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Editor's Note to Readers...

Dear Readers,

On behalf of the entire UPSCprep.com team, I would like to extend a heartfelt thank you for your overwhelming love and support for this magazine. The reviews we have received are truly encouraging and propel us to deliver our absolute best.

To address a frequent query regarding our timeline: we are happy to announce that we will now release the magazine **before the 15th of every month**. This will allow you to plan your preparation with certainty. We also take your feedback seriously. Based on your suggestions, we have incorporated three key improvements in this edition:

- **Enhanced Prelims Focus:** We have increased the number of Prelims-relevant concepts and factoids to make your preparation robust, without making the content unnecessarily bulky.
- **Visual Learning:** We have upgraded the quality of our visuals, ensuring they seamlessly complement the text for better retention.
- **Information Boxes:** You will now find special boxes that provide additional context to current affairs or help you revise basic concepts linked to specific news items.

This magazine is a reality due to the tireless efforts of our dedicated team members: Rohan sir, Anisha ma'am, Nishi ma'am, and Rishikesh sir. Furthermore, the leadership and strategic guidance of Abhijeet sir and Shashank sir have been crucial to this endeavour. We are constantly striving to improve. If you have any feedback or suggestions, please write to us at newsletter@upscprep.com.

Happy Reading!

Regards,

Krishna Tupe

Faculty, UPSCprep.com

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POLITY & GOVERNANCE

Anti-Defection Law

Context

The Anti-Defection Law is in the news after the Supreme Court pulled up the Telangana Speaker for delaying disqualification of defecting BRS MLAs.

KNOW YOUR BASICS: Anti-Defection Law

- **Purpose:** Introduced by the **52nd Constitutional Amendment Act, 1985** through the **Tenth Schedule** to curb political defections and ensure **stability of elected governments**.
- **Grounds for disqualification:**
 - Voluntarily giving up membership of a political party.
 - Voting or abstaining against the party whip without prior permission.
 - Independent members joining a political party after election.
 - Nominated members joining a political party after six months.
- **Merger exemption:** Disqualification does not apply if **two-thirds of the members** of a legislature party agree to a merger; reinforced by the **91st Constitutional Amendment Act, 2003**.
- **Decision-maker:** The **Speaker/Chairman of the House** decides disqualification cases while acting as a **tribunal**, but the law **does not prescribe a time limit**, leading to delays.
- **Judicial review:** The **Supreme Court** has held that the Speaker **does not enjoy constitutional immunity** in such matters, and judicial review is available to prevent **bias or unreasonable delay**.

Impact of the Whip System

- Legislators risk disqualification for voting against party lines.
- Discourages:
 - Independent thinking
 - Constituency representation
 - Intra-party debate
- MPs increasingly act as **numbers**, not deliberators.

Erosion of Parliamentary Functions

- **Committees weakened:** Fewer bills sent for detailed scrutiny.
- **Question Hour diluted:** Reduced accountability of the executive.
- **Debate compressed:** Laws passed with minimal discussion.

Democratic Consequences

- Legislature becomes an **approval body**, not a check on the executive.
- Concentration of power in party leadership and executive offices.
- Weakens separation of powers and representative democracy.

Reform Possibilities

- Limit anti-defection to:
 - Confidence motions
 - Money Bills
- Strengthen committee system.
- Protect voting freedom on policy legislation.

Conclusion

To restore democratic balance, **reforms to the Anti-Defection framework are essential**, enabling Parliament to reclaim its constitutional role as a deliberative and oversight institution.

Rajya Sabha Chairman

Context: The Winter Session 2025 (Dec 1 – Dec 19) presented a study in contrasts. While the **Rajya Sabha** witnessed sharp debates over the **Chairperson's impartiality** and a historic no-confidence motion, the **18th Lok Sabha** recorded significantly high productivity, breaking recent trends of disruption.

Further Info: Current Vice President of India

- **C.P. Radhakrishnan** is serving as the 15th Vice President of India, having assumed office on September 12, 2025.
- **Election Results:** In the election necessitated by the resignation of Jagdeep Dhankhar, C.P. Radhakrishnan secured **452 votes**.
- **Margin of Victory:** He defeated the opposition candidate, former Supreme Court Judge B. Sudershan Reddy, by a margin of **152 votes**.
- **Majority Threshold:** He comfortably crossed the required majority mark of **391 votes**.

KNOW YOUR BASICS: Vice President of India

Constitutional Role and Provisions

The Vice President holds the second-highest constitutional office in India and serves as the *ex-officio* Chairman of the Rajya Sabha.

Key Constitutional Articles:

- **Article 63:** Establishes the office of the Vice President.
- **Article 64:** Mandates that the Vice President is the *ex-officio* Chairman of the Council of States (Rajya Sabha) and holds no other office of profit.
- **Article 65:** Allows the Vice President to act as President during vacancies (resignation, removal, death) or absence.
- **Article 66:** Outlines the election by an electoral college of members from both Houses of Parliament (State Legislatures have no role).
- **Article 67:** Sets the tenure at five years.

Eligibility: To run for the office, a candidate must be a citizen of India, at least **35 years old**, and must not hold any office of profit.

- Frequent disruptions leading to adjournments and rushed legislative business.
- Growing trend of passing legislation with **minimal debate**.

Democratic and Institutional Implications

Parliament risks being perceived as an **executive-dominated institution** rather than a forum for accountability.

- Erosion of trust weakens legislative legitimacy and public confidence.
- Undermines the constitutional role of Parliament as a deliberative body.

Conclusion

Institutional trust in Parliament depends on **procedural fairness, Chair impartiality, and meaningful debate**. Restoring deliberative depth is essential for democratic credibility, not merely procedural compliance.

'Digital Arrest' Scams

Context: In **December 2025**, the Supreme Court of India termed "digital arrest" scams as a national security challenge and directed the **Central Bureau of Investigation (CBI)** to launch a pan-India probe. The Court granted the CBI a "free hand" to override state consent requirements, citing the loss of over **₹3,000 crore** to these organized cross-border syndicates.



Figure 1: Delhi Police Awareness Poster

Nature and Scale of the Threat

Scam typologies identified by the Court:

Issue of Chair's Neutrality

- The **Opposition raised concerns** regarding the neutrality of the Vice-President (*ex-officio* Chairperson), alleging partisan conduct and selective recognition of speakers and curtailment of opposition voices.
- **Historic Move:** The friction culminated in the Opposition moving a **no-confidence motion** against the Chairperson for the first time in recent history, though it remains unlikely to succeed due to the lack of numbers and the 14-day notice constraint.
- **Government Defense:** The ruling party defended the Chair, stating all actions were within the **Rules of Procedure** and essential for maintaining order.
- The **Government defended constitutional propriety**, stating that the Chair's actions were within the Rules of Procedure.

Declining Deliberative Quality

- **Quantity vs. Quality:** While the 111% productivity in Lok Sabha is a positive indicator of legislative *efficiency*, the Rajya Sabha crisis highlights a deficit in *institutional trust*.
- **Reduced time spent** on 'Question Hour', detailed bill discussions and committee scrutiny.

- **Digital arrests:** Fraudsters impersonate law-enforcement or government officials to coerce victims into transferring money.
- **Investment frauds:** Fake high-return schemes, often demanding funds under labels like “advance tax.”
- **Part-time job scams:** Small initial payouts lure victims, followed by coercive “premium tasks” requiring large payments.

Impact:

- Approximately **₹3,000 crore** defrauded nationwide.
- **Elderly citizens** disproportionately targeted, amplifying social harm.

Highlights of the Supreme Court Order

Directive	Details
CBI Leadership	The CBI is to spearhead a unified, nationwide investigation, treating these not just as local crimes but as organised cross-border offences .
Overriding Consent	The Court invoked extraordinary powers to bypass Section 6 of the DSPE Act , which usually requires state consent for CBI probes. States like West Bengal, Tamil Nadu, and Karnataka were explicitly ordered to cooperate.
Banker Liability	The probe will target bank employees who facilitate the opening of "Mule Accounts" (accounts used to launder stolen money) under the Prevention of Corruption Act .
International Scope	The CBI is directed to coordinate with INTERPOL to track syndicates operating from "cybercrime havens" in Southeast Asia (the "Golden Triangle" – Laos, Myanmar, Cambodia).

Institutional Coordination Framework

- **Central Bureau of Investigation (CBI):** Lead agency for investigation; coordination with **Interpol** to track overseas networks.
- **Reserve Bank of India (RBI):** Address **AI/ML-enabled fund “layering”**, improve tracing of illicit financial flows.
- **Online intermediaries:** Required to exercise due diligence and cooperate under the **IT (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021**.
- **Telecom operators & DoT:** Tighten **SIM issuance norms** and curb misuse enabling fraud.

- **Indian Cybercrime Coordination Centre (I4C):** Strengthen regional coordination and intelligence sharing.

Conclusion

The Supreme Court’s directive treats cyber fraud as a **systemic governance and national security challenge**, not merely a law-and-order issue. Effective mitigation will depend on centralised investigation, seamless Centre–State coordination, stronger platform accountability, advanced financial tracing, and telecom reforms—to protect citizens at scale in an increasingly digital economy

Shrinking Fiscal Federalism

Context: States’ fiscal autonomy has narrowed significantly in the post-**14th Finance Commission** period, raising concerns over the health of **cooperative federalism**.

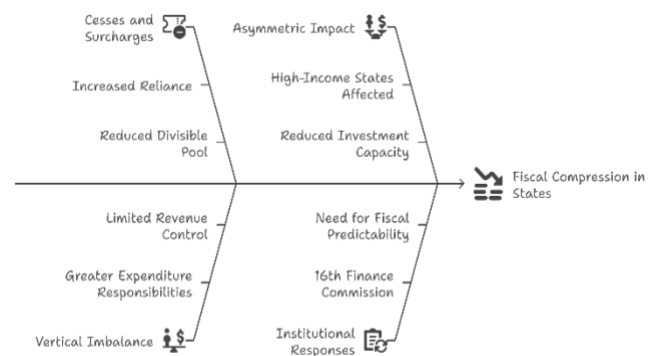


Figure 2: Drivers of Fiscal Compression in States

Drivers of Fiscal Compression

- **Cesses and surcharges:** The Centre increasingly relies on these non-shareable levies, reducing states’ divisible pool.
- **Vertical imbalance:** States bear greater expenditure responsibilities without commensurate revenue control.

Asymmetric Impact

- High-income and high-contributing states such as **Tamil Nadu, Maharashtra, and Karnataka** face greater fiscal strain.
- Limits states’ ability to invest in health, education, and infrastructure.

Institutional Responses

- Growing calls for the **16th Finance Commission** to:
 - Rebalance Centre–State devolution.

- Curb excessive use of cesses and surcharges.
- Strengthen fiscal predictability for states.

Conclusion

Sustaining cooperative federalism requires **fair tax devolution**, centralised fiscal dominance, **fiscal transparency**.

KNOW YOUR BASICS : Finance Commission

Constitutional basis: Established under **Article 280** of the **Constitution of India** to define fiscal relations between the **Union and the States**.

Nature and composition:

- It is a **quasi-judicial, independent body** appointed by the **President of India** every **five years** (or earlier).
- Members typically include experts in **public finance, economics, and public administration**.

Terms of reference: The President specifies the **terms of reference (ToR)** when constituting the Commission; these are usually broad and can cover any fiscal issues between the Centre and States.

Primary functions:

- **Distribution of net proceeds** of taxes between Centre and States and among States.
- **Principles governing grants-in-aid** to States.
- Measures needed to **augment consolidated funds** of States to supplement resources.
- Any other matter related to **Centre-State finances** as referred by the President.

Criteria for devolution: The Commission uses objective criteria such as **population, area, tax effort, fiscal discipline, and demographic changes** to determine the share of States in central taxes.

Non-lapsable recommendations: The Commission's recommendations **do not lapse** at the end of its term; they apply until implemented and remain relevant until the next Commission is appointed.

despite long-standing demands and multiple expert recommendations.

Background & Key Issues

- **Historical injustice:** DNTs were earlier notified as "*Criminal Tribes*" under the **Criminal Tribes Act, 1871**, and denotified in 1952, but stigma persists.
- **Scale:** Estimated population of **~15 crore**, among the most marginalised groups.
- **Policy efforts:**
 - 2019 ethnographic study initiated; conducted by **Anthropological Survey of India**.
 - 2023 report recommended **fresh classification for 85 communities**; others remain partially classified.
- **Earlier recommendations:**
 - **Idate Commission (2007)** urged proper classification to ensure access to constitutional benefits.
- **Institutional mechanism:**
 - **Development Welfare Board for Denotified, Nomadic and Semi-Nomadic Communities** administers schemes like **SEED**.
- **Civil society concern:**
 - Absence of community certificates blocks access to welfare, education, and jobs.

Further info:

- Communities denotified after repeal of the **Criminal Tribes Act, 1871**.
- Many **not covered under SC/ST/OBC**, causing welfare exclusion.
- Addressed through **National Commission for DNTs** and **SEED Scheme**.

Conclusion

Without formal classification, DNTs remain trapped in **administrative invisibility**. A rights-based resolution—through **clear classification or a separate constitutional schedule**—is essential to translate recognition into real social justice.

Denotified, Nomadic and Semi-Nomadic Tribes (DNTs)

Context: The Union government has clarified that it is **not considering reclassification of Denotified, Nomadic and Semi-Nomadic Tribes (DNTs)** into **SC, ST, or OBC categories**,

Chandigarh & Article 240

Context: The Centre's proposal to include **Chandigarh** under **Article 240** through the **Constitution (131st Amendment) Bill, 2025** triggered political backlash, reviving the long-standing

dispute over Chandigarh's status and raising concerns about federalism and consultation.

What is Article 240?

- Empowers the President to make regulations for peace, progress and good governance of certain Union Territories (e.g. Andaman & Nicobar Islands, Lakshadweep).
- Such Presidential regulations can repeal or amend existing laws applicable to the UTs.
- The power is exercised when the UT does not have a legislature, reflecting strong centralised governance.

- **Judiciary:** Parliament can establish a separate High Court for a UT or extend the jurisdiction of an existing High Court (Article 241).
- **Federal character:** UTs have less autonomy than states, with maximum central control in UTs without legislatures.

Conclusion

The Chandigarh question demands a **political, consensus-based resolution**. Administrative shortcuts risk eroding federal trust and should give way to sustained dialogue with all stakeholders.

e-Malkhana

Context: Bihar introduced **e-Malkhana**, a digital system to modernise police evidence storage and management.

Key Features of e-Malkhana

- Digital inventory of seized items with:
 - Photographic records
 - Time-stamped entries
 - Chain-of-custody tracking
- Centralised database accessible to investigators and courts.

Criminal Justice Benefits

- Reduces **loss, tampering, and misplacement** of evidence.
- Speeds up trials by improving evidence retrieval.
- Enhances transparency and accountability in policing.

Scalability and Governance Value

- Low-cost, tech-driven reform suitable for replication nationwide.
- Aligns with police modernisation and judicial efficiency goals.

Conclusion

e-Malkhana demonstrates how **technology-driven police reforms** can significantly strengthen **criminal justice delivery and rule of law**.

Academic Reverse Brain Drain

Context: In **December 2025**, the policy debate on reversing India's "brain drain" shifted from short-term incentives to systemic reforms. This shift is anchored by two major developments: a comprehensive **NITI Aayog report** titled

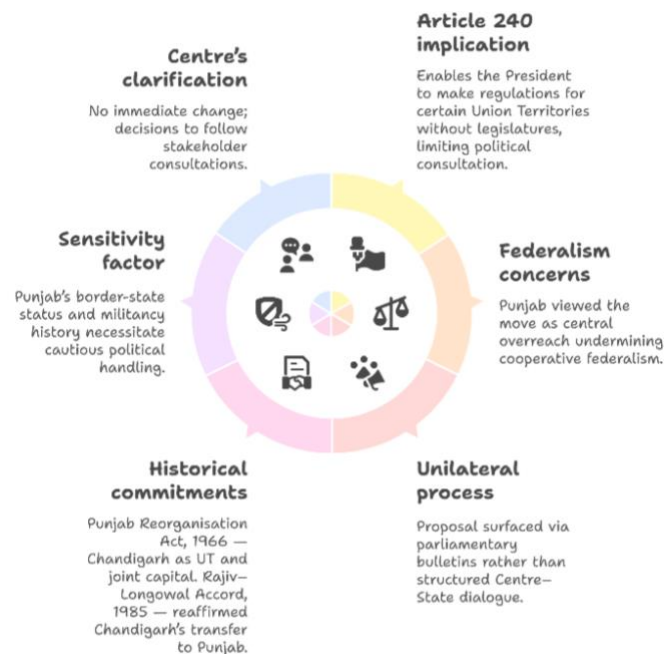


Figure 3: Key Issues & Concerns

About Union Territories (UTs)

- **Constitutional basis:** UTs are part of the Union of India (Article 1) and are covered under Part VIII (Articles 239–241) of the Constitution.
- **Administration:** UTs are administered by the President through an Administrator/Lieutenant Governor (Article 239).
- **Legislature in UTs:** Parliament may create a legislature and Council of Ministers for some UTs (Article 239A); Delhi (Article 239AA) and Puducherry have elected legislatures with limited powers.
- **Presidential regulation:** Under Article 240, the President can make regulations for peace, progress, and good governance of certain UTs, which can override existing laws.

"*Internationalisation of Higher Education in India*" and the proposal for a new **Prime Minister Research Chair (PMRC) Scheme**.

The Crisis: By the Numbers

The NITI Aayog report highlights a widening imbalance in global student mobility, warning that the exodus of skilled youth hampers innovation and increases technological dependence.

- **The Ratio:** For every **1 foreign student** studying in India, approximately **25 Indian students** go abroad for higher education.
- **Absolute Numbers:** By 2024, over **13 lakh** Indians were studying overseas, compared to fewer than **50,000** inbound international students.
- **Funding Gap:** India's R&D spending stands at a mere **0.65% of GDP**, significantly lower than China (**2.7%**) and the U.S. (**3.5%**), limiting domestic research infrastructure.

Structural Problems in Indian Academia

- **Funding constraints:** Low public spending on R&D and universities.
- **Rigid hierarchies:** Seniority-based promotion limits merit and innovation.
- **Low institutional autonomy:** Excessive bureaucratic control over curriculum, hiring, and research.
- **Infrastructure gaps:** Limited labs, grants, and interdisciplinary ecosystems.

Limits of Repatriation Without Reform

- Returnees often face:
 - Administrative frustration
 - Restricted research freedom
 - Slow career progression
- Without ecosystem reform, "ghar wapsi" becomes **symbolic tokenism** rather than systemic renewal.

What Successful Reversal Requires

- Competitive research funding.
- Autonomy for universities and faculty.
- Transparent recruitment and evaluation.
- Strong industry-academia linkages.

Structural Reforms (NITI Aayog Recommendations)

The government acknowledges that salaries alone are insufficient; "red-carpet" structural changes are required to overcome institutional inertia.

- **Single-Window Administration:** Creation of a digital portal to simplify bureaucratic procedures, procurement, and funding mechanisms.
- **Academic Autonomy:** Shifting from seniority-based promotions to **merit-based evaluations**, ensuring academic freedom and hiring autonomy for institutions.
- **Tenure Stability:** Moving away from short-term fellowships to clear, transparent **tenure-track systems** and permanent positions.
- **Holistic Support:** Providing housing, healthcare, and schooling options for the families of returning faculty.

Prime Minister Research Chair (PMRC) Scheme (Proposed)

Discussed during the **56th IIT Council meeting** (August 2025) and set for imminent launch, this scheme aims to attract **120 top Indian-origin researchers** over five years.

Feature	Details
Objective	Create a globally competitive ecosystem to bring back Indian talent.
Target Group	120 Fellows across three categories: Young Research Fellows, Senior Research Fellows, and Research Chairs .
Key Sectors	Focuses on 14 priority sectors including Semiconductors, Artificial Intelligence (AI), Clean Energy, and Advanced Materials .
Incentives	Competitive salaries, start-up research grants, and relocation support.

Institutional Measures (IIT Council)

- **Alumni Survey:** A study of alumni from 23 IITs (batches 2013–2015) is being conducted to understand why graduates pursue PhDs abroad and to propose retention strategies.
- **Foreign Faculty:** Recruitment rules are being relaxed to facilitate the easier hiring of foreign nationals as faculty members.

Conclusion

By going beyond mere financial incentives to address deep-rooted systemic bottlenecks like bureaucratic inertia and lack of academic autonomy, the government aims to create a globally competitive research ecosystem. Ultimately, the success of these reforms will depend on their effective implementation, which is critical for fostering a self-reliant (*Aatmanirbhar*) innovation hub essential for achieving the vision of **Viksit Bharat 2047**.

National Legislative Index (NLI)

Context: A proposal has been mooted to introduce India's first **National Legislative Index (NLI)** to benchmark the performance of state legislatures.

Objectives of the Index

- Improve **institutional accountability**.
- Encourage evidence-based legislative reforms.
- Foster transparency and public trust in legislatures.

Performance Metrics

- **Productivity:** Number of sittings, hours worked, bills passed.
- **Deliberative quality:** Time spent on debates, questions, and discussions.
- **Committee effectiveness:** Bills referred to committees, scrutiny depth.
- **Innovation & transparency:** Use of digital tools, public access to proceedings.

Federal & Democratic Value

- Encourages **competitive federalism** in legislative functioning.
- Allows citizens to compare legislative performance across states.
- Shifts focus from executive dominance to legislative vitality.

Conclusion

The NLI can revitalise India's legislatures through **data-driven institutional reform**, strengthening democratic accountability beyond elections alone.

SIM Binding Rule

Context: Under the **Telecom Cybersecurity Policy, 2025**, the government mandated **SIM binding** for **Telecom Identifier User Entities (TIUEs)** such as WhatsApp and Telegram.

Telecommunications (Telecom Cyber Security) Amendment Rules, 2025

Key Features

- Aims to enhance **Traceability, Trust, and Resilience** in the digital ecosystem.

- Empowers authorities to issue directions and take **Preventive or Corrective Actions** in the interest of national security and public safety.

Feature	Description
New Entity: TIUEs	A new category called Telecommunication Identifier User Entities (TIUEs) has been created. It brings digital platforms (e.g., WhatsApp, Zomato, PhonePe) that use mobile numbers for user identification under the same regulatory umbrella as telecom operators.
Mobile Number Verification (MNV)	Establishes a government-run MNV System allowing apps to instantly verify if a user-provided mobile number corresponds to a legitimate subscriber, curbing the use of fake/virtual numbers.
IMEI Regulation	Mandates a centralized database check for International Mobile Equipment Identity (IMEI) numbers before buying/selling used phones. Resellers must verify devices to disrupt the market for stolen or tampered phones.
Incident Reporting	Introduces stricter timelines: Initial reports of security breaches must be filed within 6 hours , and detailed reports within 24 hours .

Mandatory SIM Binding

As a crucial enforcement measure under these new rules, the DoT issued specific directions to major communication apps (WhatsApp, Telegram, Signal, etc.) to curb "digital arrest" and impersonation scams.

- **The Mandate:** Apps must enforce **SIM Binding**, meaning the service must be continuously linked to the physical SIM card installed in the device. If the SIM is removed, the app should cease to function.
- **Web Session Logic:** For web/desktop versions (e.g., WhatsApp Web), a **mandatory periodic logout (every 6 hours)** is enforced. Users must re-link the device via QR code to prove they still possess the physical device and SIM.
- **Rationale:** This targets **cross-border fraud** where scammers operate Indian numbers from abroad. Long-lived web sessions previously allowed criminals to control accounts remotely without the SIM, facilitating "mule account" operations.
- **Compliance:** Platforms have **90 days** to implement these changes.

Significance

- **National Security:** The framework aligns with the **Digital Personal Data Protection Act, 2023** and prepares the ecosystem for 5G proliferation.
- **Curbing Fraud:** By regulating TIEs, the rules close the loophole where non-telecom apps were used as unregulated conduits for financial fraud (over 7,000 cases reported daily in early 2024).

Challenges:

- Concerns related to **Data Privacy and Protection** due to increased sharing of user identifiers.
- **Compliance Burden** on digital platforms, especially smaller entities and start-ups.
- Lack of clarity in **Operational Guidelines** and safeguards against misuse of regulatory powers.
- Risk of **Regulatory Overreach**, potentially affecting innovation and ease of doing business.

Conclusion

The Telecommunications (Telecom Cyber Security) Amendment Rules, 2025 represent a significant step towards strengthening India's telecom security framework and addressing cyber fraud.

Sanchar Saathi App

Context: The government mandated the **pre-installation of the Sanchar Saathi app** to tackle rising digital fraud, trace stolen mobile phones, and strengthen telecom security.

Core Features & Intended Objectives

- **IMEI-based tracking:** Enables blocking and tracing of lost or stolen mobile phones.
- **Fraud reporting:** Allows users to report fraudulent calls, SMS, and spoofing incidents.
- **Security goal:** Strengthen consumer protection and reduce cyber-enabled financial crimes.

Privacy, Legal & Constitutional Concerns

- **Consent deficit:** Mandatory pre-installation undermines **informed user consent**, a core privacy principle.
- **Excessive permissions:** Access to camera, call logs, and location raises risks of **data over-collection**.
- **Surveillance risks:** Possibility of **function creep**, where data collected for one purpose is used for others.

- **Constitutional test failure:** The app does not clearly satisfy the **three-fold test laid down in the Puttaswamy judgment (2017)**:
 - **Legality:** Absence of a clear statutory mandate.
 - **Necessity:** Less intrusive alternatives exist.
 - **Proportionality:** Scope of data access appears excessive.
- **Data protection vacuum:** Weak enforcement mechanisms and lack of independent oversight heighten misuse risks.

Conclusion

While combating digital fraud is a legitimate state objective, it must balance security with **constitutional privacy guarantees under Article 21**. Technology-driven governance must be **rights-respecting, consent-based, and legally grounded**.

Further Info:

- **DoT initiative** for **IMEI-based tracking/blocking of stolen mobiles** and reporting telecom frauds.
- **Mandatory pre-installation** raises **privacy and consent concerns** due to wide data access.
- Scrutinised under **Puttaswamy (2017)** privacy principles of **legality, necessity, proportionality** (Article 21).

Digitisation of Voter Rolls in Rajasthan

Context: Rajasthan became the **first Indian state** to achieve **100% digitisation of electoral rolls** under the **Special Intensive Revision (SIR)** exercise, marking a major administrative and democratic milestone.

Key Points

- **Comprehensive coverage:**
 - **97% of voters** were digitally mapped using online verification and database integration.
 - Only **3% required physical document verification**, reducing administrative workload.
- **Process improvements:** Digitisation helped clean electoral rolls by removing duplicates, correcting errors, and updating migrant and first-time voter data.
- **Democratic benefits:**
 - Enhances **transparency and accuracy** in voter registration.
 - Reduces risks of impersonation, bogus voting, and electoral malpractice.

- **Administrative efficiency:** Lowers long-term costs, speeds up revisions, and improves coordination between election authorities.
- **Replicability:** Rajasthan's model provides a **template for other states**, especially ahead of large-scale elections and future digital censuses.

Conclusion

Complete digitisation of voter rolls strengthens **electoral integrity, administrative efficiency, and citizen trust**. Rajasthan's achievement demonstrates how technology, when carefully deployed, can deepen democratic processes and reduce electoral fraud.

Surveillance Apps in Welfare Schemes

Context: Recent editorials have criticised the increasing reliance on **surveillance-based digital tools** such as National Mobile Monitoring System (NMMS), Poshan Tracker, and Aadhaar-Based Biometric Authentication (ABBA) in welfare schemes, questioning whether they improve accountability or merely shift focus to monitoring.

Tool	Function	Critical Issues
NMMS	Mandates two geo-tagged, time-stamped photos daily for MGNREGS workers to track attendance.	<ul style="list-style-type: none"> • Corruption: A July 2025 Ministry circular admitted to "large-scale misuse," with random images uploaded to bypass checks. • Exclusion: Poor connectivity in remote areas prevents photo uploads, leading to wage denial for genuine workers.
Poshan Tracker	Real-time monitoring of Anganwadi Centres, employing Facial Recognition Technology (FRT) for Take-Home Rations.	<ul style="list-style-type: none"> • Privacy Risks: Collection of sensitive biometric data (mothers/children) without robust statutory safeguards. • Operational Failure: Users report frequent crashes, hindering actual nutritional tasks despite the app winning "innovation" awards.
ABBA	Used in PDS to verify beneficiaries via fingerprints	<ul style="list-style-type: none"> • Exclusion: High failure rates for the elderly and manual laborers due to worn fingerprints. • Quantity Fraud: It fails to prevent dealers from giving less

	before ration collection.	grain than the quota even after successful authentication.
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Key Concerns

- Emphasis on **attendance and compliance**, not service outcomes.
- **Exclusion** of elderly, disabled, and digitally marginalised due to tech barriers.
- **Privacy intrusion** and erosion of trust among frontline workers.
- Over-reliance on dashboards creates **agnotology**-ignorance of deeper structural issues.

Conclusion

Welfare delivery should move from tech-driven surveillance to responsibility-based governance, using technology as a support tool alongside investments in digital literacy, work culture, and systemic reform.

Pension Reforms in India

Context: The evolution of pension reforms in India was in the news amid renewed debate on Old Pension Scheme vs New Pension System and concerns over fiscal sustainability, ageing population, and pension coverage gaps.

Evolution of Pension Reforms in India: India's pension landscape has evolved in response to demographic shifts, labour market changes, and the need for sustainable retirement income security for both formal and informal workers. Early schemes were largely social assistance-based; over time, policy has shifted toward contributory, portable, and broad-based systems.

Key Developments

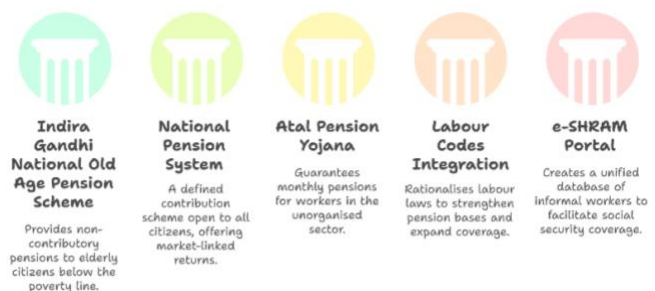


Figure 4: Strengthening Social Security for India's Aging Population

- **Indira Gandhi National Old Age Pension Scheme (IGNOAPS) – NSAP Framework:**
 - Introduced under the **National Social Assistance Programme (NSAP)**.
 - Provides a **non-contributory social pension** for individuals aged **60+ below the poverty line**.
 - Tiered pension: ~₹200 for 60–79 yrs; ~₹500 for 80+ (varies with updates and state additions).
- **OAS/OPS (Old Age/Disability/Survivor Pensions):**
 - Earlier universal non-contributory plans existed in form but were limited by fiscal sustainability concerns.
- **National Pension System (NPS):**
 - Launched for civil servants in 2004; opened to all citizens in 2009.
 - **Defined contribution**, market-linked scheme regulated by **Pension Fund Regulatory and Development Authority**.
 - Portable across jobs; contributions invested in equities and bonds, with annuity at retirement.
- **Atal Pension Yojana (APY) (2015):**
 - Replaces earlier defined-benefit plans for the unorganised sector; subscribers aged **18–40** can join; pension starts at age **60**.
 - Guaranteed monthly pension of ₹1,000–₹5,000 depending on contribution.
- **Labour Codes Integration:**
 - **Code on Social Security, 2020** rationalises multiple labour laws, standardises wages (strengthening pension base), and expands formal coverage.
- **e-SHRAM Portal (Ministry of Labour):**
 - Creates a unified database of **informal workers** to facilitate social security coverage, including pension schemes like APY.

Further Info:

- **Early phase:** Non-contributory social pensions like **IGNOAPS (NSAP)** for elderly BPL populations.
- **Structural shift:** **National Pension System (2004/2009)** introduced **defined-contribution, market-linked, portable pensions**.
- **Inclusion focus:** **Atal Pension Yojana (2015)**, **Code on Social Security, 2020**, and **e-SHRAM** target **unorganised workers' pension coverage**.

Challenges

- **Awareness and financial literacy gaps** reduce enrolment, especially among informal workers.
- **Digital exclusion/Aadhaar authentication errors** hinder access.
- **Fragmented benefits** across states and schemes; portability and inflows remain issues.

Conclusion

India's pension reform trajectory shows a progressive shift from **means-tested social assistance** to **contributory, portable, and inclusive designs** that reflect demographic and economic realities.

Nithari Acquittals & Justice System Failures

Context: The **Supreme Court of India** recently acquitted **Surinder (Surendra) Koli**, long convicted in the infamous **Nithari serial killings** case, concluding that prosecution evidence was unsustainable, spotlighting structural flaws in investigation and trial processes.

Koli's cases closed

Arrested: December 29, 2006
On charges of murder, rape and abduction

Charged: March-April 2007; 16 cases; 3 combined chargesheets filed by CBI against Koli

Convicted: 2009 to 2021
Convicted in 13 of 16 cases

Acquitted: Oct 2023 to Nov 2025

- By the Allahabad high court in 12 cases
- By the SC in the remaining pending case on Tuesday

What the court said
"The conviction cannot be sustained without departing from principles that now stand authoritatively applied to indistinguishable prosecutions arising out of the same occurrence."

Figure 5: Nithari Case | Source: Hindustan Times

Reasons for Acquittal: The Investigative Lapses

The Courts (Allahabad HC and Supreme Court) highlighted severe flaws in the investigation, noting that "suspicion, however grave, cannot replace proof".

- **Botched Investigation:** The Allahabad High Court termed the investigation a "betrayal of public trust," citing failure to collect crucial evidence.

- **Procedural Violations:**
 - **Crime Scene Management:** Failure to secure the crime scene led to the contamination of forensic material.
 - **Confessions:** The prosecution relied heavily on Koli's confession, which was recorded without necessary safeguards—lacking medical examination or legal assistance—raising doubts about coercion.
- **Ignored Leads:** The Supreme Court noted that investigators disregarded the Organ Trade angle, which was flagged by a government-appointed panel.
- **Inconsistency:** The prosecution's narrative shifted frequently; initially implicating both accused jointly, then focusing solely on Koli, which weakened the case's integrity.

Systemic Implications: "Double Injustice"

The acquittal highlights a crisis in the Indian criminal justice system, characterized as a "double injustice".

- **Denial of Justice to Victims:** The acquittal of the accused implies that the actual perpetrators remain unidentified, denying closure and justice to the families of the victims.
- **Wrongful Prosecution:** The accused spent decades in prison (Koli: 19 years, Pandher: 14 years) before being acquitted. This amounts to secondary victimization due to the stigma and loss of liberty.
- **Lack of Compensation:** The Law Commission of India's 277th Report recommended a compensation scheme for those wrongly prosecuted, but this remains unimplemented.

Structural Flaws & Ethical Concerns

- **Evidence vs. Hunch:** The Supreme Court emphasized that criminal law does not permit conviction based on "conjecture or a hunch," underscoring the peril of inadequate evidence collection.
- **Lack of Accountability:** There is no mechanism to hold investigators, forensic experts, or prosecution officers accountable for lapses that lead to failed prosecutions or wrongful convictions.
- **Data Deficit:** The system lacks a transparent, data-driven model to evaluate the performance of policing and forensic services.

Way Forward: Necessary Reforms

To restore public trust and ensure justice, the following reforms are imperative:

- **Strengthening Investigative Protocols:** Investigations must be scientific and objective, strictly adhering to evidence collection rules rather than relying solely on confessions.
- **Safeguarding Confessions:** Stringent guidelines must be enforced for recording confessions, including mandatory medical assessments and legal aid to prevent coercion.
- **Accountability Mechanisms:** Establish strict accountability for law enforcement agencies regarding procedural lapses to prevent "botched" investigations.
- **Victim & Accused Rights:** Implementation of the Law Commission's recommendation for compensating wrongly prosecuted individuals while ensuring a fresh or independent investigation to find the *actual* perpetrators in unsolved heinous crimes.

Conclusion

The Nithari acquittal is a cautionary exemplar of justice system faltering due to investigative, forensic, and procedural weakness. It highlights the urgent need for police reforms, forensic capacity strengthening, prosecutorial training, and statutory victim protection and compensation frameworks to uphold both convict and victim rights.

DHRUVA Framework

Context: The Department of Posts (India Post) proposed **DHRUVA** as a **Digital Public Infrastructure (DPI)** to modernise address systems in India.

Standardising Addresses through Digital Public Infrastructure

- Provides **unique digital address IDs**, similar to email identifiers.
- Uses **DIGIPIN** for precise geo-coded location mapping.
- Enables **consent-based address sharing** across government and private platforms.
- Enhances **service delivery, logistics efficiency, and rural inclusion**.

Conclusion

DHRUVA has the potential to significantly improve governance and service delivery, provided it is supported by **strong privacy safeguards, legal backing, and interoperability standards**.

Citizenship under CAA

Context: The **Supreme Court of India** clarified that citizenship under the Citizenship (Amendment) Act, 2019 (CAA) is **not automatic** and requires formal verification and approval by authorities.

CAA, Verification and Fear of Statelessness

- **Scope of CAA:** Applies to persecuted Hindu, Sikh, Buddhist, Jain, Parsi, and Christian minorities from Pakistan, Afghanistan, and Bangladesh who entered India before 31 December 2014.
- **Judicial clarification:** The Court observed that eligibility under CAA is conditional upon administrative scrutiny, including proof of identity, religion, country of origin, date of entry, and persecution.
- **Administrative process:** Citizenship is granted only after verification, background checks, and issuance of certificates—acknowledgement receipts alone do not confer legal status.
- **Ground-level concerns:** Petitioners highlighted panic among refugees during the Special Intensive Revision (SIR) of electoral rolls, particularly in West Bengal, where delays and lack of recognition of interim documents led to fears of deletion from rolls.
- **Risk of exclusion:** Prolonged processing timelines and weak coordination between citizenship authorities and electoral machinery can create de facto statelessness, even for eligible applicants.

KNOW YOUR BASICS: Citizenship in India

- Citizenship is covered under **Articles 5–11** of the Constitution and regulated by the **Citizenship Act, 1955**.
- It can be acquired by **birth, descent, registration, naturalisation, or incorporation of territory**.
- Citizenship may be terminated by **renunciation, termination, or deprivation**.
- India does **not allow dual citizenship**, but provides **Overseas Citizenship of India (OCI)** with limited rights.

Conclusion

The ruling reinforces **due process** in citizenship determination, while underscoring the need for **administrative sensitivity, clear timelines, and inter-agency coordination** to prevent exclusion and statelessness.

Facial Recognition for Food Aid

Context: Anganwadi workers approached the Bombay High Court challenging mandatory facial recognition and OTP verification for food distribution under Poshan 2.0.

Technology vs Right to Food in Welfare Delivery

- **Policy change:** The Facial Recognition System (FRS) was mandated for Take Home Ration (THR) distribution to curb leakages and ensure beneficiary authentication.
- **Operational hurdles:** Workers report network failures, device errors, biometric mismatches, and OTP delays—especially in rural and tribal areas.
- **Scale of impact:** Affects over 1.1 lakh anganwadi workers and millions of beneficiaries, including pregnant women, lactating mothers, and children.
- **Exclusion risks:** Authentication failures can deny timely nutrition, undermining the right to food and program outcomes.
- **Rights and governance:** Concerns raised on proportionality, absence of offline fallbacks, data privacy safeguards, and the shift from outcome-focused delivery to process-heavy compliance.

Conclusion

Digital tools should **enable, not obstruct**, welfare delivery. Robust **fallback mechanisms, privacy protections, and outcome-centric design** are essential where food security is at stake.

Karnataka Hate Speech & Hate Crimes Bill, 2025

Context: The Karnataka government proposed a law to criminalise hate speech and hate crimes, triggering debate on civil liberties and legal overreach.

Free Speech vs Over-Criminalisation

- Uses **broad and vague terms** such as “hate”, “enmity”, and “disharmony”, raising concerns of interpretational ambiguity.
- Creates scope for **subjective and selective enforcement** by executive authorities.
- Risks **chilling legitimate dissent**, political speech, and artistic expression.

- Critics note that **existing IPC provisions** already criminalise incitement to violence, promotion of enmity, and public disorder, questioning the need for a new law.

Further Info: Hate Speech

- **No explicit definition** in the Constitution; regulated through **reasonable restrictions** under **Article 19(2)** on free speech.
- Penal provisions include **IPC Sections 153A, 153B, 295A, 505** (promoting enmity, outraging religious feelings, public mischief).
- The **Supreme Court of India** has held that hate speech undermines **constitutional morality, fraternity, and public order**.
- Addressed through **Model Code of Conduct** during elections and platform obligations under **IT Rules, 2021** (due diligence by intermediaries).

Conclusion

While addressing hate is essential for social harmony, legislation must ensure **clarity, proportionality, and strong safeguards** to protect **constitutional free speech**.

WINTER SESSION BILLS

What is a Bill & When Does It Become Law

- A Bill is a proposed legislation introduced in Parliament.
- It becomes an Act only after:
- Passage by both Houses (or Lok Sabha alone in case of Money Bills), and
- Presidential assent.
- Bills are governed by Articles 107–122 of the Constitution.

Types of Bills Based on Content

- **Ordinary Bill:** Deals with non-financial matters. Can be introduced in either House and requires a simple majority in both. Joint sitting is possible in case of a deadlock.
- **Money Bill (Article 110):** Deals exclusively with taxation, borrowing, and expenditure from the Consolidated Fund. Introduced only in the Lok Sabha with the President's recommendation. Rajya Sabha can only make recommendations within 14 days. Certified by the Lok Sabha Speaker.
- **Financial Bill (Article 117):** Contains financial as well as non-financial provisions. Introduced in the Lok Sabha with the President's recommendation. Rajya Sabha has full powers and joint sitting is allowed.
- **Appropriation Bill:** Authorises withdrawal of money from the Consolidated Fund to meet government expenditure. Introduced after the Budget. No amendment can increase expenditure.
- **Constitution Amendment Bill (Article 368):** Amends the Constitution. Requires special majority in Parliament and, for federal provisions, ratification by at least half of the states.

Types of Bills Based on Sponsorship

Government Bills

- Introduced by ministers.
- Majority of laws passed fall under this category.

Private Members' Bills

- Introduced by MPs who are not ministers.
- Rarely passed but important for raising policy issues and initiating debate.

Legislative Procedure & Special Mechanisms

Stages of Passage

- First Reading – Introduction
- Second Reading – Detailed discussion, committee stage
- Third Reading – Final vote

Joint Sitting (Article 108)

- Called by President to resolve deadlock.
- Applicable only to Ordinary and Financial Bills (not Money Bills).

Ordinance Making

- President/Governor can promulgate ordinances when legislature is not in session.
- Must be approved within 6 weeks of reassembly.

BILLS PASSED IN THIS WINTER SESSION

VB Shiksha Adhishthan Bill, 2025

Context: In December 2025, the Union Minister for Education introduced the Viksit Bharat Shiksha Adhishthan (VBSA) Bill, 2025 in the Lok Sabha. The Bill, which seeks to implement the regulatory vision of the **National Education Policy (NEP) 2020**, proposes to replace the University Grants Commission (UGC), AICTE, and NCTE with a single, unified regulator. The Bill has been referred to a **Joint Parliamentary Committee (JPC)** for detailed scrutiny.

Why is this Bill Necessary?

- **Fragmented Regulation:** Currently, higher education is governed by multiple bodies (UGC, AICTE, NCTE), leading to duplication of mandates and "over-regulation".
- **NEP 2020 Vision:** The NEP envisaged a **"Light but Tight"** regulatory framework with a separation of functions (regulation, accreditation, funding, and standard-setting) to ensure distinct lines of accountability.
- **Performance Lag:** Despite having the world's 3rd largest higher education system, India's **Gross Enrolment Ratio (GER)** is low (~28%), and no Indian university features in the top 100 global rankings.

Institutional Architecture: The "Four Pillars" Approach

- **Single Umbrella Regulator:** The Bill establishes Viksit Bharat Shiksha Adhishthan (VBSA) as a 12-member apex body to oversee higher education governance.
- Unlike the UGC, the VBSA will **not** handle grant disbursements. Instead, it will oversee three autonomous verticals.

Council Name	Hindi Nomenclature	Function
Regulatory Council	1. <i>Viniyaman Parishad</i>	Handles Regulation, licensing, entry/exit of institutions, and maintains a public disclosure portal.
Accreditation Council	2. <i>Gunvatta Parishad</i>	Oversees the Accreditation ecosystem (Quality assurance and grading).
Standards Council	3. <i>Manak Parishad</i>	Sets Academic Standards, learning outcomes, and curriculum benchmarks.
Grant Disbursal	(Shifted to Ministry)	Financial powers are removed from the regulator and vested directly with the Ministry of Education.

Key Provisions

- **Unified Jurisdiction:** The Bill repeals the **UGC Act (1956)**, **AICTE Act (1987)**, and **NCTE Act (1993)**. It covers all Higher Education Institutions (HEIs) except those in **Medical** and **Legal** education. The **Council of Architecture (CoA)** will continue as a Professional Standard Setting Body.
- **Single Window System:** A technology-driven, "faceless" approval system will replace the current inspection-heavy regime. Regulation will be based on **public self-disclosure** by institutions.
- **Coverage and Exemptions:**
 - Applies to most Higher Education Institutions (HEIs).
 - Excludes professional regulators like medicine and law, which remain under sectoral councils.
- **Accreditation & Autonomy:**
 - Mandatory accreditation for all HEIs.
 - Introduces graded autonomy based on performance, allowing top institutions greater academic and administrative freedom.
- **Internationalization:** Facilitates the entry of top global universities (Top 500) into India and allows Indian Institutions of National Importance (INIs) to set up offshore campuses.
- **Penalties:** Stringent penalties for non-compliance:
 - **₹10 lakh to ₹70 lakh** for general contraventions.

- **At least ₹2 crore** for establishing a university without approval.

Strategic Significance

- **Employability:** Mandates industry-academia interface, allowing **"Professors of Practice"** (experts with 15+ years experience) to teach without a PhD, and introduces mandatory internships for degrees.
- **Academic Bank of Credits (NACB):** Supports the **Multiple Entry and Exit System**, allowing students to store and transfer credits across disciplines and institutions.
- **Global Standards:** By adopting global best practices in accreditation, the Bill aims to reverse the "brain drain" and position India as a global education hub.

Concerns and Challenges

- **Erosion of Federalism:** Education is on the **Concurrent List**. States fear that a centralized "Super-Regulator" will override state universities' autonomy and ignore regional linguistic needs.
- **Loss of Autonomy (Financial):** Moving grant-giving powers from a statutory body (UGC) to the **Ministry** raises fears of political influence in funding decisions, potentially compromising institutional independence (executive overreach).
- **Compliance Burden:** While aimed at simplification, smaller HEIs may struggle with the rigorous digital reporting and accreditation requirements, leading to a "two-tier" system.

Conclusion

The VBSA Bill, 2025 aims to deliver regulatory coherence, quality assurance, and global integration in higher education. Its effectiveness will depend on safeguards for academic autonomy, federal consultation, transparent funding, and proportionate regulation—making JPC scrutiny critical to achieving balanced reform.

VB-G RAM G Bill

Context: In December 2025, the President of India gave assent to the Viksit Bharat-Guarantee for Rozgar and Ajeevika Mission (Gramin) (VB-G RAM G) Act, 2025. This legislation marks a paradigm shift by **repealing the 20-year-old MGNREGA (2005)**, replacing the "right to work" framework with a "development-oriented" employment mission aligned with the vision of **Viksit Bharat 2047**.

Rationale: Why Replace MGNREGA?

- **Changing Rural Reality:** Since 2005, rural poverty has declined (27% to 5.3%), and livelihoods have diversified. The open-ended, demand-driven model of MGNREGA was seen as misaligned with contemporary needs.
- **Structural Issues:** The previous system faced challenges like low asset quality ("mud work"), misappropriation of funds (approx. ₹193 crore in FY25), and supply-chain leakages.
- **Outcome Focus:** The new Act shifts focus from merely providing wages to creating durable, Viksit Bharat-aligned infrastructure (Water, Roads, Climate resilience).

What the Bill Proposes

- **Replacement of MGNREGA:** Ends the statutory, rights-based guarantee of employment and introduces a centrally designed rural employment mission.
- **Supply-driven architecture:** Employment is provided within centrally capped budgets, not on household demand.
- **Geographic targeting:** Work is available only in rural areas notified by the Centre, narrowing universal coverage.
- **Implication:** Increases the fiscal burden on states, especially those with high rural distress.
- **Budget determination:** Allocations decided by the Centre using "objective parameters," limiting state flexibility.

Feature	Details
Guaranteed Days	<ul style="list-style-type: none"> Increases the statutory guarantee from 100 days to 125 days per rural household per financial year.
Agricultural Pause (Blackout Period)	<ul style="list-style-type: none"> • Statutory Mandate: States must notify a period aggregating 60 days (peak sowing/harvesting) where no public works can be executed. • Objective: To ensure labour availability for farmers and prevent wage inflation during critical agricultural seasons.
Funding Model (Normative Allocation)	<ul style="list-style-type: none"> • Normative Cap: Replaces the "Labour Budget" (demand-driven) with a Central Normative Allocation based on objective parameters. Expenditure beyond this allocation is borne by the State. • Cost Sharing: Shifts from 100% Centre (wage) to a shared model: <ul style="list-style-type: none"> - 90:10 (NE & Himalayan States). - 60:40 (General States).

	- 100% Centre (UTs without legislature).
Planning Architecture	<ul style="list-style-type: none"> • Viksit Gram Panchayat Plans (VGPP): Decentralized plans aggregated into a National Rural Infrastructure Stack (VB-NRIS). • Integration: Aligned with PM Gati Shakti for spatial planning.
Tech & Accountability	<ul style="list-style-type: none"> • Mandates Biometric Authentication, AI-based fraud detection, and Real-time dashboards. • Social Audits: Mandatory at least once every six months.

Thematic Verticals (Asset Creation)

The Act creates assets under four specific verticals to ensure they are productive and durable:

1. **Water Security:** Conservation, groundwater recharge, and irrigation.
2. **Core Rural Infrastructure:** Roads, schools, and sanitation systems.
3. **Livelihood Infrastructure:** Storage, markets, and skill centers.
4. **Extreme Weather Mitigation:** Disaster resilience works (embankments, shelters).

Operational Changes

- **Seasonal flexibility:** Permits temporary suspension ("blackout periods") during peak agricultural seasons to avoid labour-market distortion.
- **Centralised control:** The Centre determines state-wise allocations, eligible areas, and implementation norms, reducing decentralised planning.
- **Technology by law:** Digital attendance, monitoring, and verification mechanisms are codified, expanding surveillance and compliance requirements.

Key Departures from MGNREGA

- **From right to scheme:** Shifts from a legal right to employment to an administratively provided welfare programme.
- **From universality to selectivity:** Limits coverage and weakens the safety-net role during crises (e.g., droughts, pandemics).
- **From local planning to central direction:** Curtails the role of Gram Panchayats and bottom-up demand articulation.

Comparison: MGNREGA vs. VB-G RAM G

Parameter	MGNREGA (2005)	VB-G RAM G Act (2025)
Nature	Rights-Based (Demand Driven)	Supply-Driven (Normative Allocation)
Guarantee	100 Days	125 Days
Funding (Wage)	100% by Centre	60:40 Split (Centre:State) for most states
Seasonality	Work available year-round	Mandatory Pause (60 days) during farming peak
Unemployment Allowance	State Liability	State Liability (Payable if no work in 15 days)

Critical Analysis

Significance:

- **Farmer-Friendly:** The mandatory "blackout period" addresses the chronic complaint of farmers regarding labor shortages during harvest seasons.
- **Asset Quality:** Integration with **VB-NRIS** and **PM Gati Shakti** ensures that roads and water bodies are mapped and durable, not just "digging holes".
- **Higher Income:** The increase to 125 days offers higher potential annual earnings for rural households.

Concerns:

- **Fiscal Federalism:** The shift from 100% Central wage funding to a **60:40 split** places a massive financial burden on State governments.
- **End of "Right to Work":** Critics argue that "Normative Allocation" (budget caps) effectively ends the demand-driven nature of the scheme. If the central funds run out, work may stop, unlike MGNREGA where funding was open-ended.
- **Exclusion Risks:** Heavy reliance on AI and biometrics may marginalize workers in remote areas with poor connectivity or faded fingerprints.
- **Shock resilience:** Reduced flexibility during economic downturns could weaken rural distress absorption.

Conclusion

The VB-GRAM G Bill represents a paradigm shift from rights-based rural employment to supply-driven welfare governance. While it seeks efficiency, fiscal discipline, and labour

optimisation, its success will depend on safeguarding inclusion, decentralisation, and shock-responsiveness—the pillars that made MGNREGA a cornerstone of rural social protection.

SHANTI Bill, 2025

Context: In December 2025, President Droupadi Murmu granted assent to the Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Bill, 2025. This historic legislation repeals the **Atomic Energy Act, 1962** and the **Civil Liability for Nuclear Damage (CLND) Act, 2010**, ending the state monopoly on nuclear power to achieve the target of **100 GW nuclear capacity by 2047**.

Why was this Legislation Needed?

- **Stagnant Capacity:** Despite decades of effort, India's nuclear capacity stands at only **8.18 GW** (approx. 2% of electricity mix). The state monopoly (**NPCIL**) lacked the capital and execution bandwidth to scale up to the targeted 100 GW.
- **Liability Issues:** The 2010 CLND Act placed unlimited/ambiguous liability on suppliers, which stalled foreign collaboration (e.g., with Westinghouse, EDF) and domestic private investment.
- **Energy Transition:** To meet **Net Zero 2070** goals, India needs firm, clean baseload power to complement intermittent renewables.

Key Provisions

A. Privatization & Structural Reform

- **End of Monopoly:** For the first time, **private Indian firms, joint ventures, and foreign entities** can build, own, operate, and decommission nuclear power plants.
- **Strategic Ring-fencing:** The state retains **exclusive control** over strategic activities: **Uranium enrichment, spent fuel reprocessing, and radioactive waste management**. Private players are restricted to the commercial layer (power generation).

B. Regulatory Architecture

- **Statutory Independence:** The **Atomic Energy Regulatory Board (AERB)** is granted full statutory status (previously it was subordinate to the Atomic Energy Commission), enhancing its independence and enforcement powers.

- **4-Tier Adjudication:** The Bill creates a new dispute resolution mechanism:
 1. **AERB:** Initial Regulator.
 2. **Atomic Energy Redressal Advisory Council (AERAC):** Expert review body.
 3. **Appellate Tribunal for Electricity:** With added nuclear technical members.
 4. **Supreme Court:** Final arbiter on law.

C. Liability and Compensation Reforms

- **Operator Liability Cap:** The liability of the operator is capped at **300 million Special Drawing Rights (approx. ₹3,000 crore)** per incident. The government provides a "backstop" for damages exceeding this cap via a **Nuclear Liability Fund**.
- **Supplier Immunity:** The Bill rationalizes supplier liability, limiting it largely to **contractual terms** or cases of **wilful misconduct**. This aligns India with international norms and addresses investor concerns.
- **Claims Commission:** A specialized **Nuclear Damage Claims Commission** replaces civil courts to ensure faster, uniform compensation for victims.

Technology Focus: **Small Modular Reactors (SMRs)**

- The Bill explicitly supports the deployment of **Small Modular Reactors (SMRs)** and **Bharat Small Reactors (BSRs)**.
- These are quicker to build and safer than traditional large reactors, allowing private players to set up captive nuclear plants for industrial hubs.

Why it matters

- **Energy transition:** Provides firm, low-carbon power to complement renewables.
- **Industrial ecosystem:** Boosts nuclear-grade manufacturing, services, and technology transfer.
- **Investment climate:** Addresses long-standing liability concerns while strengthening safety oversight.

Critical Analysis: Benefits vs. Risks

Potential Benefits	Concerns & Challenges
Capital Inflow: Unlocks private capital to bridge the estimated ₹15 lakh crore gap needed for capacity expansion.	Safety Risks: Critics fear that "profit motive" in the private sector could compromise safety standards, drawing parallels to the Bhopal Gas Tragedy.

Project Speed: Private EPC (Engineering, Procurement, Construction) efficiency can reduce the chronic delays seen in NPCIL projects (e.g., Kudankulam).	"Polluter Pays" Diluted: Capping liability based on plant size rather than actual damage may burden the taxpayer in the event of a catastrophic accident.
Tech Transfer: Encourages foreign technology providers to share advanced designs (SMRs) due to clarified liability norms.	Grid Integration: Integrating 100 GW of baseload nuclear power requires massive upgrades to transmission infrastructure.

Conclusion

The SHANTI Bill, 2025 marks a decisive shift toward a scalable, investable, and safety-first nuclear framework. Its success will hinge on credible regulatory independence, rigorous safety enforcement, and a liability system that balances investor confidence with robust victim protection.

Sabka Bima Sabki Raksha Bill, 2025

Context: Parliament passed the **Sabka Bima Sabki Raksha (Amendment of Insurance Laws) Bill, 2025**. This landmark legislation amends the **Insurance Act, 1938**, the **LIC Act, 1956**, and the **IRDA Act, 1999**. The primary objective is to achieve the vision of **"Insurance for All by 2047"** by mobilizing long-term capital and deepening insurance penetration.

Why the amendment was needed

- **low insurance penetration:** India's insurance penetration remains around 4–5% of GDP, far below the global average, especially weak in health and non-life segments.
- **capital constraints:** High capital requirements and limited foreign participation restricted expansion, innovation, and risk coverage.
- **fragmented regulatory framework:** Rigid licensing and product silos reduced efficiency and customer-centric offerings.
- **uneven regional reach:** Rural and informal sectors remained underinsured despite flagship schemes.

Key provisions of the bill

Provision	Details
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100% FDI	<ul style="list-style-type: none"> Raises the Foreign Direct Investment (FDI) cap in insurance companies from 74% to 100%. Allows full foreign ownership and management control, aiming to attract global insurers and technology.
Composite Licensing	<ul style="list-style-type: none"> Permits insurers to offer Life, General, and Health insurance under a single entity (Composite License). Previously, an insurer could not sell life and non-life products together. This reduces compliance costs and enables bundled products.
Reinsurance Liberalisation	<ul style="list-style-type: none"> Reduces the Net Owned Fund (NOF) requirement for foreign reinsurers from ₹5,000 crore to ₹1,000 crore. Aims to position India as a regional reinsurance hub.
LIC Autonomy	<ul style="list-style-type: none"> Grants LIC greater operational freedom to open zonal and foreign offices without seeking prior government approval.
Consumer Protection	<ul style="list-style-type: none"> Establishes a Policyholders' Education and Protection Fund. Mandates insurers to provide age-sensitive health products for senior citizens.
Share Transfer	<ul style="list-style-type: none"> Increases the threshold for transfer of shares requiring IRDAI approval from 1% to 5% of paid-up capital, easing ease of doing business.
Intermediaries	<ul style="list-style-type: none"> Introduces new categories like Managing General Agents (MGAs). Removes the ₹100 crore capital requirement for insurance co-operatives.

Concerns and Challenges

- **Foreign Dominance:** Critics argue that allowing 100% foreign ownership may place domestic household savings under the control of foreign corporations, potentially prioritizing profit repatriation over local reinvestment.
- **Rural Neglect:** Foreign insurers may focus on lucrative urban markets ("cherry-picking"), leaving the rural and social sectors underserved.
- **Regulatory Capacity:** A more complex market with composite licenses and foreign giants requires the **IRDAI** to significantly upgrade its supervisory capabilities (SupTech) to prevent systemic risks.

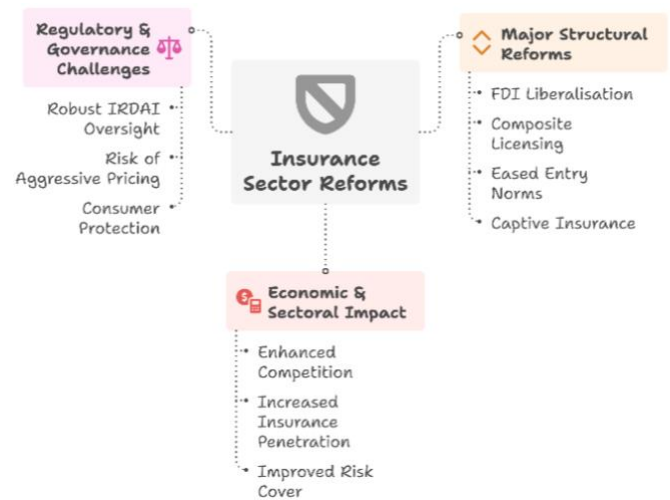


Figure 6: Insurance Sector Reforms in India

Conclusion

The Sabka Bima Sabki Raksha (Amendment of Insurance Laws) Bill, 2025 represents a structural reform aimed at transforming insurance into a universal safety net. If supported by strong regulation and consumer protection, it can significantly improve risk coverage, financial security, and long-term economic stability in India.

Expected Benefits

- **Financial inclusion:** Expands coverage among MSMEs, farmers, gig workers, and informal labour.
- **Economic stability:** Mobilises long-term funds for infrastructure and development.
- **Employment generation:** Growth in actuarial science, underwriting, and distribution networks.
- **Risk resilience:** Better protection against health shocks, climate disasters, and economic uncertainty.

Health Security se National Security

Context: Parliament passed the Health Security se National Security Cess Bill, 2025. The legislation introduces a capacity-based special excise cess on "sin goods" like tobacco and pan masala. The aim is to create a dedicated revenue stream for public health and national security expenditure, filling the fiscal gap left by the expiry of the GST Compensation Cess.

Rationale behind the bill

- **Public health burden:** Tobacco and pan masala consumption contribute significantly to cancers, cardiovascular diseases, and oral health disorders, imposing heavy costs on the public health system.
- **Declining fiscal space:** With GST compensation cess nearing expiry, the Centre required a new, non-inflationary revenue source.
- **Changing nature of national security:** Modern defence requires sustained funding for cyber security, space assets, drones, missiles, and advanced surveillance systems.
- **Behavioural correction:** Higher taxation on "sin goods" is intended to discourage consumption while raising public revenue.

Key Provisions

Feature	Details
Taxable Goods	Initially Pan Masala and Tobacco products . The Centre can notify other goods later.
Basis of Levy	Capacity-Based: The cess is calculated based on the maximum rated speed of the packaging machinery (pouches per minute) and the weight of the product. • Example: A machine packing 500 pouches/minute (up to 2.5g) faces a cess of ₹1.01 crore/month .
Manual Production	For factories using wholly manual processes, a fixed flat rate of ₹11 lakh per month applies.
Utilization	Proceeds are credited to the Consolidated Fund of India (CFI) and earmarked specifically for health and security sectors.
Abatement	If a machine remains inoperative for 15 continuous days or more , the manufacturer can claim a proportionate reduction (abatement) in the cess.
Penalties	<ul style="list-style-type: none"> • Non-compliance: Penalty of ₹10,000 or equivalent to evaded cess (whichever is higher). • Criminal Prosecution: For evasion exceeding ₹1 crore, imprisonment ranges from 1 to 5 years.

Centralised control

- Cess collected and administered by the Union government.
- States do not have discretion over utilisation, unlike GST revenue sharing.

Anti-evasion intent: Designed to reduce tax evasion common in pan masala and tobacco sectors through higher compliance and monitoring.

Government's justification

- Public health is largely a state subject, but national defence lies firmly with the Union government.
- Sin taxes are globally recognised tools for:
- reducing harmful consumption
- generating stable revenue without burdening essential goods
- Defence modernisation cannot rely on ad-hoc budgetary allocations alone.

Concerns and Criticisms

- **Fiscal federalism:** States argue that cesses bypass the divisible pool, reducing their share of central taxes.
- **Regressive impact:** Indirect taxes disproportionately affect lower-income consumers.
- **Earmarking debate:** Linking health-related taxes directly to defence spending raises questions on transparency and prioritisation.
- **Implementation challenges:** High risk of smuggling and illicit trade if enforcement is weak.

Significance

- **Behavioral Correction:** Acts as a "Sin Tax," discouraging the consumption of harmful goods while funding the treatment of diseases (cancer, cardiovascular) caused by them.
- **Rule-Based Framework:** Moves away from ad-hoc measures to a structured, statutory framework for "sin taxation," ensuring predictability for the industry.
- **Modern Defence Funding:** Acknowledges that modern national security (drones, surveillance) requires sustained funding beyond standard budgetary allocations.

Conclusion

The Health Security and National Security Cess Bill, 2025 reflects a strategic attempt to merge public health goals with defence financing through sin taxation. While fiscally innovative, its long-term success will depend on strong enforcement, transparency in fund utilisation, and careful balancing of federal and social equity concerns.

Manipur GST 2.0 Reforms

Context: Parliament has passed the **Manipur Goods and Services Tax (Second Amendment) Bill, 2025**, replacing the ordinance promulgated in October 2025. This legislation aligns Manipur's tax laws with the **Central GST Act** and prepares the state for **GST 2.0 reforms**.

Why was a State Bill passed by Parliament?

- **Constitutional Basis (Article 356):** The Bill was passed by Parliament because **Manipur is currently under President's Rule**.
- **Legislative Competence (Article 357):** When a Proclamation of President's Rule is in operation, the powers of the State Legislature are exercisable by or under the authority of **Parliament**.
- **Necessity:** The Bill replaces an earlier **Ordinance** that was set to expire. Since the State Assembly is suspended due to internal disturbances, Parliament stepped in to ensure **fiscal continuity** and prevent a legal vacuum in tax administration.

Key Provisions of the Bill

Provision	Details
Unique ID Markings	<ul style="list-style-type: none"> • Empowers the government to mandate digital stamps or unique secure markings on specific goods (e.g., tobacco, pan masala) to track production. • Penalty: Non-compliance attracts a penalty of ₹1 lakh or 10% of the tax payable, whichever is higher.
SEZ Exemptions	<ul style="list-style-type: none"> • Expands Schedule III to exclude the supply of goods warehoused in Special Economic Zones (SEZs) or Free Trade Warehousing Zones (FTWZ) from SGST, provided the supply occurs before clearance to the Domestic Tariff Area (DTA).
Credit Notes & ITC	<ul style="list-style-type: none"> • Clarifies that a supplier cannot reduce tax liability via credit notes if the recipient has already availed the Input Tax Credit (ITC) and failed to reverse it.
Appeals (Pre-deposit)	<ul style="list-style-type: none"> • Streamlines the pre-deposit requirement for filing appeals involving only penalties (no tax demand): <ul style="list-style-type: none"> • 10% of the penalty for appeals to the Appellate Authority.

- An **additional 10%** for appeals to the Appellate Tribunal.

- **GST 2.0 Alignment:** Updates tax rates and classifications in line with GST Council decisions to simplify the tax structure.
- **Post-Compensation Transition:** Revises revenue provisions following the end of guaranteed GST compensation to states.
- **New Cesses & Levies:** Enables incorporation of specific cesses (such as on tobacco and pan masala) to support revenue and public policy goals.
- **Administrative Reforms:** Streamlines registration, returns, and assessments through improved digital compliance systems.
- **State-Specific Flexibility:** Accounts for Manipur's economic conditions and logistical challenges as a Northeast border state.

Significance: GST 2.0 & Rate Rationalisation

This legislative alignment coincides with the **56th GST Council's** roadmap for **GST 2.0**, which aims to simplify the tax structure by merging the existing four slabs (5%, 12%, 18%, 28%) into **two main slabs of 5% and 18%**.

- **Revenue Stability:** Helps Manipur manage fiscal stress in the post-compensation GST regime.
- **Ease of Doing Business:** Simplified compliance benefits MSMEs and traders.
- **Cooperative Federalism:** Reflects Centre–State consensus under the GST Council.
- **Public Finance Support:** Allows targeted taxation to fund social and health priorities.

Conclusion

The Manipur GST (Second Amendment) Bill, 2025 strengthens Manipur's fiscal framework by ensuring revenue continuity, administrative efficiency, and alignment with national GST reforms, while accommodating regional economic needs.

WORLD AFFAIRS

India-Ethiopia



Figure 7: Ethiopia Map

Context: Ethiopia's entry into **BRICS** and its strategic location in the **Horn of Africa** have renewed attention on India-Ethiopia relations, positioning the partnership within India's expanding Africa strategy.

Strategic and Geopolitical Significance

- **Gateway to the Horn of Africa:** Ethiopia's location near the Red Sea-Gulf of Aden corridor gives it strategic relevance for maritime security, trade routes, and regional stability.
- **Diplomatic Hub:** Addis Ababa hosts the **African Union (AU)**, making Ethiopia central to continental diplomacy and multilateral engagement.
- **Regional Stabiliser:** Despite internal challenges, Ethiopia remains a key actor in peacekeeping and regional security architectures.

Economic Engagement and Investment

- **Indian investments exceed \$4 billion**, making India one of Ethiopia's largest foreign investors.
- Presence spans **textiles, pharmaceuticals, agro-processing, infrastructure, power**, and increasingly **mining and critical minerals**—aligned with India's resource security needs.
- Ethiopia's participation in **AfCFTA** offers Indian firms access to a larger integrated African market.

- BRICS membership enhances prospects for **South-South cooperation**, development finance, and trade settlement alternatives.

Education, Capacity Building, and People-to-People Ties

- Long-standing **educational links**, with Indian institutions and teachers historically contributing to Ethiopia's human capital formation.
- Thousands of Ethiopian students have studied in India under **ICCR scholarships** and training programmes.
- Capacity-building initiatives support governance, IT, health, and skill development.

KNOW YOUR BASICS : About Ethiopia

- **What it is:** Ethiopia is a sovereign African nation and one of the oldest continuous states, with roots in the **Aksumite civilisation** and a key role in **Pan-Africanism**.
- **Location:** A landlocked country in the Horn of Africa, entirely within tropical latitudes, centrally placed in East Africa.
- **Capital:** **Addis Ababa**, which hosts the African Union (AU) and UN Economic Commission for Africa (UNECA).
- **Neighbours:** Eritrea, Djibouti, Somalia, Kenya, South Sudan and Sudan.
- **Physiography:** Dominated by the **Ethiopian Highlands** ("Roof of Africa") with **Mount Ras Dejen** as the highest peak; traversed by the **Great Rift Valley** with volcanic and tectonic features.
- **Geology & Rivers:** Extensive basaltic volcanic plateau; source of the **Blue Nile (Abay)** and rivers like Tekeze and Baro, with the **Denakil Depression** as one of the hottest and lowest regions on Earth, hosting **Erta Ale** volcano.

Defence and Security Cooperation

- Defence ties include **military training**, professional exchanges, and cooperation mechanisms.
- Shared interests in **counter-terrorism, peacekeeping**, and maritime security in the wider Indian Ocean Region.
- Ethiopia's strategic depth complements India's outreach in East Africa and the Red Sea region.

Development Cooperation and Multilateral Synergy

- Lines of Credit and development assistance in **power, transport, and agriculture**.
- Convergence in multilateral platforms—**BRICS, G20 outreach, UN peacekeeping**—strengthens India's Global South leadership.

- Opportunities to collaborate on **digital public infrastructure, renewable energy, and climate adaptation**.

Challenges and Constraints

- Ethiopia's internal conflicts and debt stress can affect investment stability.
- Logistical bottlenecks due to landlocked geography.
- Competition from other external actors in Africa necessitates sustained engagement.

Conclusion

India-Ethiopia relations have the potential to evolve into a **comprehensive strategic partnership**, anchored in **education, defence cooperation, and critical minerals**, while leveraging BRICS and AfCFTA to deepen India's long-term engagement with Africa.

India-Oman

Context: India and Oman signed a **Comprehensive Economic Partnership Agreement (CEPA)** to deepen trade, investment, and strategic cooperation, building on long-standing political and security ties in the western Indian Ocean.



Figure 8: Oman Map

Areas of Convergence

- **Strategic & defence cooperation:** Oman is India's **closest defence partner in the Gulf**; regular exercises (e.g., *Al-*

Najah), training exchanges, and access to **Duqm Port** bolster India's maritime reach.

- **Maritime security & IOR stability:** Shared interest in **freedom of navigation**, anti-piracy, and securing **SLOCs** in the Arabian Sea and Gulf of Oman.
- **Energy partnership:** Reliable supplies of crude oil and LNG align with India's energy security.
- **People-to-people ties:** **7-8 lakh Indians** in Oman; remittances and social goodwill reinforce ties.
- **Political understanding:** Oman's moderate, independent diplomacy complements India's non-interventionist approach.

Areas of Divergence

- **China factor:** Oman's growing economic engagement with China (BRI, ports) may dilute India's relative leverage.
- **Limited trade scale:** Bilateral trade remains modest versus India-UAE/Saudi ties.
- **Regional balancing:** Oman's equations with Iran, GCC, and the West may not always align with India's priorities.
- **Economic constraints & Omanisation:** Small market, fiscal pressures, and labour localisation can affect Indian workers.

Way Forward

- **Operationalise Duqm access** for logistics and MDA; expand naval cooperation.
- **Diversify investment** into renewables, green hydrogen, logistics, ports, food processing, and mining aligned with **Oman Vision 2040**.
- **Energy transition co-investment** (upstream, LNG infrastructure, clean energy).
- **Leverage CEPA** to cut non-tariff barriers and improve connectivity.

Conclusion

The CEPA anchors a **strategic-economic partnership** with Oman; success will hinge on translating security trust into diversified trade and investment outcomes amid regional competition.

India-Russia

Context: India and Russia reaffirmed their **Special and Privileged Strategic Partnership** at the **23rd India-Russia Annual Summit**, marking **Vladimir Putin's** first visit to India since the Ukraine conflict began in February 2022. The summit

culminated in **16 agreements** spanning economic cooperation, defence, technology, energy, and people-to-people ties, reflecting continuity amid global geopolitical churn.

Key Areas of Cooperation

Economic cooperation (8 pacts):

- Bilateral trade target of **\$100 billion by 2030**.
- **Labour Mobility Framework** for ~70,000 Indian workers with safeguards.
- Push for FTA with the **Eurasian Economic Union**.
- **96% trade in national currencies**, advancing de-dollarisation.
- Russia to remain a reliable **energy supplier** to address trade imbalances.

Defence & security:

- Focus on **joint manufacturing**, spares, and **technology transfer** under Make in India.
- Continuation of **S-400** procurement; discussions on **Sukhoi-57**.
- Joint ventures for **MRO** of defence equipment.

Social & mobility:

- **30-day visa-free tourism** for Russian nationals.
- Skill training and vocational exchanges.

Technology & strategic cooperation:

- **Outer space** collaboration (human spaceflight, navigation, exploration).
- **Nuclear energy** cooperation, including fuel-cycle support for **Kudankulam**.
- **Media pacts**, including RT India and content sharing with Prasar Bharati.

Regional & global security:

- Enhanced military-technical ties and **counter-terrorism coordination**.

Conclusion

The 16 pacts signal **strategic continuity with pragmatic adaptation** in India–Russia relations. By deepening economic diversification, defence indigenisation, energy security, and people-to-people links, both countries reaffirm a partnership anchored in **long-term strategic interests** despite shifting global alignments.

KNOW YOUR BASICS: Comprehensive Economic Partnership Agreement

- **What it is:** CEPA is a **broad-based trade agreement** that goes beyond tariff reduction to include **trade in goods and services, investment, and economic cooperation** between two countries.
- **Scope:** It is more comprehensive than a Free Trade Agreement (FTA) or CECA, as it covers **market access, regulatory cooperation, movement of professionals, and trade facilitation**.
- **India's experience:** India has signed CEPAs with countries like the **UAE and Oman**, aiming to boost bilateral trade, exports, and investment flows.
- **Significance:** CEPA helps deepen **economic integration**, diversify export markets, attract foreign investment, and strengthen strategic economic partnerships.

Asia-Pacific

Context: Rapid adoption of artificial intelligence across the Asia-Pacific region risks **deepening existing socio-economic inequalities** between and within countries.

AI, Inequality and Development Gaps

- **IMF's AI Preparedness Index** shows wide gaps between advanced and fragile economies.
- **Infrastructure deficits** (electricity, internet connectivity, data systems) limit inclusive AI adoption.
- **Labour impact:** Women and low-skilled workers face higher risk of **AI-driven job displacement**.
- **Capital bias:** Without safeguards, AI may concentrate gains among tech firms and high-income groups.

Conclusion

Inclusive AI growth demands **simultaneous investment in digital infrastructure, skills, and social protection**, ensuring technology reduces—rather than reinforces

Further Info:

- **Asia-Pacific** refers to the region spanning **East Asia, Southeast Asia, South Asia, and the Pacific Island states**, centred around the western Pacific Ocean.
- It is a **global economic and trade hub**, hosting major supply chains, sea lanes of communication (SLOCs), and forums like **APEC** and **ASEAN-led mechanisms**.

China in East Asia

Context: China deployed **100+ naval and coast guard vessels** across the **Yellow Sea, East China Sea, and South China Sea**, signalling intensified maritime assertiveness.

KNOW YOUR BASICS: Yellow Sea

- Shallow marginal sea between **China** and the **Korean Peninsula**, fed by the sediment-rich **Yellow (Huang He) River**.

East China Sea

- Located between **China, Taiwan, and Japan**, with major **sea lanes of communication**..

South China Sea

- Bordered by **China and Southeast Asian countries**, forming a key **global trade and energy transit route**.



Figure 9: China Map

Key Points

- Geographic spread:**
 - Sustained presence near **Taiwan Strait**, **Senkaku/Diaoyu Islands**, and contested **South China Sea** features.
- Strategic signalling:**

- Applies pressure on **Taiwan, Japan, and the US** without crossing overt conflict thresholds.
 - Demonstrates China's capability for **simultaneous multi-theatre naval operations**.
- Grey-zone tactics:**
 - Heavy use of coast guard and maritime militia blurs lines between civilian law enforcement and military coercion.
- Regional impact:**
 - Tests alliance response times and rules of engagement.
 - Increases risks of miscalculation and escalation.
- Doctrinal shift:**
 - Reflects China's transition from coastal defence to **blue-water power projection**.

Conclusion

China's deployments underline an **assertive maritime power projection strategy**, reshaping the regional balance and challenging the existing rules-based maritime order in East Asia.

India-Sri Lanka

Context: **Cyclone Ditwah** caused widespread damage along Sri Lanka's eastern coast, prompting a rapid humanitarian response from India.

Neighbourhood First in Action

- Operation Sagar Bandhu** launched as part of India's **Neighbourhood First** policy.
- Indian Navy ships and aircraft** deployed for **Humanitarian Assistance and Disaster Relief (HADR)** operations.
- Assistance included **relief supplies, medical aid, and logistical support**.
- Demonstrates India's **operational readiness** and proximity-based response capability in the Indian Ocean Region.

Conclusion

India's swift humanitarian outreach reinforces its role as a **first responder and net security provider**, strengthening regional trust, goodwill, and leadership through humanitarian diplomacy.

ECONOMY

Repo Rate Cut

Context: In a calibrated move to support growth, the **Reserve Bank of India (RBI)**, through its Monetary Policy Committee (MPC), announced a **repo rate cut in December 2025**, reflecting confidence in inflation control and macroeconomic stability.

Key Policy Developments

Repo rate decision (5 December 2025):

- Rate cut by 25 basis points to 5.25%.
- First cut after two consecutive pauses and the lowest policy rate in over three years.
- Total easing in 2025: 125 bps (from 6.5% in June 2025).

Rationale:

- **Benign inflation:** CPI at **2.2%**, well within the 2–6% target band.
- **Growth resilience:** Domestic demand and investment remained robust despite global headwinds.
- **Improved outlook:** FY26 GDP growth projection raised to 7.3% (from 6.8%).
- **Policy space:** Anchored inflation expectations enabled a growth-supportive pivot.

Conclusion

The repo rate cut underscores RBI's **data-driven, counter-cyclical stance**, carefully balancing inflation credibility with growth imperatives. By leveraging low inflation to stimulate investment and consumption, the RBI aims to **sustain India's growth momentum** amid global uncertainties.

KNOW YOUR BASICS: Monetary Policy

- **Monetary policy** is formulated by the **Reserve Bank of India** to regulate **money supply and credit** for price stability and growth.
- Operated through **policy rates—repo rate, reverse repo, CRR, SLR, OMOs**—to control **inflation and liquidity**.
- Since **2016**, decisions are taken by the **Monetary Policy Committee (MPC)** with a **flexible inflation targeting** mandate ($4\% \pm 2\%$).

Rupee Depreciation

Context: The Indian rupee has come under sustained pressure, **breaching the 90-mark against the US dollar (₹89.95/USD)** in December 2025. While immediate triggers appear external, the episode reflects **deeper structural issues in India's capital flows**, especially a sharp slowdown in net FDI, alongside calibrated currency management by the **Reserve Bank of India**.

Rupee Under Pressure: Nature and Triggers

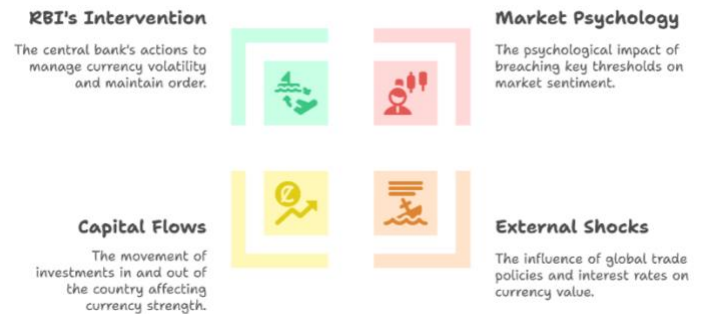


Figure 10: Rupee's Resilience

- **Trend:** Rupee weakened from ~₹88/USD (Feb 2025) to ~₹90/USD; **>5% depreciation in 2025**.
- **Psychological threshold:** Breach of 90 intensified market concerns.
- **External shocks:**
 - **50% US tariffs** on Indian exports; global trade uncertainty.
 - **Higher US interest rates** attracting capital to dollar assets.
- **Capital flows:** Equity outflows of **~\$18 billion**; weaker FDI inflows.

RBI's Currency Management

- **Forex intervention:** **~\$44 billion** sold in FY25 to smooth volatility.
- **Liquidity operations:** **₹1 lakh crore OMO** purchases.
- **Swap tool:** **\$5 billion USD/INR buy-sell swap** (3-year).
- **Policy stance:** Under Governor **Shaktikanta Das**, RBI reiterated **no exchange-rate targeting**, focusing on orderly movement and preventing excessive volatility.

Deeper Structural Issue: Falling Net FDI

- **Net FDI (FY25):** **\$29.1 billion** vs **\$56.2 billion** peak (FY21) — **~48% decline**.
- **FDI vs FPI divergence:**

- FDI (long-term) has weakened; FPI (short-term) remains volatile.
- **Indian outward FDI** rose post-2021 to ~\$28.2 billion, implying **more capital going out than coming in**.
- **Why investors are cautious:**
 - **Valuation concerns** despite 7%+ growth; better risk-adjusted returns elsewhere.
 - **Policy uncertainty** (labour, taxation).
 - **Geopolitics/trade** (tariffs).
 - **Competition** from Vietnam/Indonesia with lower manufacturing costs.
- **Vicious cycle:** Trade deficit + FDI slowdown → rupee pressure → weaker FDI appetite.

Conclusion

The rupee's depreciation is **largely structural**, driven by **capital outflows and an FDI slowdown**, not domestic macro instability. **RBI's calibrated interventions** are appropriate to contain volatility, but **durable currency stability** requires restoring FDI momentum through **policy certainty, competitiveness, and valuation comfort**—addressing the roots, not just the symptoms.

KNOW YOUR BASICS: Rupee Depreciation

- **Rupee depreciation** means a fall in the value of the Indian rupee against foreign currencies, especially the US dollar, under a market-determined exchange rate.
- Driven by **capital outflows, high current account deficit, rising crude oil prices, and US monetary tightening**.
- Managed by the **Reserve Bank of India** through **forex interventions** to curb excessive volatility, not to fix rates.

Fugitive Economic Offenders

Context: India's enforcement framework against high-value economic crime shows mixed outcomes, with **15 individuals** declared **Fugitive Economic Offenders (FEOs)** and substantial recoveries from public sector bank frauds.

Key Facts

- **FEOs declared: 15** (as of Oct 31, 2025) under the **Fugitive Economic Offenders Act**.

- **Bank fraud linkage: 9 of 15** tied to PSB frauds.
- **Amounts:**
 - Principal involved: ₹26,645 crore (NPAs).
 - Recovered: ₹19,187 crore.
- **Notable cases: Nirav Modi, Vijay Mallya, Nitin Sandesara, Chetan Sandesara, Dipti Sandesara.**
- **Money-laundering enforcement:**
 - 120 convictions under the Prevention of Money Laundering Act since 2014.
 - 6,312 PMLA cases registered; 1,805 main and 568 supplementary complaints filed.
 - Post-2019 amendment: 93 closure reports where laundering not established.

Conclusion

The data indicates **improving recovery outcomes**, but deterrence hinges on **faster extradition, trial completion, and asset confiscation**—to ensure economic offenders cannot evade Indian law.

KIIFB Masala Bonds, FEMA

Context: The **Enforcement Directorate (ED)** has initiated a probe into the **Kerala Infrastructure Investment Fund Board (KIIFB)** over its 2019 **Masala Bonds** issue, raising concerns about **FEMA compliance** and the practice of **off-budget borrowings** by states.

Key Issues

- **Bond issuance:**
 - KIIFB raised **₹2,150 crore (March 2019)** via rupee-denominated Masala Bonds.
 - Bonds listed on **London and Singapore Stock Exchanges**; fully repaid by **March 2024**.
- **ED probe:**
 - Show-cause notices issued to CM **Pinarayi Vijayan**, former FM **T. M. Thomas Isaac**, and KIIFB CEO.
 - Alleged violations of **Foreign Exchange Management Act** and **Reserve Bank of India** directions.
- **Audit concerns:**
 - **Comptroller and Auditor General** questioned the RBI's approval, flagging possible constitutional issues and Centre-State fiscal boundaries.
- **Off-budget borrowing dispute:**

- **Centre:** Treats KIIFB borrowings as **direct state liabilities**.
- **Kerala:** Argues these are **contingent liabilities**, not part of budgeted debt.

Conclusion

The KIIFB case spotlights the tension between **state financing innovation and fiscal transparency**. Clearer rules on off budget borrowings and FEMA compliance are essential to preserve **federal fiscal discipline**.

KNOW YOUR BASICS: Masala Bonds

- **Masala Bonds** are **rupee-denominated bonds issued overseas** by Indian entities to raise funds from foreign investors.
- **Currency risk is borne by investors**, not issuers, shielding Indian borrowers from exchange-rate volatility.
- Regulated by the **Reserve Bank of India**; used to finance **infrastructure and corporate funding needs**.

IMF Programmes in South Asia

Context: The **International Monetary Fund** approved a **\$1.2 billion tranche for Pakistan**, while **Sri Lanka's** IMF programme faced renewed scrutiny after **Cyclone Ditwah**, reopening debates on austerity and climate vulnerability.

Stabilisation amid Structural Fragility & Climate Shocks

Pakistan's programme:

- IMF cited "**significant progress**" on fiscal consolidation, energy pricing reforms, and revenue measures.
- The tranche is part of an ongoing bailout to address **balance-of-payments stress**, rebuild reserves, and stabilise the currency.
- Risks persist due to **weak tax base, energy-sector losses, political uncertainty**, and high external debt servicing.

Sri Lanka's concerns:

- IMF-backed adjustment prioritises **debt servicing** (over **\$2 billion due in 2026**) and fiscal tightening.
- **Cyclone Ditwah** highlighted the tension between **austerity economics and climate shocks**, as disaster response strains already tight budgets.

- Critics argue IMF **Debt Sustainability Analysis (DSA)** insufficiently accounts for **climate risks**, recurring disasters, and recovery costs, potentially undermining social protection and growth.

Shared regional lesson:

- IMF programmes can deliver **short-term macro stabilisation**, but without **structural reforms** (tax administration, SOE/energy reforms, export competitiveness) and **climate-sensitive financing**, gains remain fragile.

Conclusion

IMF assistance can stabilise crisis-hit economies, but durability depends on deep structural reform and flexible, disaster-aware financing frameworks—especially for climate-vulnerable countries in South Asia.

India's Capital Markets

Context: Indian capital markets are witnessing a structural shift, with **domestic household savings** increasingly compensating for reduced **Foreign Portfolio Investor (FPI)** participation.

Financial Deepening with New Risks

- **Mutual funds and retail investors** now hold nearly **19% of total market capitalisation**, reflecting deeper domestic participation.
- **Systematic Investment Plans (SIPs)** provide steady inflows, cushioning markets against global volatility.
- **FPI ownership** has fallen to a **15-month low**, amid global tightening and valuation concerns.
- **Emerging risks:**
 - Limited **financial literacy** among new investors.
 - **IPO overvaluation** driven by retail exuberance.
 - Potential **wealth concentration** if market corrections disproportionately hurt small investors.

Conclusion

Domesticisation has improved market resilience, but sustaining it requires **stronger investor protection, financial literacy, and market discipline**.

Goldilocks Period

Context: India is experiencing a rare **Goldilocks phase**—a macroeconomic situation where **inflation is falling while growth remains strong**, enabling growth-supportive monetary policy by the **Reserve Bank of India. India Ratings & Research** has forecasted that India's economy will continue in a "Goldilocks" phase through **FY27** (2026-27), characterized by sustained growth and benign inflation.

KNOW YOUR BASICS: Goldilocks Economy

Definition: An ideal state of the economy that is "not too hot, not too cold."

Characteristics:

- **Moderate to High Growth:** The economy expands at a healthy pace (preventing recession).
- **Low Inflation:** Prices remain stable (preventing overheating).
- **Low Interest Rates:** Central banks can keep rates lower to support investment without triggering inflation.

Risks to the Outlook

- **Weak Currency:** The Rupee is expected to average **92.3 per USD** in FY27.
- **External Shocks:** Potential **US tariffs** (50% on exports) and geopolitical tensions.
- **Climate:** Possibility of **El Nino** in mid-2026 affecting agriculture.

Why It Is Rare

- Globally, economies face **stagflation risks** due to geopolitics, trade tensions, and commodity volatility.
- India has achieved **disinflation with high growth simultaneously**.

Conclusion

This Goldilocks phase strengthens India's macroeconomic stability and provides a unique window for monetary accommodation and sustained growth.

Current Economic Indicators (The Evidence)

- **GDP Growth:**
 - **H1 FY26:** Averaged **8%**, surprising on the upside.
 - **Forecast (FY26): 7.4%.**
 - **Forecast (FY27): 6.9%.**
- **Inflation (CPI):**
 - Projected at **3.8%** for FY27, staying below the RBI's **4% target** for the second consecutive year.
 - **FY26:** Inflation forecast cut to **2%** by RBI due to broad-based disinflation.
- **RBI Action:** The RBI cut the repo rate by a cumulative **125 basis points (bps)** in 2025 to support growth.

Drivers of this Phase

- **Private Consumption:** Expected to grow by **7.6%** in FY27 due to positive real rural wages and income tax cuts.
- **Investment:** Gross Fixed Capital Formation (GFCF) is growing, driven by government Capex and emerging sectors like electronics and logistics.
- **Policy Reforms:** GST rate cuts and reforms in the Union Budget 2025-26.

SOCIAL ISSUES

Surge in Kidney Failure Cases

Context: Telangana is witnessing a sharp rise in chronic kidney disease (CKD) cases, especially among younger patients without traditional risk factors such as diabetes or hypertension. Medical experts link this trend to unprescribed alternative medicines and rampant quackery.

70% OF DEAD ARE MEN; 45+ AGE GROUP AT RISK

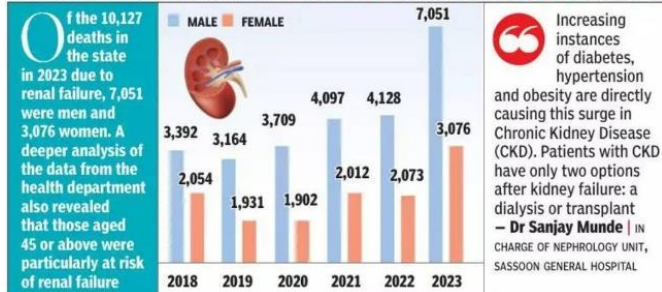


Figure 11: Surge in kidney failure cases | Source: TOI

Key Concerns

Unusual patient profile:

- Study on **75 CKD patients** (Osmania General Hospital & Apollo Hospitals):
 - Mean age **41.7 years, 68% men**
 - 77.3%** depended on groundwater
 - 40%** had used alternative medicines without medical advice

Severe disease at diagnosis:

- 44%** showed **global glomerulosclerosis**
- 40%** reached **Stage 5 CKD** at first diagnosis
- 9.3%** required dialysis

Role of quackery:

- Unqualified practitioners prescribing **unregulated herbal drugs** with unknown toxicity
- Irrational drug combinations (e.g., **dexamethasone + diclofenac**) causing direct **nephron damage**

Regulatory gap:

- Weak oversight of alternative medicines and easy access without prescriptions

Way Forward

- Strict crackdown** on quackery and illegal medical practice
- Public awareness** on dangers of self-medication and unverified treatments
- Promote licensed care** and early screening for kidney disease
- Stronger regulation** of alternative medicines
- Further research** to establish causal links between substances and CKD

Conclusion

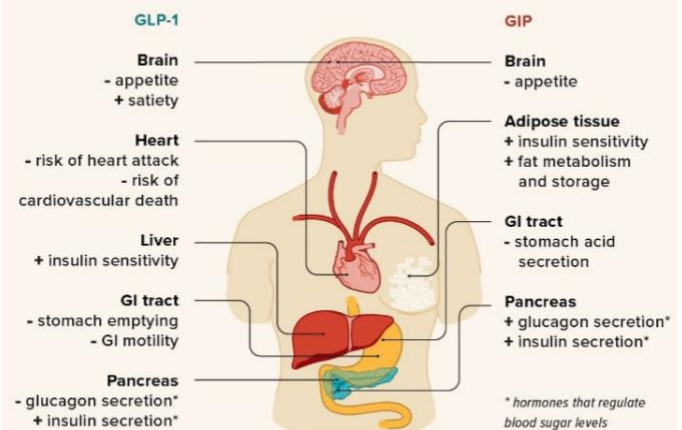
The Telangana kidney failure surge signals a **serious public health challenge driven by unregulated medical practices**. Timely enforcement, awareness, and evidence-based healthcare are essential to prevent irreversible kidney damage and a wider health crisis.

WHO: GLP-1 Drugs

Context: The World Health Organization (WHO) issued its first-ever global guidelines on the use of medications for obesity management.

How do GLP-1 Medications Work?

GLP-1 medications work by mimicking one or two naturally produced hormones: glucagon-like peptide-1 (GLP-1) and gastric inhibitory polypeptide (GIP).



Many GLP-1 drugs (like Ozempic and Wegovy) act by binding to GLP-1 receptors, resulting in the same effects of GLP-1 seen above.

However, some medications (like Mounjaro and Zepbound) are unique in that they bind to GLP-1 and GIP receptors, resulting in a combined effect.

Figure 12: How do GLP-1 medications work | Source: Healthline

Medical and Scientific Guidance

- Endorses **GLP-1 receptor agonists** (e.g., semaglutide) for **long-term obesity treatment**.
- Emphasises that drug therapy must be combined with:

- Behavioural changes
- Dietary modification
- Physical activity
- Recognises obesity as a **chronic disease**, not merely a lifestyle issue.

Equity and Access Concerns

- Flags **high costs and limited global supply** of GLP-1 drugs.
- Risk of widening health inequalities, especially in low- and middle-income countries.
- Warns against medicalisation without systemic prevention strategies.

Policy Recommendations

- Calls for:
 - Promotion of **generic versions**
 - Possible inclusion in **national essential medicines lists**
 - Strengthening primary healthcare and preventive nutrition policies
- Stresses regulation to prevent misuse and over-prescription.

Public Health Perspective

- Obesity linked to diabetes, cardiovascular diseases, and reduced productivity.
- Pharmacological solutions alone cannot substitute **population-level prevention**.

Conclusion

WHO's guidance reinforces that obesity management must follow a **public-health-first approach**, integrating medicines with prevention, affordability, and health system strengthening—beyond reliance on pharmacology alone.

Determination of Age & Adulthood

Context: Indian courts increasingly rely on **forensic age determination** to decide whether an accused should be treated as a **juvenile or an adult**, directly affecting criminal liability.

Scientific Methods Used

- **Bone ossification tests:** Examine fusion of growth plates to estimate skeletal maturity.

- **Dental analysis (OPG X-rays):** Wisdom tooth eruption and root completion as age indicators.
- **Gender variation:** Females generally mature earlier than males, affecting assessments.

Legal Significance

- Determines applicability of **Juvenile Justice laws**, sentencing severity, and trial procedures.
- Can alter the course of prosecution and rehabilitation prospects.

Limitations & Ethical Concerns

- Forensic methods have a **margin of error (±1–2 years)**.
- Over-reliance risks injustice if scientific uncertainty is ignored.
- Courts are advised to give the **benefit of doubt to juvenility**.

Conclusion

Forensic age determination is vital for **criminal justice fairness**, but its inherent uncertainty demands cautious judicial interpretation, medical standardisation, and rights-sensitive application.

Doctor–Population Ratio in India

Context: India's doctor–population ratio stands at **1:811**, nominally better than the WHO norm of 1:1000, yet access gaps remain severe.

Structural Imbalances

- **Urban–rural divide:** Urban areas are over-served, while rural and tribal regions face acute shortages.
- **Uneven deployment:** Rapid medical college expansion has not ensured equitable doctor distribution.
- **Specialisation bias:** Growth of super-speciality care has come at the cost of **primary healthcare**.

Governance and Policy Gaps

- Weak incentives for rural service.
- Poor working conditions and infrastructure in peripheral areas.
- Limited integration of AYUSH and mid-level healthcare providers.

Health System Implications

- Access deficit persists despite numerical adequacy.
- Overburdened tertiary hospitals and neglected primary care.

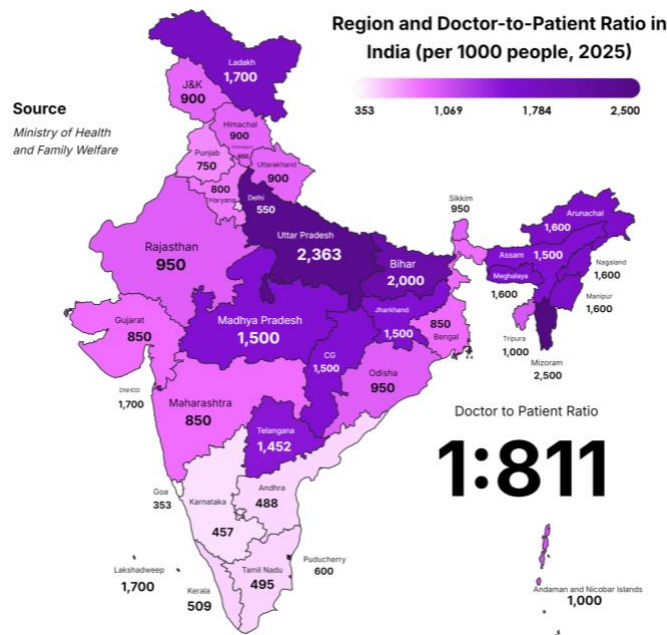


Figure 13: Doctor- Population ratio | Source: India Data Map

Conclusion

Healthcare access depends not just on doctor numbers, but on **distribution, incentives, and system design**, with primary healthcare as the foundation.

RPwD Act, 2016

Context: The RPwD Act, 2016 is in the news due to Supreme Court scrutiny and government action highlighting gaps in its implementation, especially regarding promotions for PwDs, accessibility in justice systems and infrastructure, protection of disabled prisoners, and demands to expand the list of recognised disabilities..

Expansion of Disability Recognition

- The Act expanded recognised disabilities from **7 to 21 categories**, including:
 - Autism spectrum disorder
 - Specific learning disabilities
 - Acid attack survivors
 - Parkinson's disease
- This marked a shift from a narrow medical model to a **broader rights-based framework**.

Persistent Rights Gap

- **Benchmark disability threshold:**
 - Most benefits (reservation in jobs/education, social security) are limited to persons with **40% or more disability**.
- **Exclusion problem:**
 - Many newly recognised disabilities do not easily fit percentage-based assessment.
 - As a result, recognition does not automatically translate into **access to reservations, aids, or welfare schemes**.
- **Implementation challenges:**
 - Lack of trained medical boards.
 - Inconsistent certification across states.

Governance & Equity Concerns

- Recognition without entitlements risks becoming **symbolic inclusion**.
- Contradicts India's obligations under the **UN Convention on the Rights of Persons with Disabilities (UNCPRD)**.

Conclusion

True inclusion requires that **legal recognition automatically triggers enforceable rights**, supported by simplified certification, uniform standards, and entitlement-based governance

IndiGo Crisis: FDTL Rules

Context: India witnessed over 500 flight cancellations following the enforcement of revised Flight Duty Time Limitation (FDTL) norms from 1 November 2025, exposing stress in airline operations.

Key Points

Purpose of FDTL norms:

- Ensure adequate rest for pilots and cabin crew to enhance **aviation safety**.
- Align Indian rules with global safety standards.

Operational impact:

- IndiGo's **On-Time Performance (OTP)** plunged below **20%** on certain days.
- Crew unavailability disrupted flight schedules nationwide.

Structural vulnerability:

- IndiGo's **lean staffing and high aircraft utilisation model** left little buffer.
- Sudden regulatory enforcement magnified operational fragility.

Broader implications:

- Passenger inconvenience and reputational costs.
- Raises questions about phased implementation and airline preparedness.

Regulatory challenge:

- Balancing **non-negotiable safety standards** with operational feasibility.

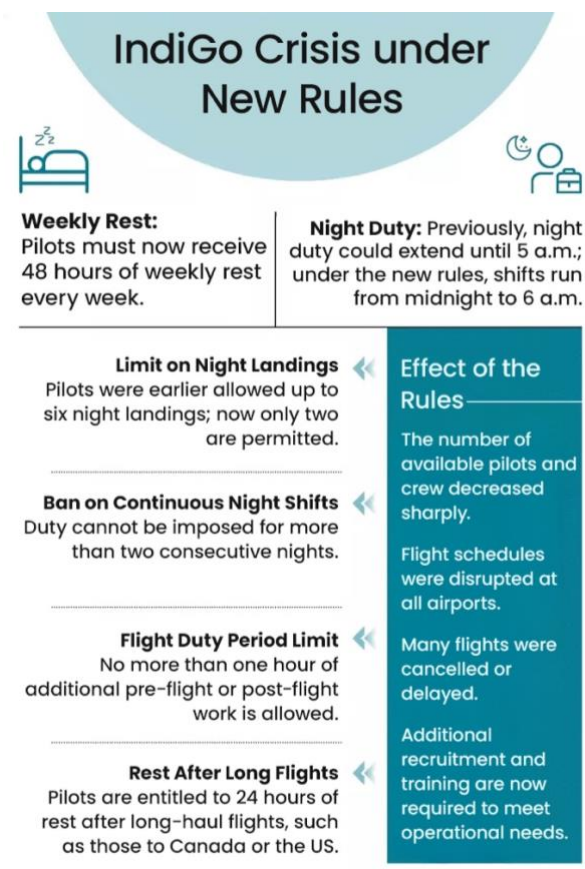


Figure 14: IndiGo Crisis | Source: Bhaskar English

Conclusion

The crisis underscores that aviation safety reforms must be paired with **adequate transition planning and workforce readiness**, ensuring safety without systemic disruptions.

Women's Health Risks from Rising Heat

Context: A study conducted by the M S Swaminathan Research Foundation highlights how rising temperatures and heatwaves disproportionately affect women, revealing the gendered dimensions of climate change.



Figure 15: Impact of Heatwaves on Women

Key Points

- **Health impacts:**
 - Nearly **70% of women** reported symptoms such as fatigue, dehydration, dizziness, and headaches during heatwaves.
 - Prolonged heat exposure aggravated **sleep disorders, anxiety, and emotional stress**.
- **Economic vulnerability:**
 - About **97% of women lost wages exceeding ₹1,500** during peak summer months.
 - Informal-sector women workers faced higher income loss due to lack of social security and heat-resilient workplaces.
- **Social consequences:**
 - Increased domestic stress and incidents of **domestic violence** were reported during extreme heat periods.
- **High-risk groups:**
 - Women aged **20–45 years** in districts with a **high Heat Vulnerability Index (HVI)** were the most affected.
 - Factors include outdoor labour, caregiving responsibilities, poor access to cooling, and water scarcity.
- **Structural reasons:**

- Gendered division of labour, nutritional deprivation, and limited access to healthcare amplify climate risks for women.

Conclusion

Rising heat is not gender-neutral. Climate change has emerged as a **gendered public health crisis**, demanding **women-centric heat action plans**, occupational safeguards, healthcare access, and integration of gender perspectives into climate adaptation policies.

Cafe Sheroes Hangout

Context: Cafe Sheroes Hangout, opened in Delhi, is run by acid attack survivors and supported by the Chhanv Foundation.

Key Contributions

- Provides **livelihood, dignity, and economic independence** to survivors.
- Uses **personal narratives** to challenge stigma and social exclusion.
- Shifts rehabilitation from charity to **rights-based empowerment**.

Conclusion

Cafe Sheroes Hangout represents a powerful model of **social entrepreneurship and survivor-led rehabilitation**, redefining inclusion through dignity and agency rather than pity.

Supreme Court on Acid Attacks

Context: The Supreme Court of India described acid attacks as among the most heinous crimes, calling for a stronger legal and victim-centric response.

Strengthening Justice for Acid Attack Survivors

- Observed that acid attacks warrant **punishment more severe** than even some terror-related offences due to their lifelong physical and psychological impact.
- Emphasised **speedy trials** through fast-track courts to avoid prolonged trauma for survivors.
- Stressed the need for **adequate and timely victim compensation**, beyond symbolic relief.
- Highlighted **"invisible injuries"**, especially in cases of forced acid ingestion, including internal organ damage and long-term health complications.

Conclusion

The Court's observations underline the urgency of a **comprehensive survivor-centric framework**—covering punishment, rehabilitation, compensation, and medical care—to deliver meaningful justice to acid attack survivors.

Rising Cost of Education in India

Context: The **NSS 80th Round report** on education in India reveals that rising costs, primarily driven by a surge in private education and coaching expenses, are creating significant equity concerns and reinforcing socio-economic divides. This trend coexists with the constitutional guarantee of free and compulsory education for children aged 6 to 14.

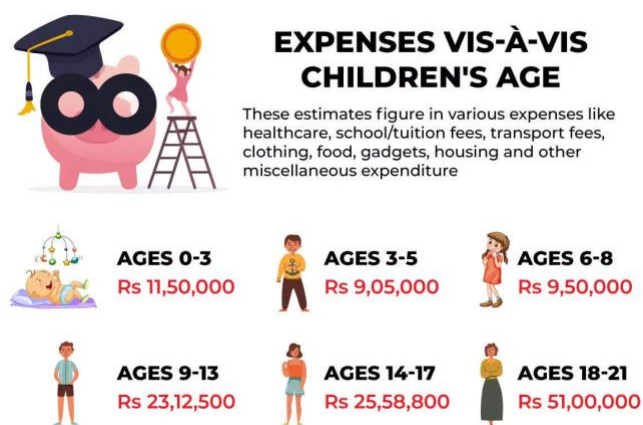


Figure 16: Rising cost of Education in India | Source: The Economic Times

Education Inequality Despite Right to Education

- Over **30% of students** are enrolled in **private unaided schools**, even at the elementary level.
- Private school fees and coaching costs** are comparable to incomes of **lower MPCE deciles**, straining household finances.
- Coaching dependency** is expanding across both **rural and urban areas**, often compensating for weak school quality.
- Undermines the promise of **equal opportunity** embedded in the Right to Education framework.

Conclusion

Without substantial improvement in **public school quality and teacher capacity**, education risks becoming a **privilege rather than a right**.

DEFENCE & SECURITY

Militarisation of Lakshadweep

Context: India is significantly enhancing its military footprint in the **Lakshadweep Islands** to counter emerging security challenges in the **Indian Ocean Region (IOR)**, particularly in the Arabian Sea.

Strategic Expansion in Lakshadweep



Lakshadweep is undergoing significant security upgrades due to its strategic location and growing regional threats.

Figure 17: Lakshadweep Security Enhancements

- **Strategic location:** Lakshadweep sits astride major **east-west shipping lanes** in the Arabian Sea.
- **Naval expansion:**
 - New **naval detachment on Bitra island**, expected to be fully operational by next year.
 - Manpower already deployed, enhancing maritime surveillance.
- **Air Force expansion:**
 - Upgradation of air facility at **Agatti**.
 - New air base planned at **Minicoy**.
 - Proposal to deploy **long-range cargo drones** for logistics and surveillance.
- **Security drivers:**
 - Rising **Chinese naval interest** in the IOR.
 - Growing **commercial shipping traffic**.
 - Persistent threat of **piracy in the Arabian Sea**.

Conclusion

Strengthening military infrastructure in Lakshadweep enhances India's **maritime domain awareness, deterrence capability, and power projection**, reinforcing its role as a net security provider in the Indian Ocean.

Operation Sindoor & Naval Readiness



Figure 18: Operation Sindoor | Source: The Punjab Pulse

Context: The **Indian Navy** demonstrated its **constant readiness doctrine** under *Operation Sindoor*, signalling India's evolving maritime posture amid rising regional and extra-regional security challenges.

Doctrine of Persistent Maritime Presence

- Continuous deployment of **aircraft carrier battle groups** in the **Arabian Sea**.
- Enables round-the-clock surveillance, deterrence, and rapid response.
- Reflects a shift from episodic deployment to **permanent forward presence**.

Strategic and Operational Impact

- **Constrains adversary naval movement** by:
 - Limiting freedom of manoeuvre
 - Raising costs of escalation
- Enhances sea control and sea denial capabilities in India's primary area of interest.
- Reinforces protection of **Sea Lines of Communication (SLOCs)** critical for energy and trade security.

Technology-Driven Maritime Transformation

- Increasing role of:
 - **Autonomous systems** (drones, unmanned surface and underwater vehicles)
 - Network-centric warfare and real-time data fusion
- Reduces response time and improves maritime domain awareness.

- Blurs lines between peace and conflict, characteristic of **grey-zone warfare**.

Geostrategic Significance

- Signals readiness against both **state and non-state maritime threats**.
- Aligns with India's Indo-Pacific vision and rules-based maritime order.

Conclusion

Operation Sindoor highlights India's transition towards a **persistent, technology-driven naval posture**, adapting effectively to **grey-zone conflicts and hybrid maritime threats**.

Indian Maritime Doctrine 2025

Context: On **Navy Day (December 4, 2025)**, the Chief of the Naval Staff (CNS) Admiral Dinesh K Tripathi released the **Indian Maritime Doctrine 2025**. This document aligns the Navy's strategic outlook with the national vision of **Viksit Bharat 2047** and major initiatives like **Sagarmala** and **PM Gati Shakti**.

What is the Indian Maritime Doctrine?

- **Definition:** It is the Indian Navy's **apex guidance document** that defines strategic principles, roles, force employment, and capability development across the entire conflict spectrum.
- **Evolution:** First issued in **2004**, revised in **2009** and **2015**. The 2025 edition reflects the major geopolitical and technological shifts of the last decade.
- **2025 Theme:** *"Combat Ready, Cohesive, Credible and Aatmanirbhar Force — safeguarding the seas for a Viksit, Samriddha Bharat"*.

Key Features of the 2025 Edition

Feature	Description
"No-War, No-Peace"	For the first time, this is formally recognised as a distinct operational category . It acknowledges that modern conflict often occurs in the "Grey Zone" —a space between peace and war involving coercion and sub-threshold actions.
Jointness & Integration	Prioritises interoperability with the Army and Air Force. It aligns with recent tri-service joint doctrines (Special Forces, Space, Cyber) as a prerequisite for future Theatre Commands .

New Threat Domains	Expands the operational theatre beyond the sea to include Space, Cyber, and Cognitive domains . It addresses hybrid warfare and irregular threats.
Emerging Tech	Emphasises the adoption of uncrewed systems , autonomous platforms (drones/UUVs), and AI-driven Maritime Domain Awareness (MDA) .

Strategic Significance

- Expanded attention on the **Indo-Pacific** and **South China Sea**.
- Signals India's intent to safeguard:
 - Sea lines of communication (SLOCs)
 - Regional stability amid rising great-power competition.
- **Maritime-Conscious Nation:** Aims to position maritime power as a central pillar of national security and economic growth (**Blue Economy**).
- **Strategic Autonomy:** Reinforces India's role as a **"Net Security Provider"** in the Indian Ocean Region (IOR) and supports the **MAHASAGAR** initiative (Mutual and Holistic Advancement for Security and Growth Across Regions).
- **Aatmanirbhar Bharat:** Focuses on indigenous innovation to reduce dependency on foreign OEMs.

Nuclear Submarine Capability

- **INS Ariddhaman** (Arihant-class):
 - Expected commissioning by **2026-27**.
 - Enhances India's **sea-based nuclear deterrence**.
- Completes a more credible **nuclear triad**, strengthening second-strike assurance.

Conclusion

Indian Maritime Doctrine 2025 reflects India's **strategic adaptation to hybrid and sub-threshold maritime conflicts**, reinforcing deterrence while avoiding open escalation.

Operation Trident

Context: India observes **Navy Day (4 December)** to commemorate **Operation Trident (1971)** during the India-Pakistan War.



Figure 19: Operation Trident

Key Points

- **The operation:**
 - Indian Navy launched a **surprise missile attack on Karachi harbour** using fast attack craft.
- **Strategic success:**
 - Destroyed key Pakistani naval assets and fuel depots.
 - Achieved **zero Indian casualties**, demonstrating superior planning.
- **War impact:**
 - Severely crippled Pakistan's naval capability and morale.
 - Played a decisive role in the **Bangladesh Liberation War**.
- **Doctrinal legacy:**
 - First combat use of anti-ship missiles by India.
 - Shaped India's naval doctrine on **offensive capability and deterrence**.

Conclusion

Operation Trident remains a landmark in India's military history, showcasing **naval innovation, deterrence, and strategic foresight**, which continues to guide India's maritime posture.

Border Infrastructure: BRO

Context: The Defence Minister inaugurated **125 Border Roads Organisation (BRO)** projects across strategic border regions.

Key Highlights

- Construction of **roads, bridges, and tunnels** (including Shyok Tunnel).
- Enhances **troop mobility, logistics, and surveillance** along sensitive borders.
- Improves **connectivity, tourism, and livelihoods** in remote border areas.
- Strengthens India's preparedness along the **LAC and LoC**.

Conclusion

BRO-led infrastructure acts as a **force multiplier**, reinforcing national security while enabling development in border regions.

Further Info:

- **Border Roads Organisation** was established in **1960** under the **Ministry of Defence** to build and maintain **strategic roads** in border and difficult terrains.
- Operates in **border states and neighbouring countries** (Bhutan, Myanmar) enhancing **defence preparedness and connectivity**.
- Implements flagship projects like **Char Dham, Vibrant Villages**, and **strategic border roads** under the **General Reserve Engineer Force (GREF)**.

India-Maldives: Exercise "EKUVERIN"

Context: The latest edition of **Exercise EKUVERIN**, a bilateral military exercise between India and Maldives, concluded in **Thiruvananthapuram**, reaffirming defence cooperation in the Indian Ocean Region.

Defence Diplomacy in the Indian Ocean

- Focuses on **counter-insurgency and counter-terrorism operations**.
- Enhances **interoperability, coordination, and mutual trust** between the two armed forces.
- Signals India's role as a **net security provider** and strengthens regional stability under the **Neighbourhood First** policy.

Conclusion

EKUVÉRIN reinforces India–Maldives defence ties and contributes to a stable, secure Indian Ocean neighbourhood.

India–UAE: Exercise Desert Cyclone–II

Context

An **Indian Army contingent** participated in **Exercise Desert Cyclone–II** in **Abu Dhabi**, marking the second edition of the bilateral military exercise with the UAE.

Defence Cooperation in the Gulf

- **Nature of exercise:** A **mechanised infantry–focused** joint exercise.
- **Operational focus:**
 - Joint training in **conventional and sub-conventional operations**.
 - Sharing best practices in **desert warfare**, mobility, and force coordination.
- **Strategic value:**
 - Enhances **interoperability and mutual trust** between the two armies.
 - Reflects growing **India–UAE defence convergence** in West Asia, beyond economic ties.
- **Regional significance:** Supports India's interests in the **Gulf region**, critical for energy security, diaspora safety, and maritime stability.

Conclusion

Exercise Desert Cyclone–II reinforces India's expanding **defence partnerships in West Asia** and strengthens military-to-military cooperation with a key regional partner.

Navy Commissions “Ospreys”

Context: The Indian Navy commissioned **INAS 335 (“Ospreys”)** at **INS Hansa, Goa**, marking its **second squadron of MH-60R Seahawk helicopters**.

Strengthening Maritime Surveillance

- **Capability enhancement:**
 - MH-60R helicopters significantly boost **anti-submarine warfare (ASW)**, **surface surveillance**, and **search-and-rescue operations**.
- **Operational role:**

- Equipped with advanced sensors, sonar, torpedoes, and missiles.
- Enhances maritime domain awareness in the **Arabian Sea and western seaboard**.

- **Modernisation drive:**

- Part of India's broader **naval aviation modernisation** and force augmentation amid growing maritime challenges.



Figure 20: MH-60R Seahawk Helicopter | Source: The Hindu

Conclusion

The induction of the “Ospreys” strengthens India's **maritime surveillance and ASW capability**, reinforcing naval preparedness and security along the western coast.

ENVIRONMENT & GEOGRAPHY

Mangroves' Salt Survival

Context: Researchers have discovered that mangroves survive saline environments due to **unique cellular traits**, rather than changes in stomata number or size.

Key Discoveries

- **Cellular traits:**
 - **Unusually small leaf epidermal pavement cells**
 - **Thicker cell walls**
- **Functional advantage:**
 - Enhanced **mechanical strength** to withstand **osmotic stress** in high-salt conditions
- **Salt management strategies:**
 - Root-level salt exclusion via waxy layers (some species)
 - Salt uptake and secretion through specialised leaf tissues (others)
- **Evolutionary insight:**
 - Mangroves evolved **~30 times independently** over 200 million years
- **Ecological role:**
 - Coastal protection from erosion
 - Critical habitats for marine and bird species

Conclusion

The findings deepen understanding of **plant adaptation to salinity**, with implications for **climate resilience, coastal conservation, and bio-inspired agricultural research**.

Further Info:

- India has **~4,975 sq km** of mangroves (FSI), with the **Sundarbans** being the **largest**, followed by **Bhitarkanika** and **Andaman & Nicobar Islands**.
- Occur mainly along **east coast deltas** (Ganga-Brahmaputra, Mahanadi, Godavari, Krishna) and **Andaman-Nicobar**; west coast mangroves are smaller and patchy.

MP's Third Cheetah Habitat

Context: Madhya Pradesh has approved **Veerangana Durgavati Tiger Reserve (Nauradehi)** as India's third cheetah habitat, after Kuno National Park and Gandhi Sagar Tiger Reserve, to expand the national cheetah reintroduction programme.

Key Developments

- **Location:** Veerangana Durgavati Tiger Reserve (Nauradehi), Sagar district
- **Approval:** In-principle clearance by the State Cabinet
- **Timeline:** Cheetahs to be introduced **before the next monsoon**
- **Progress so far:**
 - Kuno NP: First successful African cheetah translocation
 - Gandhi Sagar TR: Three cheetahs already released

State vision: Potential to support **~50 cheetahs** across MP

- **Species facts:**
 - Scientific name: *Acinonyx jubatus*
 - IUCN status: **Vulnerable**; CITES Appendix I
 - Extinct in India since **1952**; reintroduced using African cheetahs

Conclusion

Expanding cheetah habitats strengthens **ecological restoration, grassland conservation, and flagship species recovery**, positioning India as the only country to reintroduce cheetahs after extinction.

Kosi River Embankments

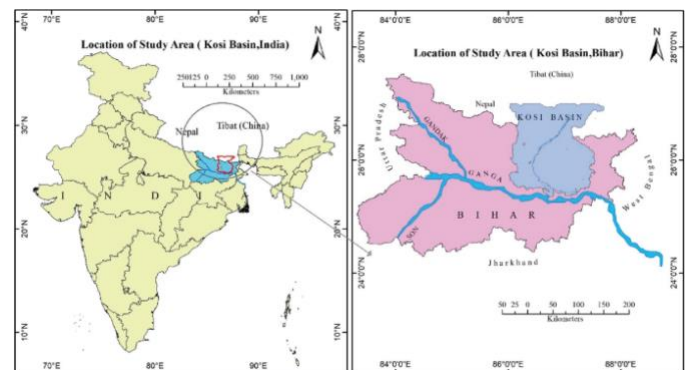


Figure 21: Kosi River Embankments | Source: Springer link

Context: Repeated embankment breaches along the **Kosi River** have highlighted the risks of relying solely on embankments for flood control, renewing calls for a strategy of “living with floods.”

Why Embankments Fail on the Kosi

- **River profile:**
 - Originates in the Himalayas of Tibet; formed by seven tributaries in Nepal (*Sapta Kosi*).
 - Major tributaries: Sun Kosi, Arun, Tamur.
 - Enters Bihar and joins the Ganga near Kursela.
- **Physical nature:**
 - Highly **sediment-laden and dynamic** river.
 - Has shifted its course nearly **120 km westward in 250 years**.
 - Forms a vast **alluvial fan** in north Bihar
- **Problem with embankments:**
 - Restrict natural floodplains, causing **silt accumulation**.
 - Raise riverbeds, increasing breach risk.
 - Often **intensify flood damage** when failures occur.
- **Nickname:**
 - Known as the “**River of Sorrow**” of Bihar due to recurrent floods.

KNOW YOUR BASICS: Kosi River

- **Kosi River** rises from **three Himalayan rivers—Sun Kosi, Arun, and Tamur—in Nepal**.
- A **left-bank tributary of the Ganga**, joining it near **Kursela (Bihar)**; drains into the **Ganga–Brahmaputra basin**.
- Called the “**Sorrow of Bihar**” due to **extreme sediment load, frequent floods, and lateral channel migration**.
- Managed under the **Kosi Agreement (1954, revised 1966)** between **India and Nepal**; **Kosi Barrage (Bhimnagar)** regulates floods and irrigation

Conclusion

The Kosi experience shows that rigid embankments are ill-suited for fragile, sediment-heavy rivers. Sustainable flood management requires **floodplain restoration, zoning, early warning systems, and adapting livelihoods to floods**, rather than relying only on structural controls.

Cold Wave

Context: The India Meteorological Department (IMD) has forecast more frequent cold wave days than usual across parts of North, Central, and Northeast India this winter. The intensification of cold conditions is linked to **fewer Western Disturbances**, the influence of **La Niña**, and episodic **polar vortex intrusions**, underscoring the growing role of global climate drivers in shaping India's winter weather.

Cold Wave: Definition and Criteria

As per IMD, a cold wave is declared when:

- **Plains:** minimum temperature $\leq 10^{\circ}\text{C}$
- **Hilly regions:** minimum temperature $\leq 0^{\circ}\text{C}$
- **Anomaly-based:** minimum temperature **4.5–6.4°C below normal** for the region

These criteria emphasise **departure from normal**, making cold waves region-specific.

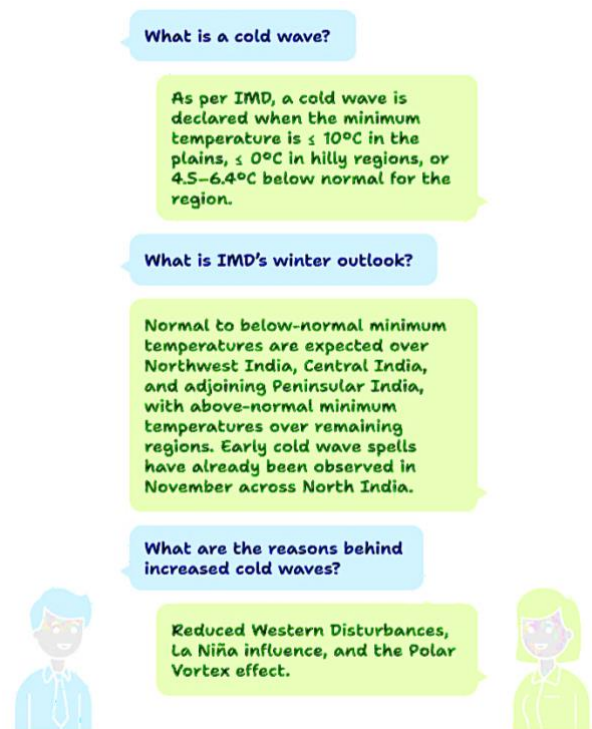


Figure 22: Cold Wave Definition and Reasons

IMD's Winter Outlook (December–February)

- **Normal to below-normal minimum temperatures** over **Northwest India, Central India, and adjoining Peninsular India**

- **Above-normal minimum temperatures** over remaining regions
- **Early cold wave spells** already observed in **November** across North India

Further Info:

- **Cold wave** conditions in India are declared by **India Meteorological Department** based on **departure of minimum temperature** from normal and **wind chill factor**, not absolute temperature alone.
- Typically occurs over **north and northwest India** due to **incursion of cold, dry continental air from higher latitudes** and clear night skies enhancing radiational ...

Reasons Behind Increased Cold Waves

- **Reduced Western Disturbances:**
 - Fewer Mediterranean-origin storms mean **less cloud cover and moisture**.
 - Clear skies enhance **radiational cooling at night**, causing sharper falls in minimum temperatures.
- **La Niña Influence:**
 - Cooling of the central and eastern Pacific alters global circulation.
 - Historically associated with **colder winters and higher cold-wave frequency** in North India.
- **Polar Vortex Effect:**
 - Southward incursions of cold polar air during vortex weakening episodes.
 - Contributed to **early-season cold spells** in November.

Broader Climatic Significance

- Indicates **higher variability and unpredictability** in winter extremes.
- Cold waves pose risks to **rabi crops, elderly and homeless populations, and energy demand**.
- Highlights that winter extremes, like heat waves, warrant equal policy attention.

Conclusion

The projected rise in cold wave days reflects a **convergence of global teleconnections and regional atmospheric processes**. With fewer Western Disturbances, La Niña conditions, and polar air intrusions intensifying winter cold, India must strengthen **early warning systems, cold-wave preparedness,**

and climate-resilient planning—especially for agriculture and vulnerable communities—as climate variability deepens.

New Seeds Bill, 2025

Context: The **New Seeds Bill, 2025** seeks to replace the outdated **Seeds Act, 1966**, responding to rising concerns over **spurious, low-quality, and unregulated seeds** affecting farm productivity and incomes.

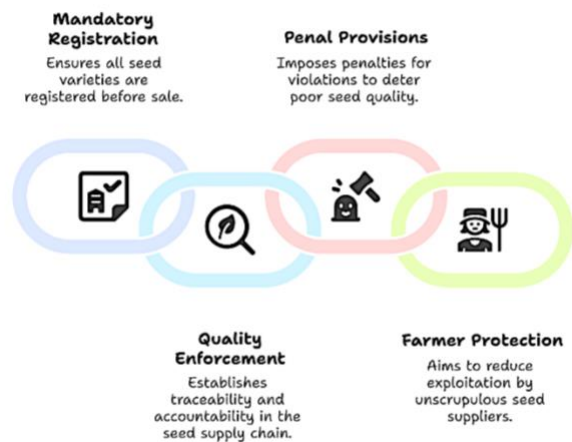


Figure 23: Strengthening India's Seed Sector

Key Provisions of the Bill

Need for Reform

- Over **43,000 seed samples** were found non-standard between **2022–25**.
- Farmers face yield losses, indebtedness, and legal uncertainty due to poor seed quality.
- India's seed sector has expanded into a **₹40,000 crore market**, demanding stronger regulation.

Implementation Challenges

- Compliance burden on small seed producers.
- Capacity constraints of state enforcement agencies.
- Risk of over-regulation affecting seed innovation if safeguards are weak.

Conclusion

The Bill strengthens **farmer protection and seed quality assurance**, but its success depends on **effective enforcement, regulatory capacity, and balancing innovation with oversight**.

Naming Tropical Cyclones

Context: The naming of **Cyclone Dityah** in the Bay of Bengal renewed public interest in how tropical cyclones are named and managed internationally.

KNOW YOUR BASICS: Tropical Cyclone

- A tropical cyclone is a rapidly rotating **low-pressure system** formed over warm tropical oceans.
- Forms when **sea surface temperature exceeds 26–27°C**, leading to rising warm, moist air.
- **Condensation releases latent heat**, which intensifies the storm.
- **Coriolis force** provides rotation; hence cyclones do not form near the equator.
- Requires **low vertical wind shear** for vertical development.
- Has a **calm eye**, surrounded by an **eyewall with very strong winds**.
- Associated with **heavy rainfall, strong winds, storm surges, and flooding**.
- Generally moves **east to west** and weakens after landfall.

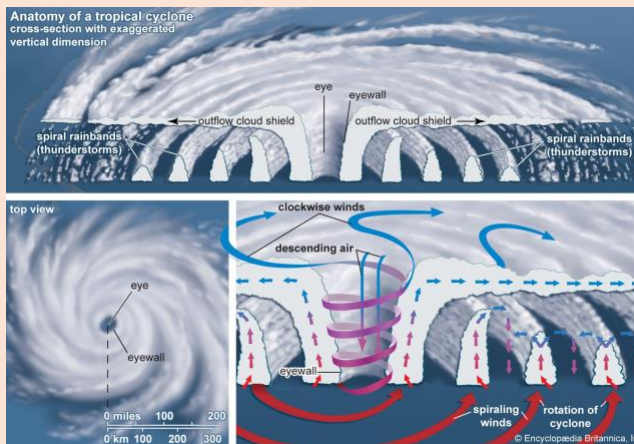


Figure 24: Tropical Cyclones

Institutional Framework

- Cyclone naming is coordinated by the **World Meteorological Organization–ESCAP Panel on Tropical Cyclones**.
- Covers the **North Indian Ocean region**, including the Bay of Bengal and Arabian Sea.

Naming Process

- Member countries submit **pre-approved lists of names** in a fixed rotational order.

- Once a name is used, it is **retired** and not reused.
- Names must be:
 - Short and easy to pronounce
 - Gender-neutral
 - Non-offensive and culturally sensitive

Case of Cyclone Dityah

- The name **“Dityah”** was contributed by **Yemen**.
- Ensures regional representation and shared ownership of disaster communication.

Significance of Cyclone Naming in Disaster Management

- Avoids confusion in warnings.
- Enhances public awareness and preparedness.
- Improves coordination among meteorological agencies and governments.

Conclusion

A standardised cyclone naming system improves **risk communication, disaster preparedness, and regional cooperation**, making it a crucial non-structural tool in disaster management.

Energy Policy: AI & Climate Change

Context: The rapid expansion of **AI, data centres, and digital infrastructure** is sharply increasing electricity demand, colliding with India's **climate commitments and energy transition goals**.

AI-Driven Energy Demand

- AI data centres require:
 - Continuous, high-quality power supply
 - Energy-intensive cooling systems
- Global estimates show data centres could consume **5–7% of electricity** in large economies by 2030.
- India's grid is already under stress due to peak demand volatility.

Key Structural Trade-offs

- **Green transition vs supply chains:** Solar panels, batteries, and EV components remain **China-centric**, exposing India to strategic vulnerabilities.
- **AI infrastructure vs grid weakness:** Renewable-heavy grids face intermittency, while AI needs 24×7 reliability.

- **Coal security vs decarbonisation:** Coal still underpins baseload power, yet conflicts with net-zero aspirations.
- **Cost vs climate:** Clean energy requires upfront capital, while coal offers short-term affordability.

Policy Challenges

- Fragmented policymaking across power, IT, climate, and industry.
- Lack of integrated planning for **AI energy demand forecasting**.
- Slow rollout of grid-scale storage and smart grids.

Conclusion

India faces an **energy trilemma**—growth, security, and sustainability. Managing it requires **policy coherence, grid modernisation, energy storage investment, and strategic diversification of clean-tech supply chains**.

Protected Area Regime & Hornbill Festival



Figure 25: Hornbill Festival | Source: The Indian Express

Context: Nagaland opposed the proposed re-imposition of the **Protected Area Permit (PAP)** regime, citing adverse impacts on tourism and the local economy.

What is the PAP Regime

- Restricts **foreign tourist entry** into certain border and strategic areas.
- Intended to address **national security and demographic concerns**.

Economic & Cultural Impact

- Tourism, particularly the **Hornbill Festival**, is a major economic driver.
- PAP restrictions reduce foreign tourist inflows, affecting:

- Local livelihoods
- Cultural exchange
- State revenue

State vs Centre Concerns

- **State view:** PAP undermines economic development and integration.
- **Centre view:** Border sensitivity and security imperatives justify restrictions.

Broader Governance Issue

- Highlights tension between **security-centric governance** and **development-led integration** of border regions.
- Raises questions on differentiated security approaches for peaceful regions.

Conclusion

The PAP debate reflects the enduring challenge of balancing **national security with regional economic development**, requiring nuanced, context-sensitive policy rather than blanket restrictions.

KNOW YOUR BASICS: Hornbill

- **Hornbill** are **large frugivorous forest birds** known for their **prominent casque** and role as **key seed dispersers**.
- In India, major species include **Great Hornbill, Indian Grey Hornbill, Malabar Hornbill**; mainly found in **Western Ghats, Northeast India, and Andaman-Nicobar**.
- **Conservation:** Several species are **threatened due to habitat loss and hunting**; protected under the **Wildlife (Protection) Act, 1972** (Schedule I for some species).



Figure 26: Hornbill

Regional Pollution Disparities

Context: North Indian cities consistently record **severe air pollution during winter**, unlike most southern and western cities, highlighting sharp regional disparities in air quality outcomes.

Geographical & Meteorological Factors

- **Indo-Gangetic Plain effect:** The Himalayan barrier restricts pollutant dispersion, creating an "airshed trap."
- **Winter meteorology:** Weak winds and **temperature inversion** prevent vertical mixing of pollutants.

Anthropogenic Contributors

- High **urban density**, vehicular emissions, and industrial clusters.
- **Crop residue burning** during the rabi season exacerbates PM2.5 levels.
- Construction dust and coal-based power generation.

Comparative Regional Advantage

- Southern and western cities benefit from:
 - Coastal winds or plateau geography.
 - Better atmospheric dispersion.
 - Less seasonal biomass burning.

Conclusion

India's air pollution challenge is **spatially differentiated**. Effective mitigation requires **region-specific strategies**, integrating geography, seasonal meteorology, and local emission profiles rather than uniform national solutions.

Yamuna Pollution

Context: A study by **The Energy and Resources Institute (TERI)** highlighted alarming pollution levels in the Delhi stretch of the Yamuna River.

Nature of Pollutants

- **Chemical surfactants:** From detergents and industrial discharge.
- **Ammonia:** Primarily from untreated sewage.
- **Microplastics:** Persistent pollutants with bioaccumulative effects.



Figure 27: Yamuna Pollution | Source: ABC News

Health & Ecological Risks

- Respiratory and dermatological illnesses.
- Long-term toxicity and endocrine disruption.
- Collapse of aquatic biodiversity in the river stretch.

Policy & Management Insights

- **Chemical dust suppressants** found more effective than water spraying for pollution control.
- Fragmented governance among multiple agencies weakens accountability.
- Focus remains on symbolic cleaning rather than systemic sewage treatment.

KNOW YOUR BASICS: Yamuna

- **Yamuna River** originates from the **Yamunotri Glacier (Uttarakhand)** and is the **largest tributary of the Ganga**.
- Flows through **Uttarakhand, Himachal Pradesh, Haryana, Delhi, and Uttar Pradesh**; joins the Ganga at **Prayagraj (Triveni Sangam)**.
- Major tributaries include **Tons (largest), Chambal, Betwa, Ken, Sindh**; river is **highly polluted in the Delhi stretch** due to urban and industrial discharge.



Figure 28: Yamuna River

Conclusion

Yamuna rejuvenation demands **scientific, inter-departmental governance**, focusing on wastewater treatment, industrial regulation, and ecological restoration—not cosmetic interventions.

Multispecies Grasslands & Agriculture

Context: An international ecological study examined **multispecies grasslands grown with low nitrogen inputs**, highlighting their potential for sustainable agriculture and climate resilience.

Key Points

- **Agronomic benefits:**
 - Multispecies grasslands produce **higher and more stable yields** compared to monocultures.
 - Reduced dependence on synthetic nitrogen fertilisers.
- **Climate adaptability:**
 - Perform especially well in **warmer and drought-prone regions**, where monocultures fail.
 - Diverse root systems improve water retention and soil health.
- **Livestock sustainability:**
 - Better-quality fodder enhances livestock productivity and health.
 - Supports low-emission, pasture-based animal husbandry.
- **Environmental gains:**
 - Lower fertiliser use cuts **nitrous oxide emissions**, a potent greenhouse gas.
 - Improves biodiversity and soil carbon sequestration.
- **Policy relevance:**
 - Aligns with sustainable agriculture, regenerative farming, and climate adaptation strategies.

Conclusion

Multispecies grasslands offer a **nature-based solution** that boosts productivity while reducing environmental costs, fully aligning with **climate-smart and sustainable agriculture goals**.

Flex-Fuel Vehicles & Ethanol Blending

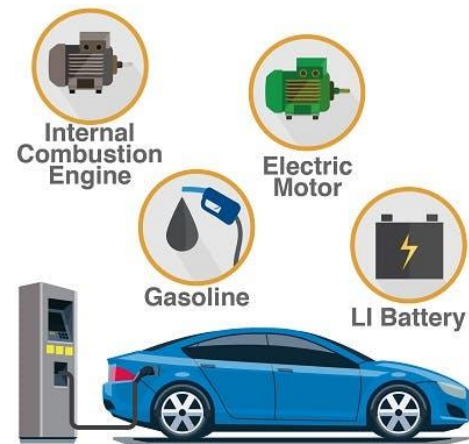


Figure 29: Flex-Fuel Vehicles | Source: Diehl Ford

Context: Following the nationwide rollout of **E20 petrol (20% ethanol blending)**, debates have intensified on the feasibility of **flex-fuel vehicles (FFVs)** as a transitional mobility solution for India.

Key Points

- **Compatibility challenge:**
 - Most **legacy vehicles** are not designed for ethanol blends beyond E10–E15.
 - Higher ethanol content can corrode engine components, reduce fuel efficiency, and raise maintenance costs.
- **Flex-fuel advantage:** FFVs can run on **any blend from E20 to E85**, offering consumer flexibility. It reduces dependence on a single fuel pathway (EV-only transition).
- **Brazilian experience:** Brazil's success is driven by **tax incentives, assured ethanol supply, and price parity**. Over 80% of new vehicles sold in Brazil are flex-fuel.
- **Economic & environmental gains:**
 - Reduces **crude oil imports**, improving energy security.
 - Ethanol blending lowers net carbon emissions and supports farmers via sugarcane and grain demand.
- **Policy gaps:**
 - Need for ethanol availability, pricing clarity, vehicle standards, and consumer incentives.

Further Info:

- **Ethanol Blended Petrol (EBP) Programme** aims to blend **ethanol with petrol** to reduce crude oil imports and emissions; India achieved **20% blending (E20)** ahead of target.
- Ethanol is produced mainly from **sugarcane juice/molasses** and **grain-based feedstock** (maize, surplus rice).
- Implemented by the **Government of India**, it supports **energy security, farmers' income**, and **lower carbon emissions**.

Conclusion

Flex-fuel vehicles offer a **pragmatic and inclusive transition pathway** toward cleaner mobility, complementing EVs while balancing energy security, farmer welfare, and affordability.

Stubble Burning

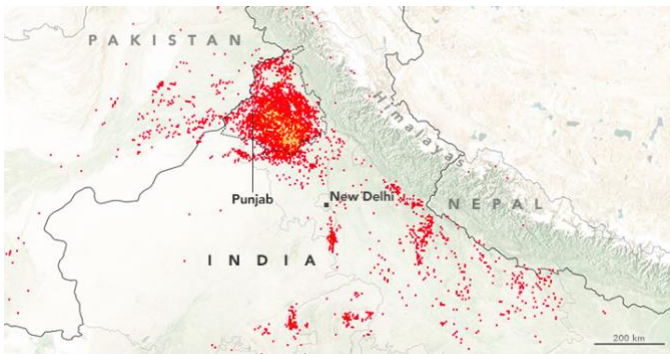


Figure 30: Stubble Burning | Source: South Asia Review

Context: Recent government claims of a sharp reduction in stubble burning have been questioned by satellite-based studies, including a crucial **ISRO study published in December 2025**. These studies highlight a significant gap between reported fire counts and the actual ground reality, driven by farmers adapting their burning schedules to evade detection.

The Core Issue: Shifting Tactics

- **Timing Shift:** The ISRO study revealed that farmers in **Punjab and Haryana** are intentionally shifting stubble burning to **late afternoon or evening hours**.
- **Objective:** This shift is a deliberate strategy to evade detection by traditional **polar-orbiting satellites**, which pass over the region only at specific times during the day.

Limitations of Current Monitoring

- **Satellite Limitations:**
 - **Polar-orbiting satellites** have limited daily passes and fail to capture short-duration fires or those lit after sunset.
 - **Fire count data** only captures detected ignition points, leading to a gross underestimation of the actual scale of burning.
- **Burnt Area Analysis:** While fire counts suggest a massive drop, **burnt area analysis** indicates only about a **30% reduction**, proving that the problem is far from resolved.

KNOW YOUR BASICS: Polar vs. Geostationary Orbits

Understanding the difference is crucial for S&T questions.

Feature	Polar Orbiting (Sun-Synchronous)	Geostationary Orbit (GEO)
Altitude	Low Earth Orbit (~700–800 km)	High Altitude (~36,000 km)
Move-ment	Passes over poles; Earth rotates beneath it.	Matches Earth's rotation; appears "fixed" over one spot.
Coverage	Global coverage, but sees a spot only every 24 hrs.	Constant view of a specific region (e.g., India).
Use Case	High-resolution mapping (Agriculture, Spying).	Weather monitoring, Communication, Continuous Fire Tracking .
Examples	Terra, Aqua (MODIS)	INSAT-3DS, Meteosat (MSG)

Institutional & Policy Implications

- **Supreme Court & CAQM:** The **Commission for Air Quality Management (CAQM)** has flagged mismatches between reported data and ground reality, while the **Supreme Court of India** has questioned why pollution persists despite the reported decline in fire counts.
- **Policy Risks:** Reliance on incomplete indicators creates a false sense of progress. Undercounting weakens enforcement, distorts incentive structures for farmers, and undermines public trust in environmental governance.

Way Forward

- **Technological Integration:** Move beyond simple fire counts to a robust system integrating **geostationary satellites** (which provide continuous monitoring), **drones**, and **ground sensors** to capture evening and night-time fires.
- **Outcome-Based Approach:** Focus on measurable **air quality improvements** rather than just counting fires.
- **Data Integrity:** Effective control requires scientifically robust, multi-source data to ensure credibility and targeted interventions.

Conclusion

Solving the air pollution crisis demands transparent data integration and genuine enforcement, rather than "cosmetic reductions" based on selective metrics. Addressing the behavioral shift in burning timing is essential for credible policy action.

Air Pollution: Public Health Emergency

Context: Air pollution has emerged as **India's largest silent killer**, surpassing many traditional health risks. Recent epidemiological evidence shows that polluted air is no longer only an environmental concern but a **systemic public health emergency** with long-term economic and social consequences

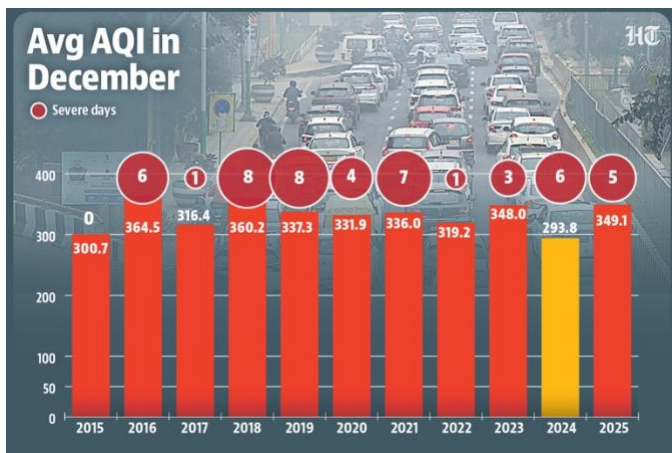


Figure 31: Average AQI in Delhi | Source: Hindustan Times

Pollution Beyond Environment—A Health Crisis

Health impacts across life-cycle:

- **PM2.5 exposure** is linked to **cardiovascular diseases**, **strokes**, **chronic respiratory illness**, **cancers**, and **neurological disorders** (including cognitive decline).

- **Neonatal and maternal impacts:** Low birth weight, preterm births, and impaired lung development.
- Reduced life expectancy by **4–6 years** in heavily polluted regions.

Invisible burden & AQI limitations:

- The **Air Quality Index (AQI)** averages pollution levels and often **masks extreme peaks** and cumulative exposure.
- Chronic exposure, not just episodic "severe" days, drives disease burden.

Inequality dimension:

- **Urban poor, informal workers, children, and elderly** face higher exposure due to outdoor work, poor housing, and proximity to pollution sources.
- Rural households suffer from **indoor air pollution** due to biomass cooking fuels.

Economic and productivity costs:

- Rising healthcare expenditure, loss of labour productivity, and school absenteeism.
- Air pollution imposes a **hidden GDP loss** through reduced human capital.

Governance gaps:

- Fragmented institutional responsibility (environment, health, transport, energy).
- Over-reliance on emergency measures (odd-even, water sprinkling) rather than **structural prevention**.

Link with climate change:

- Common sources (coal, vehicles, biomass) mean **air quality and climate mitigation are co-benefits**, not trade-offs.

Conclusion

Air pollution must be treated as a **public health emergency**, not merely an environmental issue. Recognising **clean air as a fundamental right**, integrating health metrics into pollution policy are essential for sustainable development and constitutional well-being—making air quality a core concern for India's future.

Mining in Aravalli

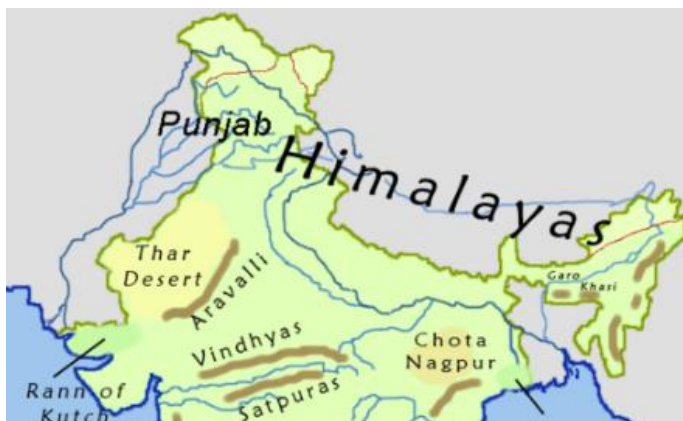


Figure 32: Map showing Aravalli Range

Context: The Supreme Court paused new mining leases in the Aravalli region and directed the adoption of **scientific and sustainable mining practices** to curb ecological degradation and illegal extraction.

Geography and Ecological Importance of the Aravalli Range

- **Geographical extent:** The Aravalli Range runs for about 690 km, from Palanpur in Gujarat through Rajasthan, ending near Delhi-Haryana.
- **Geological age:** Among the oldest fold mountains in the world (Precambrian origin), now highly eroded and discontinuous.
- **Relief features:** Characterised by residual hills, ridges, plateaus, and isolated peaks such as Guru Shikhar (Mount Abu)—the highest point (~1,722 m).
- **Climatic role:** Acts as a climatic divide, it deflects southwest monsoon winds, influencing rainfall distribution in western and eastern Rajasthan.
- **Hydrology:** Source region for rivers like Banas, Luni, Sahibi, and supports aquifer recharge critical for water-stressed regions.
- **Ecological barrier:** Prevents the **eastward expansion of the Thar Desert**, stabilises soil, and moderates dust storms.

Conservation and Judicial Intervention

- **Biodiversity hotspot:** Hosts dry deciduous forests, scrublands, wildlife corridors, and protected areas.
- **Mining threats:** Unregulated mining causes deforestation, groundwater depletion, and air pollution.
- **Supreme Court's approach:**
 - Adopted a **uniform definition of Aravalli hills (above 100 m)** to prevent misuse of classifications.

- Preferred **regulated mining** with environmental safeguards over a blanket ban to tackle illegality effectively.

Conclusion

Protecting the Aravallis demands **scientific mapping, sustainable land-use planning, and strict enforcement**. Given their geological antiquity and critical ecological functions, conserving the Aravalli Range is essential for India's environmental security and climate resilience.

TARANG Portal

Context: The Union government plans to launch **TARANG**, a national digital portal for implementing the **Forest Rights Act (FRA), 2006**.



Figure 23: Tarang Portal Website


Digitising Rights-Based Forest Governance





- Enables **end-to-end digitisation** of FRA processes:
 - Filing and tracking of claims
 - Issuance of titles
 - Digitisation of legacy records
 - Creation of a national **FRA Atlas**
- Aims to improve **transparency, accountability, and speed** in welfare delivery to **Scheduled Tribes and Other Traditional Forest Dwellers**.
- Can reduce bureaucratic delays and data fragmentation across states.

Conclusion

Digital platforms like TARANG can strengthen FRA implementation, provided **Gram Sabha authority, consent, and decentralised decision-making** remain fully protected.

SPECIES IN NEWS

Species	Why in News	Geography (Habitat & Distribution)	Status & Challenges
Indian Grey Wolf  <p>Figure 34: Indian Grey Wolf</p>	IUCN Update (2025): First-time separate evaluation of the Indian Wolf (<i>Canis lupus pallipes</i>), acknowledging genetic distinctiveness from the global Grey Wolf.	Habitat: Semi-arid grasslands, scrublands, open plains, pastoral landscapes. Distribution: <ul style="list-style-type: none"> • Global: Southwest Asia to Indian Subcontinent. • India: Rajasthan, Gujarat, Maharashtra, Karnataka, Telangana, MP. 	Conservation: <ul style="list-style-type: none"> • IUCN: Vulnerable (India)* / Least Concern (Global) • CITES: Appendix I • WPA 1972: Schedule I Threats: Habitat loss and fragmentation, hybridisation with feral dogs, hybridisation with dogs, low genetic diversity.
Blackbuck  <p>Figure 35: Blackbuck</p>	Reintroduction (2025): Successfully reintroduced in Barnawapara WLS (Chhattisgarh) after 50 years of local extinction.	Habitat: Open grasslands, dry scrublands, semi-arid plains (prefers short grass). Distribution: <ul style="list-style-type: none"> • Endemic to Indian Subcontinent. • India: Rajasthan, Gujarat, MP, Tamil Nadu. • Extinct in: Pakistan, Bangladesh. 	Conservation: <ul style="list-style-type: none"> • IUCN: Least Concern • CITES: Appendix III • WPA 1972: Schedule I Threats: Poaching (meat/horns), habitat loss (agriculture), fragmentation, road kills.
Asiatic Lion  <p>Figure 36: Asiatic Lion Source: DNA</p>	16th Census (2025): Population rose to 891 ; range expanded to coastal Saurashtra. IUCN assigned "Largely Depleted" Green Status.	Habitat: Dry deciduous forests, scrublands, open grasslands. Distribution: <ul style="list-style-type: none"> • Found only in India. • Restricted to Gir Forest landscape (Gujarat). 	Conservation: <ul style="list-style-type: none"> • IUCN: Endangered • CITES: Appendix I • WPA 1972: Schedule I Threats: Single-population risk (disease/disaster), inbreeding, accidental deaths (open wells, roads, railway), Habitat fragmentation and human pressure.
Orangutan  <p>Figure 37: Orangutan</p>	"Orangutan Diplomacy": Malaysia proposed a policy to "gift" orangutans to nations buying palm oil (later revised to conservation sponsorship).	Habitat: Tropical lowland & montane rainforests; highly arboreal . Distribution: <ul style="list-style-type: none"> • Endemic to Southeast Asia. • Only in Borneo & Sumatra (Indonesia/Malaysia). 	Conservation: <ul style="list-style-type: none"> • IUCN: Critically Endangered (all species - Bornean orangutan, Sumatran orangutan, Tapanuli orangutan) • CITES: Appendix I Threats: Deforestation (oil palm plantations, logging), habitat fragmentation, Poaching and illegal trade,

			forest fires and climate-related stress.
Wandering Albatross  <i>Figure 38: Wandering Albatross / Source: Science Learning Hub</i>	World Albatross Day 2025: Highlighted threat of Avian Flu (H5N1) reaching sub-Antarctic islands, threatening colonies.	Habitat: Open oceans (Southern Hemisphere); breeds on remote grassy/rocky islands. Distribution: <ul style="list-style-type: none"> • Circumpolar in Southern Ocean. • Breeding: South Georgia, Crozet, Kerguelen, and Macquarie Islands. 	Conservation: <ul style="list-style-type: none"> • IUCN: Vulnerable • CITES: Appendix II Threats: Bycatch (longline and trawl fisheries), plastic ingestion, climate change, slow reproduction (one chick every 2 years).
Lemur  <i>Figure 39: Lemur / Source: Nat Geo</i>	Biodiversity Crisis: Cited as the "world's most threatened mammal group" due to rapid habitat loss in Madagascar.	Habitat: Rainforests, dry deciduous forests, spiny forests, mangroves. Distribution: <ul style="list-style-type: none"> • Endemic to Madagascar (island off Southeast Africa). 	Conservation: <ul style="list-style-type: none"> • IUCN: Majority are Endangered / Critically Endangered • CITES: Appendix I Threats: Deforestation due to slash-and-burn agriculture, habitat fragmentation, hunting and illegal wildlife trade, Climate change and forest degradation.
Amazon Stingless Bees  <i>Figure 40: Amazon Stingless Bees / Source: Amazon Conservation Team</i>	Pollinator Decline: Focus on non-Apis pollinators due to Amazon drought/deforestation affecting flowering patterns.	Habitat: Tropical rainforests; nests in tree hollows, logs, soil. Distribution: <ul style="list-style-type: none"> • Amazon Basin (South America). • Brazil, Peru, Colombia, Ecuador. 	Conservation: <ul style="list-style-type: none"> • IUCN: Not Individually assessed • Status: Ecologically critical pollinators. Threats: Pesticides, deforestation and forest fragmentation, loss of nesting sites due to logging, climate change affecting flowering patterns.
Western Tragopan  <i>Figure 41: Western Tragopan / Source: BirdLife Data</i>	Captive Breeding Success: Successful captive breeding reported in Himachal Pradesh , offering hope for the species (State Bird of HP).	Habitat: Fragmented Himalayan forests (Temperate & sub-alpine zones). Distribution: <ul style="list-style-type: none"> • Endemic to the Western Himalayas. • India: Himachal Pradesh, J&K. • Others: Northern Pakistan. 	Conservation: <ul style="list-style-type: none"> • IUCN: Listed as Vulnerable. • CITES: Appendix I • WPA 1972: Schedule I Threats: Small genetic base (inbreeding risk), Climate change (altering breeding cycles), habitat loss due to logging.

SCIENCE & TECHNOLOGY

Landfill Methane Emissions

Context: Recent satellite observations reveal that methane emissions from Indian landfills are **up to 10 times higher** than official government estimates.

- **Significance:** Methane is a potent greenhouse gas and a fire hazard. The discrepancy poses a serious challenge to India's climate goals and urban safety.

KNOW YOUR BASICS: Methane (CH₄)

- **Methane** is a **potent greenhouse gas**.
- **Nature:** Odourless, colourless, and lighter than air. It is the primary component of Natural Gas (80-95%).
- Has a **short atmospheric lifetime (~12 years)**, making methane reduction a **high-impact climate mitigation strategy**.
- **Global Warming Potential (GWP):**
 - Over 20 years, it is **84 times** more potent than CO₂.
 - Over 100 years, it is **28-34 times** more potent.
- Major sources include **agriculture (enteric fermentation, rice paddies)**, **fossil fuel extraction**, **landfills**, and **wetlands**.
- **Status:** India is the **3rd largest** methane emitter globally (after China and USA).
 - **~15%** of India's methane comes from waste.

Why are Emissions Being Missed?

- **Flawed Estimation Models:** India currently relies on theoretical models that estimate emissions based on **waste input volumes** and baseline assumptions, rather than actual measurements.
- **Data Gaps:** Official data is often outdated (e.g., State-level estimates from **2018**) and aggregated, making it impossible to pinpoint specific leakages.
- **Technological Limitations:** Ground-based monitoring sensors are expensive and hard to maintain on unstable garbage dumps.

The "Satellite Solution"

- **Role:** Satellites act as "eyes in the sky" to detect invisible methane plumes.
- **Key Findings (Satellite vs. Official Data):**
 - **Delhi (Ghazipur & Bhalswa):** Satellite data shows just these two sites emit nearly as much as the *entire* official estimate for the city's waste sector.
 - **Mumbai (Kanjurmarg):** Satellite data shows emissions are **10 times higher** than model estimates.
 - **Ahmedabad (Pirana):** Identified as a major hotspot by **ISRO's 2023 study**.
- **Global Platforms:** **CarbonMapper**, **SRON**, and **ClimateTRACE** are now providing public data on these leaks.
 - **Global pattern:** Actual landfill emissions are **~1.8x higher** than predicted worldwide.

Key Government Initiatives

- **Swachh Bharat Mission (Urban):** Focuses on waste management and legacy dumpsite remediation.
- **GOBARDHAN Scheme:** Promotes converting organic waste into Bio-CNG (e.g., **Indore's Bio-CNG plant**).
- **National Green Tribunal (NGT):** Has formed committees based on ISRO's findings to investigate flagged sites.

Way Forward: The "Feedback Loop"

- **Integrated monitoring:** Combine satellite detection with on-ground validation.
 - **Detect:** Satellites identify a methane hotspot.
 - **Investigate:** Ground teams inspect the site (check for gas capture failure or illegal dumping).
 - **Fix & Validate:** Repairs are made, and ground data is used to improve satellite accuracy.
- **Institutionalize:** Bodies like **CAQM** (Commission for Air Quality Management) should oversee methane monitoring alongside air pollution.
 - **Policy linkage:** Embed methane targets in waste rules, Swachh Bharat Mission, and CAQM oversight.
- **Utilisation:** Capture methane for energy (e.g., **Bio-CNG under Gobardhan**).

Conclusion

Satellite data exposes a **systematic underestimation** of landfill methane. Closing this gap through integrated monitoring and policy action is essential for India's **climate credibility and urban sustainability**.

India's Biosecurity Architecture

Context: Urgent calls have been made to upgrade India's biosecurity measures due to rising risks from new-age biotechnologies (synthetic biology), increasing capabilities of non-state actors, and identified gaps in the current response system.

- **Status:** India currently lacks a unified national biosecurity strategy, ranking **66th** on the Global Health Security Index (2023).

KNOW YOUR BASICS: Biosafety vs. Biosecurity

- **Biosafety:** Focuses on preventing **accidental** leakage or exposure to pathogens (e.g., lab safety protocols).
- **Biosecurity:** Focuses on preventing **intentional** misuse of biological agents, toxins, or technology (e.g., preventing bioterrorism or theft of dangerous viruses).

Why Does India Need a Stronger Framework?

- **Demographic & Geographic Vulnerability:** High population density and vast borders make India prone to rapid spread of outbreaks (natural or engineered).
- **Agricultural Dependence:** With 42% of the workforce in agriculture, a biological attack on crops/livestock would devastate food security and the economy.
- **Technological Risks:** Advances in synthetic biology and gene editing (CRISPR) have lowered the barrier for creating dangerous pathogens.
 - **Concern:** 42% of high-risk labs globally lack oversight to prevent legitimate research from being diverted for harmful use.
- **Non-State Actors:** Terror groups are exploring biological tools. The article cites an incident involving the alleged preparation of Ricin toxin for terror use.

India's Existing Architecture

Category	Details
Nodal Agencies	<ul style="list-style-type: none"> • Dept. of Biotechnology (DBT): Lab governance & biosafety. • NCDC: Disease surveillance & outbreak response.
Key Laws	<ul style="list-style-type: none"> • Environment (Protection) Act, 1986: Regulates GMOs. • WMD Act, 2005: Criminalizes biological weapons.

	<ul style="list-style-type: none"> • Biosafety Rules (1989): Governs lab containment.
International	Member of Biological Weapons Convention (BWC) and Australia Group (export control of dual-use tech).

Critical Gaps & Challenges

- **Fragmented Governance:** Multiple ministries (Health, Agriculture, Environment) operate in silos without a single "National Biosecurity Authority".
- **Outdated Laws:** Current laws predate the age of synthetic biology and AI. There is no compulsory screening of gene-synthesis orders, allowing potential misuse.
- **"One Health" Silos:** Human, animal, and environmental surveillance operate separately, despite 70% of emerging diseases being zoonotic.

Way Forward: Global Best Practices

- **Unified Authority (Australia Model):** Create a National Biosecurity Authority similar to Australia's *Biosecurity Act (2015)* to coordinate across sectors.
- **Mandatory Screening (US Model):** Adopt guidelines like the *US Federal DNA Screening Guidelines (2024)* requiring companies to screen DNA orders against pathogen databases.
- **One Health Integration (EU Model):** Integrate surveillance systems across human, animal, and environmental health.

Conclusion

Given the catastrophic stakes, India needs a **coherent, whole-of-government biosecurity framework** that integrates surveillance, regulation, and rapid response to close gaps before emerging bio-risks escalates.

KAVACH 4.0

Context: The Minister of Railways announced that **Kavach Version 4.0** has been successfully commissioned on **738 Route km** (Rkm) across key sections of the Delhi–Mumbai and Delhi–Howrah routes.

- **Capacity Building:** Over **40,000 personnel**, including 33,000 Loco Pilots, have been trained on the technology in collaboration with **IRISET**, Secunderabad.

About Kavach (The "Armor")

- **Definition:** An indigenously developed **Automatic Train Protection (ATP)** system.
- **Safety Standard:** It is a **Safety Integrity Level-4 (SIL-4)** certified system, which is the highest level of safety certification globally.
- **Key Functions:**
 - **Anti-Collision:** Prevents head-on and rear-end collisions.
 - **Auto-Braking:** Automatically applies brakes if the Loco Pilot fails to control the train within speed limits or passes a "Signal at Danger" (SPAD).
 - **Weather Support:** Enables safer train operations during inclement weather (fog).

- **Cost Estimates:**
 - **Track-side:** ~₹50 lakh per km.
 - **Locomotive:** ~₹80 lakh per loco.

Evolution: Version 3.2 vs. Version 4.0

- Kavach 3.2 was the initial version deployed on **1,465 Rkm** of South Central Railway. Experience from this led to Version 4.0, approved by **RDSO** in July 2024.

Improvements in Version 4.0:

- **Higher Accuracy:** Increased location precision for trains.
- **Complex Yards:** Improved signal aspect information in bigger, complex railway yards.
- **Direct Interface:** Seamless integration with existing **Electronic Interlocking Systems** and station-to-station interfacing via OFC.

Further info:

Current Progress & Statistics

- **Routes Commissioned:** Palwal–Mathura–Nagda (Delhi–Mumbai) and Howrah–Bardhaman (Delhi–Howrah).
- **Physical Progress:**
 - **OFC Laid:** 7,129 km.
 - **Telecom Towers:** 860 installed.
 - **Locos Equipped:** 4,154.
- **Financials:** ₹2,354 crore utilized up to October 2025; ₹1,673 crore allocated for 2025-26.

Significance

- **Automatic collision prevention:** Reduces dependence on human reaction.
- **Safety impact:** Indian Railways estimates **nearly 90% reduction in accidents** on sections where KAVACH is operational.
- **Indigenous innovation:** Developed under the **Atmanirbhar Bharat** initiative, Kavach is a flagship indigenous technology, reducing dependence on expensive European systems (ETCS Level-2).
- **System integration:** Requires seamless coordination with **signalling systems, telecom networks, locomotives, and track-side equipment**, making large-scale rollout technologically complex.



Figure 42: Kavach System | Source: PIB

Components & Cost

- **Infrastructure:** Involves **RFID tags** on tracks, **telecom towers** (4G/LTE/UHF), **Optical Fibre Cables (OFC)** along tracks, and **Station/Loco Kavach units**.

- **Export Potential:** Designed with global standards, it holds export potential for markets in **Southeast Asia, Africa, and West Asia.**
- **Scalability:** The shift to Version 4.0 addresses previous limitations, making it suitable for India's diverse and high-density network.

Conclusion

KAVACH represents a **transformational leap in railway safety**, combining indigenisation with advanced automation. Its nationwide expansion is critical for safer, more reliable, and future-ready rail transport in India.

LightGen: Photonic Chip

Context: Researchers have developed **LightGen**, a **large-scale all-optical semantic generation chip** that uses **light instead of electricity** to generate images. By integrating a **photonic encoder, optical latent space, and photonic generator**, LightGen achieves **nearly 100× faster performance** with far greater **energy efficiency** than conventional electronic chips.

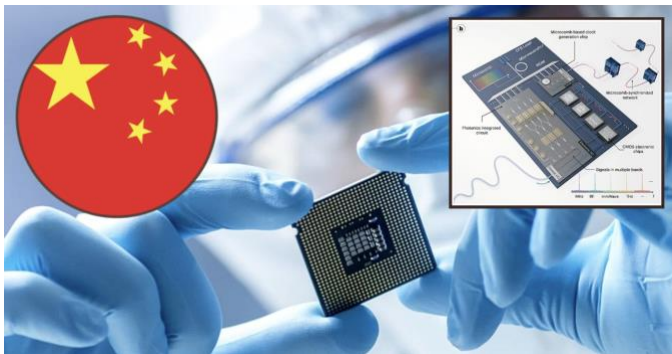


Figure 43: LightGen | Source: SciTech on X

Key Developments

- **Photonic computing breakthrough:** Replaces electrons with **photons**, enabling ultra-high-speed data processing and minimal heat loss.
- **All-optical architecture:** Computation and generation occur entirely in the optical domain, avoiding electronic bottlenecks.
- **Efficiency gains:** Dramatically reduces energy consumption—critical for AI workloads and data centres.
- **AI relevance:** Particularly suited for **image generation, machine learning models, and data-intensive AI tasks** where speed and power efficiency are constraints.

Way Forward

- Scale photonic chips for **commercial AI hardware** and data centres.
- Integrate with existing AI pipelines and hybrid electronic–photonic systems.
- Extend applications to **real-time analytics, autonomous systems, and edge computing.**

Conclusion

LightGen signals a major leap toward **energy-efficient, high-speed AI computing**. As AI demand grows, photonic chips like LightGen could redefine future computing by overcoming the speed and power limits of electronic processors.

Antimicrobial Resistance Crisis

Context: Antimicrobial resistance contributes to nearly **2.6 lakh deaths annually in India**, with ICUs emerging as hotspots.

GLOBAL

A failure to address the problem of antibiotic resistance could result in:



Figure 44: Antimicrobial Resistance Crisis

Drivers of AMR

- **Excessive antibiotic use:** About **57% prescriptions are prophylactic**, not diagnostic.
- **Weak infection control:** Poor hygiene, overcrowding, and inadequate isolation.
- **Diagnostic gaps:** Limited access to rapid pathogen identification.

Institutional Response

- **Indian Council of Medical Research (ICMR)** promoting:
 - Hospital antibiotic stewardship protocols
 - Rapid diagnostic testing
 - Surveillance of resistant strains

Public Health Implications

- Rising treatment costs and mortality.
- Threatens success of surgeries, transplants, and cancer care.

Conclusion

AMR is a **silent public health emergency** that requires **systemic reform**, integrating diagnostics, regulation, hospital governance, and public awareness.

“Alaknanda” Galaxy Discovery

Context: Indian astronomers from the **National Centre for Radio Astrophysics (NCRA-TIFR)**, Pune, have discovered a rare spiral galaxy named **"Alaknanda."**

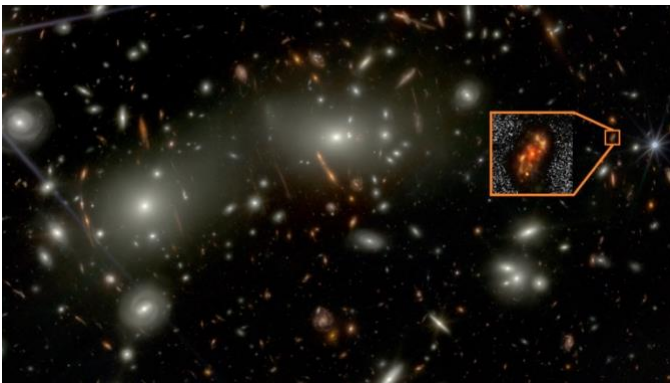


Figure 45: Alaknanda Galaxy | Source: The Indian Express

- **Significance:** This galaxy existed just **1.5 billion years after the Big Bang** (~12 billion light-years away). Its mature, "Milky Way-like" structure challenges existing theories of how quickly galaxies formed in the early universe.

About Galaxy Alaknanda

- **The Name:** Named after the **Alaknanda River** (a tributary of the Ganga). The researchers chose this name because the Milky Way is called **Mandakini** in Hindi; thus, this distant, similar galaxy is named after Mandakini's sister river.

Key Features:

- **Structure:** A "grand-design" spiral galaxy with a central bulge and two symmetrical arms. (The well-defined spiral arms challenge theories that such structures form much later.)
- **Size:** Approximately **one-third the size** of the Milky Way (spanning ~30,000 light-years).
- **Star Formation:** It is a powerhouse, forming stars at a rate **20–30 times faster** than the Milky Way today (approx. 60 solar masses per year).

Methodology:

- The discovery used data from the **James Webb Space Telescope (JWST)**, specifically the **UNCOVER** survey, which allows astronomers to see deeper into the universe's past with higher resolution than ever before.

Why is this Discovery Important?

Challenging Cosmic Models:

- **Current Theory:** Standard models predict that galaxies in the very early universe ($z \sim 4$) should be **chaotic, clumpy, and irregular** due to extreme heat and turbulence.
- **The Anomaly:** Alaknanda has a stable, rotating disk and well-defined arms, suggesting that **complex galactic structures formed much faster** than previously believed.

Implications for Cosmology

- Suggests **early gravitational stability** and organised matter distribution.
- Forces rethinking of galaxy formation timelines.
- Enhances understanding of dark matter and early universe dynamics.

India's Scientific Standing

- Highlights India's growing role in **frontier astrophysical research**.
- Strengthens global collaboration in space science.

Conclusion

The Alakananda Galaxy discovery reshapes understanding of **early cosmic evolution**, marking a significant contribution to modern cosmology by Indian researchers.

DRDO High-Speed Rocket-Sled Test



Figure 46: DRDO High Speed Rocket Sled Test | Source: PIB

Context: The **Defence Research and Development Organisation (DRDO)** successfully conducted a **high-speed rocket-sled test** of an indigenous fighter aircraft escape system.

Technological Significance

- **Simulation capability:** Replicates **mid-air ejection** at extreme speeds and stress conditions.
- **Safety validation:** Confirmed correct sequencing of:
 - Ejection mechanism
 - Parachute deployment
 - Pilot load tolerance
- **Complex engineering:** Integrates aerodynamics, propulsion, materials science, and biomechanics.

Strategic Importance

- Places India among a **small elite group of nations** with in-house ejection system testing.
- Reduces dependence on imported safety-critical defence systems.
- Supports indigenous fighter programmes and future platforms.

Conclusion

The test marks a **major leap in Atmanirbhar defence R&D**, enhancing pilot safety while strengthening India's aerospace self-reliance.

Small Modular Reactors (SMRs)

Context: During President Vladimir Putin's visit (Dec 2025), Russia offered advanced **Small Modular Reactor (SMR)** technology to India.

- **Key Offer:** Rosatom proposed joint development, **localization of equipment manufacturing** in India, and deployment of SMRs for remote/industrial locations.
- **Domestic Context:** The Union **Budget 2025-26** has already allocated **₹20,000 crore** for the development of indigenous SMRs.

Further info:

India's Indigenous SMR Mission: India is not solely dependent on imports; it has a robust domestic roadmap funded by the **Nuclear Energy Mission**.

Component Details

Target	Deployment of 5 Indigenous SMRs by 2033 .
Budget	₹20,000 Crore (Budget 2025-26).
Agencies	Designed by BARC ; Construction by NPCIL / Private Sector.
Lead Time	Construction expected within 60-72 months of sanction.

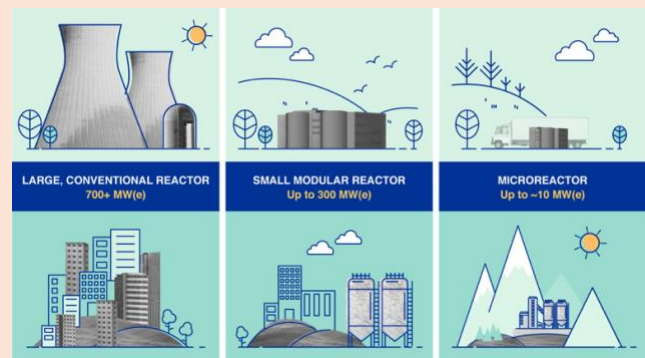


Figure 47: Nuclear Reactors | Source: IAEA

Types of Indigenous Reactors in Development

- **BSMR-200 (Bharat Small Modular Reactor):** 200 MWe capacity; intended for grid-based baseload power.
- **SMR-55:** 55 MWe capacity; compact design for remote locations.
- **HTGR (High-Temperature Gas-Cooled Reactor):** Up to 5 MWth; specifically designed for **Green Hydrogen generation**.

Highlights of India-Russia Cooperation

- **Technology Transfer:** Discussions focused on localizing production, aligning with "Make in India."
- **Strategic Alignment:** Russia pitched SMRs (like their floating **Akademik Lomonosov**) for India's remote areas and industrial captive use.

- **Nuclear Expansion:** The move supports India's target of **100 GW nuclear capacity by 2047** and Net Zero by 2070.

Key Points

- **What are SMRs:**
 - Nuclear reactors of **300–600 MW capacity**, smaller than conventional reactors.
 - Designed for **factory fabrication**, faster deployment, and enhanced safety systems.
- **Energy and climate relevance:**
 - Lower carbon footprint; suitable for grid stability alongside renewables.
 - Can be deployed in remote or industrial locations.
- **India's nuclear landscape:**
 - **Kudankulam Units 1–2** operational; **Units 3–4** under construction.
 - Long-term target of **100 GW nuclear capacity by 2047**.
- **Future potential:**
 - Global studies estimate SMRs could supply **13–28% of electricity by 2050**.
 - Supports **Make in India** through localisation of components and technology transfer.
- **Challenges:**
 - Regulatory approvals, high initial costs, public perception, and waste management concerns.

Conclusion

SMRs offer a strategic pathway to **decarbonised baseload power**, combining energy security with climate goals. If indigenised under Make in India, they can accelerate India's low-carbon transition while reducing import dependence.

Einstein–Bohr Debate Experiment

Context: A recent **single-atom laboratory experiment** has empirically validated **Niels Bohr's position** in the historic Einstein–Bohr debate on quantum mechanics.

Key Points

- **The debate:**
 - Einstein questioned the completeness of quantum mechanics.
 - Bohr defended the **uncertainty principle** and probabilistic nature of quantum reality.
- **Experimental breakthrough:**

- Precise measurement of a single atom showed that **measurement inevitably disturbs quantum systems**, as Bohr argued.

- **Scientific significance:**

- Confirms the **Heisenberg Uncertainty Principle** at the most fundamental level.
- Rejects deterministic interpretations favoured by Einstein.

- **Technological impact:**

- Strengthens theoretical foundations of **quantum computing, quantum cryptography, and quantum sensing**.

- **Philosophical dimension:**

- Reinforces the idea that nature at the quantum level is inherently probabilistic.

Conclusion

The experiment not only resolves a century-old scientific debate but also **reinforces the conceptual foundations of modern quantum physics**, crucial for next-generation technologies.

“Antariksh Prayogshala” Initiative

Context: The **Indian National Space Promotion and Authorization Centre (IN-SPACe)** invited proposals to establish **“Antariksh Prayogshala” (Space Laboratories)** in academic institutions to strengthen India's space research and innovation ecosystem.

Building India's Space Innovation Ecosystem

- **Objective:** Create advanced, hands-on space laboratories to bridge the gap between academic learning and real-world space applications.
- **Financial support:** IN-SPACe will fund **up to 75% of the project cost**, capped at **₹5 crore per institution**, reducing entry barriers for institutions.
- **Institutional coverage:** Up to **seven institutions** will be selected with **regional balance**, promoting inclusive capacity building across the country.
- **Academic focus:** Labs will enable **practical training, applied research, prototyping, and early-stage innovation** in areas such as satellite systems, payloads, propulsion, and space data applications.
- **Public-private collaboration:** Open to **non-government entities**, encouraging collaboration between academia, startups, and private industry in the space sector.

- **Talent development:** Supports development of a skilled workforce aligned with India's expanding **commercial and strategic space ambitions**.

Conclusion

The *Antariksh Prayogshala* initiative strengthens India's **space talent pipeline**, fosters innovation at the grassroots level, and advances the goal of **Atmanirbhar Bharat in space technology** by integrating education, research, and industry collaboration.

ISRO BlueBird Satellite launch

Context: The **Indian Space Research Organisation (ISRO)** is set to launch a **US-based AST SpaceMobile satellite (BlueBird)** using its **LVM3 heavy-lift launcher**, marking a significant milestone in India's commercial space engagements.

Expanding India's Commercial Launch Capability

- **Commercial credibility:** Launching a foreign satellite on **LVM3** signals global confidence in India's heavy-lift launch reliability.



Figure 48: Launch of BlueBird Satellite | Source: North East Live

- **Technological maturity:** Demonstrates ISRO's capability beyond Gaganyaan missions, showcasing versatility in deploying large payloads.
- **Market positioning:** Strengthens India's position in the **global commercial launch market**, competing with established players.
- **Space economy boost:** Supports growth of India's space services sector under **IN-SPaCe** and **NewSpace India Limited (NSIL)** frameworks.

Conclusion

Such commercial launches expand India's **space economy footprint**, enhance technological prestige, and reinforce ISRO's role as a reliable global launch partner.

Global Summit on Traditional Medicine

Context: India hosted the 2nd WHO Global Summit on Traditional Medicine in New Delhi from 17–19 December 2025.

- **Theme:** *"Restoring Balance for People and Planet: The Science and Practice of Well-Being."*
- **Organisers:** World Health Organization (WHO) and Ministry of Ayush, Government of India.



Figure 49: 2nd WHO Global Summit on Traditional Medicine

Highlights of the Summit

- **Global Launch:** The **WHO Traditional Medicine Global Library (TMGL)** was launched.
- It is the world's most comprehensive digital repository on traditional, complementary, and integrative medicine (TCIM) with over **1.5 million records**.
- **Strategic Alignment:** The summit aligns with the **WHO Global Traditional Medicine Strategy 2025–2034**, which aims to integrate TCIM into national health systems and achieve Universal Health Coverage (UHC).
- **Focus Areas:** Strengthening evidence-based research, biodiversity conservation, intellectual property rights, and "One Health" integration.

About Traditional Systems in India (AYUSH)

India recognizes six major systems under the Ministry of AYUSH. Aspirants must know the basic distinctions:

System	Origin & Key Principle
Ayurveda	Ancient Indian system focusing on balancing body, mind, and spirit through natural principles (Doshas).
Unani	Based on maintaining balance in the body through diet, lifestyle, and natural remedies; roots in Perso-Arabic tradition.

Siddha	One of India's oldest systems (Tamil Nadu origin); uses herbs, minerals, and pulse/tongue examination.
Sowa-Rigpa	"Amchi Medicine"; Himalayan tradition rooted in Buddhist principles and Ayurveda.
Yoga & Naturopathy	<ul style="list-style-type: none"> • Yoga: Mind-body discipline (postures, breathwork). • Naturopathy: Self-healing through diet and lifestyle changes.
Homoeopathy	Based on the principle of "Like Cures Like" using highly diluted substances to stimulate natural healing.

By hosting the summit, India strengthens its role as a **global hub for integrative healthcare**, blending traditional knowledge with scientific rigor and international governance.

Further info:

- **Gujarat Declaration (2023):** Adopted at the **1st WHO Global Summit (Gandhinagar)**; it reaffirmed global commitment to evidence-based TCIM.
- **Article 51A(a):** While not explicitly about health, the conservation of traditional knowledge aligns with the duty to value and preserve the rich heritage of our composite culture.
- **WHO GCTM:** The **WHO Global Centre for Traditional Medicine** is located in **Jamnagar, Gujarat**—the first and only global outpost centre for traditional medicine across the globe.

Government Initiatives for Traditional Medicine

To mainstream AYUSH, the government has launched several schemes:

- **National AYUSH Mission (NAM):** A Centrally Sponsored Scheme (launched 2014) to co-locate AYUSH facilities at PHCs, CHCs, and District Hospitals.
- **Ayurgyan:** Focuses on **Research & Education**; supports academic activities and Continuing Medical Education (CME).
- **Ayurswasthya Yojana:** A public health scheme promoting community wellness and supporting **Centres of Excellence (CoE)**.
- **AOGUSY (AYUSH Oushadhi Guvatta evum Uttapadan Samvardhan Yojana):** A Central Sector Scheme to ensure **Quality Control** and standardization of AYUSH drugs.
- **Medicinal Plants Conservation:** Support for cultivation, supply chain management, and resource augmentation of medicinal plants.

Significance & Challenges

- **Healthcare Integration:** India has over **3,800 AYUSH hospitals** and **7.5 lakh registered practitioners**. Integrating them into the primary health grid addresses the shortage of allopathic doctors in rural areas.
- **Soft Power (Vishwa Guru):** Hosting consecutive WHO summits (2023 in Gujarat, 2025 in Delhi) cements India's leadership in the Global South.
- **Economic Potential:** Promotes **Medical Value Travel (MVT)** and exports of herbal products.
- **Challenge:** The primary challenge remains **Evidence Generation**—bridging the gap between traditional texts and modern scientific validation (clinical trials).

Conclusion

CULTURE & HERITAGE

Tamil Nadu's Cultural Diplomacy

Context: Tamil Nadu is actively promoting its rich cultural heritage through the release of a coffee-table book and by seeking **UNESCO** recognition for **Pongal**, reinforcing cultural diplomacy and identity.

Key Developments

- **Book release:** *Fairs and Festivals: Traditional and Ancient Customs of Tamil Nadu* documents the state's living traditions.
- **Seasonal festivals:**
 - **Pongal** highlighted as a harvest festival rooted in agrarian cycles, later acquiring religious dimensions.
- **Syncretic customs:**
 - Head-shaving rituals at **Velankanni Church** and **Kurutholi festival** among Christians reflect local cultural blending.
- **Traditional sports & arts:**
 - **Jallikattu** and temple car (*Ther*) processions underscore continuity of ancient practices.
- **UNESCO-linked heritage in Tamil Nadu:**
 - **Living Chola Temples** (Thanjavur, Gangaikondacholisvaram, Darasuram)
 - *Group of Monuments at Mahabalipuram*
 - **Nilgiri Mountain Railway**
 - **Western Ghats** (natural heritage)
 - **Gingee Fort** (Maratha Military Landscapes, 2025)
 - Tamil manuscripts in **UNESCO Memory of the World** register

Conclusion

Tamil Nadu's push for UNESCO recognition of Pongal strengthens **cultural preservation, global visibility, and soft power**, while showcasing India's pluralistic and living heritage.

Mahad Satyagraha

Context: The **Dr. B. R. Ambedkar-led Mahad Satyagraha (1927)** marks one of India's earliest **human rights movements**, challenging caste discrimination and deeply influencing the **constitutional idea of equality, dignity, and rights** in independent India.



Figure 50: Mahad Satyagraha | Source: Mooknayak

How Mahad Shaped Constitutional Discourse

Birthplace of rights assertion:

- Mahad symbolised the shift from social reform to **rights-based struggle**, asserting Dalits' equal claim over public resources.

Immediate trigger – Bole Resolution (1923):

- Passed by the Bombay Legislative Council, it recognised the right of untouchables to access **public watering places**.

Mahad 1.0 (March 1927):

- Ambedkar led a **non-violent satyagraha** to drink water from the **Chavadar Tank**, asserting equality in everyday life.
- Upper-caste "purification rituals" that followed exposed the **deep-rooted nature of caste oppression**.

Mahad 2.0 (December 1927):

- Ambedkar publicly **burned the Manusmriti**, rejecting scriptural sanction to inequality.
- He foregrounded **women's equality**, linking social justice with gender justice.
- **25 December** is commemorated as **Indian Women's Liberation Day**.

Philosophical influence:

- Ambedkar drew from **Buddhist principles of Manushi (human dignity) and Maitri (compassion)**.
- He compared Mahad's role in India to that of the **French Revolution** in shaping constitutional ethics.

Constitutional legacy:

Mahad influenced ideas later embedded in:

- Equality before law (Article 14 & 15)
- Abolition of untouchability (Article 17)
- Constitutional morality over social morality (Sabarimala Case, Section 377 Case)

Conclusion

The Mahad Satyagraha was not merely a protest for water access; it was a **moral and constitutional watershed**. It helped define India's commitment to **human dignity, equality, non-violence, and social justice**, shaping the ethical soul of the Indian Constitution.

Vande Mataram: Constitutional Status

Context: During a Rajya Sabha discussion commemorating **150 years** of *Vande Mataram*, Union Minister J.P. Nadda argued that the National Song should be accorded the **same constitutional status** as the National Anthem (*Jana Gana Mana*).

KNOW YOUR BASICS: Vande Mataram

- **Composition:** Composed in **Sanskrit** by **Bankim Chandra Chattopadhyay** (approx. 1875).
- **Publication:** First published in the literary journal *Bangadarshan* (1875) and later included in his novel *Anandamath* (1881).
- **Musical Composition:** Set to tune by **Rabindranath Tagore**, who sang it at the 1896 session of the Indian National Congress (Kolkata).
- **Political Debut:** Became a potent slogan during the **Swadeshi Movement (1905)** against the Partition of Bengal.
 - **Fact:** **Madam Bhikaji Cama** inscribed "Vande Mataram" on the first version of the Indian flag raised in Stuttgart (1907).
 - **Fact:** **Madan Lal Dhingra's** last words before execution in 1909 were "Bande Mataram."

The Controversy & 1937 Compromise

- **The Issue:** While the first two stanzas praise the motherland as a bountiful, physical entity, later stanzas

contain imagery equating the nation to Hindu deities (e.g., Durga), which the Muslim League and Jinnah found idolatrous and exclusionary.

- **The 1937 Decision:** The **Congress Working Committee (CWC)**, based on advice from Tagore and others, decided that **only the first two stanzas** would be sung at national gatherings to ensure inclusivity.

Constitutional & Legal Status

Feature	National Anthem (Jana Gana Mana)	National Song (Vande Mataram)
Adoption Date	Jan 24, 1950 (Constituent Assembly)	Jan 24, 1950 (Constituent Assembly)
Constitutional Mention	Article 51A(a) mentions respect for "National Anthem".	Not mentioned in the Constitution.
Statutory Protection	Protected under Prevention of Insults to National Honour Act, 1971 .	No penal provision in the 1971 Act for disrespecting the song.
Legal Standing	Punishable offense to prevent singing.	Supreme Court & Govt have stated there is no concept of 'National Song' in law; both have "sanctity" but legal protection is asymmetrical.

Key Judicial Pronouncements

- **Madras HC (2017):** Initially mandated singing it in schools/offices but later clarified it was not compulsory if valid reasons existed.
- **Delhi HC (2022 - Ashwini Upadhyay PIL):** Govt submitted that while both anthem and song are on the "same footing" regarding sanctity, there is no penal provision for the song.
- **Bombay HC (2024):** Quashed an FIR regarding a WhatsApp group admin urging chanting, upholding **freedom of speech and conscience**.

Conclusion

Upholding the historical compromise on *Vande Mataram* reinforces **constitutional morality**, ensuring respect for

diversity, social harmony, and the inclusive foundations of the Indian Republic.

Deepavali: UNESCO ICH

Context: During the **20th session** of the **UNESCO** Intergovernmental Committee for the Safeguarding of the Intangible Cultural Heritage (ICH) held at **Red Fort, New Delhi**, **Deepavali** was officially inscribed on the **UNESCO Representative List of the Intangible Cultural Heritage of Humanity**.

About Deepavali (The Festival of Lights)

- **Timing:** Celebrated on **Kartik Amavasya** (Oct–Nov).
- **Symbolism:** Victory of light over darkness, hope over despair, and prosperity.
- **Significance:** Recognized as "living heritage" that strengthens social bonds, supports traditional craftsmanship, and reinforces values of generosity.

SDG Linkages

The inscription highlights Deepavali's contribution to the **Sustainable Development Goals (SDGs)**:

- **SDG 1 (No Poverty):** Supports seasonal livelihoods (artisans, potters).
- **SDG 3 (Good Health):** Promotes social bonding and community well-being.
- **SDG 5 (Gender Equality):** Active engagement of women artisans/crafts.
- **SDG 11 (Sustainable Communities):** Ensures cultural continuity and resilience.

About UNESCO Intangible Cultural Heritage (ICH)

- **Origin:** Established under the **2003 UNESCO Convention** for the Safeguarding of ICH.
- **Definition:** "Living traditions" inherited across generations (oral traditions, performing arts, rituals, knowledge of nature).
- **Process:** States submit nomination files; generally, **one nomination every two years**. India nominated Deepavali for the 2024–25 cycle.

India's UNESCO ICH Elements

With Deepavali, India's list expands. Aspirants should remember the following elements:

Element	Year	Region / Details
Garba	2023	Gujarat (Dance)
Durga Puja	2021	Kolkata (Festival)
Kumbh Mela	2017	Mass congregation of pilgrims
Yoga	2016	Ancient physical/mental practice
Nowruz	2016	Parsi New Year
Brass/Copper Making	2014	Thatheras of Jandiala Guru (Punjab)
Sankirtana	2013	Manipur (Ritual singing/drumming)
Buddhist Chanting	2012	Ladakh (Recitation of sacred texts)
Chhau Dance	2010	Eastern India (Mask dance)
Kalbelia	2010	Rajasthan (Folk songs/dances)
Mudiyettu	2010	Kerala (Ritual theatre)
Ramman	2009	Garhwal Himalayas (Religious festival)
Kutiyattam	2008	Kerala (Sanskrit theatre)
Ramlila	2008	Performance of Ramayana
Vedic Chanting	2008	Tradition of Vedic recitation

About the 20th Session (Host: India)

- **Significance:** First time India hosted the ICH Committee session.
- **Organisers:** Ministry of Culture and **Sangeet Natak Akademi** (Nodal agency).
- **Milestone:** Marked the **20th anniversary** of India ratifying the 2003 UNESCO Convention.
- **Objective:** To examine new nominations and showcase India's "community-led" safeguarding model.

Kolkata's Tram Calendar & Urban Heritage



Figure 51: Kolkata's Tram Calendar | Source: Roak Webzine

Context: A **2026 calendar campaign** has drawn attention to the decline of **Kolkata's 152-year-old tram system**, one of Asia's oldest operating tram networks.

Urban Heritage and Sustainable Mobility

- The campaign is led by **Tramjatra**, a citizen-led initiative advocating preservation of Kolkata's tram heritage.
- Highlights the deterioration of the **Nonapukur Tram Workshops**, a key heritage and maintenance facility.
- Trams represent **low-carbon, electric public transport**, especially relevant amid rising **AQI levels** and congestion.
- Decline driven by policy neglect, road prioritisation for private vehicles, and underinvestment in upgrades.
- Raises the broader issue of balancing **heritage conservation with modern urban transport planning**.

Conclusion

Preserving Kolkata's trams requires integrating **heritage conservation with sustainable mobility strategies**, rather than viewing them as obsolete infrastructure.

ETHICAL LENS

Water Conservation

Context: Severe and recurring droughts in Maharashtra have caused agrarian distress, migration, and loss of lives. In this backdrop, former IRS officer **Ujjwal Kumar Chavan** initiated a community-led water conservation movement to revive water security in vulnerable villages.

Ethical Dimensions

- **Compassion and Empathy:** Triggered by farmer suicides, the initiative reflects moral sensitivity towards human suffering.
- **Responsibility and Public Service:** Going beyond official duty, Chavan demonstrated ethical commitment to societal welfare.
- **Community Empowerment:** Villagers were made partners in water conservation, upholding dignity, participation, and shared ownership.
- **Environmental Stewardship:** Focus on groundwater recharge and sustainable water use reflects inter-generational justice.
- **Equity and Social Justice:** Improved water access reduced vulnerability of small farmers and marginalised communities.

Conclusion

The initiative exemplifies ethical governance where **empathy, accountability, sustainability, and inclusive leadership** translate into real social impact. It shows how ethical values can guide effective solutions to developmental and environmental challenges

Rural Waste Management

Context: Rural Sundargarh in Odisha struggled with open dumping and plastic pollution, posing serious environmental and health risks. To address this, IAS officer **Manoj Satyawan Mahajan** initiated a decentralised waste management model that linked cleanliness with women's empowerment.

Community-Driven Waste Management

- Rural women were trained as *Swachhta Sathis* to handle door-to-door waste collection, segregation, and processing.

- Material Recovery Facilities were established at the local level, ensuring scientific handling of plastic waste.
- The initiative processed hundreds of tonnes of plastic and generated regular income for women, strengthening livelihoods.
- Recyclable and low-value plastics were integrated into a circular economy, reducing environmental burden.
- Community participation ensured behavioural change and sustainability.

Ethical Perspective

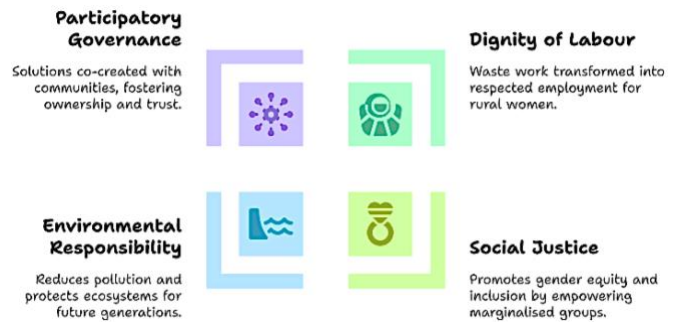


Figure 52: Ethical Foundation of the Model

Conclusion

The Sundargarh initiative demonstrates how **ethical leadership and community participation** can turn environmental challenges into opportunities for social transformation, offering a replicable model for sustainable rural development.

Artificial Intelligence

Context: Artificial Intelligence is rapidly being integrated into governance, markets, healthcare, policing, and welfare systems. While it promises efficiency and innovation, its unregulated or poorly governed use raises serious ethical concerns for rights, justice, and democracy—making it a critical issue for public policy and governance.

- **Equity, Bias, and Social Justice:** AI systems trained on historical data often reproduce social biases. This has resulted in discriminatory outcomes in facial recognition, recruitment algorithms, and predictive policing, directly challenging the principles of equality and fairness enshrined in the Constitution.

- **Privacy, Surveillance, and Human Dignity:** AI-driven data collection enables large-scale surveillance, especially in welfare delivery and public spaces. Mandatory biometric or facial recognition systems risk turning citizens into subjects of constant monitoring, weakening the right to privacy and personal autonomy.
- **Opacity, Accountability, and Rule of Law:** Many AI decisions are opaque, making it difficult to question or appeal outcomes in areas such as credit scoring, insurance, or criminal justice. This undermines due process and raises unresolved questions about liability when AI systems cause harm.
- **Economic Disruption and Employment Ethics:** Automation through AI threatens job security for low-skilled and informal workers. Without reskilling and safety nets, AI adoption can deepen economic inequality and social exclusion.
- **Democracy, Truth, and Manipulation:** Generative AI has enabled deepfakes and targeted misinformation, posing risks to electoral integrity and public trust in institutions.

Conclusion

AI's ethical challenge is not technological but moral and institutional. Ensuring that AI serves human welfare requires **rights-based regulation, transparency, accountability, and human oversight**, so that innovation strengthens democracy rather than undermines it.

Anti-Corruption Drive

Context: In 2025, state-level anti-corruption agencies intensified their crackdown on graft, with Telangana and Kerala reporting some of their strongest enforcement outcomes in recent years. The data reflects renewed institutional focus on integrity in public administration.

Governance and Ethical Implications

- Demonstrates **state capacity and political will** to act against everyday corruption.
- Reinforces **deterrence**, signalling that rent-seeking behaviour carries real consequences.

Points to **systemic vulnerabilities** in departments dealing with land, permits, and enforcement, calling for procedural reforms alongside policing



Telangana and Kerala show strong anti-corruption enforcement, but high-risk departments need procedural reforms.

Figure 53: Anti-Corruption Enforcement in Telangana and Kerala

Conclusion

The intensified actions by Telangana and Kerala show that **state-led vigilance can be a powerful tool against corruption**. However, lasting integrity will require complementary reforms—digitisation, reduced discretion, transparency, and protection for whistle-blowers—so that enforcement is preventive, not merely punitive.

Corruption in Public Office

Context: A senior Assam Civil Service (ACS) officer was arrested in 2025 after vigilance raids uncovered large amounts of unaccounted cash and gold, raising serious concerns about integrity in public administration, particularly in land and revenue governance.

Allegations and Investigation (Brief)

- Vigilance authorities seized cash and gold worth over ₹2 crore, allegedly disproportionate to known sources of income.
- The officer was under surveillance following complaints related to irregular land transactions.
- The case is being investigated under anti-corruption laws for abuse of official position.

Ethical Dimensions

- **Integrity and Probity:** Civil servants are trustees of public power. Accumulation of disproportionate assets violates the ethical core of public service.

- **Abuse of Discretion:** Land administration involves high discretion; unethical conduct here directly harms citizens and fuels inequality.
- **Erosion of Public Trust:** Such cases weaken citizens' confidence in governance institutions and honest officials.
- **Accountability and Rule of Law:** Vigilance action reinforces that no official is above scrutiny, upholding ethical governance norms.

Conclusion

The case underscores the ethical imperative of **probity, transparency, and accountability** in civil services. While enforcement acts as a deterrent, long-term integrity requires systemic reforms—digitisation, reduced discretion, ethical training, and strong vigilance—to ensure public office remains a position of trust, not personal gain.

PLACES IN NEWS

I. WEST ASIA & MIDDLE EAST

Golan Heights



Figure 54: Golan Heights Map

Why in News: Tensions have escalated due to Israeli raids and abductions reported in the occupied Golan Heights, heightening fear in the region.

Exam Focus:

- **Location:** A basaltic plateau in Southwest Syria.
- **Bordering Features:**
 - **South:** Yarmouk River.
 - **West:** Sea of Galilee (Lake Tiberias) & Hula Valley.
 - **North:** Anti-Lebanon Mountains & Mount Hermon.
 - **East:** Wadi Raqqad.
- **Strategic Importance:** It overlooks northern Israel and southern Syria. Crucially, it controls the catchment area for the **Sea of Galilee**, which is a primary source of fresh water for Israel.

Key Timeline:

- **1967:** Israel captured two-thirds of the region from Syria during the Six-Day War.
- **1981:** Israel passed the Golan Heights Law, effectively annexing it (not recognized internationally). The international community (except the U.S.) views it as Syrian territory under occupation with a UN-monitored buffer

zone separating it from remaining Syrian control, a situation Israel recently expanded into.

- **2025:** Israel still occupies the remaining third of the region.

Yemen

Why in News: The UAE-backed separatists have announced a roadmap for a **two-year transition** towards establishing an independent state.

Exam Focus: Geography

- **Location:** Southern end of the Arabian Peninsula.
- **Chokepoints:** It sits along the **Bab el-Mandeb Strait** (connecting the Red Sea to the Gulf of Aden), a critical global shipping route.
- **Borders:** Saudi Arabia (North), Oman (Northeast).
- **Maritime Borders:** Red Sea (West), Arabian Sea (Southeast), Gulf of Aden (South).

Historical & Political Context:

- Known as the **"Cradle of Civilizations"** and a historic center for the coffee trade (Mocha port).
- **Crisis:** Embroiled in a civil war since 2015, leading to severe humanitarian issues. It is currently among the poorest and least peaceful nations.

Kuwait (Boubyan Island)



Figure 55: Kuwait Map

Why in News: Kuwait has signed an agreement with **China** to construct the **Mubarak Al-Kabeer Port**, expected to be operational by **2026**.

Exam Focus: Economy & IR

- **Location:** **Boubyan Island**, Kuwait.
- **Objective:** To enhance regional trade and transport, diversifying Kuwait's economy away from oil reliance.
- **Timeline:** Expected to be operational by **2026**.
- **China's Role (BRI):** This project connects to China's **Belt and Road Initiative (BRI)** or the "New Silk Road" (launched 2013), specifically aligning with the **Maritime Silk Road** component.
- **Economic Goal:** The port is a move to diversify Kuwait's economy beyond oil dependency by becoming a regional transport hub.

Jordan



Figure 56: Jordan Map

Why in News: Prime Minister Modi concluded a successful two-day diplomatic visit to Jordan.

Exam Focus: Geography

- **Landlocked-ish:** It is nearly landlocked but has a small coastline on the **Red Sea** via the **Gulf of Aqaba** in the southwest.

- **The Dead Sea:** Located along its western border (Jordan River Valley), known for being one of the lowest points on Earth.
- **Borders:** Syria (N), Iraq (E), Saudi Arabia (S/SE), Israel & West Bank (W).

II. EUROPE & EURASIA

Black Sea



Figure 57: Black Sea

Why in News: A new study warns that rising sea levels in the Black Sea could put nearly **160 million people** at risk.

Bordering Countries: Mnemonic: **BURG-RT** or **Tea & Burger**

- **B**ulgaria
- **U**kraine
- **R**ussia
- **G**eorgia
- **R**omania
- **T**urkey

Straits Passage: To get from the Black Sea to the Mediterranean, a ship must pass through:

Bosporus Strait -> Sea of Marmara -> **Dardanelles Strait**.

Key Rivers Draining into it: Danube, Dnieper, Dniester, Don.

Netherlands

Why in News: India's Defence Minister met the Dutch Foreign Minister to strengthen defence ties.

- **Topography:** True to its name ("Lower Countries"), **26% of the land is below sea level**.

- **Agriculture:** Despite its small size, it is the world's **second-largest food exporter** (after the US) due to highly efficient, tech-driven farming.
- **History:** The **Dutch Golden Age** (starting 1588) saw the rise of the Dutch East India Company, the first multinational corporation, which played a major role in global colonial history.



Figure 58: Netherlands Map

Why in News: Tensions flared with clashes near the border, leading Thailand to impose a curfew in **Trat province**. Cambodia reportedly dismantled a coastal barrier in Koh Kong.

Exam Focus: Mapping

- **Conflict Zone:** The border areas of **Trat (Thailand)** and **Koh Kong (Cambodia)**.
- **Cambodia Geography:** Dominated by the **Mekong River** and **Tonlé Sap** (Southeast Asia's largest freshwater lake).
- **Historical Context:** Cambodia was the center of the Khmer Empire (builders of Angkor Wat) and was a French protectorate until 1953.

Myanmar



Figure 60: Myanmar Map

III. SOUTHEAST & EAST ASIA

Thailand & Cambodia



Figure 59: Thailand- Cambodia Conflict Area Map

Why in News: A Junta air strike on a hospital caused significant casualties (31 dead), highlighting the ongoing humanitarian crisis.

- **Political Crisis:** The country has been under military rule (Junta/Tatmadaw) since the **February 2021 coup** that ousted the elected government of Aung San Suu Kyi.
- **Impact:** The instability has led to severe inflation, poverty, and displacement, affecting regional stability and ASEAN relations.

Japan (Mount Fuji)

Why in News: Mount Fuji received its first snowcap of the season, but at a historically late date, signaling climate change concerns.

Exam Focus: Geography

- **Type:** An active **stratovolcano** (last erupted 1707-1708).
- **Location:** Honshu Island.

- **Status:** A **UNESCO World Heritage Cultural Site** (recognized for its influence on art and culture, not just nature).



Figure 61: Mount Fuji

Key Facts:

- Known as the "**Cradle of modern humans**" due to hominid fossil discoveries (e.g., Lucy).
- **Multi-ethnic:** Over 80 ethnic groups.
- **Religion:** Majority Christian (Ethiopian Orthodox), with a significant Muslim minority.
- **Economy:** Fast-growing but struggles with low per capita income and poverty.

V. INDIA

Boramani, Maharashtra



Figure 62: Circular Labyrinth in Boramani Grassland

IV. AFRICA

Nigeria

Why in News: US forces launched strikes against Islamic State (IS) targets in Nigeria following attacks on Christians.

Exam Focus: Demographics & Economy

- **The "Giant of Africa":** Most populous country in Africa (220M+).
- **Key Tribes:** Hausa-Fulani (North), Yoruba (Southwest), Igbo (Southeast) — often a source of ethnic friction.
- **Economy:** It is a petro-state; oil accounts for **90% of export earnings**, making it vulnerable to global oil price shocks.

Ethiopia

Why in News: PM Modi was conferred with **Ethiopia's highest honour** by PM Abiy Ahmed.

Exam Focus: Geography

- **Region:** Landlocked country in the **Horn of Africa**.
- **Borders:** Eritrea (N), Djibouti (NE), Somalia (E), Kenya (S), South Sudan (W), Sudan (NW).

Why in News: Discovery of India's **largest circular labyrinth** in the Boramani grassland, Sholapur district.

Exam Focus: Art & Culture (Ancient History)

- **Period:** The structure is nearly 2,000 years old, dating to the **Satavahana Period** (1st to 3rd Century CE).
- **Structure:** Comprises **15 concentric stone circuits**, the most found in any Indian labyrinth.
- **Trade Link:** Archaeologists suggest this structure may be connected to the **ancient Indo-Roman trade**, as Sholapur was on a trade route connecting the Deccan to the ports. Labyrinths often held symbolic or ritualistic value in ancient cultures.

Adichanallur

Context: Adichanallur in Tamil Nadu is a major Iron Age–Megalithic archaeological site.

Key Points

- Dates to around **900 BCE**.
- Known for **urn burials** with human remains.
- Artefacts: pottery, iron tools, bronze and gold items.
- Indicates advanced metallurgy and social organisation.

- Linked to early South Indian civilisation and trade networks.

Conclusion

Adichanallur highlights the antiquity and sophistication of early South Indian culture and needs strong conservation

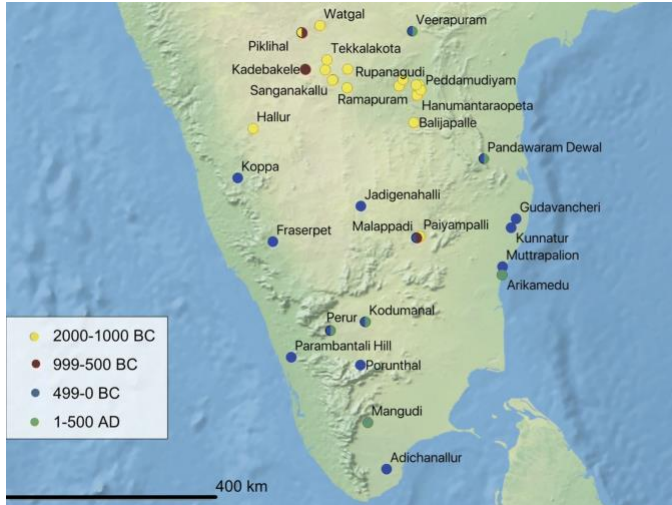


Figure 63: Adichanallur Map

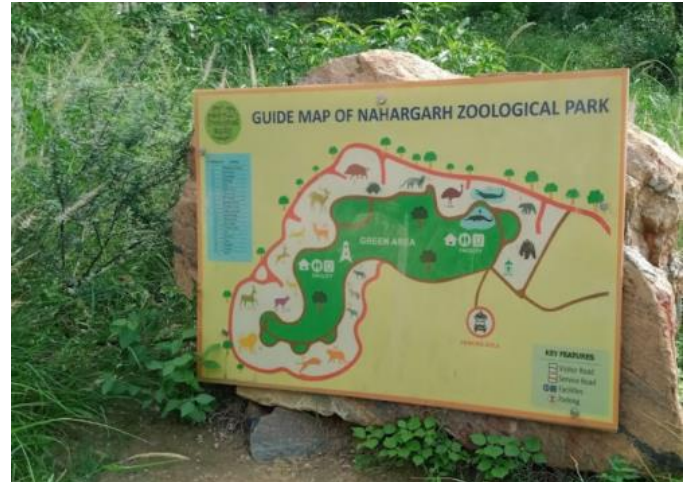


Figure 64: Nahargarh Biological Park guide map

Nahargarh Biological Park

Why in News: Nahargarh Biological Park is located near Jaipur in the Aravalli hills of Rajasthan, and is in focus due to the ongoing debate on 'Definition' of Aravali.

Key Points

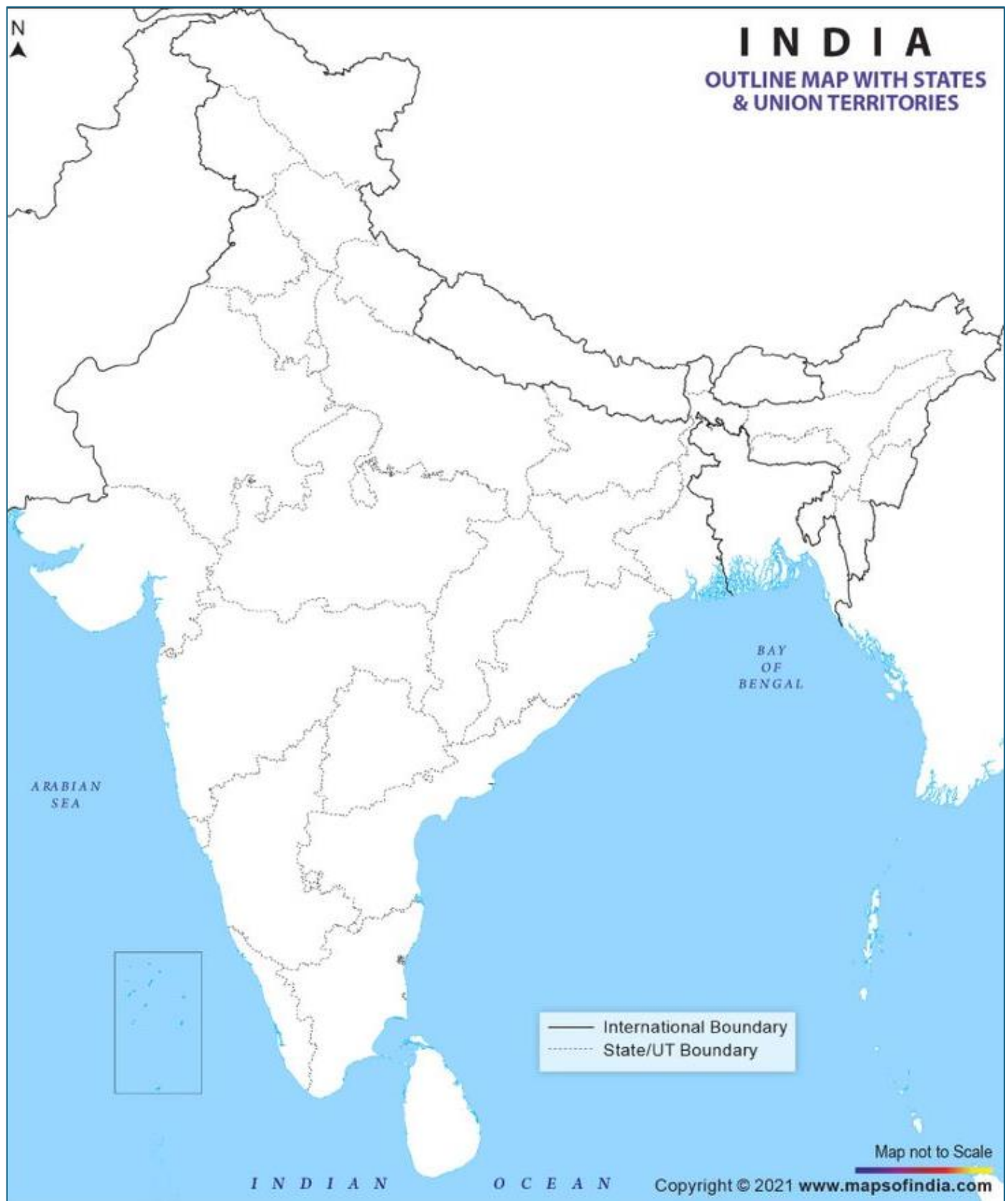
- Part of the **Aravalli ecosystem** with dry deciduous forests.
- Hosts wildlife such as **tigers, leopards, deer, hyenas, birds, and reptiles**.
- Serves as a **conservation, rescue, and eco-tourism park**.
- Aims at habitat protection and wildlife awareness.

Conclusion

Nahargarh Biological Park supports biodiversity conservation while promoting environmental education and eco-tourism.

Exercise Maps

Mark the places mentioned in the previous section, on the map given below.



Mark the places mentioned in the previous section, on the map given below.



EUROPE - POLITICAL

यूरोप- राजनैतिक



Mark the places mentioned in the previous section, on the map given below.

PERSONALITIES IN NEWS

Harsh Vardhan Shringla



Context: Harsh Vardhan Shringla was in the news primarily in his capacity as a Rajya Sabha MP and former Foreign Secretary, commenting on foreign policy issues, particularly regarding India's relations with Bangladesh and Russia.

Key Points

Served as **Foreign Secretary of India** (2019–2022), steering Indian diplomacy during the COVID-19 pandemic and rising geopolitical challenges.

- Played a key role in strengthening **India-US ties**, managing relations with China, and enhancing India's global strategic footprint.
- Post-bureaucratic role includes serving as Member of Rajya Sabha, contributions to policy discourse, international engagements, and defence diplomacy speaking roles.

Conclusion

Harsh Vardhan Shringla remains a significant voice in India's foreign policy landscape, bridging diplomatic experience with contemporary strategic debates.

Dr. Tessy Thomas



Context: **Dr. Tessy Thomas**, widely celebrated as the "**Missile Woman of India**," was recently conferred the **Paulos Mar Gregorios Award** for her pioneering contributions to missile technology and her leadership in science.

Scientific and Institutional Impact

- **DRDO Leadership:** She previously served as the Director General (Aeronautical Systems) at the Defence Research and Development Organisation (DRDO).
- **Agni-IV Project:** As the Project Director for the Agni-IV, she was instrumental in developing this critical long-range, nuclear-capable strategic missile.

- **Indigenous Innovation:** Her work cantered on strengthening India's self-reliance in missile design, reducing the nation's dependence on foreign defence imports.

Strategic and Social Significance

- **National Defence:** Her technical expertise enhanced India's credible minimum deterrence and strategic autonomy.
- **Gender Leadership:** As a prominent female leader in a traditionally male-dominated field, she has become a primary role model for women in STEM (Science, Technology, Engineering, and Mathematics) and high-technology defence R&D.

Conclusion

The recognition of Dr. Thomas via the Paulos Mar Gregorios Award underscores the intersection of scientific excellence, national security, and the vital role of gender inclusivity in India's strategic future.

Khudiram Bose



the British.

Context: Khudiram Bose's birth anniversary is observed annually on **December 3rd**, when leaders and citizens across India pay tribute to his sacrifice for the freedom struggle. He is celebrated as one of the youngest revolutionaries to be executed by

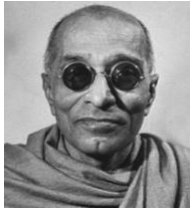
Key Points

- Born on **3 December 1889** in Medinipur, West Bengal.
- One of the **youngest revolutionary martyrs** of India.
- Associated with the **Swadeshi Movement** and the **Anushilan Samiti**.
- Involved in the **Muzaffarpur conspiracy (1908)** against British officials.
- Executed at the age of **18**, becoming a symbol of youthful courage and sacrifice.

Conclusion

Khudiram Bose continues to inspire generations through his bravery, patriotism, and supreme sacrifice for India's independence.

C. Rajagopalachari (Rajaji)



Context: C. Rajagopalachari was in the news on the occasion of his **147th** birth anniversary.

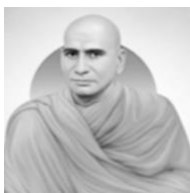
Key Points

- Born on **10 December 1878** in Thorapalli, Tamil Nadu.
- Prominent **Gandhian freedom fighter**, lawyer, and statesman.
- Actively participated in the **Non-Cooperation, Civil Disobedience**, and **Vaikom Satyagraha** movements; led the **Vedaranyam Salt March (1930)**.
- Served as the **first and only Indian Governor-General of India**, and the **Chief Minister of Madras State**, and the founder of the Swatantra Party.
- He was the first recipient of the **Bharat Ratna (1954)**; also a noted writer and thinker.

Conclusion

Rajaji's legacy reflects principled leadership, ethical politics, and a deep commitment to democracy and public service.

Swami Shraddhanand Saraswati



Context: Swami Shraddhanand Saraswati was assassinated on December 23, 1926, by a religious fanatic. In December 2025, leaders and institutions across India paid tribute to him on the 99th anniversary of his supreme sacrifice.

Key Points

- Born in 1856 in Punjab, originally named Munshi Ram Vij.
- A prominent **Arya Samaj** leader, social reformer, and freedom fighter.
- Founded Gurukul Kangri near Haridwar to promote indigenous education.
- Actively associated with the **Shuddhi movement** and social reform initiatives.
- Participated in the **Non-Cooperation Movement** and Rowlatt Satyagraha.

- Assassinated in **1926**, becoming a martyr for social and national causes.

Conclusion

Swami Shraddhanand Saraswati represents the fusion of **spiritual reform, education, and nationalism** in India's freedom struggle.

Shaheed Udham Singh



Context: The **126th birth anniversary** of **Shaheed Udham Singh** was observed on **26 December**, commemorating his sacrifice and revolutionary contribution to India's freedom struggle.

Key Points

- Born in **1899** in **Sangrur district, Punjab** (undivided India).
- Revolutionary freedom fighter who avenged the **Jallianwala Bagh massacre** by assassinating **Michael O'Dwyer** in **1940**.
- Used the name **"Ram Mohammad Singh Azad"**, symbolising **Hindu-Muslim-Sikh unity** and anti-colonial nationalism.
- Actively associated with the **Ghadar Party** and the **Hindustan Socialist Republican Association**.
- Executed in **1940**, attaining martyrdom.

Values Represented

- **Patriotism, valour, sacrifice, secularism, and justice.**

Conclusion

Shaheed Udham Singh stands as a powerful symbol of **revolutionary resistance against colonial injustice** and **inclusive nationalism**. His life reminds India that freedom was secured not only through mass movements but also through individual acts of courage rooted in unity and sacrifice.

Vinod Kumar Shukla



Context: Vinod Kumar Shukla, the celebrated 88-year-old Hindi poet and author **passed away** on December 23, 2025, in Raipur. He was recently awarded the 59th Jnanpith Award (2024) for his lifetime contribution to literature; the first writer from Chhattisgarh to receive this honor.

Key Points

- Writes **novels, short stories, and poetry** with a rare blend of prose and lyricism.
- Style marked by **quiet surrealism**, simplicity, and deep emotional resonance rooted in everyday life.
- Explores themes of **ordinary existence, inner worlds, solitude, and human sensitivity** through understated narration.
- Considered a significant figure in shaping **post-independence Hindi literary aesthetics**.

Conclusion

Vinod Kumar Shukla's work expands the boundaries of Hindi prose by transforming the ordinary into the poetic, securing his place as a **distinct and enduring voice** in Indian literature.

Mahakavi Subramania Bharati



Context: Mahakavi Subramania Bharati was in news as Prime Minister Narendra Modi and other leaders paid him tribute on his birth anniversary (December 11, 2025), honoring his legacy as a revolutionary poet, freedom fighter, and social reformer whose

work transformed modern Tamil literature and nationalist thought.

Key Points

- Born in **1882** in Tamil Nadu; often called **Bharathiyar**.
- A leading voice in the **Indian freedom movement**, he used poetry and journalism to inspire patriotism and social awakening.
- His literary style blended **romanticism, radicalism, and spiritualism**, making him a seminal figure in modern Tamil poetry.
- Champion of **women's liberation, social equality, and caste reform**, promoting progressive values ahead of his time.
- Worked as an editor for nationalist publications, using his pen to critique colonial rule and conservative social norms.

Conclusion

Subramania Bharati's legacy endures as a **revolutionary poet and reformer** whose creative genius and fearless advocacy for freedom and equality continue to inspire generations across Tamil Nadu and India.

MAINS VALUE ADDITIONS

GENERAL STUDIES PAPER – I

Indian Society | Social Issues | Culture | Secularism

Theme	Issue / Development	Key Points / Significance
Art & Culture (GI Tag)	Ponduru Khadi receives GI tag	Traditional khadi from Srikakulam, Andhra Pradesh; known for hand-spun yarn using indigenous cotton; recognition helps artisans, livelihood, and heritage preservation
Tribal Culture	Bison Horn Maria Dance	Folk dance of Dandami Madias of Bastar, Chhattisgarh; symbolises community identity, ancestral beliefs, and close relationship with forests; resilient against modern influences

GENERAL STUDIES PAPER – II

Governance | Social Justice | Policing | Welfare | Cooperative Federalism

Theme	Issue / Development	Key Points / Significance
Governance / Police Reforms	Need to transform public perception of police	PM stressed professionalism, sensitivity, responsiveness, people-centric policing, and trust-building
Legal Awareness	New criminal laws	Public awareness drive on Bharatiya Nyaya Sanhita, Bharatiya Sakshya Adhiniyam, and Bharatiya Nagarik Suraksha Sanhita
International Relations / HADR	Operation Sagar Bandhu	India evacuated over 300 citizens from flood-hit Sri Lanka and provided humanitarian assistance
Governance / Employment	PM Internship Scheme (PMIS)	Pilot exceeded offer targets but showed low acceptance (20%) and high dropout (20%) due to location, role mismatch, and duration issues

GENERAL STUDIES PAPER – III

Economy | Environment | Disaster Management | Agriculture | Infrastructure | Science & Technology | Defence

Theme	Issue / Development	Key Points / Significance
Internal Security / Technology	Technology integration in policing	Use of AI, NATGRID database for actionable intelligence; integration of uninhabited islands into security framework
Defence Cooperation	Exercise EKVURIN	Joint military exercise between Indian Army and Maldives National Defence Forces; focus on Counter-Insurgency and Counter-Terrorism
Defence Modernisation	AH-64E Apache helicopters	Indian Army received final batch from US; completes six-unit fleet; enhances western front strike capability
Economy / Trade	Export growth to USA	Exports to US grew 22.6% to \$6.98 billion compared to Nov 2024

PRACTICE QUESTIONS

Prelims Practice MCQs

Q1. With reference to the Small Satellite Launch Vehicle (SSLV) developed by ISRO, consider the following statements:

1. SSLV is an all-solid launch vehicle with three stages, along with a velocity trimming module for precise orbital insertion.
2. It is designed to provide low-cost access to space with minimal launch preparation and short turnaround time.
3. SSLV is capable of placing satellites into Geosynchronous Earth Orbit (GEO).

Which of the statements given above is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q2. Consider the following statements with reference to the Cabinet Mission Plan (1946):

1. Gopinath Bordoloi, the first Chief Minister of Assam, opposed the proposal to group Assam with Bengal under the Cabinet Mission Plan.
2. Jawaharlal Nehru criticised the Cabinet Mission Plan on the ground that it was designed to accommodate the political demands of Muhammad Ali Jinnah.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Q3. "I am sending thither Abdullah my ambassador and Dominic Pires to ask you to send me two learned Priests, who should bring with them the Principal books of the Law and the Gospel so that I may learn the Law and what is most perfect in it."

Which Mughal emperor's invitation (above) surprised the Jesuits, who saw it as a chance to convert the Muslim rulers of the north to Christianity?

- (a) Humayun
- (b) Akbar
- (c) Jahangir
- (d) Shahjahan

Q4. With reference to the National Legal Services Authority (NALSA), consider the following statements:

1. It was constituted under the Legal Services Authorities Act, 1987.
2. Its mandate includes providing free legal services to weaker sections of society and organising Lok Adalats for amicable settlement of disputes.
3. The Chief Justice of India functions as the Executive Chairman of NALSA.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q5. With reference to the nature of the Indian Constitution, consider the following statements:

1. The Constitution of India does not explicitly describe India as a federation.
2. India follows a quasi-federal system of governance.
3. The Indian Constitution is largely unwritten and flexible in nature.
4. The Constitution provides for a division of powers between the Union and the States through the Union, State, and Concurrent Lists.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Q6. With reference to the Right to Food in India, consider the following statements:

1. The Constitution of India does not explicitly enumerate the Right to Food as a Fundamental Right.
2. Article 47 of the Constitution directs the State to raise the level of nutrition and improve public health.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Q7. With reference to influenza (flu) infection, consider the following statements regarding the role of clathrin protein:

Clathrin plays a role in:

- (a) Destroying viral RNA before it enters the host cell
- (b) Preventing the virus from binding to host cell receptors

- (c) Mediating viral entry into the host cell through receptor-mediated endocytosis
- (d) Producing antibodies against the virus

Q8. With reference to coral reefs, consider the following statements:

1. Coral reefs act as natural barriers that reduce the impact of waves and storms along coastlines.
2. The Government of India has proposed the establishment of a National Coral Reef Research Institute in Lakshadweep.
3. Coral reefs play a role in reducing loss of life and property in coastal regions by mitigating storm surges and erosion.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q9. With reference to beaked whales, consider the following statements:

1. They are among the deepest-diving mammals known, capable of reaching extreme ocean depths.
2. They spend a significant portion of their life at the ocean surface.
3. They are highly sensitive to naval and military sonar, which can disrupt their feeding and navigation behaviour.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q10. With reference to the current account deficits (CAD), consider the following statements:

1. The CAD always enhances the productive capacity and thus overall GDP growth.
2. A current account deficit happens when a country's imports exceed its exports in terms of goods and services.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Q11. With reference to nuclear energy in India, consider the following statements:

1. India has more than 20 operational nuclear power reactors contributing to its electricity generation capacity.
2. Small Modular Reactor (SMR) technologies are designed to provide low-carbon electricity, particularly suitable for remote or grid-constrained regions.
3. The Kudankulam Nuclear Power Plant (KKNPP) in Tamil Nadu is India's largest nuclear power station in terms of installed capacity.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q12. With reference to stablecoins, consider the following statements:

1. Stablecoins are a category of cryptocurrencies designed to minimise price volatility, often by pegging their value to fiat currencies or other assets.
2. All stablecoins are required to undergo mandatory third-party audits to verify the adequacy of their reserve backing.
3. Despite their intended stability, stablecoins can be vulnerable to confidence shocks, liquidity stress, and structural weaknesses.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q13. With reference to the Consumer Price Index (CPI) series in India, consider the following items:

1. Food and beverages
2. Clothing and footwear
3. Fuel and light
4. Capital goods such as machines, tools, and factories
5. Land and real estate prices

Which of the above are not included in the current CPI basket?

- (a) 1, 2 and 3
- (b) 3, 4 and 5
- (c) 2 and 4 only
- (d) 4 and 5 only

Q14. With reference to United Nations Assistance Missions, consider the following statements:

1. They are established by the United Nations Security Council to support countries in peacebuilding, political processes, and governance.
2. The United Nations Assistance Mission in Afghanistan (UNAMA) was established in 2002.
3. United Nations Assistance Missions have no role in providing support during electoral processes.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q15. Consider the following statement regarding disqualification of a legislator:

A member of the legislature stands disqualified if convicted and sentenced to imprisonment for a period of not less than two years. Such disqualification continues unless the conviction itself is stayed by a competent court, which nullifies the legal consequences of conviction.

The above provision is contained in which of the following?

- (a) Representation of the People Act, 1951
- (b) Constitution of India
- (c) Code of Criminal Procedure, 1973
- (d) Election Symbols (Reservation and Allotment) Order, 1968

Q16. With reference to assisted dying, consider the following statements:

1. In India, assisted dying is treated as an offence under criminal law and may attract provisions relating to culpable homicide or abetment of suicide under the Bharatiya Nyaya Sanhita (BNS).
2. Assisted dying necessarily involves a physician administering a lethal substance with the direct intention of causing death.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Q17. With reference to octopuses, consider the following statements:

1. Octopuses are soft-bodied molluscs that primarily move by crawling along the seafloor rather than undertaking long-distance swimming.
2. They pump blood directly to the gills, where oxygen is absorbed from seawater.

3. Octopuses possess four hearts.
4. During swimming, octopuses use jet propulsion by forcefully expelling water through a siphon.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Q18. The Al Maszhabiya region is best described as:

- (a) a coastal lagoon located along the eastern coast of Oman
- (b) a desert region situated in southwestern Qatar
- (c) a mountainous plateau in northern Iran
- (d) a river basin region in southern Iraq

Q19. With reference to “Vande Mataram”, the song written by Bankim Chandra Chattopadhyay, consider the following statements:

1. The song, written partly in Bengali and partly in Sanskritised Hindi, became a symbol of protest during the Partition of Bengal (1905) and later emerged as a rallying cry of the Indian freedom movement.
2. Bankim Chandra Chattopadhyay himself set the song to music and sang it for the first time at the Indian National Congress session held in Calcutta in 1896.
3. The song appears in the novel *Anandamath* (published in 1882), which depicts a rebellion of sanyasis against foreign rulers.

Which of the statements given above is/are not correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 3 only
- (d) 2 and 3 only

Q20. With reference to Kalaka Acharya Katha, consider the following statements:

1. It narrates the story of a Jain monk who sought the assistance of the Sakas to counter the oppression by local rulers.
2. It is a Buddhist canonical text forming part of the Tripitaka literature.
3. The text was originally composed in Sanskrit and was later adapted into Prakrit traditions.
4. It primarily deals with the construction of ancient Hindu temples in western India.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 3 only
- (c) 2 and 4 only

- (d) 1, 2 and 3

Q21. With reference to personal laws and the Uniform Civil Code (UCC) in India, consider the following statements:

1. Matters such as marriage, divorce, and succession in India are largely governed by personal laws linked to religious identity.
2. The Hindu Marriage Act, 1955, applies exclusively to Hindus and Sikhs.
3. India presently has a Uniform Civil Code applicable uniformly across the entire country.

How many of the statements given above are correct?

- (a) Only one
(b) Only two
(c) All three
(d) None

Q22. With reference to Article 361 of the Constitution of India, consider the following statements:

1. It provides personal immunity to the President and Governors by stating that they shall not be answerable to any court for the exercise and performance of their official powers and duties.
2. It places the actions and inactions of the Governor's office completely beyond judicial review, even when constitutional obligations are allegedly violated.

Which of the statements given above is/are correct?

- (a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Q23. Consider the following statements:

Statement 1: Genome-edited crops involve targeted modifications of genes that are already present in the plant's genome, resulting in precise changes in the DNA sequence without introducing foreign genetic material.

Statement 2: Such genome editing is carried out using specific protein enzymes that function as molecular scissors to cut DNA at designated sites, enabling modification of the native gene.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement 1 and Statement 2 are correct, and Statement 2 is the correct explanation of Statement 1.
(b) Both Statement 1 and Statement 2 are correct, but Statement 2 is not the correct explanation of Statement 1.
(c) Statement 1 is correct, but Statement 2 is incorrect.
(d) Statement 1 is incorrect, but Statement 2 is correct.

Q24. With reference to the applications of certain elements and materials, consider the following statements:

1. Rubidium is widely used in nuclear energy applications because of its exceptional resistance to corrosion.
2. Caesium finds significant application in advanced electronics, especially in highly precise atomic clocks.
3. Graphite is used in the manufacture of certain specialty glasses employed in fibre-optic and telecommunication systems.

How many of the statements given above are correct?

- (a) Only one
(b) Only two
(c) All three
(d) None

Q25. With reference to Haemorrhagic Septicaemia (HS), consider the following statements:

1. Haemorrhagic Septicaemia is an acute and highly fatal disease that mainly affects cattle and buffaloes in tropical regions.
2. The occurrence of the disease increases during the monsoon season due to high humidity and animal stress.
3. Vaccination is an effective preventive measure against Haemorrhagic Septicaemia.
4. The disease is caused by a viral pathogen transmitted through insect vectors.

Which of the statements given above are correct?

- (a) 1, 2 and 3 only
(b) 1 and 4 only
(c) 2 and 4 only
(d) All four

Mains Practice Questions

1. “Constitutional immunity is meant to protect the dignity of office, not to shield constitutional violations.” In this context, critically examine Article 361 of the Indian Constitution and discuss the evolving role of judicial review in holding constitutional authorities accountable
2. Discuss the tensions between religious personal laws, fundamental rights, and the idea of a Uniform Civil Code (UCC). How can constitutional morality guide reform in this sensitive domain?
3. Genome-edited crops are often distinguished from transgenic crops in regulatory and ethical debates. Explain the scientific basis of genome editing in agriculture and evaluate its potential benefits, risks, and regulatory challenges in India.
4. Failures in investigation, misuse of power, and selective accountability weaken public trust in institutions. Using examples such as anti-corruption enforcement, electoral disqualification, and judicial oversight, discuss how ethical governance and rule of law can be strengthened in India.
5. From coral reefs and beaked whales to ecological succession and homeostasis, ecosystems are increasingly under anthropogenic stress. Discuss how scientific understanding of ecological processes can inform sustainable conservation policies, with suitable examples.

MCQs Solutions

Q1. (b) Only two



- **Statement 1 is correct:** SSLV is an all-solid launch vehicle with three solid propulsion stages and a velocity trimming module, which helps in precise orbital insertion.
- **Statement 2 is correct:** SSLV is designed to provide low-cost, on-demand access to space with minimal launch infrastructure, shorter launch preparation time, and quick turnaround capability.
- **Statement 3 is incorrect:** SSLV is meant for launching satellites into low earth orbit and is not capable of placing satellites into geosynchronous earth orbit, which requires much higher launch energy.

Q2. (c) Both 1 and 2

- **Statement 1 is correct:** Gopinath Bordoloi, the first Chief Minister of Assam, strongly opposed the Cabinet Mission Plan's proposal to group Assam with Bengal. He feared that such grouping would compromise Assam's political autonomy and potentially place it under Muslim-majority domination.
- **Statement 2 is correct:** Jawaharlal Nehru criticised the Cabinet Mission Plan, arguing that its provisions—especially the grouping of provinces—were largely designed to accommodate the political demands of Muhammad Ali Jinnah and the Muslim League, particularly their insistence on safeguards for Muslim-majority areas.

Q3. (b) Akbar



- **Akbar is correct:** The invitation quoted above was sent by Akbar to the Jesuits. Akbar invited Jesuit priests to his court at Fatehpur Sikri, expressing curiosity about Christian theology and scriptures. This invitation surprised the Jesuits, who viewed it as an opportunity to convert the Mughal ruler and the Muslim elite of north India to Christianity.

Akbar's interest, however, was intellectual and comparative, reflected in his broader policy of religious tolerance and dialogue, rather than an intention to convert.

- **Humayun is incorrect:** Humayun did not invite Jesuit missionaries nor engage in structured inter-religious theological discussions.
- **Jahangir is incorrect:** Jahangir interacted with Jesuits but did not issue the original invitation that marked the beginning of Jesuit missions to the Mughal court.
- **Shahjahan is incorrect:** Shahjahan followed a more orthodox Islamic policy and showed limited interest in Christian theology or missionary dialogue.

Q4. (b) Only two

- **Statement 1 is correct:** The National Legal Services Authority (NALSA) was constituted under the Legal Services Authorities Act to give statutory backing to legal aid mechanisms in India.
- **Statement 2 is correct:** NALSA's mandate includes providing free legal services to the weaker sections of society and organising Lok Adalat's for the amicable settlement of disputes, thereby promoting access to justice.
- **Statement 3 is incorrect:** The Chief Justice of India is the Patron-in-Chief of NALSA, while the Executive Chairman is a sitting or retired judge of the Supreme Court nominated by the Chief Justice of India.

Q5. (c) Only three

- **Statement 1 is correct:** The Constitution of India does not explicitly describe India as a "federation"; instead, it refers to India as a "Union of States."
- **Statement 2 is correct:** India follows a quasi-federal system, as it has a strong central government with federal features, but the Centre holds overriding powers in certain circumstances.
- **Statement 3 is incorrect:** The Indian Constitution is written and relatively rigid, not largely unwritten and flexible.
- **Statement 4 is correct:** The Constitution provides for a clear division of powers between the Union and the States through the Union List, State List, and Concurrent List in the Seventh Schedule.

Q6. (c) Both 1 and 2

- **Statement 1 is correct:** The Constitution of India does not explicitly list the Right to Food as a Fundamental Right. However, the Supreme Court has interpreted it as part of the Right to Life under Article 21 through judicial pronouncements.
- **Statement 2 is correct:** Article 47 of the Constitution of India, a Directive Principle of State Policy, directs the State to raise the level of nutrition and improve public health, thereby forming the constitutional basis for food security policies.

Q7. (c) Mediating viral entry into the host cell through receptor-mediated endocytosis

Explanation

- Clathrin is a cellular protein involved in the formation of clathrin-coated vesicles. During influenza infection, the virus exploits the host cell's clathrin-mediated endocytic pathway to enter the host cell after binding to surface receptors.

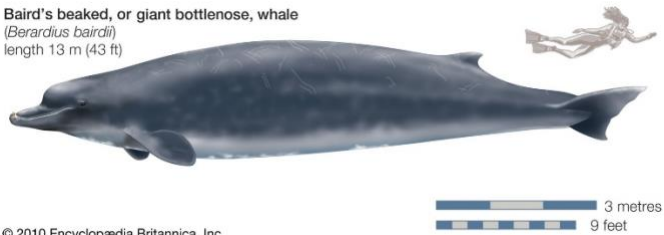
Q8. (b) Only two



- Statement 1 is correct:** Coral reefs act as natural barriers by absorbing and dissipating wave energy, thereby reducing the impact of waves and storms along coastlines.
- Statement 2 is incorrect:** As of now, the Government of India has not formally proposed the establishment of a National Coral Reef Research Institute in Lakshadweep.
- Statement 3 is correct:** By mitigating storm surges, coastal erosion, and wave force, coral reefs help reduce loss of life and property in coastal regions.

Q9. (b) Only two

Baird's beaked, or giant bottlenose, whale
(*Berardius bairdii*)
length 13 m (43 ft)



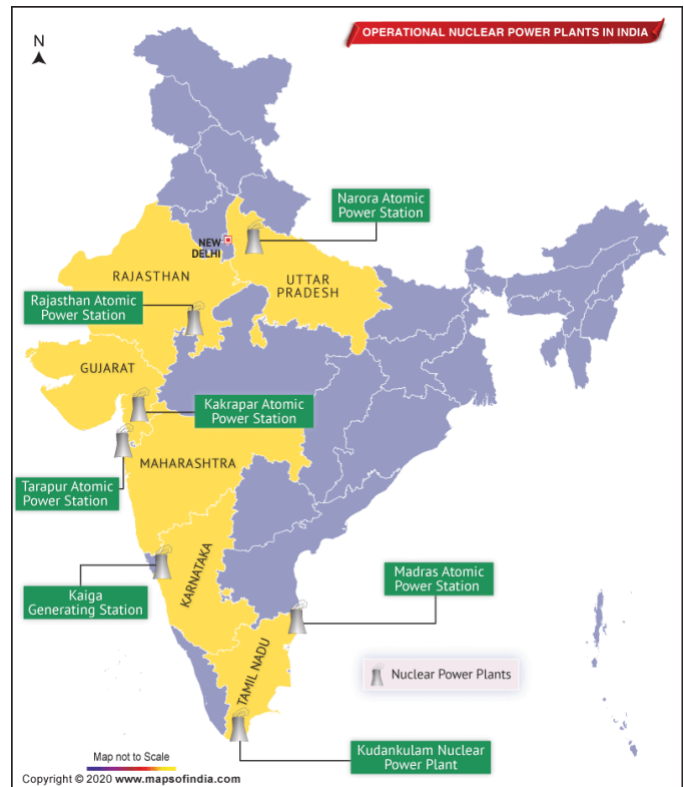
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- Statement 1 is correct:** Beaked whales are among the deepest-diving mammals known and are capable of diving to extreme depths for prolonged durations.
- Statement 2 is incorrect:** Beaked whales spend very little time at the ocean surface and are generally elusive, surfacing briefly between deep dives.
- Statement 3 is correct:** Beaked whales are highly sensitive to naval and military sonar, which can disrupt their feeding and navigation behaviour and has been linked to mass strandings.

Q10. (b) 2 only

- Statement 1 is incorrect:** A current account deficit does not always enhance productive capacity or GDP growth. While a CAD can finance investment if capital inflows are used productively, persistent or consumption-driven deficits can increase external vulnerability and macroeconomic risks.
- Statement 2 is correct:** A current account deficit occurs when a country's imports of goods and services exceed its exports of goods and services.

Q11. (c) All three



- Statement 1 is correct:** India has more than 20 operational nuclear power reactors contributing to its electricity generation capacity, operated by Nuclear Power Corporation of India Limited.
- Statement 2 is correct:** Small Modular Reactors (SMRs) are designed to provide low-carbon electricity and are particularly suitable for remote locations or grid-constrained regions due to their smaller size, modularity, and enhanced safety features.
- Statement 3 is correct:** The Kudankulam Nuclear Power Plant in Tamil Nadu is India's largest nuclear power station in terms of installed capacity.

Q12. (b) Only two

- Statement 1 is correct:** Stablecoins are a category of cryptocurrencies designed to minimise price volatility, usually by

pegging their value to fiat currencies (like the US dollar) or other assets such as commodities or algorithmic mechanisms.

- **Statement 2 is incorrect:** There is no universal mandatory requirement across jurisdictions that all stablecoins must undergo third-party audits. Regulatory frameworks differ by country, and many stablecoins operate without compulsory, standardised audit requirements.
- **Statement 3 is correct:** Despite their intended stability, stablecoins can face risks such as confidence shocks, liquidity stress, reserve management issues, and structural weaknesses, as seen in past stablecoin disruptions.

Q13. (d) 4 and 5 only

- **Items 1, 2 and 3 are included:** The CPI basket in India includes food and beverages, clothing and footwear, and fuel and light, as these represent regular household consumption expenditure.
- **Items 4 and 5 are not included:** Capital goods like machines, tools, and factories, as well as land and real estate prices, are investment assets rather than consumption items and are therefore excluded from the CPI basket.

Q14. (b) Only two

- **Statement 1 is correct:** United Nations Assistance Missions are established by the United Nations Security Council to support countries in peacebuilding, political processes, governance, rule of law, and institutional development.
- **Statement 2 is correct:** The United Nations Assistance Mission in Afghanistan was established in 2002 following the Bonn Agreement to assist Afghanistan in political stabilization and reconstruction.
- **Statement 3 is incorrect:** United Nations Assistance Missions do play a role in electoral processes, including technical assistance, monitoring, capacity-building, and support for free and fair elections.

Q15. (a) Representation of the People Act, 1951

Explanation

The provision stating that a legislator stands disqualified upon conviction and sentencing to imprisonment for not less than two years, and that such disqualification continues unless the conviction itself is stayed by a competent court, is contained in the Representation of the People Act, particularly under Section 8.

The Supreme Court has clarified that only a stay on conviction, and not merely a stay on sentence, removes the disqualification.

Q16. (a) 1 only

- **Statement 1 is correct:** In India, assisted dying is treated as an offence under criminal law. Acts related to assisted dying may attract

provisions concerning culpable homicide or abetment of suicide under the Bharatiya Nyaya Sanhita.

- **Statement 2 is incorrect:** Assisted dying does not necessarily involve a physician directly administering a lethal substance. It may also involve assistance in the act (such as providing means or information), which is distinct from active euthanasia.

Q17. (c) Only three



- **Statement 1 is correct:** Octopuses are soft-bodied molluscs and usually move by crawling along the seafloor rather than sustained long-distance swimming.
- **Statement 2 is correct:** Octopuses pump blood to the gills, where oxygen is absorbed from seawater.
- **Statement 3 is incorrect:** Octopuses possess three hearts, not four—two branchial hearts and one systemic heart.
- **Statement 4 is correct:** During swimming, octopuses use jet propulsion by forcefully expelling water through a siphon.

Q18. (b) a desert region situated in southwestern Qatar



Q19. (d) 2 and 3 only

- **Statement 1 is correct:** “Vande Mataram,” written by Bankim Chandra Chattopadhyay, was composed partly in Bengali and partly in Sanskritised language. It became a powerful symbol of protest during the Partition of Bengal (1905) and later emerged as a rallying cry of the Indian freedom movement.

- **Statement 2 is not correct:** Bankim Chandra Chattopadhyay did not set the song to music nor sing it at the 1896 Calcutta session of the Indian National Congress. The song was first sung at that session by Rabindranath Tagore, not by Bankim himself.
- **Statement 3 is not correct:** While “Vande Mataram” does appear in Anandamath (published in 1882), the novel depicts a rebellion of sanyasis against British colonial rule, not against vague or generic “foreign rulers.”

Q20. (b) 1 and 3 only

- **Statement 1 is correct:** *Kalaka Acharya Katha* narrates the story of Kalaka Acharya Katha, centred on a Jain monk, Kalaka Acharya, who sought the help of the Sakas (Scythians) to counter oppression by local rulers. The narrative reflects early interactions between indigenous religious communities and foreign groups.
- **Statement 2 is incorrect:** The text is not a Buddhist canonical work and does not form part of the Tripitaka literature. It belongs to the Jain literary tradition.
- **Statement 3 is correct:** The story was originally composed in Sanskrit and later adapted and transmitted through Prakrit traditions, which were more accessible to the wider Jain community.
- **Statement 4 is incorrect:** The text does not deal with temple construction or architectural themes; its focus is historical-religious narrative and political conflict.

Q21. (b) Only two

- **Statement 1 is correct:** In India, matters such as marriage, divorce, inheritance, and succession are largely governed by personal laws linked to religious identity, such as Hindu, Muslim, Christian, and Parsi personal laws.
- **Statement 2 is incorrect:** The Hindu Marriage Act, 1955 applies not only to Hindus and Sikhs, but also to Buddhists and Jains, unless they are governed by a different law.
- **Statement 3 is incorrect:** India does not presently have a Uniform Civil Code applicable uniformly across the entire country. Article 44 of the Constitution places UCC under the Directive Principles of State Policy, making it aspirational rather than mandatory.

Q22. (a) 1 only

- **Statement 1 is correct:** Article 361 of the Constitution of India provides personal immunity to the President and the Governors. It states that they shall not be answerable to any court for the exercise and performance of the powers and duties of their office.
- **Statement 2 is incorrect:** Article 361 does not place the actions or inactions of the Governor’s office completely beyond judicial review. While personal immunity is granted to the office-holder, the actions of the Governor can still be subject to judicial scrutiny, especially in cases involving alleged violation of constitutional obligations.

Q23. (a) Both Statement 1 and Statement 2 are correct, and Statement 2 is the correct explanation of Statement 1.

- **Statement 1 is correct:** Genome-edited crops involve targeted modifications in genes already present in the plant’s genome, leading to precise changes in DNA without introducing foreign genetic material.
- **Statement 2 is correct:** Genome editing uses specific protein enzymes (such as CRISPR-associated nucleases) that act as molecular scissors, cutting DNA at designated sites, which enables precise modification of native genes.

Statement 2 correctly explains Statement 1 because the use of such enzymes is the reason genome editing can make precise, targeted changes without adding foreign DNA.

Q24. (a) Only one

- **Statement 1 is incorrect:** Rubidium is not widely used in nuclear energy applications. It is a highly reactive alkali metal and does not possess exceptional resistance to corrosion. Nuclear reactors instead rely on materials like zirconium alloys, stainless steel, and graphite for corrosion resistance and structural stability.
- **Statement 2 is correct:** Caesium has significant applications in advanced electronics, most notably in atomic clocks. Caesium-133 atomic clocks are the global standard for timekeeping due to their extremely high precision and stability.
- **Statement 3 is incorrect:** Graphite is mainly used as a moderator in nuclear reactors, in lubricants, electrodes, and refractory materials. Specialty glasses used in fibre-optic and telecommunication systems are typically made from high-purity silica (silicon dioxide), not graphite.

Q25. (a) 1, 2 and 3 only

- **Statement 1 is correct:** Haemorrhagic Septicaemia is an acute and highly fatal disease that mainly affects cattle and buffaloes, particularly in tropical and subtropical regions.
- **Statement 2 is correct:** The disease shows higher incidence during the monsoon season due to increased humidity, water stagnation, and stress among animals, which favour the spread of the causative bacteria.
- **Statement 3 is correct:** Vaccination is the most effective preventive strategy to control Haemorrhagic Septicaemia, especially when administered before the monsoon.
- **Statement 4 is incorrect:** Haemorrhagic Septicaemia is caused by the bacterium *Pasteurella multocida* and not by a virus, nor is it primarily spread through insect vectors.

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