

Weekly Current Affairs



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GS Paper 2 – Governance, Constitution, Polity, Social Justice

Judicial Accountability Under Scrutiny: Debate Over In-House Inquiry Mechanism

Context: In a significant development, the Chief Justice of India (CJI) has agreed to constitute a special Bench to hear a petition filed on behalf of Justice Yashwant Varma of the Allahabad High Court, raising questions about the constitutional validity of the judiciary's in-house inquiry mechanism. This petition could redefine the contours of judicial accountability and the doctrine of separation of powers in India.



Background: Allegations and a Constitutional Crisis

In **March 2025**, unaccounted cash was allegedly recovered from Justice Varma's residence. Following this, an **in-house committee** recommended his removal **without granting a personal hearing**. After refusing to resign, proceedings for his **impeachment** were initiated in **Parliament**, sparking intense debate over the **independence of the judiciary** and the **limits of internal oversight**.

Understanding the In-House Procedure for Judges:

The **in-house mechanism**, introduced in **1999 by** the **Supreme Court**, was aimed at dealing with complaints of judicial misconduct without resorting to the formal impeachment process. Here's how it works:

- Filing of Complaints: Complaints may be submitted to the Chief Justice of India, the Chief Justice of a High Court, or directly to the President of India.
- **Preliminary Examination**: The **High Court Chief Justice** seeks a response from the accused judge and forwards the findings to the CJI.
- Fact-Finding Committee: Upon finding prima facie merit, the CJI appoints a committee consisting
 of two Chief Justices of other High Courts and one High Court judge.
- Outcome and Recommendation: If the committee finds sufficient grounds for removal, the CJI may
 advise resignation. Upon refusal, the findings are forwarded to the President and Prime Minister,
 potentially triggering parliamentary impeachment.

Key Legal and Constitutional Issues Raised:

Justice Varma's petition highlights several serious concerns:

- 1. Lack of Constitutional Backing: The in-house procedure is not grounded in the Constitution or any statute, making it vulnerable to challenge. Articles 124(4) (for Supreme Court judges) and 218 (for High Court judges) provide for removal only through parliamentary procedure, implying that internal mechanisms may lack legitimacy.
- 2. Violation of Natural Justice: The petition argues that no personal hearing was granted, and the accused judge was denied access to the full report and the evidence. This undermines the right to fair trial and due process, guaranteed under Articles 14 (equality before law) and 21 (right to life and liberty).
- **3. Breach of Separation of Powers:** Critics argue that by conducting disciplinary proceedings internally, the **judiciary is encroaching on Parliament's exclusive domain**—a violation of the **separation of powers**, a basic structure of the Constitution.

Wider Implications and the Road Ahead:

Need for Institutional Reform



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There is an urgent need to **codify judicial conduct mechanisms** within a **legislative framework**—possibly through an updated version of the **Judges (Inquiry) Act, 1968**, with provisions for **transparency, fairness, and appeal**.

Balancing Judicial Independence and Accountability:

Judicial independence must **not be equated with immunity**. Judges must be held to the **highest ethical standards**, but **disciplinary mechanisms must ensure procedural fairness** and avoid becoming tools of internal bias or executive influence.

Comparative Perspective: Global Practices

- In the **United States**, judges can be investigated by **Judicial Councils** but only removed through **Congressional impeachment**.
- The UK uses a formal complaint mechanism under the Judicial Conduct Investigations Office (JCIO), ensuring independent review and procedural transparency.
- Several European countries, like Germany and France, have codified procedures for disciplining
 judges through independent bodies with judicial and administrative members.

Conclusion: Towards Transparent Judicial Ethics

This case could become a watershed moment for judicial reform in India. As public trust in institutions is crucial, the judiciary must not only be impartial but appear to be so. Strengthening external oversight, ensuring due process, and codifying judicial discipline are vital steps toward a robust, accountable, and independent judiciary.







GS Paper 3 – Economy



Sharp Decline in Net FDI Raises Concerns Over Investment Sentiment in India

Context: India witnessed a staggering drop of 98.2% in Net Foreign Direct Investment (FDI) during May 2025, with inflows plunging to just \$40 million, compared to \$2.2 billion recorded in May 2024. While gross FDI inflows remained relatively resilient at \$7.2 billion, they too saw a slight dip from \$8.1 billion year-on-year, reflecting an evolving investment landscape.



Understanding Net FDI: A Key Economic Indicator

Net FDI refers to the **net inflow of foreign capital** into the country, calculated by subtracting **outflows** (such as **profit repatriation**, **divestments**, and **outward FDI** by Indian firms) from **gross inflows**. It represents the **real addition of foreign investment** to the domestic economy and serves as a barometer of **long-term investor confidence**.

Why the Sudden Decline? Key Drivers Behind the FDI Slowdown

Several factors have contributed to this sharp fall in net FDI:

- Increased Repatriation and Divestment: Foreign investors withdrew profits or sold their stakes, reducing net inflows.
- Higher Outward FDI by Indian Firms: Indian companies have been actively investing abroad, which has added to the outflows.
- **Global Economic Uncertainty**: Geopolitical tensions, inflation, and tightening financial conditions in developed markets have **tempered investor risk appetite**.

Top Sources and Sectors Attracting FDI:

Despite the drop in net inflows, India remains an attractive destination for long-term investment:

- Major Source Countries: Singapore, Mauritius, the UAE, and the United States accounted for over 75% of FDI inflows in May 2025.
- **Leading Sectors:** The **manufacturing sector**, **financial services**, and **computer services** remained top performers in absorbing foreign capital.

Implications of the Declining Net FDI:

- 1. External Sector Vulnerability: A sudden drop in net FDI can lead to short-term pressure on the balance of payments and affect the exchange rate stability, especially when accompanied by portfolio outflows.
- 2. Liquidity Challenges for Key Sectors: Sectors heavily reliant on FDI, such as infrastructure, technology, and real estate, may face liquidity constraints and slower expansion plans if this trend continues.
- 3. Mixed Investor Sentiment: While gross inflows remain strong, suggesting that India's fundamentals are still attractive, the rising repatriation signals a more mature investment climate where investors are freely entering and exiting the market.
- **4. Strategic Repositioning by Investors:** The shift could also reflect **strategic realignment**, where investors choose to diversify portfolios geographically due to emerging risks in Asia or improved prospects in other regions.

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Types of FDI: A Quick Overview:

Understanding the **forms of FDI** provides insight into the nature of foreign investments:

- Horizontal FDI: Replicating the same business in a foreign country.
 - Example: McDonald's opening outlets in India.
- **Vertical FDI**: Investing in a different part of the supply chain.
 - *Example*: A U.S. oil company investing in Indian petrol stations.
- **Conglomerate FDI**: Investing in an **unrelated sector** abroad.
 - *Example*: A textile firm acquiring a fintech startup overseas.
- **Greenfield FDI**: Setting up **entirely new infrastructure** (e.g., a new manufacturing plant in India).
- **Brownfield FDI**: Acquiring or investing in **existing facilities**.
 - *Example*: Foreign acquisition of an Indian pharmaceutical unit.

Expert View: A Sign of Market Evolution?

According to the **Reserve Bank of India (RBI)**, the uptick in repatriation may indicate a **maturing investment environment**, where foreign investors are now **more confident in managing capital exit**—a hallmark of an **open and stable economy**.

Looking Ahead: Rebuilding Investor Momentum

To restore and enhance net FDI performance, India needs to:

- Ensure policy consistency and regulatory clarity.
- Accelerate ease of doing business reforms.
- Strengthen **bilateral investment treaties** (BITs) to protect investor rights.
- Foster long-term strategic partnerships in **emerging sectors** like **green energy**, **semiconductors**, and **digital infrastructure**.





GS Paper 1 - Geography



Syros Island in the Spotlight: Cruise Diverted Amid Political Protest

Context: A cruise liner carrying **Israeli tourists** was recently **diverted to Cyprus** after being denied docking at **Syros Island** due to a **quayside protest** linked to ongoing tensions over the **Gaza conflict**. The incident has drawn international attention, highlighting how global issues can impact even the most peaceful tourist destinations. The Greek government has yet to issue a formal statement, but local reports confirm the protest was non-violent and involved a small group of demonstrators.



Discovering Syros: The Beating Heart of the Cyclades

Syros (also known as **Siros** or **Syra**) is a **picturesque island** nestled in the **Cyclades archipelago** in the **Aegean Sea**. Known for its blend of **classical elegance** and **island charm**, Syros stands out from the more commercial tourist hotspots like Mykonos and Santorini.

- Located approximately **78 nautical miles (144 km) southeast of Athens**, Syros spans a modest area of **83.6 square kilometers**.
- The island is hilly and irregular in shape, with its highest point reaching 442 meters (1,450 feet) above sea level.
- As of the **2021 census**, the population stood at around **21,124 residents**.

Major Towns: Where History Meets the Horizon

The **main city**, **Ermoupoli**, is a **hilltop settlement** with neoclassical architecture, cascading down to a picturesque port. It serves as:

- The administrative capital of the Cyclades.
- The headquarters for the South Aegean region.
- A vibrant hub of **culture**, **history**, **and governance**.

Other notable towns include **Ano Syros**, a traditional medieval settlement, and **Vari**, a seaside village known for its calm beaches and tavernas.

What Makes Syros Special: Beyond the Postcards

While less flashy than other Aegean islands, Syros is treasured for its authentic Greek lifestyle, offering visitors:

- **Stunning beaches** like Galissas, Kini, and Delfini.
- Cultural festivals, especially the Syros International Film Festival and Ermoupolia Festival, celebrating music, theatre, and visual arts.
- A rich blend of **Orthodox and Catholic heritage**, evident in its architecture and religious landmarks.

Economy of Syros: Anchored in Tradition and Trade

Syros boasts a **diverse economy** that combines traditional industries with maritime commerce:

Shipbuilding and repair continue to thrive, especially around Ermoupoli's historic Neorion Shipyards.

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- Other industries include **tanning**, **textile production**, **weaving**, and **confectionery**, particularly the famous **Syros loukoumi** (Turkish delight).
- However, the **backbone of Syros's economy** is **maritime trade** and **commercial shipping**, thanks to its strategic location and robust port infrastructure.

A Blend of Old-World Grace and Modern Vitality

Syros offers a unique contrast to Greece's more touristic islands. Its **noble charm**, **quiet sophistication**, and **resilient local culture** make it a hidden gem for travelers seeking **authenticity** and **rich history**. Though recent protests may have briefly stirred its calm waters, Syros remains a symbol of **civic expression** and **timeless beauty** in the Aegean.





GS Paper 3 – Environment and Ecology

Rare Bird Alert: Long-Billed Bush Warbler Spotted in India After 46 Years

Context: In an exciting breakthrough for birdwatchers and conservationists, a group of birders recently made the **first confirmed sighting in 46 years** of the **Long-Billed Bush Warbler** (*Locustella major*) in **India**. The elusive species, classified as **Near Threatened** by the IUCN, was observed in the remote **Suru Valley of Ladakh**, marking a monumental moment in Indian ornithological history.



Meet the Long-Billed Bush Warbler: A Hidden Gem of the Highlands

The **Long-Billed Bush Warbler** is a **medium-sized songbird**, best known for its **extraordinarily elusive nature** and its preference for rugged, high-altitude landscapes.

- Scientific Name: Locustella major
- **Size**: Measures approximately **15–17 cm** in length.
- Distinct Features:
 - o A long bill and relatively long tail
 - Brownish-olive plumage with fine streaks on the back
 - Pale underparts, ranging from whitish to buff
 - Sexes appear similar, making field identification challenging
- Behavior:
 - Skulking and secretive, often running through undergrowth rather than flying
 - Occasionally appears on low bushes to sing, producing a faint clicking call, likened to the soft buzz of a grasshopper.

Natural Habitat: High-Altitude Hideouts

This rarely seen warbler is typically found in **mountainous regions of Central Asia**, with its range covering **parts of China, India, Pakistan**, and **Tajikistan**. It thrives in:

- **Grassy slopes** with scattered bushes and tall weeds
- Terraced upland cultivation
- Alpine meadows and forest edges, usually between 2,400 to 3,600 meters in elevation

Its **camouflaged plumage** and preference for **dense vegetation** make sightings extremely rare, even within its known range.

Conservation Status: A Species on the Edge

• **IUCN Red List**: **Near Threatened** This classification reflects its **small and fragmented population**, as well as the **ongoing loss of suitable habitat** due to overgrazing, land conversion, and changing alpine ecosystems under the pressure of climate change.

The recent sighting in India provides hope, but also underscores the urgent need for **habitat protection** and **long-term monitoring**.

Why This Sighting Matters:

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- Rediscovery After Decades: The last confirmed record of the Long-Billed Bush Warbler in India dates back to 1979, making this a landmark rediscovery.
- **New Avenues for Research**: The documentation of the species in Suru Valley opens doors to **deeper ecological studies**, potentially updating range maps and conservation priorities.
- Boost for Bird Tourism and Citizen Science: Ladakh's growing appeal among birders and nature enthusiasts could lead to greater investment in conservation efforts and eco-tourism infrastructure.

Did You Know?

The **genus Locustella**, to which the Long-Billed Bush Warbler belongs, is named after the Latin word for "grasshopper" – a nod to the **insect-like calls** of many species in this group.

Conclusion: A Call to Protect the Silent Singers

The return of the **Long-Billed Bush Warbler** to Indian skies is not just a thrilling ornithological event—it's a powerful reminder of nature's resilience and the mysteries that still lie hidden in the **Himalayan highlands**. As conservationists celebrate this rediscovery, it becomes crucial to ensure these fragile habitats remain safe for the birds that call them home.





GS Paper 1 – Geography



Cambodia Back in Focus: Border Dispute Sparks Fresh Tensions with Thailand

Context: Tensions have flared once again between **Cambodia and Thailand** over long-standing **territorial disputes**, with recent developments along the shared border igniting diplomatic and military concern. The dispute centers on claims near culturally and strategically significant areas, adding to the region's geopolitical sensitivities.



Cambodia: A Key Nation in Mainland Southeast Asia

Situated in the heart of **Mainland Southeast Asia**, **Cambodia** holds a strategic position both politically and geographically.

- · Capital: Phnom Penh
- Regional Affiliation: A prominent member of the Association of Southeast Asian Nations (ASEAN)
- Land Borders: Shares boundaries with **Thailand** to the west and northwest, **Laos** to the north, and **Vietnam** to the east and southeast.
- Maritime Border: Faces the Gulf of Thailand to the south, giving it access to vital sea routes and economic zones.

Geography of Cambodia: Rivers, Mountains, and More

Cambodia's diverse landscape blends river systems, mountain ranges, and lowland plains, playing a crucial role in its agriculture and biodiversity.

- Major Rivers:
 - The **Mekong River**, one of Asia's longest and most important rivers, flows through the country from north to south.
 - o The **Tonle Sap River** connects the Mekong to **Tonle Sap Lake**, Southeast Asia's largest freshwater lake and a vital ecosystem for fisheries and flood regulation.
- Mountain Ranges:
 - o **Dangrek Mountains** (forming the northern border with Thailand)
 - Krâvanh Mountains (also known as the Cardamom Mountains) in the southwest
 - o **Dâmrei Mountains** (also called the **Elephant Mountains**) in the south-central region

These highlands are home to **dense tropical forests** and rich wildlife, including endangered species like the **Indochinese tiger** and **Asian elephants**.

Strategic and Cultural Significance:

The Cambodia–Thailand border region includes **historically significant sites**, such as the **Preah Vihear Temple**, which has been at the center of past confrontations. The area holds both **cultural heritage** and **strategic value**, intensifying the stakes in any territorial disagreement.

A Brief Historical Perspective:

• The **Preah Vihear dispute** has seen periodic military and legal battles, with the **International Court of Justice (ICJ)** ruling in favor of Cambodia in 1962, and again reinforcing that decision in 2013.



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 However, disputes over surrounding lands persist, occasionally leading to armed clashes, heightening regional tension.

Looking Ahead: Diplomacy and Regional Stability

While both Cambodia and Thailand are members of **ASEAN**, the grouping's non-interference policy often limits its role in **resolving bilateral conflicts**. There is increasing international interest in the dispute due to its potential to disrupt **regional peace and cross-border trade**.

Did You Know? Cambodia is home to **Angkor Wat**, the world's largest religious monument, and a UNESCO World Heritage Site. Its architectural brilliance reflects the country's deep cultural roots and ancient Khmer empire.

Conclusion: A Nation of Rich Heritage and Strategic Importance

As Cambodia navigates both **domestic development** and **border challenges**, its role as a bridge between Southeast Asian neighbors becomes even more critical. The recent dispute underscores the importance of **dialogue**, **diplomacy**, and **regional cooperation** in maintaining peace in one of Asia's most dynamic regions.





GS Paper 2 – International Relation



India-UK Free Trade Agreement 2025: A Defining Moment in Global Economic Diplomacy

Context: In a historic development, India and the United Kingdom signed a Comprehensive Economic Trade Agreement (CETA) on July 24, 2025, during Prime Minister Narendra Modi's official visit to the UK. Accompanying the trade deal, both nations also unveiled a forward-looking strategic roadmap titled the India–UK Vision 2035, replacing the earlier Roadmap 2030.



The Vision 2035 document lays out a robust framework for cooperation across **trade**, **technology**, **climate action**, **defence**, **education**, and **innovation**, aiming to foster deeper ties grounded in **shared democratic values** and mutual economic growth.

Key Highlights of the India-UK Free Trade Agreement:

The agreement is one of India's most **comprehensive FTAs**, delivering **substantial benefits** across goods, services, and labour mobility. Here's a sector-wise breakdown:

1. Market Access: A New Era of Duty-Free Trade:

- For India: 99% of Indian exports to the UK will now enjoy zero tariffs, greatly benefiting key labour-intensive sectors.
- For the UK: 90% of tariff lines will see cuts, with 85% reaching zero-duty status within a decade.
- Sectors Benefited: Textiles, marine products, chemicals, base metals, and processed foods.
- Example: Tariffs on processed foods slashed from 70% to 0%; Indian tea, spices, rubber, and plastics gain free access.

2. Agriculture: **Boosting** Rural Prosperity:

- Zero Duties on 95%+ agricultural lines including millets, fruits, pulses, vegetables, pickles, and organic herbs.
- Could raise India's agri-exports by 20% within 3 years, supporting its \$100 billion export target by 2030.
- Sensitive products like dairy and apples remain protected.

3. Marine Sector: Coastal Economies Set to Benefit:

- **Tariff elimination** on exports like **shrimp, tuna**, and **fishmeal**.
- India currently holds just 2.25% of the UK's marine imports, leaving significant room for growth.
- Potential to transform **coastal livelihoods** and enhance marine exports to **\$5.4 billion**.

4. Textiles & Apparel: Competitive Edge Reclaimed:

- Covers over 1,140 product categories, all now duty-free.
- India poised to gain an **additional 5% market share** in UK textiles.





 Helps level the field with nations like Bangladesh and Cambodia, boosting handicrafts, carpets, and home textiles.

5. Engineering Goods: Aiming for Export Doubling:

- Presently, India exports \$4.28 billion worth of engineering goods to the UK.
- With **tariffs up to 18% removed**, exports are projected to hit \$7.5 billion by 2030.

6. Pharmaceuticals & Medical Devices: Gateway to New Markets

- Tariff-free access for generic drugs, surgical tools, and diagnostic devices like ECG and X-ray systems.
- India currently exports only **\$1 billion** in pharma to the UK, despite UK importing over **\$30 billion** globally.

7. Chemicals & Plastics: Strong Growth Forecast:

- Chemical exports projected to grow 30–40%, reaching \$750 million in FY26.
- **Plastics** (films, kitchenware, sheets) to see **15% export growth**, aided by lower input costs and enhanced pricing power.

8. Niche Sectors: Toys, Jewellery & Leather Get a Boost

- **Toys and sports goods** gain export advantage over **China and Vietnam**.
- Jewellery exports could double within 2-3 years, tapping into the UK's \$3 billion jewellery market.
- Leather and footwear exports from MSME hubs like Kanpur, Agra, Kolhapur, Chennai set to exceed \$900 million, aided by removal of 16% duties.

9. Services & Skilled Mobility: Empowering Indian Professionals

- 36 UK service sectors opened without the Economic Needs Test.
- Indian professionals can now work in 35 sectors for up to 2 years.
- **75,000 Indian workers** will be **exempt from UK social security contributions** for **3 years**, thanks to a **Double Contribution Avoidance Agreement**.
- Annual quotas set for **1,800 chefs, yoga instructors, and artists**, enhancing **cultural exchange**.

Strategic Impact of the India-UK FTA:

Expanding Trade Volumes

- Bilateral trade expected to rise by 39%, adding approximately £25.5 billion annually.
- UK's exports to India projected to surge by 60%, adding £15.7 billion by 2040.

Post-RCEP Pivot:

• After India's **2019** exit from the RCEP, this agreement reflects a strategic pivot toward Western economies such as the UK and EU.







 Aligns with India's larger agenda to build high-standard, rules-based trade partnerships with advanced economies.

Bilateral Gains:

- India strengthens key sectors while improving its global market competitiveness.
- UK gains deeper access to India's fast-growing consumer base and key export sectors like automobiles, alcohol, and technology.

Conclusion: A Turning Point in India's Trade Strategy

The India-UK Free Trade Agreement isn't just a bilateral trade deal — it's a blueprint for India's 21st-century global economic engagement. It signals India's readiness to take on complex trade negotiations, while ensuring inclusive growth, job creation, and strategic depth in foreign partnerships. The agreement places both countries on a path of shared prosperity, built on democratic values, innovation, and mutual respect.





GS Paper 2 – Governance, Constitution, Polity, Social Justice

Presidential Reference and the Supreme Court: Can Past Verdicts Be Clarified Without Being Overturned?

Context: In a significant constitutional development, the Supreme Court of India has issued notices to the Union Government and all States following a Presidential Reference under Article 143 of the Constitution. The move seeks the apex court's advisory opinion on whether courts can compel constitutional authorities like the President and Governors to act within specific timelines on Bills passed by State legislatures.



A Constitution Bench led by Chief Justice B.R. Gavai is slated to commence detailed hearings by mid-August 2025.

Background: April 2025 Judgment Under Review

This Reference stems from a landmark **April 2025 ruling** delivered in response to a petition by the **Tamil Nadu government**. In that case, the **Supreme Court ruled that the inordinate delay by Governor R.N. Ravi** in assenting to **ten State Bills**—which had been re-enacted by the legislature—was "**constitutionally impermissible**." For the first time, the Court introduced judicially enforceable timelines for both **Presidential and Gubernatorial assent** to Bills.

Following this, President Droupadi Murmu, exercising powers under Article 143(1), referred 14 constitutional questions to the Court, seeking clarity on the limits of judicial supervision over constitutional authorities.

Understanding Article 143: The Supreme Court's Advisory Jurisdiction

Article 143(1) empowers the **President** to seek the **Supreme Court's advisory opinion** on matters of **law or fact of public importance**, even if **no case is currently before the Court**.

- This provision has roots in the Government of India Act, 1935.
- It has been invoked at least 14 times since Independence, dealing with matters such as the Berubari Union, Ram Janmabhoomi, and the Collegium system.
- The Court's opinion is advisory, not binding, but carries tremendous persuasive authority.

However, **Article 145(3)** mandates that such References must be heard by a **Constitution Bench of at least five judges**, ensuring constitutional depth and balance.

Can the Supreme Court Decline a Presidential Reference?

Yes. Though Article 143 uses the word "may", implying discretion, this was judicially confirmed in the Special Courts Bill case (1978). The Supreme Court may refuse to answer, especially if the questions are:

- Hypothetical
- Purely political
- Require expert, non-legal evidence

In **Ismail Faruqui v. Union of India (1994)**, the Court declined a Reference linked to the **Ayodhya-Babri Masjid dispute**, citing **ongoing civil proceedings and political sensitivities**. Similarly, in **1982**, it refused to answer a question on a law regarding **migrant resettlement in J&K** after it was already enacted.

Are Supreme Court's Advisory Opinions Binding?

The **legal status** of advisory opinions has remained **ambiguous**:

• In **St. Xavier's College v. State of Gujarat (1974)**, the Court ruled that advisory opinions are **not binding** under **Article 141**, which covers "**law declared**" by the Court.

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- Yet in **R.K. Garg v. Union of India (1981)**, the Court treated reasoning in an advisory opinion as **binding**.
- In the Cauvery Water Disputes case (1991), the Court observed that such opinions "deserve due respect and weight" but stopped short of making them binding.

Thus, while **not enforceable**, advisory opinions **strongly guide legal and constitutional developments**.

Can the April 2025 Verdict Be Reversed Through a Presidential Reference?

Absolutely not. The Supreme Court has consistently held that a Presidential Reference cannot override or reverse a binding judgment rendered under its adjudicatory jurisdiction.

- In the Cauvery Water Disputes case, the Court clarified that Article 143 is not a backdoor for review.
- The only legal route to challenge a final verdict is through a **review petition or curative petition**, as per Articles 137 and 142.

However, the Court may use the **Reference to clarify or expand on its legal reasoning**, as seen in:

- **1998 Collegium case**, where clarification led to modifications in the appointment process of judges.
- Natural Resources Allocation case (2012), where the Court clarified the meaning of "auction" in the allocation of national resources without altering its earlier rulings.

What This Means for the Future:

While the **April 2025 decision remains final and enforceable**, the present Reference provides an opportunity for the Supreme Court to elaborate its constitutional reasoning, especially regarding the doctrine of separation of powers, the scope of judicial review, and the autonomy of constitutional functionaries.

Crucially, the **14 questions** raised in the current Reference go beyond the Tamil Nadu case, potentially impacting **ongoing cases in Kerala**, **Punjab**, and other States where Governors have allegedly delayed assent to Bills.

Additional Insight: Why This Matters Now

In recent years, there has been growing friction between **State governments and Governors**, particularly in non-BIP-ruled States. Governors have increasingly been accused of withholding or delaying assent for political or ideological reasons, raising serious concerns about federal balance and legislative sovereignty.

This Presidential Reference could, therefore, play a **pivotal role in shaping the contours of Indian federalism**, reaffirming or redefining the powers and duties of Governors and the President in a parliamentary democracy.

Conclusion: The upcoming hearings on this **Presidential Reference** are more than a legal formality—they are a constitutional moment. While the Supreme Court cannot and will not undo its April 2025 verdict, it holds the power to clarify critical constitutional doctrines that will shape the functioning of State legislatures, the **Union executive, and India's democratic ethos** for years to come.





GS Paper 3 - Defence & Science & Technology

MiG-21 Bison: India's Iconic Fighter Jet Nears Final Flight

Context: The **Indian Air Force (IAF)** is preparing to bid farewell to one of its most iconic aircraft — the **MiG-21 Bison**. By **September 2025**, the last of these Russian-origin fighter jets will be retired from service, bringing an end to over **six decades of operational legacy**. The retirement marks the closure of a historic chapter in India's military aviation.



A Supersonic Trailblazer: First of Its Kind in India

The **MiG-21** was the **first supersonic jet** to be inducted into the Indian Air Force, entering service in **1963**. Designed by the **Mikoyan-Gurevich Design Bureau** of the **former Soviet Union**, it became a symbol of India's aspirations for aerial dominance during the Cold War era.

- India acquired license production rights from the USSR and went on to **build 657 MiG-21s** domestically through **Hindustan Aeronautics Limited (HAL)**.
- It remains the second most produced fighter aircraft in the world, after the American F-4 Phantom.

Known by Many Names, Feared by Many Adversaries

The aircraft earned several nicknames across the globe:

- NATO reporting name: Fishbed
- 'Balalaika' due to its triangular wing design resembling the Russian string instrument
- 'Ołówek' (Polish for "pencil") for its slender fuselage
- 'Én Bac' (Vietnamese for "silver swallow") for its agility and shine

Its unique delta-wing configuration and compact build made it ideal for high-speed interception and dogfights.

A Veteran of Every Indian Conflict Since 1963:

The **MiG-21** has participated in **almost every conflict India has faced** post-independence:

- 1965 India-Pakistan War
- 1971 Indo-Pak War, including the creation of Bangladesh
- **Kargil War of 1999**, where it was used for ground-attack roles
- **Balakot Airstrikes in 2019**, where a MiG-21 Bison famously engaged in aerial combat with Pakistani F-16s
- Operation Sindoor a recent mission that further added to its combat résumé

With these engagements, the MiG-21 has arguably seen **more combat than any other fighter in Indian service**.

A Machine of Mixed Legacy: Power and Controversy

While the MiG-21 holds a **glorious record in air defense**, it has also drawn criticism for its **high accident rate** in later years. Often referred to in headlines as the "Flying Coffin", the aging aircraft has suffered from **maintenance challenges**, **outdated avionics**, and **pilot safety issues**.

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Over **400 accidents involving MiG-21s** have been reported since their induction, raising questions about continued reliance on an aging fleet. However, in its early decades, it was considered cutting-edge and unmatched in speed and maneuverability.

Why the Retirement Matters:

The retirement of the MiG-21 reflects a **generational shift in India's airpower** strategy:

- The IAF is now modernizing its fleet with Rafale, LCA Tejas, and plans for fifth-generation stealth aircraft under the AMCA (Advanced Medium Combat Aircraft) project.
- The phase-out of the MiG-21 opens the way for newer technologies, enhanced safety, and improved battlefield effectiveness.

Did You Know?

- The MiG-21 holds the record for being the **longest-serving combat aircraft** in the history of the IAF.
- Globally, over **11,000 MiG-21s** were built making it **one of the most mass-produced jet fighters** ever.
- Apart from India, it served in over 60 countries, including Vietnam, Egypt, Libya, Poland, and North Korea.
- The MiG-21 was one of the first aircraft capable of achieving Mach 2 speed, which is twice the speed of sound.

The End of an Era, but a Legacy That Will Fly Forever

As the Indian Air Force prepares to send off the MiG-21 Bison, it is more than just the retirement of an aircraft — it is the **farewell of a legend** that shaped India's skies for decades. It trained generations of pilots, defended the nation in its darkest hours, and became an indelible part of India's military and strategic history.

The MiG-21 may soon stop flying, but its legacy will remain etched in the annals of Indian aviation for generations to come.





GS Paper 3 – Environment and Disaster Management



Sea Slugs: Nature's Colorful Marvels Revealing New Secrets

Context: In an exciting discovery for marine biology, scientists have recently identified two previously unknown species of wart sea slugs off the coast of **North Sulawesi**, **Indonesia**. These new species—**Phyllidia** ovata and Phyllidia fontjei—have now been formally described, adding to the rich biodiversity of the Indo-Pacific region. The find highlights the undiscovered potential of coral reef ecosystems, which continue to surprise researchers with their hidden wonders.



What Are Sea Slugs?

Commonly referred to as **sea slugs**, these fascinating creatures are part of a group called **nudibranchs**—a type of soft-bodied marine mollusc belonging to Phylum Mollusca and Class Gastropoda. Found in oceans worldwide, from shallow tropical reefs to the deepest trenches, sea slugs have evolved into some of the most visually striking animals on Earth.

Nature's Living Rainbows:

Sea slugs are famous for their vibrant colours, bold patterns, and fluid movements—traits that are not just beautiful but also **defensive**. Their dazzling appearances often act as **warning signals** to predators, as many species are highly toxic.

- Their toxicity is often acquired from their diet, especially from sponges, jellyfish, and anemones.
- Some can even retain the stinging cells (nematocysts) of jellyfish and use them as defense mechanisms.

Naked but Not Defenseless:

Unlike other molluscs, sea slugs lack external shells, which is why they're sometimes described as "naked **snails.**" Despite this, they have adapted **incredible survival mechanisms**:

- **Photosynthetic Abilities**: Some species, like *Elysia chlorotica*, can **photosynthesise** by incorporating **chloroplasts** from the algae they consume—a phenomenon known as **kleptoplasty**.
- Gene Theft: Certain sea slugs can steal genes from their prey and incorporate them into their own DNA.
- **Limb Regeneration**: In some species, **lost body parts can regenerate**, adding another layer to their survival toolkit.

Ecological Importance of Sea Slugs:

Sea slugs are more than just eye-catching marine creatures. They play a **vital ecological role** in **coral reef** ecosystems:

- Their presence is often a **positive indicator of coral health**.
- They help **control populations of algae and sponges**, contributing to **reef balance**.
- Some even act as **bioindicators**—their **sensitivity to pollution and climate change** helps scientists monitor reef health.

Behaviours and Lifestyle:





- Feeding Habits: These slow grazers feed on algae, hydroids, small invertebrates, and even other nudibranchs.
- **Diurnal and Nocturnal**: While many species are **active during the day**, some are **nocturnal** and venture out under the cover of darkness.
- **Reproduction**: Sea slugs are **simultaneous hermaphrodites**, meaning they carry both male and female reproductive organs, often exchanging roles during mating.

A Field of Endless Discovery:

With over **3,000 known species** and more being discovered regularly, sea slugs continue to captivate scientists and divers alike. The discovery of **Phyllidia ovata** and **Phyllidia fontjei** is a **reminder of how much remains unexplored** beneath the waves.

Conclusion: Small Creatures, Big Impact

Sea slugs, despite their delicate and miniature appearance, represent some of the **most complex and adaptive life forms** in the ocean. Their **brilliant adaptations**, **striking appearance**, and **ecological importance** make them a symbol of the **hidden intelligence and beauty of marine life**.





GS Paper 1 - Geography



Kanniyakumari Wildlife Sanctuary: A Biodiversity Hotspot at India's Southern Tip

Context: In a remarkable revelation highlighting the sanctuary's rich biodiversity, a **research scholar recently documented around 450 species of moths** at the **Kanniyakumari Wildlife Sanctuary**. This discovery emphasizes the ecological significance of the region and showcases its potential for **scientific research and conservation**.



Location: Where Land Meets Three Seas

The Kanniyakumari Wildlife Sanctuary is located in Kanyakumari district, Tamil Nadu, near the southernmost tip of mainland India. It lies at the unique confluence of the Arabian Sea, Bay of Bengal, and Indian Ocean, making it not only geographically important but also ecologically diverse.

- To the north, the sanctuary shares its boundary with the Kalakkad Mundanthurai Tiger Reserve.
- To the south, it is flanked by the Kodayar left bank channel and the Thovalai channel.
- To the west, it borders the state of Kerala.

Lifeline Rivers and Lush Landscapes:

The sanctuary is the **origin point for seven rivers**, including the well-known **Pahrali** and **Thamirabarani** rivers. These rivers play a vital role in supporting **agriculture**, **biodiversity**, **and the livelihoods of local** communities.

Diverse Vegetation Covering Multiple Ecozones:

The natural vegetation of Kanniyakumari Wildlife Sanctuary spans across several ecological zones:

- Southern thorn forests
- Dry and moist deciduous forests
- Semi-evergreen and evergreen hill sholas
- Grassy hilltops and downs

This variety in vegetation supports an equally wide array of **flora and fauna**, making it one of the **most ecologically rich sanctuaries in southern India**.

Rich and Rare Fauna: A Sanctuary for the Wild

The sanctuary provides safe haven to several **threatened and endemic species**, including:

- Indian Bison (Gaur)
- Asiatic Elephant
- **Nilgiri Tahr** an endangered mountain goat species found only in the Western Ghats
- Sambar Deer
- **Lion-tailed Macague** one of the most endangered primates in the world

In addition to these, the forest is also home to **reptiles like the Indian Rock Python**, and now, as revealed, **hundreds of moth species**, many of which are indicators of **healthy ecosystems**.

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Home to Indigenous Communities:

Several **tribal communities** reside in the **reserve forests adjacent to the sanctuary**, living in close harmony with nature. Their **traditional knowledge** of the forests and sustainable practices are an **integral part of the sanctuary's cultural heritage**.

Conservation Significance:

- The sanctuary lies within the **Western Ghats**, which is one of the **eight "hottest hotspots" of biodiversity in the world**, as declared by Conservation International.
- It forms a crucial part of the **Agasthyamalai Biosphere Reserve**, contributing to the conservation of rare and endemic species.
- The discovery of 450+ moth species serves as an indicator of the sanctuary's excellent environmental health, as moths play key roles in pollination, food webs, and ecosystem stability.

Did You Know?

- Kanniyakumari district is the only place in India where you can watch the sunrise and sunset over the ocean from the same spot.
- The region is home to **Agasthiyar Malai**, a sacred peak named after the sage Agastya and considered one of the oldest geological formations in the country.

Conclusion: A Sanctuary Worth Protecting

The **Kanniyakumari Wildlife Sanctuary** is much more than just a green expanse—it's a living mosaic of **natural wonders, ancient forests, cultural richness, and ecological balance**. As new species continue to be discovered, its importance as a **biodiversity reserve** and **conservation model** becomes ever clearer.

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GS Paper 3 - Digital Economy



Unified Payments Interface (UPI): India's Digital Payment Revolution Gains Global Recognition

Context: The **International Monetary Fund (IMF)**, in its recent report titled "Growing Retail Digital Payments: The Value of Interoperability," has **praised the Unified Payments Interface (UPI)** for revolutionizing India's digital payments ecosystem. The IMF emphasized UPI's **interoperable design**, calling it a model for developing countries aiming for **inclusive and scalable payment systems**.



What is UPI? A Game-Changer in Digital Transactions

The **Unified Payments Interface (UPI)** is a **real-time payment system** developed by the **National Payments Corporation of India (NPCI)**. It allows users to **link multiple bank accounts** in a single app to **send and receive money instantly**, without needing to input card or bank details repeatedly.

- Dual Functionality: UPI supports both push (sending) and pull (receiving) transactions using a Virtual Payment Address (VPA), offering high convenience and security through two-factor authentication.
- Built on Robust Tech: It leverages the Immediate Payment Service (IMPS) and integrates with the Aadhaar Enabled Payment System (AePS).
 - IMPS enables fast fund transfers using mobile numbers and account details.
 - o **AePS** allows Aadhaar-based services like cash withdrawal, deposits, and balance checks through biometric verification.

BHIM App: India's UPI at Your Fingertips

The **BHIM** (Bharat Interface for Money) app, launched by NPCI, is a flagship **UPI-based mobile** application designed to promote easy, secure, and fast transactions—especially in rural and semi-urban India.

How UPI Reshaped India's Digital Economy:

Unprecedented Growth and Reach

- In June 2025 alone, UPI processed 24.03 lakh crore across 18.39 billion transactions.
- UPI now caters to **491 million users** and **65 million merchants**, connecting **over 675 banks**.
- It has become the **world's largest real-time payments platform**, handling **over 640 million daily transactions**, surpassing global giants like **Visa**.

Seamless Interoperability Across Apps and Banks:

UPI broke the limitations of **closed-loop systems** (like individual digital wallets), enabling users to **transact across different apps and banks** with ease.

- This platform-agnostic model fosters innovation, improves competition, and enhances user experience.
- **QR codes** powered by UPI are now commonplace, making **cashless payments effortless even at local shops and street vendors**.

Empowering Financial Inclusion:

One of UPI's most transformative roles has been in **bridging the financial divide**:

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- With zero-cost and real-time transfers, UPI has made digital payments accessible to small vendors, self-employed individuals, and first-time users.
- It has empowered **kirana stores**, **gig workers**, **and rural communities**, while also **boosting digital literacy and trust** in financial systems.

UPI's Global Footprint Expands:

India's digital diplomacy has taken UPI across borders. It is now live in 7 countries:

- UAE, Singapore, Bhutan, Nepal, Sri Lanka, France, and Mauritius.
- Its launch in France marked UPI's European debut.
- India is actively promoting UPI integration within **BRICS nations**, aiming to ease **cross-border remittances and payments** for Indian migrants and travelers.

Digital Backbone Behind UPI's Success:

The rise of UPI wasn't an overnight miracle—it stands on a **strong digital foundation** known as the **JAM Trinity**:

1. Jan Dhan Yojana (Financial Inclusion):

- Over **55.9 crore bank accounts** opened under Jan Dhan as of July 2025.
- Enabled direct benefit transfers (DBTs) and brought millions into the formal banking system.

2. Aadhaar (Digital Identity):

- Over **142 crore Aadhaar IDs** issued by June 2025.
- Enabled secure, biometric-based authentication, facilitating digital governance and payments.

3. Mobile Connectivity:

- India now boasts one of the world's fastest-growing 5G networks, with 4.74 lakh base stations
 covering nearly all districts.
- **Mobile data costs** dropped from 308/GB in 2014 to just 9.34 in 2022, making internet access highly affordable.
- Over **116 crore mobile subscribers** now use mobile-based financial services, many for the first time.

Did You Know?

- UPI handles more than **85% of India's digital retail payments** and accounts for **almost half of global real-time transactions**.
- Several African and Southeast Asian nations are studying the **UPI model** to replicate it for their financial inclusion goals.
- India's RuPay card and UPI system have begun integrating to create a seamless **card-to-app transaction ecosystem**.

Conclusion: UPI - A Blueprint for Digital Transformation

The **Unified Payments Interface** has transformed how India **pays, banks, and transacts**, becoming a symbol of **self-reliant innovation** and **inclusive digital progress**. As it expands globally, UPI stands not just as a **technological success**, but as a **model for empowering people through digital infrastructure**.





GS Paper 3 - Biodiversity and Environment



Lantana Camara: A Beautiful Menace Threatening India's Forest Ecosystems

Context: The invasive plant **Lantana camara**, once introduced in India as an **ornamental shrub**, has now become a serious ecological threat. Recent reports reveal that it has infested nearly 3.25 lakh hectares of forest land in Himachal Pradesh alone, severely endangering native **biodiversity** and disrupting the natural balance of ecosystems.



What is Lantana Camara?

Lantana camara is an **invasive alien species** that has spread rapidly across the **tropical and subtropical regions** of India.

- Originally native to Central and South America, it belongs to the Verbenaceae family.
- It was first introduced in India during the early 1800s by the British for use in gardens and **hedges** due to its vibrant, colorful flowers.
- However, over time, it has **escaped cultivation** and now grows **wild**, covering vast stretches of forest and grassland.

Rapid Spread and Invasion Pattern:

Lantana grows **aggressively**, forming **dense thickets** that block sunlight and suppress the growth of other plant species.

- Its invasion pattern shows an alarming trend—it spreads from low-lying regions to higher altitudes, gradually conquering hills and forested slopes.
- In India, Lantana has now become **one of the most widespread invasive weeds**, especially across the Western Ghats, central India, and the Himalayan foothills.

Ecological Consequences:

The presence of **Lantana camara** in forested areas leads to a **significant decline in native flora and fauna**.

- It **releases allelochemicals**—toxic compounds that **inhibit the germination and growth** of nearby native plants.
- This results in **monoculture-like conditions**, reducing **plant diversity**, and in turn, affecting **insects, birds, and other wildlife** that depend on indigenous vegetation.
- **Forest regeneration slows down**, and in extreme cases, native species may **disappear entirely**.

Socio-Economic and Agricultural Impact:

Lantana not only impacts biodiversity but also poses threats to agriculture and rural livelihoods:

- It **invades grazing lands**, reducing fodder availability for livestock.
- Farmlands adjacent to forested areas are vulnerable to its spread, forcing farmers to spend on manual or chemical removal.
- It increases **forest fire risks**, as the plant's **woody biomass** is highly **flammable during dry seasons**.

Can Lantana Be Managed? Turning a Threat into a Resource

Despite its destructive nature, Lantana's biomass holds **potential for productive use**, if managed wisely:



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- Its wood can be used to make low-cost furniture, handicrafts, and fuelwood.
- When processed properly, its **leaves and stems** can be converted into **organic compost and vermicompost**—a sustainable alternative to **chemical fertilizers**.
- Livelihood programs in parts of India, including Madhya Pradesh and Uttarakhand, have begun engaging local communities in Lantana removal and biomass utilization, offering employment and environmental restoration.

Interesting Fact: From Poisonous Shrub to Useful Product

While **toxic to many animals**, certain parts of the Lantana plant are being **experimented with in biopesticide research**. In some regions, Lantana extract has been shown to **repel insects** and may serve as an **eco-friendly pest control solution**.

Conclusion: The Dual Nature of Lantana

Lantana camara is a classic example of how a **non-native species**, when unchecked, can **outcompete native biodiversity** and alter entire ecosystems. While its **vivid flowers** may deceive the eye, its ecological impact is far from beautiful.

Yet, with **innovative management strategies**, **community participation**, and **scientific research**, India can transform this invasive threat into a **valuable resource**—protecting both nature and livelihoods in the process.





GS Paper 3 – Economy



Context: India has witnessed a remarkable surge in Intellectual Property (IP) filings, recording a 44% growth over the past five years. The total filings rose from 4,77,533 in 2020–21 to 6,89,991 in 2024–25, showcasing the country's expanding innovation landscape and growing awareness of Intellectual Property Rights (IPRs).



Breaking Down the Growth: Geographical Indications Lead the Way

Among the various categories of IP, **Geographical Indications (GIs)** have seen the **highest increase**—a staggering **380% rise**. This is followed by:

- Industrial Designs: 266% growth
- Patents: 180% increase
- Copyrights: 83% rise
- Trademarks: 28% growth
- Semiconductor Integrated Circuits Layout-Designs (SICLD): 20% increase

This exponential rise is a testament to **India's growing culture of innovation and creativity**, supported by robust government initiatives.

What is Intellectual Property?

Intellectual Property is defined as the "Product of the Mind"—creations of human intellect in industrial, scientific, literary, and artistic fields. It includes:

- Patents
- Copyrights
- Trademarks
- Industrial Designs
- Geographical Indications
- Layout Design of Integrated Circuits
- Protection of Plant Varieties & Farmers' Rights
- Trade Secrets / Undisclosed Information

IP Rights grant the **exclusive legal ownership** of these innovations to the creator for a **limited time**, promoting innovation by rewarding **human ingenuity and creativity**.

Key Insight: Are Indian Patents Valid Globally?

No, patents are **territorial rights**, meaning an **Indian patent is only valid within India**. To secure protection abroad, applicants must apply for patents in each individual country, often via the **Patent Cooperation Treaty (PCT)** mechanism for streamlined global filings.

Government Support: Driving IP Growth

India's transformation into an IP-conscious nation is propelled by landmark policy initiatives and technology adoption:

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- **National IPR Policy (2016)**: A comprehensive framework to promote and protect all forms of IP under a unified vision.
- **CIPAM**: The **Cell for IPR Promotion and Management**, coordinates the policy's implementation.
- National Intellectual Property Awareness Mission (NIPAM): Spreads IP literacy and basic training across schools and colleges.
- Startups Intellectual Property Protection (SIPP) Scheme: Offers free legal and technical support to startups for filing patents, trademarks, and design applications.
- AI & ML-based Trademark Search Tools: Enhance efficiency and accuracy in trademark examination.
- **Atal Innovation Mission (AIM)**: Established by **NITI Aayog** to foster entrepreneurship and innovation, including:
 - Atal Tinkering Labs
 - Atal Incubation Centres
 - Atal New India Challenges
 - Mentor India Program

Additional Insight: India on the Global IP Map

India now ranks among the **top 10 patent-filing countries** globally and is steadily improving its position in the **Global Innovation Index**. This is a strong indicator of the nation's shift towards an **innovation-driven economy**, especially in sectors like **pharmaceuticals**, **biotechnology**, **information technology**, and **renewable energy**.

Conclusion: A Promising Future for Innovation in India

The sharp rise in IP filings reflects **India's deepening culture of innovation, creativity, and entrepreneurship**. With continued government support, legal reforms, and awareness programs, India is well on its way to becoming a **global IP powerhouse**. This momentum aligns seamlessly with India's broader goals of **economic transformation**, **self-reliance (Atmanirbhar Bharat)**, and **sustainable development through innovation**.





GS Paper 3 - Science & Technology



WiFEX Marks a Decade of Scientific Excellence in Fog Forecasting

Context: India's pioneering **Winter Fog Experiment (WiFEX)** has successfully completed **ten years** of groundbreaking research into **North India's dense winter fog** — a natural phenomenon that disrupts the daily lives of millions during the colder months.



Launched in the winter of 2015 at Indira Gandhi International Airport (IGIA), New Delhi, this unique initiative was spearheaded by the Indian

Institute of Tropical Meteorology (IITM) under the **Ministry of Earth Sciences (MoES)**. It was executed in collaboration with the **India Meteorological Department (IMD)** and the **National Centre for Medium Range Weather Forecasting (NCMRWF)**.

What is WiFEX? A Global-Scale Effort on Fog

WiFEX is among the **world's few long-term open-field research projects** dedicated exclusively to the study of **winter fog** — particularly across the **Indo-Gangetic Plain**, where thick fog frequently causes **major delays and accidents in air, rail, and road transportation**.

Key Objectives of WiFEX:

- To develop accurate now-casting (within 6 hours) and short-to-medium-range forecasts of winter fog.
- To minimize the economic losses and life-threatening risks posed by dense fog, particularly in the aviation and transport sectors.
- To aid in policy formulation and disaster preparedness by providing timely and precise information.

How the Experiment Was Conducted:

Scientists under WiFEX deployed an array of advanced instruments, including:

- Micrometeorological towers
- Ceilometers (used to detect cloud base and fog layers)
- High-frequency sensors

These tools were used to collect high-resolution data on:

- Temperature stratification
- Relative humidity
- Wind patterns
- Turbulence
- Soil heat flux
- Aerosol concentration

This rich dataset enabled researchers to understand the **complex physical mechanisms** behind the **formation, duration, and dissipation** of winter fog.

Game-Changing Output: High-Resolution Fog Prediction Model

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A major achievement of WiFEX has been the development of a high-resolution (3 km) probabilistic fog forecasting model. This tool is now considered one of the most advanced fog prediction systems in South **Asia**, boasting over **85% accuracy** in predicting **very dense fog** (visibility below 200 meters).

It can forecast:

- When fog will start
- How dense it will become
- How long it will last
- · When it will lift

Broader Impact: Saving Lives, Boosting the Economy

The insights and tools developed under WiFEX are already helping in:

- Reducing flight delays and train cancellations
- **Enhancing road safety** by informing early-morning commuters
- **Protecting lives** by enabling better emergency planning and traffic management
- **Improving energy efficiency** by optimizing power plant operations that are sensitive to weather

Did You Know?

India experiences some of the densest and most persistent fog events in the world, particularly between **December and February**, affecting cities like Delhi, Amritsar, Lucknow, and Patna. In recent years, climate variability has made fog prediction even more crucial.

Conclusion: A Vision for Safer Winters

With ten successful years behind it, WiFEX has transformed India's fog forecasting capabilities and placed the country at the forefront of atmospheric research. Its findings continue to contribute to global climate models and pave the way for a safer, smarter, and more prepared India in the face of winter weather hazards.

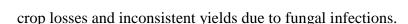




GS Paper 2 - Bio-technology, Environment and Disaster Management

Breakthrough in Pineapple Protection: Indian Scientists Discover Gene to Combat Fusariosis

Context: In a major leap for agricultural biotechnology, **Indian researchers have identified a crucial gene in pineapple** that may offer an effective and sustainable defence against **Fusariosis**, a devastating fungal disease threatening pineapple crops across the country. This discovery marks a significant step forward for farmers struggling with





Understanding Fusariosis: A Hidden Threat to Pineapple

Fusariosis is caused by the aggressive fungus *Fusarium moniliforme*, one of the **most destructive pathogens** in pineapple cultivation. It attacks the plant's **stem**, causes **blackening of leaves**, and **rots the fruit internally**, often making it unmarketable.

This disease not only slashes productivity but also leads to **serious economic losses** in key pineapple-producing regions.

Research Highlights: Gene Discovery Brings Hope

Traditional plant breeding methods have long struggled to outpace fast-evolving fungal pathogens. But this latest research brings new hope:

- Scientists focused on the Somatic Embryogenesis Receptor Kinase (SERK) family of genes, known for boosting plant immunity and stress tolerance.
- Specifically, they zeroed in on the AcSERK3 gene, a natural component of the pineapple's genome.
- By **overexpressing AcSERK3**, researchers significantly **enhanced the plant's immune response**, empowering it to resist **Fusarium infection** more effectively.

This advancement could lead to the development of **disease-resistant pineapple varieties**, reducing dependency on chemical fungicides and increasing farm resilience.

Pineapple at a Glance: India's Tropical Treasure

- Scientific name: Ananas comosus L. Merr.
- Family: Bromeliaceae
- Climate: Grows best in 15–30°C; drought-tolerant due to specialized water-storage cells
- Rainfall requirement: 600–2500 mm annually (optimal: 1000–1500 mm)
- Soil: Adapts to various soils but cannot withstand waterlogging
- **Cropping patterns**: Can be cultivated as a **monocrop** or **intercrop** in **coconut plantations**

Major Pineapple-Producing Regions:

In India, key pineapple-growing states include:

- Assam, Meghalaya, Tripura, Manipur
- West Bengal, Kerala, Karnataka, Goa

Globally, top producers are:





Thailand, Philippines, Brazil, China, Nigeria, Mexico, Indonesia, Colombia, and the United States India is among the top 10 pineapple-producing countries, and this gene discovery may help enhance its competitiveness on the global stage.

Did You Know?

Pineapples contain bromelain, a natural enzyme known for its anti-inflammatory and digestive properties. Beyond being a tropical delicacy, it also holds medicinal value and is used in cosmetics, health supplements, and food processing.

Conclusion: A Step Toward Resilient Farming

The identification of the **AcSERK3 gene** is a potential game-changer for India's pineapple industry. With continued research and field trials, this breakthrough may pave the way for the development of fungusresistant pineapple varieties, ensuring higher yields, better fruit quality, and sustainable farming practices.





GS Paper 1 - Geography



Vanuatu in Focus: Island Nation Leads Global Push for Environmental Justice

Context: The Pacific island country of **Vanuatu** has recently made headlines for taking a bold step in global climate advocacy. The nation has formally approached the **International Court of Justice** (ICJ), seeking legal recognition of environmental destruction as "ecocide" — a move aimed at holding polluters accountable for the degradation of nature.

This pioneering action places Vanuatu at the forefront of international environmental diplomacy, signaling a growing demand for legal mechanisms to address climate-related harms.

Where is Vanuatu?

Vanuatu is a picturesque **archipelago** in the South Pacific Ocean, located:

- East of northern Australia
- West of Fiji
- It is part of the **Melanesian subregion** of Oceania

The **capital city** is **Port Vila**, situated on the island of **Efate**.

Geographical Highlights:

The islands of Vanuatu are primarily of **volcanic origin**, resulting in:

- **Mountainous** interiors
- Narrow coastal plains
- Frequent seismic and volcanic activity

Major islands include:

- **Espiritu Santo** (largest)
- Malakula
- **Efate** (home to the capital)

Vanuatu's location gives it a vast Exclusive Economic Zone (EEZ) in the South Pacific, rich in marine biodiversity and fisheries — critical to its economy and food security.

Political and Environmental Significance:

- Vanuatu is a parliamentary democracy and a member of numerous international organizations, including the United Nations, Pacific Islands Forum, and Commonwealth of Nations.
- The country is especially vulnerable to **climate change**, with rising sea levels, cyclones, and coral bleaching posing existential threats.
- Its recent appeal to the ICI underscores a growing movement among small island developing states (SIDS) to demand legal accountability from major polluting nations and industries.

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- Vanuatu is ranked as one of the **most disaster-prone countries** in the world due to its exposure to **tropical cyclones, earthquakes, tsunamis, and volcanic eruptions**.
- Despite its challenges, Vanuatu is known for its rich cultural heritage, with over 100 indigenous languages spoken making it one of the most linguistically diverse countries per capita.

Conclusion: A Voice from the Pacific

Through its environmental leadership, **Vanuatu is amplifying the voice of vulnerable nations** on the world stage. By pushing for the recognition of **ecocide as a crime under international law**, this island nation is not only safeguarding its own future but also inspiring a **global movement for climate justice and environmental accountability**.





GS Paper 3 – Environment, Ecology, Biodiversity, and Climate Change



Arctic Under Threat: Unprecedented Winter Warming Raises Global Alarms

Context: In **February 2025**, the **Arctic archipelago of Svalbard** experienced unusually high air temperatures and even rainfall, triggering widespread **snowmelt** and the **pooling of meltwater** — an event rarely seen in the heart of the Arctic winter. This extreme weather event highlights the growing impact of **human-induced climate change** in one of the most sensitive regions on Earth.



Arctic Amplification: Why the Arctic is Warming Faster

The Arctic is warming more than twice as fast as the global average, a phenomenon known as Arctic Amplification. This accelerated warming is the result of multiple interconnected feedback processes:

- Reduced Albedo Effect: As ice and snow melt, they are replaced by darker ocean waters and **exposed land**, which **absorb more sunlight** instead of reflecting it. This **increases heat absorption**, leading to even more ice loss—a classic positive feedback loop.
- Lapse Rate Feedback: In polar regions, greenhouse gas-induced warming is concentrated near the surface, unlike in the tropics where heat disperses vertically. This makes the surface warming in the Arctic far more intense.
- Water Vapour's Triple Threat:
 - Acts as a powerful greenhouse gas
 - Creates cloud cover that traps heat
 - Releases latent heat during condensation, further boosting temperatures
- **Atmospheric Heat Transport**: Warmer, **moisture-laden air from the tropics** is now traveling more frequently to the Arctic, delivering additional heat and disrupting the region's energy balance.

Consequences of Arctic Amplification: A Global Ripple Effect

Accelerated Climate Change:

Thawing permafrost is releasing long-trapped **carbon dioxide and methane**, powerful greenhouse gases that are intensifying global warming.

Ecological Disruption:

- Rain-on-snow events in winter can remove the insulating snow cover, exposing tundra vegetation and microbial life to damaging freeze-thaw cycles.
- This impacts local wildlife like **caribou and Arctic foxes**, which depend on stable snow conditions for survival.

Impact on India and the Global South:

- **Indian Monsoon Disruption**: Research shows that **declining Arctic sea ice** is linked to **stronger**, more erratic monsoons in South Asia, increasing the frequency of extreme rainfall events and floods.
- **Sea-Level Rise**: Melting Arctic ice contributes to rising sea levels, threatening **coastal cities** like Mumbai, Chennai, and Kolkata, and increasing the salinization of agricultural land.
- **Socioeconomic Consequences:**





- Crop losses due to erratic weather patterns
- o **Public health challenges** from heatwaves and waterborne diseases
- Infrastructure damage due to flooding and storms

Did You Know?

- The Arctic is now warming at nearly **four times the global average**, according to recent satellite data
 a rate that continues to outpace even the most alarming predictions.
- A study by the **Intergovernmental Panel on Climate Change (IPCC)** notes that Arctic amplification will continue even if **emissions are significantly reduced**, making **adaptation planning essential**.

Conclusion: The Arctic is the Planet's Early Warning System

The **Arctic's rapid winter warming** is not a distant or isolated event — it's a **clear signal of accelerating climate breakdown**. What happens in the Arctic doesn't stay in the Arctic. It has far-reaching impacts on **global weather, ecosystems, food systems,** and **human security**.

The urgent need now is for **strong international climate action**, **emissions reduction**, and **resilient adaptation strategies** — before the Arctic, and the world, crosses irreversible tipping points.





GS Paper 3 – Investment models and Planning



World Bank Urges Massive Investment in Green and Resilient Urban Infrastructure for India

Context: A recent World Bank report, titled 'Towards Resilient and **Prosperous Cities in India**', emphasizes the urgent need for India to invest \$2.4 trillion in climate-resilient and green urban **infrastructure** by **2050**. As Indian cities expand rapidly, the report highlights both the immense opportunity and the critical risk posed by climate change to the nation's urban future.



India's Urban Transition: Growth with Vulnerabilities

India is experiencing an unprecedented urban transformation:

- In **2020**, cities were home to over **480 million people**, accounting for **more than one-third** of the national population.
- By **2050**, the urban population is projected to **double to 951 million**, making India one of the most urbanized nations globally.
- Between 1985 and 2015, urban settlements in high flood-risk zones increased by 102%, highlighting a trend of unsafe expansion.
- By 2030, urban areas are expected to generate 70% of new jobs and contribute around 75% to India's GDP by 2050.

This rapid growth, however, makes Indian cities increasingly vulnerable to **climate-induced shocks**.

Climate Risks Facing Indian Cities:

Indian cities are facing a dual threat of **flooding** and **extreme heat**:

- Flooding: Due to climate change and increased impermeable surfaces, cities may see a 3.6 to 7-fold rise in pluvial (surface water) flooding by 2070.
- **Heat Stress:** By **2050**, nearly **20% of working hours** in major urban centers could be lost due to **extreme heat**, directly impacting labor productivity and public health.

A Roadmap for Climate-Resilient Urban Development

The World Bank report lays out a comprehensive action plan for Indian cities to become **climate-smart and** inclusive:

Risk-Informed Planning:

- Integrate climate and disaster risk assessments into urban land-use planning
- Develop **hazard-specific investment strategies** at the local level

Protecting the Urban Poor:

- Identify and support **vulnerable populations** in informal settlements
- Expand **local climate adaptation programs** for low-income communities

Sustainable Urban Expansion:

- Encourage compact urban growth through transit-oriented development
- Promote energy-efficient technologies such as LED streetlights

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Restrict development in climate-sensitive zones

Resilient Urban Services:

- Upgrade municipal water systems to enhance energy and water efficiency
- Invest in low-carbon solid waste management (SWM) practices
- Build **cooler cities** through green roofing, urban forests, and permeable pavements

Private Sector Participation:

- Facilitate the role of **private enterprises in risk financing**, insurance, and resilience-building
- Create **public-private partnerships** for green infrastructure development

Did You Know?

India's cities already account for more than **two-thirds of energy demand**, and with rising temperatures, **energy consumption in urban cooling alone** could **triple by 2050**. Investing in **green infrastructure today** could drastically cut future energy costs and emissions.

Conclusion: Investing Today for a Sustainable Tomorrow

India stands at a critical crossroads. With **urbanization** accelerating and **climate threats intensifying**, the choices made today will define the **livability**, **safety**, **and prosperity** of its cities for decades to come. The **\$2.4 trillion investment** in **resilient**, **inclusive**, **and low-carbon urban infrastructure** is not just a necessity — it's an opportunity to build cities that are **future-ready**, **climate-resilient**, and **economically vibrant**.









GS Paper 2 – Governance, Constitution, Polity, Social Justice

Kashi Declaration: Paving the Way for a Drug-Free India

Context: India took a significant step toward building a **Nasha Mukt Bharat** (**Drug-Free India**) with the adoption of the **Kashi Declaration**, a comprehensive five-year strategy unveiled during the **Youth Spiritual Summit in Varanasi**. The declaration represents a collective national vision to combat the growing menace of drug abuse through a **holistic and inclusive approach**, blending governance, spirituality, technology, and social reform.



Highlights of the Kashi Declaration:

The **Kashi Declaration** signals a paradigm shift in how India addresses substance abuse—not merely as a legal issue but as a **multi-dimensional public health and societal challenge**. Key elements include:

- Whole-of-Government and Whole-of-Society Approach: Recognizing that no single entity can solve the crisis, the declaration calls for **coordinated efforts** across ministries, civil society, and local communities.
- Integration of Spiritual, Cultural, and Educational Tools: Leveraging India's rich spiritual heritage, the declaration promotes mindfulness, value-based education, and community support as preventive measures against addiction.
- Technology-Driven Solutions: It advocates using digital platforms to track, prevent, and rehabilitate, offering real-time support to affected individuals.
- **Institutional Framework**: Proposes the creation of a **Joint National Committee**, annual performance reviews, and a centralized **national support platform** to connect addicts with rehabilitation services and emotional support.

Understanding India's Drug Abuse Crisis:

The scale of India's drug challenge is staggering. A 2019 report by **AIIMS** and the **Ministry of Social Justice** and **Empowerment** provides alarming statistics:

- Over **16 crore people** consume alcohol, with **5.7 crore** requiring treatment.
- Around 2.3 crore Indians use cannabis and opioids.
- **1.18 crore** individuals between ages 10 and 75 use **sedatives** (non-medically).
- **Inhalants**, especially among children and teens, show a **higher prevalence** (1.17%) than among adults.

These figures underscore the urgent need for **multi-layered intervention strategies** that not only penalize but **educate**, **heal**, **and reintegrate**.

Root Causes Behind the Drug Menace in India:

India's drug problem is fueled by a mix of geographical, social, and systemic factors:

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- **Strategic Location**: India is sandwiched between the **Golden Crescent** (Afghanistan, Iran, Pakistan) and the **Golden Triangle** (Myanmar, Laos, Thailand)—two of the world's largest drug-producing regions.
- **Cross-Border Smuggling**: Border states like **Punjab, Manipur, and Assam** are hotspots for illegal drug entry due to porous borders.
- **Youth Vulnerability**: Unemployment, academic pressure, peer influence, and curiosity contribute significantly to drug initiation among youth.
- Weak Enforcement Mechanisms: Overburdened law enforcement, corruption, and inadequate surveillance hamper effective control.
- Easy Access: Drugs are now available via online markets (including the darknet), local dealers, and even certain pharmacies.
- **Social Breakdown**: Dysfunctional families, **mental health issues**, and isolation are major contributors to substance dependence.

Impact of Drug Abuse on India's Socio-Economic Fabric:

Drug addiction doesn't just harm individuals—it damages entire communities and the nation's core:

- Economic Loss: Drug abuse reduces workforce productivity, strains healthcare systems, and erodes the country's human capital.
- Public Health Crisis: Widespread drug use is linked to mental illness, spread of HIV/AIDS, and chronic diseases.
- Family and Social Disruption: Addiction causes domestic violence, family breakdown, and leads to stigmatization and social alienation.
- National Security Threat: The drug trade finances terrorist organizations, strengthens organized crime, and destabilizes youth, weakening internal security.

India's Policy Response and Ongoing Initiatives:

India has adopted a **multi-pronged approach** to address the drug problem at national and international levels:

National-Level Interventions:

- Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985: A legal framework that prohibits
 the production, sale, possession, and consumption of banned substances, with stringent
 punishments.
- Nasha Mukt Bharat Abhiyaan (2020): A flagship campaign focusing on awareness, community outreach, and behavior change, operating in hundreds of vulnerable districts.
- Anti-Narcotics Task Forces (ANTFs): State-level enforcement bodies to enhance local law enforcement capabilities.





• DarkNet Monitoring Cell: A unit under the Narcotics Control Bureau (NCB) that monitors illicit online drug sales.

Global Collaborations:

- **United Nations Office on Drugs and Crime (UNODC)**: India works with UNODC to share best practices, promote prevention, and tackle transnational trafficking.
- **International Narcotics Control Board (INCB)**: India's compliance with global treaties is monitored and aligned with international standards.

Way Forward: Toward a Truly Nasha Mukt Bharat

India's rising drug crisis demands more than just regulation—it calls for a **massive cultural and policy transformation**. The **Kashi Declaration** provides the framework, but **implementation is key**.

To truly eradicate drug abuse, India must:

- Empower youth through education, employment, and mental health support
- Foster grassroots movements involving religious leaders, educators, and social workers
- Expand rehabilitation services with a focus on dignity and reintegration
- Use technology for early intervention, anonymous reporting, and support delivery

Conclusion: A Nation United Against Addiction:

The **Kashi Declaration** is more than a policy—it's a **call to conscience**. It affirms that drug addiction is not just a personal failing, but a **national challenge** requiring empathy, coordination, and sustained action. As India envisions a **Viksit Bharat by 2047**, building a **drug-free society** is an essential step toward achieving a **healthier**, **safer**, **and more empowered nation**.





GS Paper 3 – Environment and Ecology



Context: The **Geological Survey of India (GSI)** has raised serious concerns about the **deteriorating condition** of the **Guryul Ravine fossil site**, located in **Khonmoh**, near **Srinagar**, Jammu and Kashmir. In its latest warning, the GSI emphasized that this globally significant geological heritage is facing a "**serious threat**" due to human activity, negligence, and lack of proper conservation measures.



This ancient site, often hailed as a **natural archive of Earth's prehistoric past**, is now at risk of being lost forever unless **urgent preservation efforts** are undertaken.

Guryul Ravine: India's Window into Earth's Deep History

The **Guryul Ravine**, situated in the **Vihi district of Kashmir**, is not just a regional landmark—it's a site of **global geological importance**. This extraordinary fossil-rich ravine contains layers of sediment that provide critical evidence of the **Permian–Triassic extinction event**, the most devastating mass extinction in Earth's history, dating back nearly **260 million years**.

Key Features of Guryul Ravine:

- Contains fossils from the Permian-Triassic boundary, offering insights into how life on Earth was nearly wiped out.
- Hosts what is believed to be the world's earliest recorded tsunami event, with physical imprints still visible in the exposed strata.
- Lies adjacent to Dachigam National Park and is part of the Khonmoh Conservation Reserve, a sensitive ecological area.

The fossil layers here help scientists **reconstruct past climates**, **track extinction patterns**, and understand **geological transitions** over millions of years.

What Was the Permian-Triassic Extinction Event?

Often referred to as the "Great Dying", the Permian–Triassic extinction occurred around 251.9 million years ago, marking a pivotal boundary between the Paleozoic and Mesozoic eras and the Permian and Triassic periods.

Significance of the Event:

- Over 90% of marine species and around 70% of terrestrial vertebrates vanished.
- Triggered by massive volcanic eruptions, global warming, acid rain, and ocean anoxia.
- Reshaped the evolutionary trajectory of life, eventually paving the way for the rise of **dinosaurs** and **mammals**.

This event is regarded as the **most catastrophic extinction in Earth's history**, even surpassing the later extinction that wiped out the dinosaurs.

Why Guryul Ravine Matters to the World:

Globally, there are only a few places where the **Permian–Triassic boundary** is so well exposed and preserved. Guryul Ravine offers:

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- **Exceptional geological clarity**, enabling researchers to pinpoint extinction-related events.
- A **research goldmine** for studying ancient tsunamis, climate shifts, and ecosystem collapses.
- A unique opportunity for India to **promote geotourism** and **scientific education** by conserving and showcasing this natural heritage.

Current Threats to the Site:

Despite its immense scientific value, the Guryul Ravine is under threat due to:

- Unregulated construction, quarrying, and illegal stone mining.
- Lack of protective fencing or on-site supervision by authorities.
- Encroachment and habitat degradation in surrounding conservation areas.
- Neglect in recognizing it officially as a **geo-heritage or UNESCO site**.

If these issues are not addressed, the **irreplaceable fossil evidence** and geological structures could be **permanently lost**.

The Way Forward: Conservation and Recognition

To safeguard this priceless natural archive, experts recommend:

- Immediate declaration of Guryul Ravine as a National Geo-Heritage Site.
- Involvement of local communities and educational institutions in its protection.
- Establishment of a **fossil park or research center to** promote scientific tourism.
- Application for UNESCO Global Geopark status to bring international attention and funding.

Conclusion: A Legacy Worth Preserving

The **Guryul Ravine fossil site** is not just a Kashmiri or Indian treasure—it's a **global monument to Earth's ancient history**. It stands as a silent witness to one of the most critical turning points in the evolution of life. The recent warning by the GSI should serve as a call to action for conservationists, policymakers, and citizens alike. Protecting Guryul Ravine means preserving a **timeline of survival, extinction, and rebirth**—a story that belongs to all of humanity.





GS Paper 2 – Indian Constitution



Vice President Jagdeep Dhankhar Resigns: A Historic Move Amid Health Concerns

Context: In a surprising turn of events, Vice President Jagdeep Dhankhar tendered his resignation on July 21, coinciding with the opening day of the Monsoon Session of Parliament. Citing health-related issues and following medical advice, Dhankhar submitted his resignation to President Droupadi Murmu, invoking Article 67(a) of the Indian Constitution.



With this step, he becomes only the **third Vice President in India's history** to resign before completing his term—after **V. V. Giri** and **R. Venkataraman**, both of whom stepped down to contest in **presidential elections**.

Constitutional Framework: Resignation of the Vice President

Under **Article 67(a)** of the Constitution, the **Vice President** has the right to **resign at any time** by submitting a written letter to the **President of India**. The resignation takes effect **immediately upon acceptance**, with no further approval needed.

Dhankhar, who assumed office in **August 2022**, resigned roughly **two years into his five-year tenure**, well ahead of the scheduled end in **2027**.

What Happens Next? Succession and Parliamentary Functioning

The Indian Constitution does not provide for an acting Vice President. Following a resignation:

- The post **remains vacant** until a new Vice President is elected.
- Meanwhile, the Deputy Chairman of the Rajya Sabha, currently Harivansh Narayan Singh, will
 perform the Vice President's ex-officio role as Chairman of the Upper House.
- This arrangement ensures the Rajya Sabha continues functioning without disruption.

Timeline for Vice-Presidential Election: What the Law Says

Unlike the Presidential office, where elections must be held within six months, there is no fixed deadline for electing a new Vice President. The law mandates that the **Election Commission** conduct the election "as soon as possible" after a vacancy arises.

- The election will be held under the **Presidential and Vice-Presidential Elections Act, 1952**.
- The **Secretary-General of Parliament** (on a rotational basis from either House) will serve as the **Returning Officer**.
- Once elected, the new Vice President will begin a fresh five-year term, not just the remainder of Dhankhar's term—unlike some constitutional roles where the successor serves only the remaining period.

Who Can Contest? Eligibility Criteria for Vice President of India

As per **Article 66** of the Constitution, a candidate for the office of Vice President must:

- Be a citizen of India
- Be at least 35 years of age
- Be eligible to be elected as a member of the Rajya Sabha

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Not hold any office of profit under the Government of India or any state/local authority

These criteria are designed to maintain the **integrity and impartiality** of the high office.

Election Mechanism: A Parliamentary Affair

The Vice President is elected through an **electoral college** consisting solely of **members from both Houses of Parliament**, including **nominated members**.

- The election is conducted via **secret ballot** using the **proportional representation system** with a **single transferable vote**.
- Members rank candidates by preference.
- A candidate must secure a **quota** of votes—calculated by dividing total valid votes by two and adding one—to win.
- If no one meets the quota in the first round, **the candidate with the fewest votes is eliminated**, and second-preference votes are redistributed. This process continues until a winner emerges.

State assemblies do **not participate** in this process, making it **distinct from the Presidential election**.

The Role of the Vice President: A Pillar of Parliamentary Democracy

The **Vice President of India** holds the second-highest constitutional office in the country. Though not part of any legislature, the Vice President plays a **vital role in parliamentary proceedings** as the **Chairperson of the Rajya Sabha**.

- Ensures discipline, order, and procedural conduct in the Upper House.
- In the event of a vacancy in the office of the President—due to resignation, death, or inability—the Vice President serves as Acting President until a new one is elected.
- Acts as a symbol of federal unity and a key constitutional figure for maintaining checks and balances in governance.

Looking Ahead: What This Means for India

The resignation of Jagdeep Dhankhar has added a new chapter to India's political and constitutional history. As the nation prepares to elect a new Vice President, the spotlight will be on **Parliament's choice**, political alignments, and potential contenders for the prestigious post.

This event also opens up a **larger conversation about health transparency, leadership transitions**, and the **functionality of constitutional offices** in modern India. The smooth process laid out by the Constitution ensures that **democratic continuity and institutional stability remain intact**, even in moments of abrupt change.





GS Paper 1 – Geography



India Strengthens Ties with Lesotho: A Mountain Kingdom in Focus

Context: India is poised to enhance its **bilateral cooperation with Lesotho**, following the visit of the **Indian Minister of State for External Affairs** to the southern African nation. This visit marks a key step in deepening political, economic, and developmental ties with **Lesotho**, a country that holds strategic importance in the **Southern African region**.

Lesotho: A Unique Landlocked Nation in Southern Africa

Lesotho, with its capital at **Maseru**, is a **landlocked country completely surrounded by South Africa**, making it one of only three such countries in the world. Despite its size, Lesotho stands out for its **distinct topography**, **strategic water resources**, and **stable democratic governance** in a complex regional landscape.



Geographical Marvel: The 'Kingdom in the Sky'

Often referred to as the "Kingdom in the Sky," Lesotho is the only country in the world located entirely above 1,000 metres in elevation. Its dramatic landscape is dominated by rugged mountains and high plateaus, making it not just a scenic wonder but also a unique ecological zone in Africa.

Key Geographical Highlights:

- Mountains cover over two-thirds of Lesotho's total area.
- The **highest point** is **Thabana Ntlenyana**, standing tall at **3,482 metres**, and also recognized as the **highest peak in Southern Africa**.
- Drakensberg Mountains form the eastern boundary, while the Maloti Mountains stretch across the north-south axis of the country.

This elevation gives Lesotho a **cooler climate** than most African nations and influences its agriculture, biodiversity, and settlement patterns.

White Gold: Lesotho's Most Precious Natural Asset

Among Lesotho's key natural resources, water is the most valuable, often referred to as "White Gold." The country's high-altitude rivers and abundant rainfall make it a regional water hub.

- The **Lesotho Highlands Water Project** (LHWP), a collaborative initiative with South Africa, channels vast quantities of water to meet urban and industrial demands in **Gauteng province**, including **Johannesburg and Pretoria**.
- In return, Lesotho earns **revenue and electricity** from the hydro-power facilities associated with the project.

This makes Lesotho a **critical water security partner** in the region, and a potential area of collaboration with countries like India on **water management and sustainable development**.

India-Lesotho Relations: A Partnership with Potential

India and Lesotho share warm diplomatic relations, with India offering support in areas such as **healthcare**, **education**, **capacity building**, **and IT infrastructure**. The visit by India's Minister of State underscores:

Growing South-South Cooperation



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- India's commitment to Africa's development agenda
- Potential for collaboration in solar energy, digital connectivity, skills training, and agricultural innovation

India also provides **scholarships and technical training** to students and professionals from Lesotho under the Indian Technical and Economic Cooperation (ITEC) program.

Conclusion: Mountainous Yet Connected

Lesotho, with its towering landscapes and flowing rivers, offers not just natural beauty but **geostrategic** and developmental significance. As India looks to build stronger ties with African nations, Lesotho stands out as a partner in progress, where diplomacy meets elevation—literally and figuratively. This renewed engagement paves the way for mutual growth, sustainability, and regional stability in the years to come.





GS Paper 3 - Economy



India's Coal Sector on the Path to Sustainability and Self-Reliance

Context: India, home to the **world's fifth-largest coal reserves**, relies on coal to meet nearly **55% of its energy demands**. As the nation moves toward **cleaner energy and economic resilience**, the government has laid out a **comprehensive strategy** to make the coal sector more **sustainable**, **competitive**, and **environmentally compliant**, while also aiming to **reduce dependence on coal imports**.



Sustainability-Driven Transformation in Coal Mining:

To align with **environmental goals** and global climate commitments, India is pushing for a **green overhaul** of its coal sector through several forward-looking initiatives:

Eco-Restoration and Green Credits:

- Afforestation of mined-out areas is being actively pursued under bio-reclamation efforts.
- Coal and lignite PSUs are participating in the Ministry of Environment, Forest and Climate Change's Green Credit Programme, incentivizing ecological restoration.

Sustainable Use of Mine Water:

• Treated mine water is being reused for community irrigation, industrial needs (such as dust suppression and firefighting), and ecological services like aquifer recharge and fish farming.

Utilizing Overburden for Sand Extraction:

 Sand derived from overburden waste material is being repurposed for construction activities and stowing operations, reducing pressure on river sand ecosystems and promoting circular mining practices.

Adoption of Blast-Free Technologies:

 Modern technologies such as Surface Miners, Continuous Miners, and Rippers are replacing traditional blasting and drilling methods, resulting in lower emissions, noise pollution, and enhanced worker safety.

Clean Coal and Renewable Integration:

- Strategic focus is on **Coal Gasification**, **Coal-to-Liquid (CTL)**, and **Coal Bed Methane (CBM)** to **minimize carbon output** and **create cleaner alternatives**.
- These efforts complement India's **commitment to achieving 500 GW of non-fossil fuel energy capacity by 2030**.

Moving Towards Import Independence:

To cut down reliance on **imported coal**, especially for **power and steel production**, the government is implementing multiple strategies:

Boosting Domestic Production:

- Accelerated allocation of coal blocks and enhanced private sector participation are driving local production.
- A dedicated Inter-Ministerial Committee (IMC) was formed to streamline efforts for coal import substitution.

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Upgrading Supply Chain Infrastructure:

New railway corridors, modernized coal transport systems, and First Mile Connectivity (FMC)
projects are improving the coal evacuation process from mines to consumers, reducing logistical
delays and transport emissions.

Financial Reforms Under SHAKTI Policy:

 Under the SHAKTI (Scheme for Harnessing and Allocating Koyla Transparently in India) policy, import-based coal power plants can now procure domestic coal more easily, ensuring energy security without added foreign dependence.

Coking Coal Mission for Steel Industry:

India has launched a dedicated Coking Coal Mission to ramp up the domestic supply of coking coal,
a crucial raw material in steel production, reducing import bills and strengthening the Make in India
initiative.

Conclusion: Balancing Growth with Green Responsibility

India's coal sector is undergoing a **paradigm shift**—from being a carbon-intensive industry to a **technologically upgraded and environmentally conscious sector**. With a strong emphasis on **sustainability**, **domestic capacity building**, and **resource efficiency**, the sector is being prepared to meet both the **energy demands of a growing economy** and the **climate goals of a responsible global player**.







GS Paper 1 - Indian Society & Culture



Hatti Tribe: Preserving Heritage and Traditions in the Himalayan Foothills

Context: In a recent social event that drew significant public attention, two brothers from the Hatti tribe in Himachal Pradesh married the same woman—reviving the centuries-old tradition of polyandry, a practice still found in some isolated tribal pockets. Hundreds gathered to witness the rare union, spotlighting the tribe's unique cultural identity.



Who Are the Hatti? A Community Rooted in 'Haats'

The **Hatti tribe** derives its name from "haats" — traditional village markets where they **sold home-grown crops, vegetables, livestock, and wool**. This trade-centric lifestyle shaped their **tight-knit social structure** and distinctive **community identity** over generations.

- **Traditional Attire:** Hatti men are easily recognized by their **distinctive white headgear**, worn proudly during festivals, weddings, and community gatherings.
- Geographic Spread: They inhabit the Himachal-Uttarakhand border, particularly along the Giri and Tons river basins, both important tributaries of the Yamuna River.

Two Regions, One Culture: Hatti Clans Across States

The Hatti community is primarily split into **two major regional groups**:

- 1. Trans-Giri Region Located in Sirmaur district of Himachal Pradesh
- 2. **Jaunsar-Bawar Region** Situated in **Uttarakhand**

Despite residing in two different states, **both groups share similar customs**, **rituals**, **and dialects**. Intermarriages are common, and community bonds remain strong across state lines.

The community is governed by a traditional tribal council called 'Khumbli', which handles local disputes, marriage approvals, and social matters—much like a customary judiciary.

Life and Livelihood: Agriculture as a Way of Life

The **Hatti people primarily depend on agriculture**, with their **climate favoring cash crop cultivation** such as **ginger**, **fruits**, **pulses**, **and millets**. Farming is often **subsistence-based**, though market trading remains a vital economic activity.

- The community still practices **barter exchange in remote areas**, reflecting their **semi-traditional economy**.
- Some Hatti families are also involved in **seasonal migration** for labor in towns and cities.

Population and Political Recognition:

- As per the **2011 Census**, the Hatti community numbered around **2.5 lakh**.
- Current estimates place their population at approximately 3 lakh.

In a historic development:

• In 2023, the Hatti community of Himachal Pradesh was granted Scheduled Tribe (ST) status, fulfilling a long-standing demand and promising greater access to educational, political, and economic opportunities.

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The **Jaunsar-Bawar region in Uttarakhand** had already received **tribal recognition back in 1967**.

This ST status opens doors to affirmative action benefits, preservation of traditional practices, and increased representation in policymaking.

Conclusion: A Tradition-Rich Community at the Crossroads of Change

The **Hatti tribe** is a striking example of a community that has **retained its deep-rooted traditions**, while slowly adapting to the modern socio-political landscape. From ancestral customs like polyandry to **newfound constitutional recognition**, the Hattis stand at the **intersection of heritage and progress**.





GS Paper 2 – Governance, Constitution, Polity, Social Justice

India's Strategic Shift at the UN: Rising Abstentions Reflect New Diplomatic Approach

Context: India's voting behavior at the **United Nations** has undergone a notable transformation over the decades. A recent analysis of over **5,500 UN resolutions** from **1946 to June 2025** reveals a striking trend: the percentage of 'yes' votes by India has dropped to just **56%**—the **lowest since 1955**—while **abstentions** have reached an **all-time high of 44%**.



This marked shift is more than a statistical anomaly; it signals a **strategic recalibration** of India's foreign policy in response to an increasingly **polarised global order** and the complexities of modern multilateral diplomacy.

Historical Evolution of India's UN Voting Patterns:

India's voting trajectory at the UN can be traced across four distinct eras:

- **1946 to Late 1960s**: A **volatile phase**, with 'yes' votes ranging from **20% to 100%**. Abstentions remained between **0% and 40%**.
- 1970 to 1994: A period of greater consistency, with India supporting 74% to 96% of resolutions. Abstentions were relatively low, at 8% to 19%.
- Mid-1990s to 2019: The country adopted a stable voting stance, maintaining 'yes' votes in the range of 75% to 83%, and abstentions between 10% and 17%.
- Post-2019: A dramatic shift began, culminating in 2025 with a record 44% abstention rate and a significant fall in 'yes' votes.

Why Is India Abstaining More Often?

- 1. The Rise of Global Polarisation: As geopolitical tensions escalate—particularly among the United States, China, and Russia—India faces mounting pressure to take sides. However, as a nation committed to strategic autonomy, India increasingly opts for abstention to maintain a neutral, independent posture.
- 2. Complexity of Modern Resolutions: Former Indian diplomats describe today's resolutions as "Christmas trees"—laden with multiple provisions, some of which may conflict with India's interests or principles. This structural ambiguity makes outright support or opposition difficult, rendering abstention a pragmatic alternative.
- **3. Assertion of Sovereign Judgment:** Abstention is no longer seen as indecision. For a country positioning itself as a **responsible middle power**, abstaining can be a **diplomatic signal**—a way to express **reservations** without burning bridges or aligning with controversial stances.

Strategic Abstention in Action:

Although the analysis doesn't cite specific resolutions, India's recent abstentions have commonly occurred on issues like:

- The Russia-Ukraine conflict, where India has abstained to preserve ties with both the West and Moscow
- **Human rights resolutions** on Myanmar or China, where abstention helps **avoid direct** confrontation

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The Israel-Palestine question, where abstention reflects India's attempt to balance its historic support for Palestine with growing ties with Israel

Each instance reflects a careful balance between **principle and pragmatism**.

Global Implications of India's Voting Shift:

- 1. Reinforcing Strategic Autonomy: By abstaining more frequently, India is reasserting its non-aligned identity. distancing itself from the rigid blocs of the Cold War era while embracing a multi-aligned approach suited for the 21st century.
- 2. Potential Diplomatic Tensions: This strategy, however, is not without risks. Allies—especially in the West—may view India's abstentions on value-based issues as a lack of moral clarity or political commitment.
- 3. Balancing Influence and Credibility: India must strike a fine balance: using abstention to preserve diplomatic room to manoeuvre, while also projecting itself as a **credible**, **responsible global actor**.

Looking Ahead: What This Means for India's Global Ambitions

India's increasing reliance on **abstention** aligns with its broader ambition to secure a **permanent seat on** the United Nations Security Council (UNSC). As India seeks to play a greater role in global governance, its approach to voting reflects a desire to be seen as a balancer, not a follower.

In an age of **multipolarity and fractured alliances**, abstention gives India the space to:

- Preserve critical bilateral relationships
- Avoid entanglement in power struggles
- Express nuanced foreign policy positions

Extra Insight: How India Compares Globally

- **China** also often abstains, particularly on humanitarian interventions.
- **Brazil and South Africa**, like India, use abstention as a tool of strategic flexibility.
- **Western nations**, in contrast, generally have lower abstention rates and higher 'yes' votes, reflecting alliance-based voting.

Conclusion: A Recalibration, Not a Retreat

India's record number of abstentions in **2025** is not a sign of retreat from international responsibility. Rather, it reflects a **more mature**, **strategic diplomatic posture** in a world where clarity is often elusive and stakes are high.





GS Paper 3 – Biodiversity and Conservation

Shettihalli Wildlife Sanctuary Under Threat: Legal Breach Sparks Conservation Concerns

Context: The **Shettihalli Wildlife Sanctuary** in **Karnataka** is at the center of a major environmental controversy. The **Karnataka state government** has allegedly violated provisions of the Wildlife (Protection) Act, 1972, and Supreme Court directives by approving a proposal to denotify **nearly 300 sq. km** of this ecologically sensitive area.



Shockingly, the **National Board for Wildlife (NBWL)** failed to uphold its responsibility by not ensuring that the lost forest area is compensated through equivalent protected land, as required by legal and conservation norms.

A Sanctuary Rich in Biodiversity:

Declared a wildlife sanctuary on 23rd November 1974, Shettihalli spans a diverse and ecologically vital region in **Shimoga (Shivamogga)** district of Karnataka, covering an area of **395.6 square kilometres**. It is home to a unique blend of flora and fauna, water bodies, and bird habitats.

One of its most notable features is the **Tunga Anicut Dam**, located within the sanctuary, which serves as a refuge for otters and numerous species of water birds.

The sanctuary also encompasses the Mandagadde Bird Sanctuary, situated on a small island in the River Tunga, a haven for migratory and resident bird species.

Ecology and Vegetation:

The forest type in Shettihalli includes:

• Dry deciduous

- Moist deciduous
- Semi-evergreen forests

These forest types together support a wide array of **plant biodiversity**. Prominent species include:

- Teak (Tectona grandis)
- Silver Oak
- **Indian Thorny Bamboo**
- Calcutta Bamboo
- **Asan**
- Amla (Indian gooseberry)
- **Sweet Indrajao**, among others

Home to Diverse Wildlife:

Shettihalli is known for its rich wildlife population, playing host to several flagship and endangered species.

Mammals Found in the Sanctuary:

Tiger

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- Leopard
- Sloth Bear
- Gaur (Indian Bison)
- Asian Elephant
- Sambar Deer
- Spotted Deer
- Wild Dogs (Dhole)
- Jackal
- Bonnet Macaque
- Common Langur
- Wild Pig

Avian Diversity:

The sanctuary is a paradise for bird lovers, sheltering species like:

- Hornbills
- Peafowl
- Kingfishers
- Parakeets
- Junglefowl
- Bulbuls
- Doves and Pigeons
- Flycatchers
- Swallows
- Woodpeckers
- Partridges
- Babblers
- Munias

Human Settlements and Historical Context:

Interestingly, Shettihalli also accommodates **numerous human settlements**, many of which consist of families **displaced during the construction of the Sharavathi Dam** in the 1960s. These communities have coexisted with the sanctuary ecosystem for decades, though pressures of human activity remain a **challenge to conservation efforts**.

Conservation Concerns and Future Risks:

The proposed **denotification of 300 sq. km** could significantly damage the sanctuary's **ecological balance**, especially at a time when **biodiversity loss and climate change** are accelerating.

Experts warn that such reductions can:

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- Fragment animal corridors
- Threaten the survival of keystone species
- Reduce the sanctuary's climate resilience
- Open doors to illegal encroachments and developmental pressures

Moreover, failure to provide **compensatory afforestation or alternate protected areas** violates the **principle of "no net loss"** in biodiversity.

Why Shettihalli Matters More Than Ever:

As India faces increasing environmental challenges, **protected areas like Shettihalli** are crucial not just for wildlife, but for the **ecological security of the region**. They support:

- Carbon sequestration
- Soil and water conservation
- · Livelihoods through eco-tourism
- Flood regulation and microclimatic stability

Conclusion: A Call for Stronger Action

The developments surrounding Shettihalli Wildlife Sanctuary underline the need for **stronger environmental governance** and **accountable decision-making**. The sanctuary is not just a forest—it is a **living ecosystem**, a **biodiversity hotspot**, and a **natural heritage site** that deserves protection.





GS Paper 3 – Environment & Biodiversity



Lyriothemis abrahami: A Stunning New Dragonfly Species Discovered in Kerala

Context: A remarkable discovery has enriched India's biodiversity records: a **new species of dragonfly**, named *Lyriothemis abrahami*, has been officially identified in the **forests of Kerala**. Previously mistaken for the closely resembling *Lyriothemis flava*, this species has now been correctly distinguished and documented, showcasing the importance of **detailed taxonomic studies** in understanding our ecosystems.



Where Nature Hides Her Secrets:

Lyriothemis abrahami was found breeding in **small, water-filled tree holes**, a rare microhabitat in the dense **tropical forests** of Kerala. The species thrives across various forest zones—ranging from **lowland rainforests** to **mid-elevation evergreen and deciduous forests**, at altitudes between **50 m and 1,100 m above sea level**.

This dragonfly's ability to inhabit such specific and often overlooked habitats highlights the **rich yet fragile biodiversity** of the **Western Ghats**, a global biodiversity hotspot.

A Dragonfly with Striking Features:

This species stands out not only for its ecological uniqueness but also for its **distinct physical traits**:

- **Sexual Dimorphism**: Males and females exhibit marked physical differences—a rare feature in many dragonfly species.
- Males: Noted for their uniquely shaped hamules (secondary genitalia used in mating).
- **Females**: Feature **jet-black bodies** adorned with **striking yellow triangular spots**, offering a visual treat and easy identification in the wild.

Boosting Kerala's Biodiversity Count:

With the discovery of *Lyriothemis abrahami*, Kerala's total **odonate species count** has risen to **191**, of which a significant **78 species are endemic** to the region. This highlights **Kerala's crucial role** in conserving India's dragonfly and damselfly diversity and underscores the need to continue biodiversity research in lesser-known forest habitats.

Ecological Importance of Dragonflies:

Dragonflies, such as *Lyriothemis abrahami*, are **key ecological indicators**. Their presence signals the **health of forest and freshwater ecosystems**. Here's why they're vital:

- They are **apex insect predators**, feeding on mosquitoes, flies, and other pest insects.
- They play a role in **controlling vector-borne diseases** by keeping mosquito populations in check.
- Their sensitivity to environmental changes makes them excellent **bioindicators** of **climate shifts**, **pollution**, **and habitat degradation**.

In short, when dragonflies thrive, it often means the **ecosystem is thriving** too.

More Than Just a Beautiful Insect: The discovery of *Lyriothemis abrahami* is a reminder of the hidden wonders of the forest and the importance of continued field research and conservation. As we uncover more such species, it becomes clearer that protecting habitats like the Western Ghats is not just about saving wildlife—it's about preserving ecological balance, human health, and the natural heritage of future generations.





GS Paper 3 - Science & Technology



INVICTUS Programme: Pioneering Europe's Hypersonic Flight Future

Context: The **European Space Agency (ESA)**, in collaboration with UK-based **Frazer-Nash Consultancy**, has officially launched the **INVICTUS research programme**—a visionary project aiming to develop cutting-edge **hypersonic flight technologies** for the next generation of **reusable aerospace vehicles**.

This initiative marks a significant step toward creating **horizontal launch platforms** capable of operating at extreme speeds, redefining the future of space access and high-speed atmospheric travel.



What is the INVICTUS Programme?

The **INVICTUS programme** is designed to develop and demonstrate **advanced hypersonic technologies**. At its core is a fully **reusable experimental aerospace vehicle** capable of flying at **Mach 5**—that's **five times the speed of sound**.

The programme is funded through ESA's **General Support Technology Programme (GSTP)** and **Technology Development Element (TDE)**, both of which support **strategic innovation** in European space technology.

Key Features of the Hypersonic Vehicle:

- Horizontal Take-Off Capability: Unlike traditional rockets, the INVICTUS vehicle will launch and land like an aircraft, making it more versatile and reusable.
- Mach 5 Speed: Designed to sustain speeds exceeding 6,000 km/h, the vehicle will operate in the hypersonic regime, significantly reducing travel and launch times.
- Modular Design: The vehicle will be upgradable, allowing for the interchange of propulsion systems, materials, and software across various flight test campaigns.
- **Sustained Atmospheric Flight**: Aimed at mastering long-duration flight at hypersonic speeds within Earth's atmosphere—essential for both spaceplane concepts and high-speed air travel.

Propulsion Breakthrough: Hydrogen-Fuelled Innovation

One of the most transformative aspects of the INVICTUS programme is its focus on a **hydrogen-fuelled**, **precooled air-breathing propulsion system**. This technology is:

- **Eco-friendly**: Hydrogen combustion produces **zero carbon emissions**, making it a **sustainable alternative** to conventional jet fuels.
- **Highly Efficient**: Air-breathing systems reduce the need for onboard oxidisers, increasing fuel efficiency and payload capacity.
- **Scalable for Future Applications**: Suitable for a variety of missions, from **hypersonic transport** to **orbital launch platforms**.

This propulsion approach could revolutionize **aerospace engineering** by bridging the gap between traditional aircraft and space vehicles.

Building on ESA's Past Innovations:





The INVICTUS initiative builds upon a foundation of previous ESA-led technology demonstrations, integrating lessons from earlier high-speed flight experiments. It will provide a testbed for European industry, academia, and agencies to validate and refine emerging hypersonic systems in real-world conditions.

Why INVICTUS Matters: Strategic and Technological Impact

- **Boosting Europe's Aerospace Competitiveness:** INVICTUS positions Europe as a global leader in hypersonic technology, alongside powers like the US, China, and Russia.
- **Dual-Use Potential**: Technologies developed could have both civilian and defence applications, including **rapid global mobility** and **spaceplane operations**.
- Advancing Reusability: With the space industry shifting towards cost-effective, reusable platforms, INVICTUS aligns with the vision of sustainable space access.

Did You Know?

Mach 5 speed means travelling over 1.6 kilometres per second—fast enough to cross the Atlantic in under an hour. Mastering such speeds with reusable, air-breathing vehicles could revolutionize space tourism, satellite launches, and even intercontinental travel.

Looking Ahead: A New Chapter in Aerospace Exploration

The **INVICTUS** programme isn't just a research effort—it's a bold **technological leap** toward the future of aerospace mobility. By blending reusability, sustainability, and speed, INVICTUS is set to reshape how we think about **spaceflight** and **high-speed** atmospheric travel in the decades to come.







GS Paper 3 - Economy



Why Food Inflation Is Set to Stay Low in India

Context: In a positive economic development, India's consumer price index (CPI) inflation eased to 2.1% in June 2025, placing it below inflation rates in the US (2.7%) and the UK (3.6%). Even more striking was the trend in food inflation, which contracted by 1.1% in India, while food prices rose by 3% in the US and 4.5% in the UK.

This marks India's lowest food and retail inflation since January 2019, offering much-needed relief to households and the Reserve Bank of India (RBI), which grappled with stubborn inflation during 2023–2024.



What Is Food Inflation and Why It Matters:

Food inflation tracks the year-on-year increase in prices of essential food items and forms a significant component of the **Consumer Price Index (CPI)**. In India, CPI is calculated by the **Ministry of Statistics and Programme Implementation (MoSPI)** and directly impacts:

- Household budgets, especially for low- and middle-income families
- Monetary policy decisions by the RBI
- Consumer confidence and economic stability

It covers staples such as cereals, pulses, vegetables, fruits, milk, eggs, meat, and edible oils.

Abundant Monsoon Spurs Record Harvests:

The turnaround in food inflation is largely due to the **exceptionally strong 2024 monsoon**, which delivered **7.6% above-normal rainfall**. This surplus boosted **kharif and rabi crop yields**, improving supply and easing pressure on food prices by early 2025.

The 2025 monsoon has continued the trend, arriving early over Kerala on May 24 and delivering 7.1% above the long-period average (LPA) by July 20. Except for a few regions—including Telangana, Andhra Pradesh, Bihar, eastern Uttar Pradesh, Marathwada, Assam, Meghalaya, and Arunachal Pradesh—most parts of India have received above-normal rainfall.

Cereal Stocks Surge: Wheat and Rice Supply Stabilized

One of the strongest indicators of food inflation control has been the **rebound in wheat stocks**:

- Wheat inventories in government godowns rose to **358.78 lakh tonnes (lt)** as of July 1, 2025—a **four-year high**, up from **282.61 lt** a year earlier.
- Procurement increased to 300.35 lt in April–June 2025, compared to 266.05 lt in 2024 and 187.92 lt in 2022.
- Rice stocks are also at record highs, ensuring sufficient supply for the Public Distribution System (PDS).

This robust stockpile allows the government to **intervene in markets if prices rise**, something that wasn't possible during the previous inflationary spikes.

Shift in Cropping Patterns: A Strategic Realignment: While crops like pigeon pea (arhar), soyabean, and cotton saw reduced sowing due to price volatility and pest threats, farmers have increasingly shifted to maize, which has become more lucrative thanks to demand from:

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- Ethanol blending programmes
- Animal feed
- Starch and food processing industries

Despite the dip in some oilseeds and pulses, India is mitigating shortages with **record imports**.

Imports and Duty Cuts Keep Prices in Check:

To stabilise the domestic market, the government has:

- Imported 72.56 lt of pulses and 164.13 lt of vegetable oils in 2024–25
- Extended zero-duty imports on key pulses till March 2026
- **Reduced import duties** on major edible oils

These steps ensure **ample domestic availability**, helping control prices even amid minor supply disruptions.

Fertiliser Shortages Pose a Lingering Risk:

Despite a promising start to the cropping season, a **fertiliser shortfall** has emerged as a concern. The strong monsoon has driven up demand, but **stock levels have dropped**:

- Urea stocks fell from 103 lt to 61.22 lt
- DAP (Di-ammonium phosphate) reduced from 19.18 lt to 12.98 lt

This decline is primarily due to reduced imports from China, which imposed export restrictions. For instance:

- China's urea exports to India fell from 21.48 lt to just 1.04 lt
- DAP exports dropped from 22.87 lt to 8.43 lt

These constraints have driven **DAP prices up sharply**, from \$525 to \$810 per tonne, raising concerns over input costs and potential yield losses if the shortfall persists.

Did You Know?

India is the **second-largest producer of rice and wheat globally**, but it is also the **largest importer of edible oils**. Hence, global commodity prices and trade flows play a critical role in **domestic food inflation trends**.

Conclusion: Outlook Remains Positive but Watchful

India's food inflation outlook remains **optimistic**, supported by:

- Record harvests
- High buffer stocks
- Strategic imports
- Duty reductions

However, **fertiliser shortages** and **future monsoon patterns** remain **uncertain variables**. Vigilant policy support, timely imports, and responsive market interventions will be essential to **keep food inflation in check** and ensure **price stability** through the rest of 2025 and beyond.





GS Paper 1 – Geography



Slovenia: A Picturesque Alpine Nation Embracing Progressive Values

Context: In a significant and sensitive policy shift, **Slovenia has become** one of the latest countries to legalise assisted dying, granting terminally ill adults the **right to end their lives** if they are suffering from **unbearable pain**. This progressive legislation reflects Slovenia's alignment with a growing number of nations embracing individual dignity and choice in end-of-life care.



Where Is Slovenia? A Crossroads of Europe

Slovenia is a small yet stunning country located at the intersection of **Central and Southeastern Europe**. It shares borders with:

- **Austria** to the north
- **Hungary** to the northeast
- **Italy** to the west
- **Croatia** to the southeast

In addition to its land borders, Slovenia also enjoys a short but scenic coastline along the Adriatic Sea, offering both Alpine charm and coastal allure.

Geography and Natural Beauty:

More than 40% of Slovenia's landscape is mountainous, making it a haven for hikers, nature lovers, and winter sports enthusiasts. The country is shaped by four major European geographic zones:

- The majestic **European Alps**, including the **Julian Alps**
- The **karstic Dinaric Alps**, known for their caves and limestone formations
- The fertile **Pannonian and Danubian plains** and rolling hills
- A narrow but stunning **Mediterranean coastline**

Its highest peak, Mount Triglav (2,864 metres), is not only a natural landmark but also a national symbol proudly featured on the country's flag and coat of arms.

Climate: Diversity Across a Small Nation

Slovenia's climate is surprisingly varied for its size:

- Mediterranean climate along the coast with mild winters and hot summers
- **Continental climate** inland, with warm summers and cold, snowy winters in the valleys and plateaus

This climatic diversity supports a rich biodiversity and varied agricultural output.

Natural Resources and Rivers:

Slovenia is endowed with several **natural resources**, including:

- **Lignite** (a type of coal)
- Lead and zinc
- Forests and building stone





Significant **hydropower potential** from its many rivers

Major rivers include the **Sava** and the **Drava**, both of which play crucial roles in hydroelectric generation and irrigation.

Economy: A Modern, High-Income Market

Despite its small size, **Slovenia boasts a well-developed market economy**. It is one of the most prosperous nations in Eastern Europe, with strengths in:

- Services and international trade
- Automotive parts manufacturing
- **Pharmaceutical production**
- Electrical appliances and precision engineering

The country is a member of the **European Union**, the **Schengen Area**, and the **Eurozone**, which has helped boost trade and investment.

Ljubljana: Slovenia's Cultural and Political Heart

The capital city, Ljubljana, is a charming blend of Baroque architecture, modern urban design, and green public spaces. It's known for:

- A vibrant **cultural scene**
- Historic castle and riverfront cafés
- Strong focus on **sustainability and environmental planning**—Ljubljana was named the **European Green Capital** in 2016

Did You Know?

Slovenia is home to over 10,000 caves, with Postojna Cave and Škocjan Caves being world-famous attractions. The **Škocjan Caves** are a **UNESCO World Heritage Site** and among the largest known underground canyons in the world.

Conclusion: A Nation of Natural Wonder and Progressive Spirit

From its **Alpine peaks** to its **Adriatic shores**, **Slovenia** is a country that blends **natural splendour** with a forward-thinking society. Whether it's promoting sustainable urban living, fostering a strong industrial base, or taking bold steps in social legislation, Slovenia continues to make a mark on Europe—not just as a travel destination, but as a **modern**, **compassionate**, **and innovative nation**.





GS Paper 3 - Economy

India Sets Ambitious Goal: Tourism to Contribute 10% to GDP by 2047

Context: The **Government of India** has unveiled an ambitious roadmap to elevate the contribution of the **tourism sector to 10% of the national GDP** by the year **2047**, aligning with the centenary of India's independence. This marks a major push to position **India as a leading global tourism hub**, leveraging its vast cultural, spiritual, ecological, and medical potential.



The Current Landscape: A Rising Economic Pillar

- **Current Contribution**: Tourism currently contributes around **5–6%** to India's **\$4 trillion economy**.
- **Future Target**: By 2047, India's economy is projected to reach **\$32 trillion**, with tourism expected to make up **\$3.2 trillion** of that figure.
- **Global Position**: India ranked **14th** in global tourism receipts in 2023, capturing **1.8%** of global tourism revenue.
- **Growth Forecast: The Indian tourism sector** is anticipated to grow at a **Compound Annual Growth Rate (CAGR) of 24%**, making it one of the fastest-growing sectors in the country.

India's Tourism Treasures: A Land of Endless Experiences

India offers an unparalleled variety of experiences that cater to every kind of traveler. From the majestic **Himalayas** to the serene **coastal retreats**, India's diversity fuels its tourism growth.

- **1. Spiritual Tourism:** India is a **spiritual heartland**, home to major world religions and sacred sites. Pilgrimage destinations like **Varanasi**, **Rameshwaram**, **Bodh Gaya**, and **Golden Temple** draw millions each year.
- 2. Adventure Tourism: For thrill-seekers, destinations like Ladakh, Spiti, Sikkim, and Meghalaya offer trekking, paragliding, white-water rafting, and more.
- **3. Beach Tourism:** The golden shores of **Goa**, tranquil backwaters of **Kerala**, and pristine islands of **Andaman & Nicobar** and **Lakshadweep** are a magnet for beach lovers.
- 4. Cultural & Heritage Tourism: India is home to 40 UNESCO World Heritage Sites, including Taj Mahal, Hampi, Khajuraho, and Qutub Minar. Fairs and festivals like Pushkar Fair, Taj Mahotsav, and Surajkund Mela showcase India's vibrant traditions.
- **5. Wildlife Tourism:** India boasts over **100 national parks and 500+ wildlife sanctuaries**, home to **endangered species** like the **Royal Bengal Tiger**, **Asiatic Lion**, and **one-horned rhinoceros**.
- **6. Medical and Wellness Tourism:** With world-class healthcare at competitive costs, India attracts patients globally through the **"Heal in India" initiative**. Traditional wellness systems like **Ayurveda**, **Yoga**, and **Siddha** also boost **wellness tourism**.

Key Government Initiatives to Drive Growth:

The Government is implementing multi-pronged strategies to **revamp infrastructure**, **enhance services**, and **position India competitively** on the global tourism map.

1. Top 50 Destination Challenge: Under the 2025 Union Budget, a new initiative will develop 50 world-class destinations in collaboration with states through a "challenge mode" to improve infrastructure, connectivity, and visitor experience.

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- **2. Swadesh Darshan 2.0:** A revamped scheme promoting **theme-based circuits** such as **Buddhist**, **Spiritual**, **Heritage**, and **Eco circuits**, with focus on quality infrastructure and immersive experiences.
- **3. PRASHAD Scheme:** Focused on spiritual tourism, this scheme is **revitalizing pilgrimage centers** like **Ayodhya**, **Kashi Vishwanath**, and **Amritsar** with upgraded amenities and transport.
- **4. Medical Value Travel:** India is being positioned as a **global medical hub**, with specialized visa processes, healthcare facilitation centers, and partnerships with hospitals.
- **5. Atithi Devo Bhava:** This initiative promotes the **Indian tradition of hospitality**, with training programs to enhance **service quality** in tourism and hospitality sectors.
- **6. Visa Reforms:** The **e-Visa facility** for citizens of over **160 countries** and **visa fee waivers** for select groups simplify international travel and encourage global tourist footfall.
- **7. Sustainable Tourism Initiatives:** Promotion of **eco-friendly**, **community-based**, and **responsible tourism** models to ensure growth without compromising on environmental and cultural heritage.

Challenges on the Path Ahead:

Despite the potential, India's tourism industry must overcome key barriers:

- Infrastructure Gaps: Many remote or high-potential sites lack roads, transport, and basic facilities.
- Environmental Concerns: Over-tourism has caused degradation in fragile ecosystems like Himalayas and Western Ghats.
- **Quality Control**: Service inconsistency across hotels, guides, and transport providers hampers tourist satisfaction.
- **Seasonal Fluctuations**: Destinations like **Manali** and **Goa** witness boom-and-bust cycles, affecting local livelihoods.
- **Promotion Deficit**: Lesser-known but beautiful regions like **Northeast India**, **Chhattisgarh**, and **Odisha** need better branding and marketing.

Budget 2025–26: Employment-Led Tourism Growth

To ensure inclusive and employment-driven growth, the government has introduced:

- MUDRA Loans for Homestays: Empowering locals to host tourists and create micro-entrepreneurs.
- **Incentives to States**: Performance-based rewards for excellence in destination management, cleanliness, and tourist amenities.
- Streamlined Visa Processing: Enhancing ease of access and attractiveness to international tourists.

The Road to 2047: India's Global Tourism Footprint

India's tourism vision is aligned with **Vision@2047**, aiming to transform the nation into a **top-5 global tourism economy**. By tapping into its **rich heritage**, **diverse landscapes**, and **hospitality culture**, India seeks not only economic growth but also a **cultural renaissance**.

"**India is not just a destination—it's an emotion.** From the snow-clad peaks of Kashmir to the tropical charm of Kerala, every corner tells a story waiting to be discovered."

Additional Insights:

• **Digital Push**: Integration of **AI and digital platforms** like **incredibleindia.org** and virtual reality experiences for global outreach.



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- Community Tourism Models: Promotion of eco-villages and tribal tourism to bring income directly to indigenous communities.
- Women in Tourism: New initiatives aim to train and employ more women guides, entrepreneurs, and **hospitality workers**, fostering gender equality.

Conclusion: With visionary policy, enhanced infrastructure, global outreach, and community involvement, **India is poised to become a world-class tourist destination**. The government's commitment to "Seva" (service) and "Atithi Devo Bhava" (the guest is god) lies at the heart of this transformation. As India marches toward **2047**, its tourism sector is not just growing—it is redefining the way the world sees and experiences





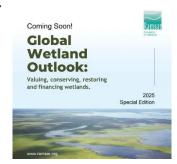


GS Paper 3 – Biodiversity and Conservation

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Global Wetland Outlook 2025: A Call to Protect Earth's Most Vital Ecosystems

Context: The **Global Wetland Outlook 2025**, released by the **Ramsar Convention on Wetlands**, presents the most comprehensive and up-to-date evaluation of the **state**, **trends**, **value**, **and policy responses** concerning wetlands across the world. Prepared by the **Scientific and Technical Review Panel (STRP)** of the Convention, this report is a wake-up call to governments, industries, and civil society to act **urgently and decisively** to preserve and restore wetlands — the planet's most valuable yet threatened ecosystems.



Wetlands: Earth's Lifelines at Risk

The Outlook assesses **eleven broad types of wetlands**, including:

- Seagrass
- Kelp Forests
- Coral Reefs
- Estuarine Waters
- Salt Marshes
- Mangroves
- Tidal Flats
- Lakes
- Rivers and Streams
- Inland Marshes and Swamps
- Peatlands (Mires)

These ecosystems, essential for life on Earth, are rapidly disappearing.

Major Alarming Findings:

A Shrinking Natural Asset:

• Since **1970**, the world has lost around **411 million hectares** of wetlands — a **22% decline** in global wetland extent.

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• The **annual loss rate** stands at **-0.52%**, with some wetland types declining as fast as **-1.8% per year**.

Global Degradation Patterns:

- The most significant losses were reported in **Africa**, **Latin America**, and the **Caribbean**.
- Even developed regions like **Europe**, **North America**, and **Oceania** showed alarming levels of **wetland degradation**.

Main Drivers of Destruction:

- **Urban expansion**, **industrial development**, and **infrastructure projects** remain the key drivers in many developing nations.
- **Invasive species** plague wetlands in North America and Oceania.



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Prolonged droughts are emerging as a major threat across **Europe**.

Economic and Ecological Importance:

Wetlands: A Trillion-Dollar Ecosystem

- The remaining 1,425 million hectares of wetlands generate between \$7.98 trillion to \$39.01 trillion annually in ecosystem services.
- If conserved and managed properly, wetlands can contribute over \$205.25 trillion in net present value (NPV) by 2050.

Restoration vs Conservation:

- The cost of wetland restoration can range from \$1,000 to \$70,000 per hectare per year.
- **Conservation** of healthy wetlands is **far more cost-effective** and efficient than post-degradation restoration.

Financial Shortfalls and Global Inaction:

Despite their immense value, wetlands remain underfunded and neglected in global environmental finance:

- Current biodiversity conservation investment is only 0.25% of global GDP.
- This highlights a massive financing gap that must be addressed through both public and private sector participation.

Urgent Recommendations:

To reverse wetland decline, the report urges:

- Integration of wetlands into global financing mechanisms, such as the Kunming-Montreal Global Biodiversity Framework (GBF).
- Unlocking a blend of public and private finance to treat wetlands as nature-based solutions to climate change, water management, and biodiversity loss.
- Enhancing **political will**, **public awareness**, and **institutional capacity** at all levels.

The Kunming-Montreal Global Biodiversity Framework (GBF):

Adopted at COP15 to the Convention on Biological Diversity in 2022, the GBF is dubbed the "Paris Agreement for Nature."

Key Highlights of the GBF:

- Contains 4 overarching global goals and 23 specific targets to be achieved by 2030.
- Target 3 or "30x30 Goal":
 - o Protect 30% of global land and marine areas by 2030.
 - o Restore **30% of degraded ecosystems**.
 - o Achieve **near-zero biodiversity loss** in intact ecosystems by the end of the decade.

Understanding Wetlands: The Unsung Ecosystems

Wetlands are areas where water dominates the land — either permanently or seasonally — and form unique ecosystems.

They include:





- Natural wetlands: Rivers, lakes, mangroves, coral reefs, peatlands, deltas, and swamps.
- **Human-made wetlands**: Fish ponds, rice paddies, reservoirs, and artificial lakes.

Wetlands are usually classified into **inland**, **coastal**, and **man-made** wetlands

Wetlands in India: A Rich Yet Vulnerable Treasure

India is home to a wide variety of wetland types:

- Himalayan high-altitude wetlands
- Floodplains of the Ganga and Brahmaputra
- Mangrove forests along the Sundarbans
- Coral reefs in Lakshadweep and Andaman & Nicobar Islands

Current Status:

- Wetlands cover 4.6% of India's land area.
- India has 91 Ramsar Sites, the highest in South Asia and third-highest in Asia.

Ecological Importance of Wetlands:

- **Biodiversity Reservoirs**: Home to countless endangered and endemic species.
- Water Purifiers: Naturally remove pollutants, sediments, and heavy metals.
- **Flood Regulators**: Absorb excess rainfall and mitigate natural disasters.
- Carbon Sinks: Peatlands and marshes store vast amounts of carbon, helping to combat climate change.
- Livelihood Supporters: Wetlands sustain agriculture, aquaculture, and tourism industries.

Ramsar Convention: Global Guardian of Wetlands

- Established in 1971 in Ramsar, Iran and came into force in 1975.
- Focuses on the wise use and conservation of wetlands.
- Wetlands under the Convention are known as **Ramsar Sites**.

Key Criteria for Ramsar Sites:

- Support for endangered species and ecological communities.
- Provide habitat to **20,000+ waterbirds** regularly.
- Function as important **spawning or breeding grounds** for fish and other aquatic life.

Conclusion: A Race Against Time

The **Global Wetland Outlook 2025** paints a stark picture: **wetlands are disappearing faster than forests**, and with them, **life-sustaining services are vanishing**. Yet, with the right policies, financing, and collective will, it is **not too late**.





GS Paper 3 - Environment & Biodiversity



Kerala Emerges as India's Biodiversity Discovery Champion

Context: In a record-breaking year for **India's biodiversity** documentation, Kerala has taken the lead as the top contributor of **new faunal discoveries** in the country. According to the recently released 'Animal Discoveries: New Species and New Records 2024' report by the **Zoological Survey of India (ZSI)**, a staggering **683 new** species and subspecies were documented in India in 2024 — the highest-ever tally since formal records began in 2008.



Of these, 459 species are entirely new to science, while 224 species were recorded for the first time in India.

Kerala Leads the Nation:

Kerala alone accounted for **101 faunal discoveries**, of which **80 are new species** and **21 are new records** for India. This exceptional achievement places Kerala ahead of other biodiversity-rich states:

Karnataka: 82 species

Arunachal Pradesh: 72 species

Tamil Nadu: 63 species West Bengal: 56 species Meghalaya: 42 species

Andaman and Nicobar Islands: 43 new faunal entries, including 14 new species and 29 new records

Noteworthy Discoveries: From the Forest Floor to the Canopy

Among the most remarkable finds is a **new snake species from Himachal Pradesh**, named **Anguiculus** dicaprioi in honor of actor and environmentalist Leonardo DiCaprio, recognizing his work in climate action and biodiversity conservation.

Additional highlights include:

- Two new genera and 37 new reptilian species
- **Five amphibians**, including one from a **new genus**
- Contributions to herpetology, entomology, and marine fauna

Botanical Breakthroughs: Flora Flourishes Too

The **Botanical Survey of India (BSI)** also released its report documenting **433 new plant taxa** in 2024. Once again, **Kerala led the count**, with **58 new plant discoveries**, which included:

- 154 angiosperms
- 63 lichens
- 156 fungi
- 32 algae
- 9 microbial species





With these additions, **India's documented plant diversity** has now reached an impressive **56,177 species**, reaffirming the country's position as one of the **most biodiverse nations on the planet**.

Why Kerala Stands Out as a Biodiversity Powerhouse:

Kerala's dominance in biodiversity discoveries can be attributed to a combination of ecological richness and **scientific rigor**:

- Home to the **Western Ghats**, one of the world's most significant **biodiversity hotspots**
- A diverse range of ecosystems: coastal wetlands, tropical rainforests, montane forests, and freshwater lakes
- Proactive **field surveys** and the use of **modern techniques** like **DNA barcoding**
- Strong collaboration between **ZSI scientists**, **local experts**, and **academic institutions**

India's Biodiversity Hotspots: Where Life Thrives

India is one of the 17 megadiverse countries globally and hosts four globally recognized biodiversity **hotspots**. These regions are identified by **Conservation International** and were conceptualized by ecologist Norman Myers.

The Four Hotspots in India:

- 1. **Western Ghats** (Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra, Gujarat) Notable species: **Lion**tailed macaque, Nilgiri tahr, Malabar civet
- 2. **Himalayas** (J&K, Himachal Pradesh, Uttarakh<mark>and, Sikk</mark>im, Arunachal Pradesh, Assam) Unique fauna: Snow leopard, Red panda, Himalayan monal
- 3. Indo-Burma (Northeast India and Andaman Islands) Home to: Clouded leopard, Golden langur, Hoolock gibbon
- 4. Sundaland (Nicobar Islands) Rich in: Nicobar megapode, saltwater crocodile, marine coral ecosystems

These hotspots are ecologically fragile but **teeming with endemic life forms**, making them **critical areas** for conservation.

Why These Regions Matter

- **High Endemism**: Species found nowhere else on Earth
- Vital Ecosystem Services: Water regulation, soil protection, carbon storage
- Cultural Relevance: Integral to indigenous communities' traditions and livelihoods
- Global Priority: Though they cover only 2.3% of Earth's surface, they host over 50% of endemic plant species

Growing Threats to Biodiversity:

Despite their importance, India's rich ecosystems face mounting threats:

- **Deforestation and habitat loss**
- Climate change and glacial retreat
- Illegal wildlife trade and poaching
- Infrastructure expansion, mining, and urban sprawl





Invasive species and agricultural encroachment

These pressures highlight the urgent need for **sustainable and community-led conservation** efforts.

Conservation Initiatives: Protecting India's Natural Wealth

India has been proactive in preserving its biodiversity through:

- **Protected Areas**: 106 national parks, 566 wildlife sanctuaries, and 18 biosphere reserves
- **Legislation**: Wildlife Protection Act, 1972 Biological Diversity Act, 2002
- **People-Centric Approaches**: Sacred groves, eco-development, and Joint Forest Management (JFM)
- **International Commitments**: Convention on Biological Diversity (CBD) Sustainable Development Goal 15: "Life on Land"

Conclusion: A Moment of Celebration and Caution

Kerala's ascent as **India's top biodiversity discovery hotspot** is not just a scientific milestone — it is a reminder of the **natural heritage we must protect**. As India continues to uncover new species at a record pace, the emphasis must shift from **discovery** to conservation.





GS Paper 1 – Geography



Bitra Island: Lakshadweep's Smallest Inhabited Isle May Soon Host Defence Base

Context: Bitra Island, the smallest inhabited island in the Lakshadweep archipelago, has come under the spotlight as the Union Territory administration is reportedly considering its acquisition for defence purposes. If finalized, Bitra would become the third island in Lakshadweep to host a defence establishment, joining INS Dweeprakshak in Kavaratti and INS Jatayu in Minicoy.



Where is Bitra Island?

Located in the **northernmost region of Lakshadweep**, **Bitra Island** is a **tiny coral atoll** that holds both **strategic and cultural significance**. Despite its small size, it is **inhabited** and serves as a **key location in India's western maritime frontier**.

A Place of Pilgrimage:

Bitra is also known for a **small but sacred shrine** dedicated to **Malik Mulla**, an **Arab saint** believed to be **buried on the island**. This makes Bitra a **spiritual destination**, attracting occasional pilgrims from across Lakshadweep.

Climatic Conditions:

The **climate of Bitra** closely mirrors that of **coastal Kerala**. The **hottest months** stretch from **March to May**, with **temperatures ranging between 25°C and 35°C**, and **humidity levels** typically hovering between **70% and 76%** throughout the year. This **tropical marine climate** is influenced by the **Southwest Monsoon**, like the rest of Lakshadweep.

A Lost Haven for Seabirds:

In the past, **Bitra Island served as a significant breeding ground** for various **seabird species**, highlighting its **ecological importance**. Though human settlement and changing climatic patterns have altered its biodiversity, the **island** still remains **biologically sensitive** and forms part of the **Lakshadweep Archipelago's fragile coral ecosystem**.

Strategic and Defence Relevance:

With India strengthening its **maritime security posture** in the **Indian Ocean Region (IOR)**, Bitra's potential role as a **defence outpost** gains importance. Positioned closer to key international shipping lanes and far from the mainland, **Bitra offers a strategic vantage point** for **monitoring naval activity** and **enhancing coastal security**.

Once operationalized, a base here would:

- Expand the Indian Navy's surveillance reach
- Strengthen India's blue water capabilities
- Support search and rescue operations and disaster relief efforts
- Enhance logistical support for vessels operating in the Arabian Sea

A Glimpse Into Bitra's Life:

• **Population**: The island has a **very small population**, primarily composed of **fisherfolk** and **government employees**.

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- Connectivity: Like other remote islands in Lakshadweep, access to Bitra is limited, mostly dependent on **boat services** and **helicopter operations** from larger islands like Agatti.
- Infrastructure: Facilities on the island are minimal, making it a likely candidate for strategic **infrastructure development** if the defence acquisition proceeds.

Conclusion: Bitra on the Brink of Transformation

From a quiet, remote isle with spiritual and ecological value, Bitra Island is poised to play a vital role in India's defence architecture in the Arabian Sea. As India continues to prioritize its maritime security and **island development**, Bitra could soon evolve into a **strategic cornerstone** in the country's oceanic frontier.







GS Paper 3 – Science & Technology



Indian Astronomical Observatory Captures Rare Interstellar Comet in Ladakh's Skies

Context: In a groundbreaking celestial event, **Indian astronomers have** successfully captured images of the interstellar comet C/2025 N1 (ATLAS)—also referred to as 3I/ATLAS—using the Himalayan Chandra Telescope (HCT) located at the Indian Astronomical **Observatory (IAO)** in **Hanle, Ladakh**. This marks a **major milestone** for Indian space science, showcasing the country's growing capability in observational astronomy and deep-space tracking.



About the Indian Astronomical Observatory (IAO):

Often referred to as the Hanle Observatory, the Indian Astronomical Observatory is situated in the remote Hanle Valley of Ladakh, at an altitude of 4,500 metres above sea level, making it one of the **highest observatories in the world**. It was officially inaugurated in **2001** and is operated by the **Indian** Institute of Astrophysics (IIA), Bengaluru.

Why Hanle? The Ideal Site for Astronomy

The **location of IAO** is nothing short of extraordinary. Nestled in a **dry, cold desert**, with **minimal human** activity, low humidity, and crystal-clear skies, Hanle offers one of the best viewing platforms on the planet for astronomical observations. The **atmospheric clarity** at Hanle enables observations in:

- Optical wavelengths
- Infrared
- Sub-millimetre and millimetre bands

This makes it a world-class site comparable to global observatories in Chile, Hawaii, and the Canary Islands.

Key Features of the Observatory:

- Himalayan Chandra Telescope (HCT): A 2-meter aperture optical-infrared telescope, remotely operated from CREST (Centre for Research and Education in Science and Technology) in Bengaluru. It plays a key role in imaging supernovae, gamma-ray bursts, variable stars, and now even interstellar comets.
- **Solar Power Plant**: Ensures energy efficiency in this remote location.
- **Satellite Communication Systems**: Enables seamless data transfer and real-time remote operation.
- **Liquid Nitrogen Plant**: Used to cool sensitive astronomical detectors and instruments.

Hanle: India's First Dark Sky Reserve

In a rare honour, Hanle has been declared as India's first Dark Sky Reserve by the International Dark-Sky Association (IDA). This designation is given to places that maintain exceptionally dark night skies, actively protect them from light pollution, and foster scientific research and eco-tourism.

What makes Hanle special:

- Fewer than **1,000 residents**, ensuring minimal artificial lighting
- Pristine, **unpolluted skies** perfect for stargazing and astrophotography
- Proximity to **Hanle Monastery**, blending ancient culture with cutting-edge science





Hanle is now a major hub for astro-tourism, offering breathtaking views of the Milky Way, meteor showers, and planetary movements.

Interstellar Comet 3I/ATLAS: A Rare Visitor from Deep Space

The comet C/2025 N1 (ATLAS)—now officially the third known interstellar object to visit our Solar System—was captured in detail by the IAO. These interstellar objects originate from outside our Solar **System**, making their detection both **scientifically invaluable** and **rare**. Previously, only two such visitors had been recorded:

- 1. **'Oumuamua (1I/'Oumuamua)** in 2017
- 2. **2I/Borisov** in 2019

The ability of the **IAO** in **Hanle** to image 3I/ATLAS proves its **high-precision tracking capabilities**, even of high-velocity, transient deep-space objects.

Conclusion: Hanle Shines Bright in the World of Astronomy

The successful observation of 3I/ATLAS from India's high-altitude observatory is a landmark achievement, reinforcing the status of the Indian Astronomical Observatory as a global centre for advanced astronomical research.







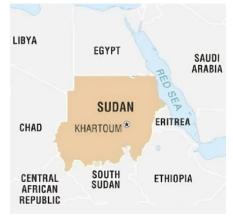


Sudan: Conflict Rekindles in the Heart of Northeast Africa

Context: Sudan, a country at the crossroads of Sub-Saharan Africa and the Middle East, is once again in the global spotlight following deadly clashes between rival military factions in its Kordofan region. The ongoing internal strife, rooted in political instability and power struggles, continues to claim civilian lives and destabilize the region.

Capital and Strategic Location:

- Capital: Khartoum situated at the iconic confluence of the White Nile and Blue Nile, forming the world-renowned Nile River.
- **Geopolitical Position**: Sudan holds a **strategic location**, **bordering the Red Sea** to the east, making it a **critical maritime gateway** between **Africa and the Arabian Peninsula**.



Political Borders:

Sudan is surrounded by **seven countries**, which reflect its **strategic and sensitive location**:

- North Egypt
- East Eritrea and Ethiopia
- South South Sudan
- West Central African Republic and Chad
- Northwest Libya

Its **eastern maritime boundary** along the **Red Sea** also enhances its geopolitical importance in **global trade** and regional security.

Physical Geography: Mountains and Mighty Rivers

- **Highest Peak: Jebel Marra** (also called the **Marrah Mountains**) a volcanic mountain range in **western Sudan**, known for its **fertile highlands and unique biodiversity**.
- Rivers: The White Nile and Blue Nile, two of the most important tributaries of the Nile River, merge in Khartoum. This confluence forms the lifeline of Northeast Africa, supporting agriculture, transportation, and cultural development across multiple nations.

Extra Insight: Sudan's Role in the Nile Basin

Sudan is one of the **key riparian states** in the **Nile Basin**, making it central to water-sharing agreements and regional diplomacy involving **Egypt**, **Ethiopia**, and **South Sudan**. The **Grand Ethiopian Renaissance Dam (GERD)** has been a major point of contention involving Sudan, highlighting its **diplomatic balancing act** between national interests and regional cooperation.

Conclusion: A Nation of Geopolitical and Environmental Significance

Despite the **political turmoil** and **civil unrest**, **Sudan remains a country of immense historical**, **geographic**, **and strategic importance**. With its **location bridging Africa and the Middle East**, access to the **Red Sea**, and its place in the **Nile River system**, Sudan's future will significantly influence regional stability and development in the Horn of Africa.



