Sheikh Muhammad Ghaus of Gwalior**, whose tomb he shares.

**Cultural Contribution of Tansen**

- **Raga Creation/Introduction:** Credited for introducing or refining several famous ragas, including:
    o **Miyan ki Malhar** (associated with bringing rain).
    o **Miyan ki Todi** (a gentle morning raga).
    o **Darbari (Kanhra)** (a complex, contemplative evening raga, believed to have originated in his time in court).
    o Miyan ki Sarang.
- **Dhrupad Compositions:** Tansen is particularly remembered for his **classical Dhrupad compositions**.
    o **Dhrupad** is one of the oldest and grandest forms of Hindustani classical music, characterized by its majestic, contemplative, and spiritual nature.
    o Compositions often praise heroes, gods, and kings.
    o Tansen is associated with the **Goudhar Bani** style within Dhrupad, known for its pure and melodious use of notes.

- **Legacy:** His contributions fundamentally shaped Hindustani classical music, influencing numerous *gharanas* and laying the groundwork for its subsequent development.
- He remains an iconic figure symbolizing musical excellence and innovation in India.

## Balkampet Yellamma Temple



**Context:** In recent news, Nita Ambani, wife of billionaire Mukesh Ambani, reportedly donated ₹ 1 crore to the **Balkampet Yellamma Temple** in Telangana, highlighting the temple's significance and its role in philanthropic activities.

**1. About Balkampet Yellamma Temple:**

- **Location:** The temple is a prominent Hindu shrine located in **Balkampet, Hyderabad, Telangana**.
- **Deity:** It is primarily dedicated to **Goddess Yellamma**, who is widely revered as a form of **Renuka Devi**, the mother of Lord Parashurama (an avatar of Vishnu). The temple is also popularly known as **Yellamma Pochamma Temple**.
- **Historical Origins (15th Century):**
    o The temple's origins are steeped in local legend, tracing back to the **15th century**.
    o It is believed that during a **well-digging excavation**, a rock bearing the sculpture of the goddess was discovered approximately **10 feet underground**.

- o The inability to move the idol from its spot was perceived as a **divine sign**, leading to the construction of the temple directly over the discovered idol. The idol is considered *Swayambhu* (self-manifested) and is partially submerged in water, giving rise to the nickname "Jala Durga" (Goddess in Water).
- **Renovations and Current Structure:** Over centuries, the temple has undergone several renovations and expansions. The **current structure was established in 1919**, showcasing architectural evolution over time.
- **Significance:** The temple holds immense spiritual and cultural significance for devotees in Telangana and beyond, attracting large crowds, particularly on Sundays and Tuesdays. It is believed that the water from the well in the temple premises has curative properties for skin diseases.

**2. Festivals Celebrated:**

Two major festivals are celebrated with great fervor at the Balkampet Yellamma Temple, drawing thousands of devotees:

- **Bonalu Jathara:**
  - o **Description:** Bonalu is a traditional Hindu festival dedicated to **Goddess Mahakali**, widely celebrated across Telangana, particularly in Hyderabad and Secunderabad.
  - o **Timing:** It is celebrated annually in the Hindu month of **Ashada Masam** (typically July/August).
  - o **Rituals:** Devotees, especially women, carry "Bonam" (pots containing cooked rice, jaggery, and sometimes curd) adorned with neem leaves, turmeric, and vermillion, on their heads to offer to the Goddess. Special *poojas* and ceremonies are performed. The festival is a thanksgiving to the Goddess for fulfilling vows and protecting the community.
  - o **Processions:** Vibrant processions featuring traditional folk dances (including the Pothuraju dance), rhythmic drum beats, and decorated Ghatams (pots representing the goddess) are a highlight.
- **Yellamma Kalyanotsavam:**
  - o **Description:** This festival celebrates the **celestial wedding (Kalyanotsavam)** of Goddess Yellamma.
  - o **Significance:** It is a significant event for devotees, symbolizing the sacred union of the divine and celebrated with elaborate rituals and festivities.

**3. Balkampet Yellamma Temple Architecture:**

- **Dravidian Style:** The temple is constructed in the **Dravidian style of architecture**, characteristic of South Indian temples. It is considered one of the oldest temples in Hyderabad city.
- **Key Architectural Features:**
  - o **Raja Gopuram:** The temple features a **large, towering gateway (gopuram)** at its entrance. Gopurams are typically multi-storied and intricately carved, forming a prominent feature of Dravidian temples.
  - o **Underground Idol:** A unique aspect is the idol of the goddess being located approximately **10 feet below ground level** in a natural spring, necessitating devotees to descend steps for *darshan*.
  - o **Inscriptions and Carvings:** The temple walls are adorned with **several inscriptions and intricate carvings**, reflecting historical periods and mythological narratives.
  - o **Subsidiary Shrines:** Within the temple complex, there are several other shrines dedicated to various deities, including:
    * **Goddess Sri Pochamma**
    * **Goddess Rajarajeshwari**
    * **Goddess Nagadevta** (Serpent Deity)
    * **Lord Ganesha** (remover of obstacles)

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# Persons in News

**I. Important Appointments/Resignations**

## Amitabh Kant



o Joined Fairfax as Senior Adviser after G20 Sherpa Role

## Kirsty Coventry



o Became the first female and African President of the IOC. she is a two-time Olympic gold medallist in swimming for Zimbabwe, finally and formally takes office on **June** 23, **2025**

## Prof M Satish Kumar



o Appointed First Dean of Queen's University Belfast's GIFT City Campus.

## Parag Jain (IPS officer)



o Appointed new RAW chief, played a key role in Operation Sindoor.

## Lt Commander Yashasvi Solanki



A Historic Milestone!
Lt Commander
**Yashasvi Solanki**
becomes the first woman naval Aide–de–Camp (ADC) to the President of India.
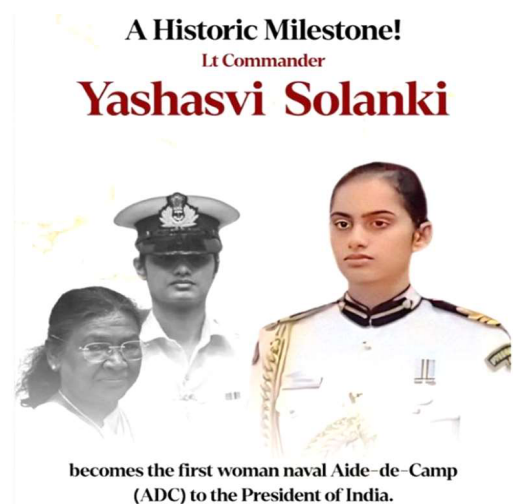
o Became the first woman naval ADC to the President (June 25, 2025).

## Shubman Gill



o Became brand ambassador for Oakley in India (June 01, 2025).

### Anil Kumble



**Former Indian cricket captain Anil Kumble** has been appointed **ambassador for the Karnataka Forest Department and wildlife conservation**. On **June 3, 2025**, he met **Environment Minister Eshwar Khandre** and thanked the government for the appointment.

o Kumble, who earlier served as **vice-president of the Karnataka Wildlife Board**, said he would support the department in conservation and development efforts. The Minister praised Kumble's dedication, noting that he accepted the role **without any remuneration**, highlighting his genuine commitment to the environment.

o Kumble is expected to play a key role in **promoting awareness about forest and wildlife conservation** across the state.

## II. Awards and Honours

### Radhanath Swami
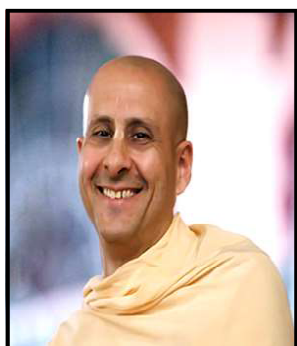


o Honoured by New York City for Spiritual and Community Leadership (June 30, 2025).

### India Post Payments Bank (IPPB)



o **India Post Payments Bank (IPPB)**, a 100% Government of India-owned entity under the Department of Posts, Ministry of Communications, has been conferred the prestigious **Digital Payments Award 2024-25** by the Department of Financial Services (DFS), **Ministry of Finance**, in recognition of its outstanding contribution to expanding **digital payments** and **financial inclusion** across the country.

### Opal Suchata Chuangsri (Thailand)



o May 31, **2025** In an unforgettable evening that brought the world together in celebration of beauty, social and environmental service, and global sisterhood, **Hyderabad**, Telangana, witnessed history as **Opal Suchata** from **Thailand** was **crowned** the 72nd **Miss World** at the glittering grand finale held at the HITEX Exhibition Centre

### PM Narendra Modi

o Conferred Cyprus's highest honour, the "Grand Cross of the Order of Makarios III" (June 16, 2025). This marks the first visit by an Indian PM to Cyprus in over two decades.

**III. Other Significant News**

### Prasanta Chandra Mahalanobis
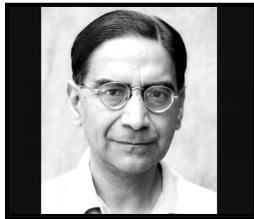


On **June 29, 2025**, India celebrated the **19th National Statistics Day**, marking the **132nd birth anniversary of Prof. P.C. Mahalanobis**.

o The theme for 2025 was **'75 Years of National Sample Survey (NSS)'**, highlighting its role in data-driven governance since 1950.

o **Prof. P.C. Mahalanobis** (1893–1972), known as the **Father of Indian Statistics**, founded the **Indian Statistical Institute** in 1931 and developed the **Mahalanobis Distance** in 1936.

o He played a key role in designing the **National Sample Survey**, shaping India's planning system, and guiding the **2nd Five-Year Plan** with his industry-focused economic model.

o He also contributed to **flood management studies** and established the statistical journal **Sankhya**.

o Statistics Day aims to raise awareness about the importance of statistics in national planning and innovation in data systems.

### Bhagwan Birsa Munda
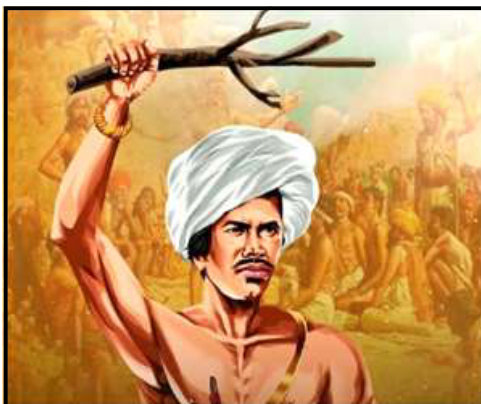


o **Prime Minister Narendra Modi** on 9 june paid tributes to legendary tribal leader and freedom fighter Bhagwan Birsa Munda on his 125th death anniversary, also known as 'Balidan Diwas', calling his life a symbol of courage, sacrifice, and commitment to tribal welfare and national pride.

### IAF Group Captain Subhanshu Shukla



o Part of the Axiom 4 mission, a private spaceflight to the International Space Station (ISS).

o He is one of the crew members.

**IV. Persons in News :**

### Ayilyabai Holkar
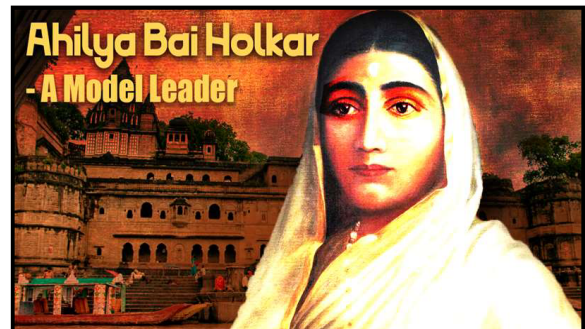


o On May 31, 2025, India marked the **300th birth anniversary of Ahilyabai Holkar**, one of the country's most respected women rulers.

o The day was celebrated with pride, especially in **Madhya Pradesh** and **Maharashtra**, where her legacy remains strong.

o Born on **May 31, 1725**, in Chondi, Maharashtra, Ahilyabai became the queen of Indore in the 18th century after a series of personal tragedies.

o Known for her **just rule, public welfare initiatives**, and **temple restorations**, she is credited with building and renovating key religious sites such as the **Kashi Vishwanath Temple** and **Dashashwamedh Ghat**.

o Ahilyabai promoted **trade, education, and social justice**, making Indore a model of good governance. Her Jayanti is observed with **cultural events**, **public tributes**, and **educational programs**.

o To commemorate the 300th anniversary, the **Government of Maharashtra** announced a ₹ 681

crore memorial project—**'Punyashlok Ahilyabai Holkar Smarak Sthal'**.

o Indore's airport is also named in her honour.

### *Pandit Jawaharlal Nehru*



o On Pandit Jawaharlal Nehru's death anniversary, **PM Modi** paid tribute, acknowledging his contributions to the nation.

o Nehru, born on November 14, 1889, was a key figure in India's independence movement and post-independence governance.

o Mentored by Mahatma Gandhi, he became India's interim Prime Minister in 1946 and the first official Prime Minister in 1947, delivering the iconic "Tryst with Destiny" speech. As Congress President in 1929, he called for complete independence from British rule.

o Nehru passed away on May 27, 1964. His birthday is celebrated as Children's Day in India, honoring his affection for children.

### *Veer Savarkar (Vinayak Damodar Savarkar)*



Freedom Fighter and Social Reformer
**Veer Savakar**
28th May 1883 - 26th Feb 1966

o On Veer Savarkar's birth anniversary, **PM Modi** paid tribute to the freedom fighter and nationalist leader.

o Born on May 28, 1883, in Bhagur, Maharashtra, **Vinayak Damodar Savarkar**, also known as **Veer Savarkar**, was a revolutionary, writer, and politician.

o He was a key figure in the development of the **Hindutva ideology** and played a major role in the **Hindu Mahasabha**, serving as its president from 1937 to 1943.

o Savarkar strongly opposed the caste system and promoted reconversion to Hinduism.

o While studying law in the UK, he became active in nationalist groups like **India House** and founded the **Free India Society**.

o He was arrested in 1910 and sentenced to two life terms, serving time in the **Cellular Jail (Kala Pani)** in the Andaman Islands.

o During his imprisonment, he wrote *Hindutva: Who is a Hindu?*

o Savarkar was released in 1924 and later led the **Ratnagiri Hindu Sabha**. He passed away on February 26, 1966, after voluntarily fasting to death.

o His legacy remains influential and often debated in Indian political discourse.

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