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MONTHLY CURRENT AFFAIRS

JANUARY 2026

FOR UPSC AND OTHER STATE GOVT. EXAMS

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POLITY, CONSTITUTION & GOVERNANCE

Topic: Indian Constitution - historical underpinnings, evolution, features, amendments, significant provisions and basic structure.

Constitutional Morality

Concept and Intellectual Origins

- **Constitutional morality** refers to guiding constitutional values shaping governance and citizen conduct.
- The concept was propounded by **George Grote** in the nineteenth century. Grote defined it as a **"paramount reverence for constitutional forms."**
- In India, the term was first articulated by **Dr. B.R. Ambedkar**.
- The Indian Constitution does not explicitly mention the term, but embeds its spirit.

Core Pillars of Constitutional Morality

- **Constitutional values** include justice, liberty, equality, fraternity, secularism, and individual dignity.
- **Rule of law** ensures accountability of citizens and authorities under the same legal framework.
- **Democratic principles** protect participatory governance and accountability of elected representatives.
- **Fundamental rights** safeguard equality, free expression, and life and personal liberty.
- **Separation of powers** prevents excessive concentration of authority in any constitutional organ.
- **Checks and balances** restrain abuse of power and protect institutional integrity.
- **Constitutional interpretation** adapts foundational values to evolving social circumstances.
- **Ethical governance** promotes transparency, integrity, and accountability in public administration.

Constitutional Foundations in India

- Constitutional morality flows from the **Preamble, Fundamental Rights, and Directive Principles of State Policy**.
- The Supreme Court has repeatedly invoked this doctrine in rights-based and institutional cases.

Key Judicial Pronouncements

- **Kesavananda Bharati (1973):** Established the **basic structure doctrine** protecting core constitutional principles.
- **S.P. Gupta (1982):** Treated constitutional breaches as violations of constitutional morality.
- **Naz Foundation (2009)**: Prioritised constitutional morality over prevailing social morality.
- **Manoj Narula (2014):** Linked constitutional morality with **rule of law and non-arbitrariness**.
- **Sabarimala Case (2018):** Upheld equality and dignity over restrictive religious practices.
- **Navtej Singh Johar (2018):** Decriminalised homosexuality by affirming constitutional rights and dignity.

Challenges in Contemporary Governance

- **Political interference** undermines autonomy of constitutional and statutory institutions.
- **Judicial activism versus restraint** raises concerns over separation of powers.
- **Enforcement gaps** include delays, limited legal awareness, and uneven compliance.

Way Forward

- **Strengthen institutions** through transparent appointments and reduced political influence.
- **Promote civic education** to deepen constitutional awareness among youth and citizens.
- **Enhance access to justice** via legal aid, backlog reduction, and alternative dispute mechanisms.
- **Encourage ethical leadership** to model accountability and public service values.
- **Adapt legal frameworks** to address technological, global, and environmental challenges.

Personality Rights in India

Case Background and Judicial Proceedings

- Delhi High Court issued notice to Salman Khan on **January 21, 2026**.
- Application filed by a **China-based AI voice platform** seeking to vacate interim injunction.
- Main matter heard by **Joint Registrar (Judicial) on January 23, 2026**.
- Chinese platform's application listed for **February 27, 2026**.

Scope of Defendants and "John Doe" Mechanism

- Original suit named **28 defendants**, including Apple, Google, Meta, X, and e-commerce platforms.
- Intermediaries such as **Telegram FZ LLC** were also impleaded in the proceedings.
- Unknown persons joined as **"John Doe" or "Ashok Kumar"** for unidentified infringers.
- Chinese AI platform added later as **Defendant No. 35**, pending formal impleadment.

Legal Basis of Personality Rights

- Supreme Court in **Puttaswamy (2017)** recognised privacy as a fundamental right under **Article 21**.
- Courts treat unauthorised commercial use of persona as **infringement of the right to life**.
- Personality rights protect the **economic value of identity**, especially for public figures.
- Rights remain **distinct from statutory intellectual property protections**.

Judicial Trends and Expression Balance

- **2025 Aishwarya Rai case** restrained unauthorised use of celebrity identity.
- Courts restricted **false impersonation, manipulated images, and misleading AI-generated content**.
- **Article 19(1)(g)** business freedom is subject to **reasonable restrictions**.
- Artistic expression protected unless it **misleads the public or implies endorsement**.
- Foreign entities **cannot invoke Article 19** before Indian courts.

Technology and Regulatory Context

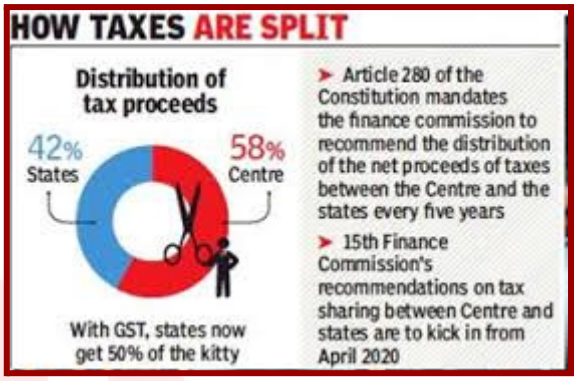
- Government banned **200+ Chinese apps in 2020** under **Section 69A of IT Act**.
- **Digital Personal Data Protection Act, 2023** enacted, but enforcement remains pending.
- Regulatory gaps persist in **AI-driven voice and impersonation platforms**.
- Nandan Nilekani highlighted **voice-based AI as critical for digital equity**.

Procedural and Policy Implications

- Celebrity suits filed under **Commercial Courts Act, 2015**.
- Courts allow **interim injunctions without upfront court fees**, drawing scrutiny.
- **IT Rules, 2021** provide takedown mechanisms, but grievance redressal remains limited.
- Case raises concerns over **digital impersonation affecting celebrities and ordinary citizens**.

Topic: Federalism

State Fiscal Situation



Institutional Framework of Fiscal Transfers

- India's **fiscal federalism** rests on cooperative sharing of national resources.
- **Finance Commission** recommends sharing of Central tax revenues with States. The transfers occur through **tax devolution, grants-in-aid, and CSS**.
- **15th Finance Commission** fixed States' share at **41% divisible pool**.
- Transfers finance **welfare delivery, infrastructure, and governance functions**. Between **2020–21 and 2024–25**, transfers totalled **₹75.12 lakh crore**.

Post-GST Fiscal Federalism Concerns

- **GST** restructured fiscal balance between Centre and States.
- States perceive erosion of **fiscal autonomy** after GST implementation.
- **GST compensation phase-out** created revenue uncertainty for States.
- Rising **cesses and surcharges** reduced divisible tax revenue pool.
- **Centrally Sponsored Schemes** restricted States' spending flexibility.
- **Industrialised States** allege shrinking fiscal space despite higher contributions.

Equity vs Efficiency & Contribution Debate

- Finance Commissions prioritised **redistribution** for balanced regional development. The criteria include **income distance, population, and area**.
- Poorer States receive higher transfers to reduce disparities and developed states argue their **contributions remain undervalued**.
- **Maharashtra, Karnataka, Tamil Nadu** cite contribution–transfer imbalances.
- However, direct taxes reflect **place of collection** and not production origin. Further, the **corporate headquarters** distort State-wise tax contribution estimates.

Declining Devolution & Rising State Borrowing

- **Tax devolution** no longer ensures predictable fiscal support.
- States increasingly depend on **State Development Loans (SDLs)**.
    - E.g: SDLs formed **35% of Tamil Nadu's revenues**. Similarly, Maharashtra's SDL share reached nearly **26% revenue receipts**.
- Borrowing surged after **COVID-19 fiscal disruptions**.
- **Cesses** and **GST centralisation** reduced effective devolution flows.

Reform Imperatives

- States shoulder **pensions, health insurance, welfare obligations**. The welfare commitments increasingly financed through **public borrowing**.
- The rising debt burdens constrain **capital expenditure investments**. Debt pressures weaken long-term **fiscal sustainability**.
- Strengthening **effective devolution** remains essential for fiscal balance.
- The criteria must reward **tax effort and growth contribution**. In such scenario, including **cesses in divisible pool** can improve equity.

Delimitation and Federal Equity

Constitutional and Political Background

- **Delimitation** periodically redraws electoral boundaries to reflect population changes and democratic fairness.
- Inter-State Lok Sabha seat distribution has remained frozen since **1976**, based on **1971 Census figures**.
- The **84th Constitutional Amendment Act, 2001** froze Lok Sabha seats till the **first Census after 2026**. Thus, the representation still reflects an India of **548 million**, not today's **1.47 billion population**.
- The Census was delayed from **2021**, with results expected by **October 2028**.
- A **Delimitation Commission** will be constituted before the **2029 Lok Sabha elections**.
- The freeze was intended as a **"motivational measure"** to reward **population stabilisation**.

Projected Seat Redistribution Trends

- An expanded Lok Sabha of **approximately 888 seats** shows major northern gains.
    - Uttar Pradesh may rise from **80 to 151 seats**, Bihar from **40 to 82 seats**.
- **Southern States'** proportional share would decline despite absolute seat increases.
    - Tamil Nadu may rise from **39 to 53 seats**, Kerala from **20 to 23 seats**.

Way Forward

- Increase Lok Sabha seats using **2011 Census**, keeping existing proportions, raising total seats to **about 866**.
- Increase Lok Sabha seats and give **equal Rajya Sabha representation**, for example **10 seats per State**, totalling **290**.
- Increase **Vidhan Sabha seats** to equalise representatives per **1,000 population**, keeping Lok Sabha unchanged.
- Allocate **60% Lok Sabha seats by population** and **40% by population-control performance**, using a **sliding scale**.
    - This solution reflects **EU Parliament's Digressive Proportionality** system. The larger states get **more seats but fewer per person**, while smaller states get **fewer seats but higher weight**.
    - It balances **population proportionality** with **State equality**, avoiding domination by populous regions.
- Implement **phased redistribution** across two election cycles to reduce political shock.
- Commission should include **demography, constitutional, and federalism experts** with State representation.
- Transparency, public hearings, and oversight are essential for trust and legitimacy.

Tussle Between Governor and State Cabinet

Constitutional Provisions Related to Governor

- India adopted the **Westminster parliamentary model**, where real executive power rests with elected governments.
- **Article 176** mandates **Governor's address** at the first Assembly session yearly. Governor functions on **aid and advice** of the Cabinet.
- **Article 175** allows Governor to address the Legislature when necessary, while **Article 159 oath** obligates preservation of the Constitution.
- **Constitutional Position**
    - Governor is a **nominal executive head**, not policy decision-maker.
    - Address represents the **elected government's vision**, not personal views.

Conventions and Historical Evolution

- The origin traces to **Government of India Act, 1935**. After 1937 provincial autonomy, speeches reflected ministerial policy.
- **Constituent Assembly** retained this convention post-Independence.
- **Motion of Thanks** enables legislative scrutiny of government agenda.
- **Democratic Convention**
    - Governor reads the address **without**

substantive deviation.
    - Similar to the British monarch reading government-prepared speeches.

Recent Areas of Conflict

- Recent events in **Opposition-ruled States** revived constitutional tensions.
- **Governors deviated** from Cabinet-approved Assembly addresses where the instances include skipping, modifying, or refusing to read speeches.
- Some added **unapproved content** or walked out mid-address. Further, the **delays in summoning Assembly** sessions were also reported.
- **Federal Concerns**
    - Critics allege **political bias** due to Union appointment.
    - Raises questions on **gubernatorial neutrality**.
    - Weakens trust between Raj Bhavan and elected governments.

Judicial Interpretations on Governor's Role

- Courts have consistently reinforced constitutional limits on gubernatorial discretion.
- **Shamsher Singh (1974) Case:** Governor bound by ministerial advice.
- **Nabam Rebia (2016) Case:** Reaffirmed advice-based functioning.
- **Andul Gafoor Habibullah (1966) Case:** Address is mandatory duty.
- **B.P. Singhal (2010) Case:** Emphasised constitutional neutrality.
- **Essence of Judicial Observations**
    - Governor is a **constitutional head, not parallel executive** authority.
    - **Discretion** must remain **narrow** and constitutionally guided.

Federal Implications & Reform Proposals

- Frequent confrontations carry deeper institutional consequences.
- **Governance & Federal Impact**
    - Strains cooperative federalism.
    - Disrupts legislative functioning and session timelines.
    - Fuels perception of politicisation of constitutional offices.
    - Undermines democratic legitimacy and public trust.
- **Reform Suggestions**
    - **Sarkaria Commission:** Appoint non-political eminent Governors.
    - **Punchhi Commission:** Governors should not act as Union agents.
    - Consult States during gubernatorial appointments.
    - Ensure time-bound compliance with Cabinet advice.

Conclusion: India's **federal balance** rests not only on **written provisions** but also on **constitutional morality**. Respecting conventions, neutrality, and democratic mandate ensures that the Governor's office remains a **bridge of coordination**, not a site of confrontation.

Topic: Judiciary and other dispute redressal mechanisms

Institutional Arbitration Reforms

Status of Arbitration Council of India

- The **Arbitration Council of India** remains unconstituted nearly six years after the 2019 amendments.
- The Council was envisaged as a central body to promote and regulate **institutional arbitration**.
- Its creation followed recommendations of the **Justice B.N. Srikrishna Committee Report, July 2017**.

Proposed Mandate and Institutional Design

- The Council was mandated to **grade arbitral institutions** and recognise professional arbitrator-accrediting bodies.
- It was empowered to maintain a **national repository of arbitral awards** rendered in India.
- The Chairperson would be appointed by the Union government in consultation with the **Chief Justice of India**.
- Eligible Chairpersons included **former Supreme Court judges, High Court Chief Justices, or arbitration experts**.
- The Council's composition included **ex officio executive members**, reflecting strong governmental presence.

Concerns Regarding Institutional Impartiality

- Majority government-nominated membership raised concerns about **independence of arbitration governance**.
- Critics highlighted risks because the **government remains the largest litigant** in arbitration proceedings.
- Unlimited accreditation of institutions could **dilute quality standards and increase administrative burdens**.
- Exclusion of **foreign legal professionals** may reduce India's attractiveness as an arbitration seat.
- Comparisons with **Singapore and Hong Kong** noted absence of centralised institutional arbitration models.

Draft Arbitration and Conciliation (Amendment) Bill, 2024

- The Bill redefined an **arbitral institution** as a body conducting proceedings under agreed procedural rules.
- It removed the requirement of **Supreme Court or High Court designation** for institutional recognition.
- Proposed powers include **extending award timelines and substituting arbitrators** to reduce court dependence.
- The Bill remained under consideration, as stated by the **Union Law Minister in March 2025**.

Limiting Judicial Intervention in Arbitration

- Courts currently grant **interim measures** before, during, and after arbitral proceedings.
- The draft Bill restricts court intervention to **pre-arbitration and post-award enforcement stages**.
- Section **9(2) timeline** would begin from the filing of interim applications, not court orders.
- A new **Section 9-A** enables interim relief through **emergency arbitrators** before tribunal constitution.

Way Forward and Trust Deficit

- The Srikrishna Report identified preference for **procedural autonomy** driving ad hoc arbitration dominance.
- Building trust in **institutional independence and administrative competence** remains critical for global competitiveness.

Juvenile Justice and Age of Criminal Responsibility

Context

- A **Private Member's Bill (December 2025)** proposes lowering the transfer age from **16 to 14 years**.
- The proposal targets children accused of **heinous offences** carrying minimum seven-year imprisonment.

Juvenile Justice Framework

- The **JJ Act, 2015** introduced a **"transfer system"** for serious adolescent offences.
- Children aged **16–18 years** may face preliminary assessment by **Juvenile Justice Boards**.
- Assessments examine **mental capacity, understanding of consequences, and circumstances of offence**.
- Children's courts can try transferred adolescents **as adults or as children**.
- **Concerns with Transfer System**
  - The system lacks **empirical support** and contradicted parliamentary review findings.
  - No reliable tools exist to assess **adult-level mental capacity retrospectively**.
  - Decisions often rely on **subjective indicators** like remorse, fear, or awareness of wrongdoing.
  - Similar cases receive **unequal outcomes** due to varied JJB interpretations and procedures.

Statistical Reality of Youth Crime

- **NCRB 2023** recorded **31,365 cases** involving Children in Conflict with the Law.
- These cases formed **0.5% of total crimes** registered nationwide.
- **79% of apprehended adolescents** were aged **16–18 years**.
- Only **21% belonged to the 12–16 years** category, challenging deterrence claims.

Structural Vulnerability Perspective

- Many CICLs are also **children needing care and protection**.
- Contact with justice systems often reflects **poverty, inequality, and unmet welfare needs**.
- Lowering the age threshold risks **deepening punitive exposure** rather than addressing vulnerability.
- **Impacts of Adult Criminal Processes**
  - Detention **disrupts education** and hampers cognitive development.
  - Criminal trials create **stigma and lasting psychological stress** for adolescents.
  - Reports highlight **illegal police detention and adult prison placements**.

Reform-Oriented Approach

- The Bill prioritises **punishment over rehabilitation and reintegration principles**.
- Emphasis should shift toward **family support, education, and mental health services**.
- Strengthening institutions ensures **child protection without eroding rights-based safeguards**.

Judicial Impeachment Procedure in India

Context

- In **December 2025**, 107 Lok Sabha Members submitted a removal motion against **Justice G.R. Swaminathan**.
- The notice, containing **13 charges**, was presented to the **Speaker** for preliminary consideration.

Constitutional Framework

- **Articles 124(4) and 124(5)** govern removal of

Supreme Court judges.

- **Articles 217(1)(b) and 218** extend the same procedure to High Court judges.
- The Constitution uses the term **"removal"**, **not impeachment**, for judicial offices.
- Parliament enacted the **Judges (Inquiry) Act, 1968**, with accompanying procedural rules.
- **Grounds for Removal**
  - Judges can be removed for **proved misbehaviour or incapacity** only.
  - Misbehaviour includes **corruption, lack of integrity, moral turpitude, and wilful misconduct**.
  - **K. Veeraswami (1991)** emphasised absolute standards of judicial honesty and impartiality.
  - **M. Krishna Swami (1992)** clarified that errors or negligence alone do not constitute misbehaviour.
- **Procedure for Motion**
  - Motion requires **100 Lok Sabha Members** or **50 Rajya Sabha Members** signatures.
  - The Speaker or Chairman must first **admit or disallow** the notice.
  - Upon admission, a **three-member inquiry committee** is constituted.
  - The committee includes a **Supreme Court judge, High Court Chief Justice, and jurist**.
- **Role of Parliament and President**
  - Each House must pass an address with **special majority requirements**.
  - The address is sent to the **President**, who orders the judge's removal.
  - The process aims to protect **judicial independence** through high thresholds.

Identified Legal Flaw

- The Act allows the **Speaker or Chairman to reject motions without stated criteria**.
- Disallowance causes the motion to **lapse without inquiry or investigation**.
- **Article 124(5)** does not explicitly empower refusal of a validly signed motion.
- This creates potential for **arbitrariness and executive influence**.

Implications

- Judicial accountability can be **blocked at the preliminary stage**.
- Government preference may shape outcomes, weakening **constitutional safeguards**.
- The flaw risks undermining **transparency and public trust in removal mechanisms**.

Judicial Independence

Context and Background

- Supreme Court judge **Justice Ujjal Bhuyan** delivered remarks at **ILS Law College, Pune**. He warned that **judicial credibility** is essential for preserving the judiciary's legitimacy.

Core Constitutional Principles

- Judicial independence is a **basic feature of the Constitution**, described as non-negotiable.
- Credibility sustains the **relevance and moral authority** of courts in democratic governance.
- Courts lack the **power of the purse or sword**, relying on public trust for legitimacy.
- Judges must avoid appearing to justify **denial of liberty or human rights**.

Collegium Decision and Executive Role

- The collegium changed a transfer recommendation after a **"reconsideration sought by the government."**
- Justice Atul Sreedharan was shifted from **Madhya Pradesh High Court** to **Allahabad High Court**.
- Justice Bhuyan termed this a **clear intrusion of executive influence**.
- He stressed transfers are an **internal judicial matter**, beyond Central government authority.

Safeguarding Democratic Values

- Judges should stand **erect against political whims**, quoting Caroline Kennedy.
- Decisions should not appear **predetermined by bench composition**.
- Political and ideological leanings must not **cloud judicial reasoning**.
- Constitutional morality ensures **liberty and justice are protected from majoritarian power**.

Institutional Integrity and Public Faith

- Judicial independence is guarded by **judges themselves, not security forces**.
- Breach of public faith would leave the judiciary **institutionally hollow**.
- Justice Bhuyan cited **CJI Harilal J. Kania's guidance** on staying aloof from party politics. The courts must remain **neutral, sympathetic to all, and allied to none**.

Broader Implications

- Executive interference risks **weakening the collegium's original purpose**.
- Judicial credibility underpins **democracy, rights**

protection, and rule of law.
- Maintaining independence preserves **public confidence in constitutional governance**.

Collegium System
- **Judicial mechanism** for appointment and transfer of judges to the **Supreme Court (SC)** and **High Courts (HCs)**.
- **Not mentioned in the Constitution**; evolved through **Supreme Court judgments**.
- Based on the **"Three Judges Cases" doctrine**.
- **Constitutional Provisions**
  - **Article 124(2):** SC judges appointed by the President after consultation with the CJI and other judges.
  - **Article 217:** HC judges appointed by the President in consultation with the CJI, Governor, and HC Chief Justice.
  - **Article 126:** Appointment of **Acting CJI** by the President (senior-most SC judge).
  - **Article 127: Ad hoc SC judge** from HC if quorum unavailable (with President's consent).
  - **Article 128: Retired SC judge** may sit temporarily (with President's consent).

Evolution of Collegium
- **First Judges Case (1981)**
  - **Consultation ≠ Concurrence**
  - Gave **primacy to the Executive** in judicial appointments.
- **Second Judges Case (1993)**
  - Overruled 1981 verdict.
  - **Judicial primacy established.**
  - CJI's recommendation made **binding** after consulting **two senior-most SC judges**.
  - **Collegium System** formalised.
- **Third Judges Case (1998)**
  - Expanded Collegium.
  - CJI must consult **four senior-most SC judges**.

Role of Government
- Can **seek clarification or return recommendations**.
- If Collegium **reiterates**, appointment becomes **binding on the Executive**.

Topic: Role of civil services in a democracy

All-India Services Cadre Allocation Policy Reforms

Background and Policy Revision
- The **Centre revised cadre allocation policy** for IAS, IPS, and IFoS.
- The reform was notified by the **Department of Personnel and Training (DoPT)**.
- The policy replaces the **2017 zonal arrangement** with an alphabetical grouping system.
- The objective is to ensure **fairness, transparency, and national integration**.

New Grouping Structure
- All **State and Joint Cadres** are arranged alphabetically into **four groups**.
- Candidates express **preferences among groups**, forming the basis for allocation.
- **Group I:** AGMUT, Andhra Pradesh, Assam-Meghalaya, Bihar, Chhattisgarh.
- **Group II:** Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh.
- **Group III:** Maharashtra, Manipur, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu.
- **Group IV:** Telangana, Tripura, Uttarakhand, Uttar Pradesh, West Bengal.

Vacancy Determination Framework
- **DoPT, MHA, and MoEF&CC** control vacancies for IAS, IPS, and IFoS.
- Vacancies are determined **annually and category-wise** for UR, SC, ST, and OBC.
- **EWS vacancies** are treated as part of the **Unreserved category**.
- States must submit requisitions by **January 31** for the following year.
- Determination is based on **cadre gap as of January 1** after examinations.
- Late requisitions from States **will not be considered**.

Insider and Outsider Allocation Rules
- **Insider candidates** are allocated strictly by **merit order and vacancy availability**.
- Willingness to serve in the **home State is mandatory** for insider eligibility.
- Outsider allocation follows a **two-stage roster system**.
- **PwBD candidates** are placed first, followed by other categories.

Rotational Cycle System
- Allocation proceeds through a **rotational cycle covering 25 candidates**.
- Higher-ranked candidates receive **priority within the same cycle**.
- Remaining candidates move to **subsequent allocation cycles**.

Administrative Objectives
- The reform addresses **uneven vacancy distribution** raised by States.
- It aims to enhance **inter-State exposure for**

young officers.
- The framework promotes **objectivity, efficiency, and transparency** in cadre allocation.

Topic: Comparison of the Indian constitutional scheme with that of other countries

27th Constitutional Amendment of Pakistan

Background and Nature of the 27th Amendment
- Pakistan's legislature passed the **27th Constitutional Amendment** during November 12–13, last year.
- The amendment received **presidential assent**, formally altering the constitutional framework.
- Presented as military command reorganisation, it **restructures constitutional adjudication authority**.

Shift in Judicial Authority
- Original jurisdiction over constitutional interpretation transferred from the **Supreme Court to "Federal Constitutional Court" (FCC)**.
- FCC now decides **fundamental rights, federal–provincial disputes, and constitutional questions**.
- Supreme Court's role as **final constitutional guardian is significantly reduced**.
- Earlier jurisdiction enabled landmark rulings, including **Panama Papers and Memogate cases**.

Rule of Law and Institutional Balance
- Amendment weakens **judicial independence** by fragmenting constitutional adjudication.
- A.V. Dicey's doctrine emphasises **courts as sentinels against arbitrary executive power**.
- Courts function as **bridges between authority and liberty**, not mere dispute-resolution bodies.

Federal Constitutional Court Concerns
- Specialised courts are not inherently problematic, but **removal of Supreme Court primacy is destabilising**.
- The earlier **18th Amendment strengthened judicial appointments through Judicial Commission of Pakistan**.
- FCC structure risks **greater executive influence over constitutional interpretation and composition**.
- Judicial review may become **extension of executive preferences rather than independent oversight**.

Historical and Comparative Perspective
- Sir Edward Coke resisted **King James I's claim to personal judicial authority**.
- This episode affirmed **courts must remain insulated from political or royal interference**.
- Judicial independence forms the **foundation of modern constitutional democracies**.

Regional and Indian Significance
- South Asia faces **institutional strain, political instability, and security-driven governance choices**.
- India, as the region's **largest constitutional democracy**, has a normative stake in outcomes.
- The PCA reflects a trend of **using formal legal changes to concentrate political power**.
- Democratic erosion often occurs through **gradual constitutional rewriting, not abrupt coups**.

Core Democratic Lesson
- Constitutions survive through **institutional restraint, judicial autonomy, and respect for boundaries**.
- The amendment risks turning the Constitution from a **shield of liberty into an instrument of control**.
- The future of republics depends on **preserving the spirit, not just the text, of constitutionalism**.

Topic: Constitutional and Non-Constitutional Bodies

Enforcement Directorate Powers and Rule of Law

Background and Case Context
- The Madras High Court stayed **ED proceedings** against film-producer Akash Bhaskaran in June.
- Media had portrayed him as a key figure in an alleged **₹1,000-crore TASMAC liquor scam**.
- The ED raided his residence, seized **laptops and mobile phones**, and sealed an associate's premises.
- The Court found **no credible link to a scheduled offence** or the alleged TASMAC case.
- The ED was directed to **return seized materials and unseal premises**, issuing an apology.
- The Supreme Court later stayed the broader probe, citing **violation of federal principles**.

Mandate and Legal Framework of the ED
- The ED enforces the **Prevention of Money Laundering Act, 2002** to target proceeds of crime.
- The law requires a **scheduled predicate offence** before initiating money-laundering proceedings.
- Section **50** empowers summons and recording statements under oath without clarifying legal status.
- Section **17** authorises searches and seizures of materials from any person.
- Section **19** permits arrest without warrant based on subjective "reason to believe".

Concerns over Procedural Overreach

- Critics argue the ED often **inverts the legal sequence**, probing laundering before establishing predicate offences.
- **Bail conditions reverse presumption of innocence**, requiring courts to assess future conduct risks.
- Section 50 summons allegedly create **psychological pressure through prolonged waiting and uncertainty**.
- Courts have held **rumours and vague allegations** do not constitute credible search information.
- Attached properties are sometimes **retained despite case collapse**, affecting businesses and livelihoods.

Judicial Scrutiny and Constitutional Issues

- The Supreme Court in **Vijay Madanlal Choudhary** upheld several PMLA provisions, now under review.
    - The Court mandated **audio-visual recording of interrogations** to ensure transparency.
- Justice **B.V. Nagarathna** raised concerns about selective invocation of **Article 32**.
- The judiciary warned against using PMLA for **prolonged incarceration without convictions**.

Allegations of Corruption and Political Misuse

- ED officers were arrested for **bribery in Rajasthan, Tamil Nadu, Mumbai, and Odisha**.
- The agency responded with **suspensions and press statements**, without systemic institutional reforms.
- Raids in **West Bengal and Tamil Nadu** raised concerns of politically timed investigations.
- Media leaks of ED communications created **public suspicion before judicial verification**.

Role of Media and Democratic Safeguards

- The article stresses journalism must **verify allegations rather than amplify investigative leaks**.
- Citizens are encouraged to demand **evidence-based accountability instead of institutional theatrics**.
- Courts are urged to **define constitutional limits** on investigative authority.
- The rule of law must prevent **financial statutes becoming tools of political intimidation**.

Topic: Vulnerable Sections

Decentralised Waste Management

Swachh Bharat Mission (SBM)

- Swachh Bharat Mission, **launched in 2014**, aimed to achieve universal rural sanitation coverage.
- Over **12 crore toilets** constructed in rural India. All villages declared **Open Defecation Free (ODF)**.
- **Role**
    - Reduced **sanitation-linked diseases** and improved public health outcomes.
    - Enhanced **dignity, privacy, and safety of women**.
    - Strengthened **inclusion** of vulnerable rural populations.

Post-ODF Challenge

- Toilet access created new sanitation **management responsibilities.**
    - Rural sanitation systems depend on **septic tanks and pits**.
    - Require periodic **faecal sludge removal**.
    - Unsafe disposal risks **environmental contamination**.
- **ODF Plus Framework:** SBM-Grameen Phase II focuses on sustainability of sanitation outcomes.
    - Emphasises **solid and liquid waste management**.
    - Strengthens **faecal sludge management (FSM)**.
    - Promotes **behavioural change and service delivery systems**.
- **5.68 lakh villages (≈97%)** declared ODF Plus.

Case Study: Maharashtra Model

- **Urban-Rural Convergence Approach**
    - Developed **faecal sludge treatment plants** in urban areas.
    - Enabled **co-treatment in sewage treatment plants**.
    - Rural areas linked to nearby urban treatment infrastructure.
- **Decentralised FSM Innovation**
    - Scheduled desludging systems institutionalised.
    - Panchayats engaged private service operators.
    - User charges ensured **financial sustainability**.
    - Cluster-based FSM plants served multiple villages.

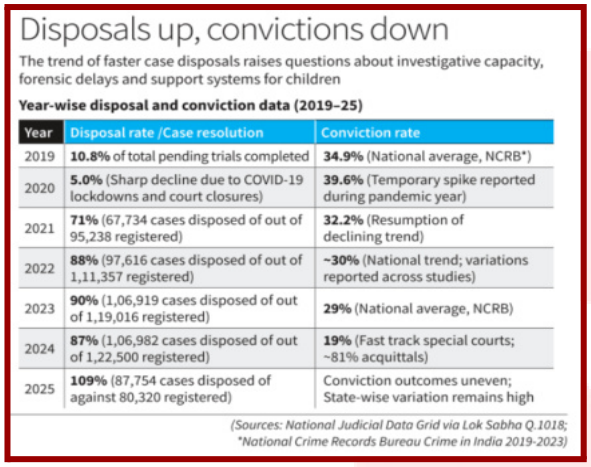
Significance

- **Public Health Gains:** Prevents disease resurgence through safe waste treatment.
- **Environmental Sustainability:** Reduces soil and groundwater contamination.
- **Gender & Social Dignity:** Sustains safety and privacy gains post-ODF.
- **Institutional Strengthening:** Builds urban–rural

governance partnerships.

- **Service Delivery Shift:** Moves sanitation policy from access to lifecycle management.
- **Scalability:** Provides replicable sanitation sustainability models nationwide.

POCSO Justice Delivery and Trial Outcomes



Disposals up, convictions down

The trend of faster case disposals raises questions about investigative capacity, forensic delays and support systems for children

Year-wise disposal and conviction data (2019–25)

Year	Disposal rate /Case resolution	Conviction rate
2019	**10.8%** of total pending trials completed	**34.9%** (National average, NCRB*)
2020	**5.0%** (Sharp decline due to COVID-19 lockdowns and court closures)	**39.6%** (Temporary spike reported during pandemic year)
2021	**71%** (67,734 cases disposed of out of 95,238 registered)	**32.2%** (Resumption of declining trend)
2022	**88%** (97,616 cases disposed of out of 1,11,357 registered)	**~30%** (National trend; variations reported across studies)
2023	**90%** (1,06,919 cases disposed of out of 1,19,016 registered)	**29%** (National average, NCRB)
2024	**87%** (1,06,982 cases disposed of out of 1,22,500 registered)	**19%** (Fast track special courts; ~81% acquittals)
2025	**109%** (87,754 cases disposed of against 80,320 registered)	Conviction outcomes uneven; State-wise variation remains high

*(Sources: National Judicial Data Grid via Lok Sabha Q.1018; *National Crime Records Bureau Crime in India 2019-2023)*

Background of POCSO Framework

- The **POCSO Act, 2012** created a **child-specific legal framework** for sexual offences.
- It replaced reliance on **general IPC provisions**, which failed to reflect children's vulnerabilities.
- The Act promised **child-friendly procedures**, **time-bound trials**, and **special courts**.

Fast-Track Courts and Disposal Trends

- In **2025**, fast-track special courts achieved a **109% disposal rate**.
  - **87,754 cases** were disposed against **80,320 newly registered** cases.
- India operates **773 fast-track courts**, with **400 dedicated to POCSO cases**.
  - These courts were launched in **October 2019** using **₹1,952 crore from the Nirbhaya Fund**.

Issues with the Implementation

- **Falling Convictions Despite Speed**
  - Conviction rates dropped from **35% in 2019 to 29% in 2023**.
  - A **90% disposal rate** should have produced **45% convictions**, but outcomes were weaker.
  - Fast-track courts recorded only **19% average conviction rates**.
  - In several States, **acquittals exceed convictions**, leaving offenders free.
- **Weak Investigations and Systemic Gaps**
  - **Hasty investigations, incomplete charge sheets**, and **delayed forensic reports** weaken prosecutions.
  - These issues are severe in **Uttar Pradesh and Maharashtra**.
  - **Support persons** under **Section 39 of POCSO** remain largely **un-empanelled** across States.
- **Para-Legal Volunteers (PLVs) and First Response Failures**
  - The **Supreme Court** in December 2025 directed **PLVs at every police station**.
  - However, **Andhra Pradesh** has PLVs in only **42 of 919 stations** while **Tamil Nadu** has **none across 1,577 stations**.
  - Lack of PLVs enables **FIR delays, intimidation, and evidence loss**.
- **Compensation and Social Harm**
  - Courts delay **interim compensation**, often waiting for **final verdicts**.
  - Survivors receive support **years later**, making relief **largely ineffective**.
  - Families incur **travel, legal, and income losses** during prolonged trials.

Conclusion

- **Speed without support** has produced **weaker convictions and fragile justice** for child survivors. Effective **forensics, PLVs, and support persons** are essential for **meaningful POCSO enforcement**.

Debate on Age of Consent

Context

- The Supreme Court, in ***State of Uttar Pradesh vs Anurudh (2026)***, flagged misuse of POCSO in adolescent romance.
- Court urged the Union government to examine exemptions for **genuine consensual adolescent relationships**.
- **Concern:** Harsh criminal prosecution may harm young lives rather than protect them.

Existing Legal Framework

- Age of consent in India is **18 years** under the gender-neutral **Protection of Children from Sexual Offences (POCSO) Act**.
- Anyone below 18 is legally a **child**, making consent immaterial in sexual relations.
- Criminal law amendments aligned rape provisions with the **18-year threshold**.
- Minimum legal marriage age: **18 for females, 21 for males**.

Arguments for Lowering the Age

- **Changing Social Reality**
  - Many POCSO cases involve **16–18-year-olds in consensual relationships**.

    - Law often criminalises **romantic adolescent behaviour**, not exploitation.
- **Empirical Evidence**
    - NFHS data shows early sexual awareness among adolescents.
    - Enfold study: **24.3% POCSO cases** linked to romantic relationships.
    - In **~82% cases**, victims refused to testify against partners.
    - Another study found significant share of aggravated charges consensual in nature.
- **Comparative Global Practice**
    - Countries like the U.K. and Canada fix consent at **16 years**.
    - 'Romeo–Juliet clauses' protect consensual peer relationships from prosecution.
- **Humanistic Concern**
    - Criminalisation may stigmatise youth, disrupt education, and fracture families.

Arguments Against Lowering the Age

- **Child Protection Imperative**
    - Bright-line age of 18 ensures **clear, uniform legal protection**.
    - Prevents subjective interpretation of consent.
- **Vulnerability to Abuse**
    - Government studies show most abusers are **known to the child**.
    - Lower age may legitimise coercion disguised as consent.
- **Risk of Structural Exploitation**
    - Could enable trafficking, grooming, and pressure-based relationships.
    - Fear of normalising unequal power dynamics.
- **Institutional Position**
    - Parliamentary Committees rejected recognising minor consent.
    - Law Commission warned dilution could weaken POCSO's deterrent value.

Judicial Views

- High Courts have acknowledged **adolescent autonomy concerns** in select cases. And simultaneously reiterated that **minor consent lacks legal validity**.
- **The Supreme Court** reaffirmed that **POCSO** does not recognise consent below 18.
- Judicial voices have also noted trauma from criminalising adolescent elopements.

Way Forward

- **Balancing Protection and Autonomy:** Parliament must weigh **child safety** with evolving adolescent realities.
- **Legal Clarity:** Courts require statutory guidance for uniform adjudication.
- **Holistic Social Response:** Comprehensive **sex education** and adolescent counselling essential. Further need for strengthening the **reproductive health services** for young people.
- **Doctrinal Challenge:** Law must distinguish **consensual peer relationships** from exploitation and thus avoiding **unjust criminalisation.**

Early Childhood Care and Development (ECCD)

Development Context

- India's **Viksit Bharat** and **$30 trillion economy by 2047** require long-term **human capital investments**. Economic growth cannot rely only on **infrastructure, manufacturing, or digital expansion**.
- **Early Childhood Care and Development (ECCD)** remains the weakest link in India's development strategy.

Why ECCD is Critical

- The **first 1,000 days** from conception to two years are a vital **developmental window**.
- The next **2,000 days** up to eight years shape **brain, health, cognition, and behaviour**.
- Nearly **80–85% of brain development** occurs during this early period.
- Early nutrition, stimulation, and emotional security determine **learning capacity and productivity**.
- Countries like the **U.S., Finland, and South Korea** show strong returns from ECCD investments.
- ECCD lowers **future health costs**, improves **education outcomes**, and expands the **tax base**.
- Benefits are **intergenerational** and emerge over **10–20 years**, but remain long-lasting.
- **India's Existing Foundations**
    - Programmes like **ICDS (1975)** and **POSHAN 2.0** strengthened nutrition and early care and the **National Health Mission** improved immunisation and malnutrition control.
    - These policies focused mainly on **survival**, not **full developmental potential**.
    - Further, the ECCD support is limited to **welfare beneficiaries**, excluding **middle-income families**.

What India Needs

- **Premarital and pre-conception counselling** on nutrition, mental health, and lifestyle.
- **Parent education** on stimulation, play, talking, and emotional bonding.
- **Growth and milestone monitoring** for early detection of delays.
- **High-quality care for ages two to five** to prevent undernutrition and obesity.

- **Integrated systems** combining learning, nutrition, and health through schools.
- **Nationwide awareness** of the **first 3,000 days** as a developmental foundation.

Conclusion

- ECCD is not welfare but a **strategic national investment**. A **citizen-led, inter-ministerial mission** is required to secure India's future workforce.

Combating Child Trafficking in India

Bakground

- The Supreme Court issued strict guidelines in **K. P. Kiran Kumar versus State** to prevent trafficking. The Court held trafficking violates children's **fundamental right to life** under the Constitution.
- **NCRB 2022** data reported **3,098 rescued children** below eighteen years nationwide.
    - Between April 2024 and March 2025, over **53,000 children were rescued** from exploitation.
    - The conviction rate for trafficking offences between 2018 and 2022 remained **4.8%.**

Definition and Legal Meaning of Trafficking

- The **Palermo Protocol, 2000** defines trafficking as recruitment or transfer of children for exploitation.
- **Section 143, Bhartiya Nyaya Sanhita, 2023** criminalises recruitment, transport, or receipt through coercive means.
- The definition covers **fraud, deception, abuse of power, and inducement for consent**.
- Exploitation includes **physical abuse, sexual exploitation, slavery, servitude, and organ removal**.

Constitutional and Statutory Protection for Children

- **Articles 23 and 24** prohibit human trafficking, forced labour, and hazardous child employment.
- **Article 39(e) and (f)** mandate protection from exploitation and moral or material abandonment.
- **Sections 98 and 99 of BNS** address selling and buying of minors.
- The **Immoral Traffic (Prevention) Act, 1956** targets sexual exploitation and trafficking networks.
- The **Juvenile Justice Act, 2015** ensures rehabilitation, care, and protection for trafficking victims.
- The **Criminal Law Amendment Act, 2013** expanded trafficking definitions, irrespective of victim consent.
- **Supreme Court** in **M. C. Mehta versus Tamil Nadu, 1996** prohibited child employment in hazardous industries.

POCSO Act and Fast-Track Justice

- The **POCSO Act, 2012** defines sexual assault, harassment, and child pornography offences.
- The Act provides **stringent punishments, including life imprisonment and death penalty**.
- The legislation is **gender-neutral**, ensuring comprehensive child protection coverage.
- Around **400 fast-track courts** aim to dispose approximately **165 cases annually per court**.

Way Forward and Governance Imperatives

- Vulnerabilities arise from **poverty, migration, disasters, and family system breakdowns**.
- **Social media platforms** increasingly facilitate deceptive recruitment and exploitation.
- The government must improve **conviction rates to strengthen deterrence mechanisms**.
- A strong **Union–State coordination** is essential since law and order remain State subjects.

Topic: Education and Health

Higher Education Governance

Systemic Concerns

- The Supreme Court intervened while hearing cases related to student suicides in higher education institutions.
- Court acknowledged growing **student distress** across universities and linked suicides to **financial, social, academic, and injustice-related pressures**.
- Recognised rapid expansion or **massification of higher education** and flagged privatisation without proportional **quality enhancement**.
- Court invoked **Article 142** to mandate systemic corrective reforms.
- The intervention reflects concern for both **student dignity and institutional accountability**.

Supreme Court Directions on Institutional Reform

- The Court issued structural directions to address governance and student welfare gaps.
- Directed separate **record-keeping and tracking** of student suicides.
- Ordered governments to improve **reporting systems and data transparency**.
- Mandated filling **Registrar and Vice-Chancellor vacancies**.
- Directed recruitment for **all vacant faculty posts**.
- These steps aim to restore administrative continuity and student support systems.

Faculty Vacancies & Governance Deficits

- **Public universities** face deep institutional capacity challenges.

- Nearly **50% faculty posts** remain vacant in many institutions.
- Declining teaching strength weakens academic supervision.
- **Chronic** understaffing disrupts research and governance processes.
- Administrative paralysis affects long-term academic planning.
- **Case Study: University of Madras**
    - **Premier State university** facing severe **faculty shortages.**
    - Teaching strength nearly half of sanctioned capacity.
    - **Research output** remains marginal despite advanced study centres.
    - Limited institutional support for regional social science research.

Appointment Challenges, Quality Concerns & Reform Imperative

- Governance bottlenecks **extend beyond vacancies.**
    - Vice-Chancellor appointments stalled due to **Governor–State disputes**.
    - Ambiguity over gubernatorial powers delays administrative decisions.
    - Faculty hiring follows **UGC procedures**, causing time delays.
    - Budget constraints require possible **Union financial support**.
- **Quality & Integrity Issues**
    - Shortage of qualified faculty persists.
    - Allegations of corruption and ideological appointments exist.
    - Institutional credibility and student trust suffer.

Conclusion: The Court's time-bound directions highlight urgency of reform. Strengthening public universities remains essential for equitable human development and long-term national progress.

School Education Reforms under NEP 2020

Context

- China uses **large, holistic schools** to strengthen quality through scale and integrated infrastructure.
- Chinese K-12 schools average **2,800 students**, compared to India's average **150 students** per K-8 school.
- Despite being three times larger, China operates **one-third the number of schools** as India.
- India achieved access at elementary level, but **quality gaps persist in fragmented school networks**.

Current Status and Infrastructure Gaps

- India has **5.6 lakh schools enrolling fewer than 50 students each**, reflecting severe fragmentation.
- Over **1 lakh single-teacher schools** serve **33 lakh students**, necessitating multi-grade teaching.
- Around **40% of government secondary schools** have fewer than **100 students enrolled**.
- Only **19% of schools have functional ICT labs**, while **51% have integrated science laboratories**.
- About **10% offer higher secondary classes**, and just **6% provide vocational education**.

State-Level Reform Experiments

- Rajasthan created **Adarsh Schools** with phased upgrades in infrastructure and staffing.
- Uttar Pradesh approved **Model Composite Schools** with smart classrooms and WiFi connectivity.
- Madhya Pradesh consolidated **36,000 under-enrolled schools** under the **SATH-E programme**.
- The **CM RISE initiative** targets one upgraded school for every **25–30 villages**.
- Odisha, Jharkhand, West Bengal, Tamil Nadu, Telangana, and Gujarat pursue similar consolidation models.

Composite School Model and Equity

- Composite schools aim for **one teacher per class** and adequate **subject specialists**.
- **Transport facilities** ensure access and prevent exclusion of remote or vulnerable students.
- **Community engagement** supports smooth transitions and builds trust in school consolidation.

Targets for 2035

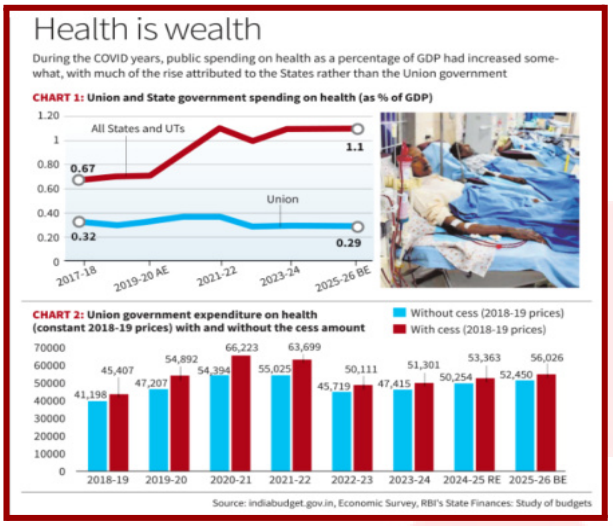
- Establish **one K-8 school per Gram Panchayat**, serving around **300 students each**.
- Integrated K-8 campuses could educate **8.1 crore children nationwide**.
- Transition rates fall from **87% middle-to-secondary** and **75% secondary-to-higher secondary**.
- Projected **8 crore students in Classes 9–12** justify large, well-resourced composite secondary schools.

Implementation Strategy

- States require **context-specific road maps** based on geography and population density.
- Priorities include **teacher deployment, decentralised planning, transport solutions, and funding support**.
- **Samagra Shiksha**, combined with State schemes,

can finance composite school infrastructure upgrades.

Health System Reforms



Vision of Health System Reform & Governance Architecture

- India's health reform discourse is moving toward a citizen-centred public system. The Lancet-commissioned experts proposed **publicly financed, citizen-centred healthcare**.
- The model envisioned as primary vehicle for **Universal Health Coverage (UHC)**.
- Private sector should complement, not dominate, public delivery.
- State and district institutions require **clear functional roles**. Further, greater **financial autonomy** needed at decentralised governance levels. The local administrators need enhanced management capacity.
- Digital governance tools can improve **fund flows and accountability**.
- Simplified financial procedures can reduce bureaucratic delays.

Public Health Financing

- Financing remains the backbone of any equitable health system.
- **Policy Targets**
  - **National Health Policy, 2017** targeted public spending at **2.5% of GDP**.
  - Union government expected to contribute **40% of public expenditure**.
- **Spending Trends**
  - India's public health spending remains low globally.
  - Bhutan spent **2.5 times more per capita**, while Sri Lanka spent **three times more in 2021**.
  - Other BRICS nations recorded **14–15 times higher per capita health expenditure**.
- **State-Level Trends**
  - State spending rose from **0.67% to 1.1% of GDP**.
  - Health share in State budgets increased modestly.
  - Pandemic spending expansion was largely State-driven.
- **Union Allocation Patterns**
  - Union spending declined from **0.37% to 0.29% of GDP**.
  - Budget share for health also reduced.
- **Cess & Transfers**
  - **Health and Education Cess** collections remain underutilised for health.
    - FY2023-24 collections reached **₹71,180 crore nationwide**.
  - Union transfers for **State health schemes** declined substantially.
  - Reflects growing fiscal centralisation despite State responsibility.

Human Resources, Medical Education & Workforce Conditions

- Healthcare systems depend fundamentally on people, not just infrastructure.
- **Workforce Expansion Vision**
  - Shift focus from formal qualifications to **provider competencies**.
  - Emphasis on ethics, motivation, and service orientation.
  - Frontline workers require empowerment and institutional support.
- **AYUSH Integration**
  - Recognised systems include **Ayurveda, Yoga, Unani, Siddha, Homeopathy**.
  - Integration can expand reach of primary care delivery.
- **Workforce Distress**
  - ASHA workers struggle for dignified working conditions.
  - Public hospital staff face unsafe infrastructure environments.
- **Medical Education Challenges**
  - Commercialised private education charges extremely high fees.
  - Doctors face pressure to recover education costs.
  - Training increasingly exam-oriented, weakening ethical grounding.

Service Delivery & Institutional Capacity

- Technology is emerging as a bridge between access and quality.
- Digital systems can integrate providers and financing agencies.
- Health data exchange improves care coordination.

- AI and genomics enable advanced diagnostics.
- Capital-efficient innovation supports point-of-care delivery.
- **Institutional Capacity Gaps**
    - Underfunding weakens infrastructure and service readiness.
    - Privatisation creates profit pressures in care delivery.
    - Public-private partnerships risk diverting public funds.

Public Health Crisis, Social Determinants & Accountability

- **Structural Health Burdens**
    - Rise of non-communicable diseases linked to processed diets.
    - Pollution and climate change intensify disease exposure.
    - Healthcare access shaped by class, caste, gender inequalities.
- **Systemic Policy Gaps**
    - Advanced disease stages reflect regulatory failures.
    - Persistent burdens: tuberculosis, anaemia, dialysis demand.
    - Policy focus remains treatment-centric, not preventive.
- **Doctors as Social Advocates**
    - Physicians witness policy failures through patient suffering.
    - Clinical proximity grants moral authority.
    - Doctors can influence courts, media, and policy discourse.
- **Historical & Ethical Legacy**
    - Rudolf Virchow linked disease to poverty and exclusion.
    - Physicians globally opposed structural injustices.
    - Indian reformers used medicine to advance social justice.
- **Ethical Imperative**
    - Medical professionals must challenge privatisation excesses.
    - Advocacy for equity and public financing remains essential.
- **Global Health Positioning**
    - India can expand leadership amid shifting global health governance.
    - Opportunity to amplify **Global South equity concerns** internationally.

Conclusion: A **humane health system** requires more than hospitals as it demands **financing justice**, **workforce dignity**, **technological integration,** and **ethical accountability** rooted in social equity.

Topic: Important aspects of governance, transparency and accountability, e-governance

Bhoomi Project of Karnataka: Case Study for E-Governance

Need

- Handwritten **land records** were fragmented, outdated, and manipulation-prone.
- Farmers depended on **village accountants**, causing delays and corruption.
- Rising **land disputes** increased litigation and administrative burden.
- **Small and marginal farmers** faced maximum governance distress.

Basic Components of the Project

- Launched in **2000** to computerise land records.
- Digitised **RTC (Records of Rights, Tenancy and Crops)**.
- Computerised records granted **legal validity**.
- **Bhoomi Kendras** set up at taluk level for service delivery.

Digital Integration & Service Expansion

- Integrated with **Kaveri Registration System**.
- Enabled **automatic mutation** post-registration.
- **Mojini software** digitised land surveys.
- Improved **boundary accuracy** and reduced transaction fraud.

Role in Welfare Delivery

- Enabled **Direct Benefit Transfers** to farmers.
- Supported **crop compensation** and **loan waivers**.
- Integrated with **PM-Kisan** database.
- **Aadhaar seeding** improved beneficiary targeting.

Prior Sanction in Corruption Investigations

Background and Case Context

- A Supreme Court two-judge Bench delivered a **split verdict on Section 17A** of the Prevention of Corruption Act (PCA) validity.
    - Section 17A mandates **prior government sanction** before corruption inquiries against public servants.
- **Judicial Precedents Referenced**
    - In **Vineet Narain versus Union of India (1998)** the Court held investigations must remain free from executive interference. The ruling followed the **N.N. Vohra Committee (1993)** findings on criminal-political nexus.

Debate on Prior Sanction under Section 17A

- **Petitioners' Arguments**
  - Section 17A grants broad protection to public servants, diluting **equality before law**.
  - Mandatory prior approval delays corruption investigations.
  - Weakens **investigative autonomy** and institutional independence.
  - Risks shielding corrupt officials from timely scrutiny.
- **Government's Defence**
  - Provision is a **statutory safeguard**, not an executive directive.
  - Aims to prevent **frivolous and politically motivated harassment**.
  - Protects honest officials and ensures fearless decision-making.
- **Divergence Between Judges**
  - **Justice B.V. Nagarathna**
    - Viewed **provision as enabling** protection of corruption.
    - Flagged **conflict of interest** in government-controlled sanction.
  - **Justice Viswanathan**
    - Supported prior approval safeguards and warned removal may cause **policy paralysis**.

Reforms Suggested

- Ensure **swift disposal of corruption cases** to strengthen deterrence against guilty public servants.
- Impose **time-bound punishment mechanisms** to reinforce accountability within public institutions.
- Introduce **penalties for false and malicious complaints** to discourage vexatious allegations.
- Establish safeguards to **filter frivolous complaints** before initiating formal investigations.
- Balance protections to **prevent harassment of honest officials** while enabling effective anti-corruption enforcement.

Miscellaneous

Sports Governance Reforms

Background and Policy Context

- The Prime Minister reiterated India's intent to **host the Olympic Games, 2036**.
- The announcement builds upon hosting the **Commonwealth Games, 2030**, and expanding domestic athlete platforms.
- The ambition aligns with sustained investments in **infrastructure and high-performance sports development**.

Government Initiatives and Budgetary Support

- Key programmes include **Khelo India, TOPS, and the Fit India Movement**.
- The **Union Budget 2025–26** allocated **₹3,794.30 crore** to the sports sector.
- A record **₹1,000 crore** was earmarked specifically for **Khelo India**.
- Over **1,000 Khelo India Centres** support nearly **3,000 athletes** nationwide.
- Support includes **coaching, nutrition, equipment, and medical services** for grassroots talent.

Why Olympic 2036 Raises Governance Stakes

- The **International Olympic Committee** emphasises ethical governance, gender equity, and financial transparency.
- Hosting requires **large public investment** in infrastructure, urban development, and security systems.
- Risks include **cost overruns, crony contracts, and underutilised stadium infrastructure**.

Institutional and Structural Challenges

- Most **National Sports Federations** function autonomously with limited athlete representation.
- The **National Sports Development Code, 2011** faces resistance over tenure caps and transparency norms.
- Continued **politicisation of federations** undermines professional decision-making and accountability.
- Absence of **athlete-to-administrator pathways** weakens policy alignment with performance needs.
- Sports ecosystem suffers from **digital and data analytics deficits** in performance monitoring systems.
- Persistent **regional disparities** concentrate medals among resource-rich states in youth competitions.

Lessons and Ongoing Reforms

- The **Commonwealth Games, 2010** exposed governance lapses and inefficient project management.
- The **Sports Authority of India** introduced National Centres of Excellence and a **Digital Athlete Database System**.
- Expansion of the **National Centre for Sports Science and Research** strengthens evidence-based coaching.
- The **Abhinav Bindra Task Force, 2025** highlighted accountability gaps and outdated administrative training.

Way Forward and Conclusion

- Proposed pillars include **professional sports administration, governance reform, athlete mentoring, and data-driven management**.
- The Olympic vision requires **institutional credibility**

and administrative capacity alongside financial commitment.

PRELIMS

Topic: Acts and Government Initiative

The Central Excise (Amendment) Act, 2025

Context and Background

- The **Central Excise (Amendment) Act, 2025** was notified to revise taxation on tobacco products.
- Changes take effect from **February 1, 2026**, coinciding with the end of GST compensation cess.
- The reform aligns **public health objectives** with **fiscal restructuring** of tobacco taxation.

What is the Act?

- Amends the **Central Excise Act, 1944** to revise excise duties on tobacco products.
- Applies to products remaining **outside the full GST framework**.
- Seeks to preserve overall tax incidence after cess withdrawal.

Key Excise Duty Revisions

- **Unmanufactured tobacco** duty increased from **64% to 70%**.
- **Chewing tobacco** excise raised sharply from **25% to 100%**.
- **Hookah and gudaku tobacco** duty increased from **25% to 40%**.
- **Smoking mixtures** duty raised steeply from **60% to 325%**.
- **Cigarettes** duty revised from **₹200–₹735** to **₹2,700–₹11,000 per thousand sticks**.

GST Compensation Cess Changes

- GST compensation cess introduced in **July 2017** to protect State revenues.
- Extended until **March 31, 2026** due to pandemic-related shortfalls.
- Used to repay about **₹2.7 lakh crore** borrowed for State compensation.
- **Phased out fully from February 1, 2026**, including on tobacco products.

Census in India

Core Concept

- Census is a **systematic enumeration of population**.
- Provides data on **demography, socio-economic and cultural characteristics**.
- Conducted at **local, regional and national levels**.

History

- First census conducted in **1872** (non-synchronous).
- First **synchronous census** held in **1881**.
  - Conducted under **W.C. Plowden**, Census Commissioner of India.
- Census is carried out **every 10 years**.

Institutional Responsibility

- Conducted by the **Office of the Registrar General and Census Commissioner of India (RGI)**.
- RGI functions under the **Ministry of Home Affairs**.

Legal and Constitutional Basis

- Census is listed in the **Union List (Entry 69)** of the **Seventh Schedule**.
- Conducted under the **Census Act, 1948**.

Upcoming Census: Key Features

- Will be the **16th Census of India**.
- It will be the **8th census after Independence**.
- Census data will be collected **digitally using a mobile application**.
- **Self-enumeration facility** will be provided for the first time.

Pre-Census Preparations

- States must report **changes in districts, towns and villages** to RGI.
- **Administrative boundaries are frozen** before census operations.
- Boundary freeze occurs **not earlier than one year** before census reference date.
- Census work is preceded by **house-listing enumeration**.

Arbitration and Conciliation Act, 1996

Nature & Purpose

- Provides a **legal framework for Arbitration, Conciliation and Mediation** in India.
- Promotes **speedy, cost-effective and non-adversarial dispute resolution** outside courts.
- Based on the **UNCITRAL Model Law**, aligning India with global arbitration practices.

Key Features

- Establishes a **two-track ADR system** covering arbitration and conciliation.
- Ensures **party autonomy** in selecting arbitrators and deciding procedures.
- Mandates **confidentiality** of arbitral and conciliation proceedings.

- Arbitral awards are **final, binding and enforceable** like court decrees.
- Limits **judicial intervention** to appointment, interim relief and enforcement.

Major Provisions

- Arbitration agreement must be **written**.
- Arbitrators appointed by parties or by **courts on failure of consensus**.
- Courts may grant **interim measures** before or during proceedings.
- Awards must be **written, signed and reasoned** (unless waived).
- Awards can be set aside only on **limited grounds** like incapacity or invalid agreement.
- Appeals permitted on **restricted statutory grounds**.

Key Amendments

- **2015 Amendment**
  - Introduced **12-month time limit** for arbitral proceedings.
  - Reduced judicial interference and regulated arbitration costs.
- **2019 Amendment**
  - Established **Arbitration Council of India (ACI)**.
  - Mandated disclosure of arbitrators' **conflict of interest**.
- **2021 Amendment**
  - Removed **automatic stay on awards** in fraud or corruption cases.

Arbitration Council of India (ACI)

- Autonomous statutory body created under the **2019 Amendment**.
- Grades arbitral institutions and accredits arbitrators.
- Promotes **institutional arbitration** in India.
- **Chairperson:** Former **Supreme Court/High Court judge** or arbitration expert, appointed by the Central Government.

Digital Personal Data Protection Act, 2023

Digital Personal Data Protection Act, 2023 (DPDP Act)

- **Applicability**
  - Applies to **digital personal data** processed within India, including digitised offline data.
  - Extends to **extra-territorial processing** if goods or services are offered in India.
  - Excludes personal data used for **personal purposes** or made public legally by the individual.
- **Consent Framework**
  - Data processing permitted only for **lawful purposes with consent** of the Data Principal.
  - Consent can be **withdrawn at any time**.
  - **Children defined as below 18 years**; verifiable parental or guardian consent mandatory.
  - **Section 9** prohibits harmful processing and targeted advertising towards children.
  - Consent exemption allowed for **government services, medical emergencies, and legitimate uses**.
- **Rights and Duties of Data Principals**
  - Rights include **access, correction, erasure, grievance redressal**, and nomination of representatives.
  - Duty to avoid **false or frivolous complaints**, with penalties up to **₹10,000**.

National Legal Services Authority (NALSA)

Context: The Minister of State for Law and Justice informed the Rajya Sabha about district legal services clinics under **NALSA.**

About

- Established under **Legal Services Authorities Act, 1987**
- Provides **free and competent legal services** to **poor and marginalised sections**
- Covers **Scheduled Castes and Scheduled Tribes beneficiaries**
- **Headquarter:** Housed at **Supreme Court of India, New Delhi**

Institutional Structure

- **State Legal Services Authority** in every State
- **High Court Legal Services Committee** in every High Court
- **District Legal Services Authorities** in all districts
- **Taluk Legal Services Committees** in most taluks

Free Legal Services Include

- Payment of **court fees and legal process charges**
- Provision of **lawyers for legal proceedings**
- Supply of **certified copies of legal documents**
- Preparation of **appeals, paper books, translations, and printing**

Eligible Beneficiaries

- Women and children
- Members of SC and ST communities
- Industrial workmen
- Victims of disasters and violence
- Persons with disabilities

- Persons in custody
- Low-income persons below prescribed annual income limits
- Victims of human trafficking

Income Eligibility Limits

- **₹1 lakh annual income** for general legal services eligibility
- **₹5 lakh limit** for Supreme Court Legal Services Committee cases

Jal Jeevan Mission (JJM)

Context: Jal Jeevan Mission achieved **98% tap coverage**, but only **76% households** have **functional, reliable water supply**.

More in news:

- **83% households** received water in last seven days despite **98% tap availability**.
- Only **80% households** got sanctioned minimum **55 litres per person daily**.
- **76% households** met **water quality standards** for **e-coli, coliform, pH levels**.
- **Bihar (61%), UP (72%), Nagaland (74%)** reported lowest water availability among states.
- **2.72 lakh of 5.8 lakh villages** certified as Har Ghar Jal villages.

About Jal Jeevan Mission (JJM)

- **Background**
  - Restructured from National Rural Drinking Water Programme
  - Implemented as **Centrally Sponsored Scheme**
- **Nodal Ministry**
  - Department of Drinking Water and Sanitation
  - Under Ministry of Jal Shakti
- **Funding Pattern**
  - **90:10** for Himalayan and North-Eastern States
  - **100 percent** funding for Union Territories
  - **50:50** funding for other States
- **Mission Objective**
  - Provide **functional household tap water connections** in rural areas
- **Core Components**
  - Ensures **safe drinking water quality standards nationwide**
  - Promotes **groundwater recharge and source sustainability**
  - Encourages **greywater reuse and wastewater recycling systems**
  - Supports **bottom-up community planning and local participation**
  - Strengthens **women involvement in planning and monitoring**
  - Builds **local skills for operation and maintenance workforce**
  - Prioritises **tap water access for schools and Anganwadi Centres**
- **States with 100 Percent Coverage**
  - Arunachal Pradesh, Goa, Haryana, Himachal Pradesh, Gujarat, Punjab, Telangana, Mizoram

Topic: Functioning of Parliament and State Legislature

Parliamentary Privileges & Immunities

Core Concept

- Parliamentary privileges are **special rights, freedoms and immunities**.
- Available to **MPs and State Legislature members**.
- Aim is **independent and obstruction-free functioning** of legislatures.

Historical Origin

- Rooted in the **Charter Act, 1833**.
- Expanded under **Government of India Act, 1935**.

Sources

- **Constitutional Sources**

Article	Provision
Article 105	Freedom of speech, immunity for MPs, power to define privileges
Article 122	Courts barred from examining Parliamentary procedure
Article 194	Same privileges for State Legislatures
Article 212	Courts barred from State Legislature procedural scrutiny

- **Other Sources**
  - British Parliamentary conventions (as in 1947)
  - Statutory laws enacted by Parliament
  - Rules of Procedure of Lok Sabha and Rajya Sabha
  - Judicial interpretations

Legal Position

- **No Act of Parliament defines privileges.**

- Privileges currently follow **British conventions**.
- **Lok Sabha Privileges Committee (2008)** rejected codification.

Nature of Privileges

- Available to **individual members and the House**.
- **Co-terminus with membership**.
- Cease after **member leaves office**.
- **Individual Privileges of MPs & MLAs**

Right	Source
Freedom of speech in legislature	**Article 105(1)**
Immunity for speech and votes	**Article 105(2)**
Protection for authorised publications	**Article 105(2)**
Courts barred from procedural inquiry	**Article 122(1)**
Freedom from civil arrest during session + 40 days before & after	**Section 135A, CPC 1908**

- **Collective Privileges**
  - Power to **publish and restrict parliamentary reports**
  - **44th Constitutional Amendment (1978)** allows press reporting except secret sittings
  - Power to hold **secret sittings**
  - Authority to **make internal rules**
  - Power to **punish for breach or contempt**
  - Right to **information on member arrest or detention**
  - Power to **summon witnesses and demand records**
  - **Judicial immunity** for proceedings
  - No arrest inside Parliament without **Presiding Officer's consent**

Breach of Privilege

- Violation of **House or Member rights**
- Includes **disobedience of House orders**
- Includes **defamatory acts against House, members, committees**

Contempt of the House

- Any act **obstructing legislative functioning**
- Includes:
  - Defamatory publications
  - Questioning Chair's impartiality
  - Publishing expunged proceedings

Supreme Court Judgments

Case	Principle
P.V. Narasimha Rao (1998)	MPs immune if vote linked to bribe
K. Ajith (2021)	Privileges do not override criminal law
Sita Soren (2024)	Bribery not protected by Articles 105 & 194

Topic: Constitutional, Statutory and Executive Bodies

Telecom Regulatory Authority of India (TRAI)

Establishment and Legal Basis

- **Telecom Regulatory Authority of India (TRAI)** was established under the TRAI Act, 1997.
- The Act was passed by Parliament to create an independent telecom regulatory framework.
- TRAI assumed tariff fixation and revision functions earlier exercised by the Central Government.

Mandate and Scope of Regulation

- TRAI regulates **telecommunication services** across India.
- Its jurisdiction includes **tariffs**, quality of service, and interconnection arrangements.
- It oversees aspects of **spectrum management** and consumer protection in telecom services.
- TRAI ensures orderly growth and fair competition within the telecom sector.

Composition of TRAI

- TRAI comprises a **Chairperson**, up to two full-time members, and two part-time members.
- All appointments are made by the **Central Government**.
- Members hold office for **three years** or until attaining **65 years**, whichever is earlier.

Extent of Government Control

- TRAI is **not fully independent** and functions under executive constraints.
- Under **Section 25** of the TRAI Act, the Government may issue binding directions.
- TRAI's **funding is entirely** provided by the Central Government.
- Despite advisory status, TRAI plays a **mandatory consultative role** in telecom licensing.

State Election Commissions (SECs)

Constitutional Status and Role

- State Election Commission is a **constitutional authority** for local body elections.
- Responsible for **conducting free, fair and impartial elections**.
- Jurisdiction covers **Panchayats and Municipalities** within a state.

Appointment

- State Election Commissioner is **appointed by the Governor**.
- SEC functions independently of the State Government in election matters.

Powers (Article 243K(1))

- Vests **superintendence, direction and control** of local body elections.
- Responsible for **preparation of electoral rolls** for Panchayats.
- Conduct of Municipal elections governed under **Article 243ZA**.

Tenure (Article 243K(2))

- **Tenure and conditions of service** decided by state legislature law.
- Constitution does not prescribe a **fixed tenure period**.

Removal and Safeguards

- State Election Commissioner enjoys **status of High Court Judge**.
- Salary and allowances equivalent to **High Court Judge**.
- Removal only in **like manner and like grounds** as High Court Judge.

Bureau of Indian Standards (BIS)

Institutional Profile

- BIS is **India's National Standards Body** responsible for **standardisation, certification and hallmarking**.
- **Establishment and Legal Basis**
  - BIS was established in **1987**.
  - Came into force on **1 April 1987**.
  - Governed under the **BIS Act, 2016**.
  - Headquarters located in **New Delhi**.

Historical Evolution

- **Indian Standards Institution (ISI)** was set up in **1947**.
- **ISI Certification Marks Scheme** launched during **1952–56**.
- ISI was transformed into **BIS in 1987**.
- **BIS Act, 2016** expanded statutory powers.

Core Functions

- Formulates **Indian Standards** across sectors.
- Operates **product certification schemes**.
- Implements **Compulsory Registration Scheme**.
- Runs **Foreign Manufacturers Certification Scheme**.
- Conducts **hallmarking of precious metals**.
- Provides **laboratory testing and recognition services**.

Recent Initiatives

- **BIS Standardisation Portal** launched for **digital standards lifecycle**.
- **SHINE** programme focuses on **women-centric capacity building**.
- **BIS-SAKSHAM** recognises **institutional excellence**.

Insurance Regulatory and Development Authority of India (IRDAI)

Legal Status

- IRDAI is a **statutory regulatory body**.
- Established under the **IRDAI Act, 1999**.
- Functions as an **autonomous authority**.
- Works under the **Ministry of Finance**.
- Head office located at **Hyderabad**.

Composition

- **Chairperson**.
- **five** full-time members and **four** part-time members.

Regulatory Powers

- Registers and licenses **insurers and intermediaries**.
- Prescribes **capital and eligibility requirements**.
- Regulates **premium pricing and policy conditions**.
- Approves **insurance products**.
- Regulates **investment of insurance funds**.
- Specifies **financial reporting standards**.
- Conducts **inspection, audit and investigation**.

Entities Regulated

- Life insurance companies (public and private).
- General insurance companies.
- Standalone health insurance companies.
- Reinsurance companies.
- Insurance intermediaries.

Intermediaries Covered

- Corporate agents.
- Insurance brokers.

- Third-party administrators (TPAs).
- Surveyors and loss assessors.

Delimitation Exercise in India

What is Delimitation?

- Delimitation is the process of **fixing or re-drawing boundaries of parliamentary and state legislative constituencies** based on changes in population, to ensure **equal representation**.
- It is carried out by an independent **Delimitation Commission** (also called Boundary Commission).

Constitutional Basis

Article	Provision
Article 82	Parliament shall enact a **Delimitation Act after every Census** to readjust Lok Sabha constituencies
Article 170	Provides for **re-division of State Assembly constituencies** after every Census
Delimitation Act	Gives **absolute legal authority** to the Commission; its orders **cannot be challenged in any court**

- Once Commission's orders are laid before Parliament or State Assemblies, **they cannot be modified**.

Composition of Delimitation Commission

Post	Member
Chairperson	**Retired Supreme Court Judge**
Ex-officio Member	**Chief Election Commissioner of India**
Members	**State Election Commissioners** of concerned states

- Appointed by the **President of India** and works in coordination with the **Election Commission of India (ECI)**.

Historical Timeline

- **First Delimitation Commission (1953)**
  - Based on **1951 Census**.
  - Headed by **Justice N. Chandrasekhara Aiyar**.
  - Lok Sabha seats **fixed at 494.**
- **Second Delimitation Commission (1963)**
  - Based on **1961 Census**.
  - Lok Sabha seats **increased to 522.**
- **Third Delimitation Commission (1973)**
  - Based on **1971 Census**.
  - Headed by **Justice J. L. Kapur**.
  - Lok Sabha seats increased **from 522 to 543**.
  - State Assembly seats increased **from 3,771 to 3,997**.
- **Freeze Period (Post-1971 Census)**
  - No delimitation exercise after **1981 and 1991 Censuses**.
  - **42nd Constitutional Amendment Act, 1976** froze delimitation of constituencies till the **2001 Census**.
  - **84th Constitutional Amendment Act, 2002** froze **increase in seats** in Parliament and Assemblies till **2026**.
- **Fourth Delimitation Commission (2002)**
  - Based on **2001 Census**.
  - Headed by **Justice Kuldip Singh**.
  - **Only constituency boundaries** were redrawn.
  - No increase in Lok Sabha or Assembly seats due to 84th Constitutional Amendment.

Central Vigilance Commission (CVC)

Context

- Shri **Praveen Vashista, IPS (Bihar cadre, 1991 batch)** appointed as **Vigilance Commissioner** in the CVC.
- He **took oath on 16 January 2026**, strengthening leadership in India's apex vigilance body.

Article	Provision
Article 82	Parliament shall enact a **Delimitation Act after every Census** to readjust Lok Sabha constituencies
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Delimitation Act	Gives **absolute legal authority** to the Commission; its orders **cannot be challenged in any court**

About CVC

- Apex vigilance and integrity institution of the **Government of India**.
- Promotes **transparency, accountability and corruption prevention** in Central Government organisations.

- **Establishment and Legal Status**
  - **Established:** 1964 by executive resolution of Government of India.
  - **Statutory status:** Central Vigilance Commission Act, **2003**.
- **Historical Background**
  - Originated from recommendations of the **Santhanam Committee (1962–64)**.
  - Initially lacked statutory authority, limiting enforcement capacity.
  - Became an **independent statutory body in 2003**, strengthening oversight powers.
- **Composition and Appointment**
  - **Chairperson:** Central Vigilance Commissioner.
  - **Members:** Up to **two Vigilance Commissioners**.
  - **Appointing Authority:** President of India.
  - **Selection Committee:**
    - Prime Minister (Chair)
    - Union Home Minister
    - Leader of Opposition in Lok Sabha
  - **Tenure:** Four years or **65 years of age**, whichever is earlier.
- **Organisational Structure**
  - **Secretariat:** Headed by a Secretary.
  - **Chief Technical Examiners' Wing (CTE):** Examines technical aspects of works contracts.
  - **Commissioners for Departmental Inquiries (CDIs):** Act as inquiry officers.
  - **Chief Vigilance Officers (CVOs):** Posted in ministries, PSUs, banks as extended arm.
- **Jurisdiction**
  - Covers **All India Services and Group 'A' officers** of Central Government.
  - Includes officials of **CPSUs, Public Sector Banks, RBI, NABARD, SIDBI, LIC, General Insurance Companies**.
  - Covers specified **societies and autonomous bodies** under Union control.
  - Exercises superintendence over **CBI investigations** under Prevention of Corruption Act, 1988.
  - Conducts inquiries on **Lokpal-referred complaints** for Group A, B, C and D officials.
- **Key Functions**
  - Supervises and coordinates **vigilance machinery** across Central organisations.
  - Inquires or orders investigations into **corruption-related complaints**.
  - Issues **vigilance advice** to ministries, departments and PSUs.
  - Reviews progress of investigations and **pendency of prosecution sanctions**.
  - Recommends senior appointments in **CBI and Directorate of Enforcement**.
  - Acts as authority under **PIDPI Resolution** for whistle-blower protection.

Central Bureau of Investigation (CBI)

Overview

- **Nature:** Premier central investigating agency of India
- **Role:** Investigates corruption, economic offences, special crimes; coordinates with **Interpol**
- **Motto:** *Industry, Impartiality and Integrity*

Genesis

- **Established:** 1963
- **Basis:** Recommendation of **Santhanam Committee (1962–64)** on Prevention of Corruption

Legal Status

- **Type:** Non-constitutional, non-statutory body
- **Governing Law: Delhi Special Police Establishment (DSPE) Act, 1946**

Administrative Control

- **Ministry:** Ministry of Personnel, Pension & Public Grievances

Organisation Structure

- **Head:** Director, CBI
- **Assisted by:** Special Director / Additional Director
- **Hierarchy:** Joint Directors → DIGs → SPs → Police ranks

Tenure

- **CBI Director:** Fixed tenure of **2 years**
- **2021 Ordinance:** Allows extension up to **5 years** (annual review basis)

Types of Cases

- **Anti-Corruption**
- **Economic Offences**
- **Special Crimes**
- **Suo Motu Cases**

State Consent (Section 6, DSPE Act)

- **General Consent:** Allows CBI to investigate in a state without case-wise approval
- **Specific Consent:** Required for each case, if general consent withdrawn
- **States withdrawing general consent:** West Bengal, Punjab, Telangana, etc.

Appointment of CBI Director

- In **Common Cause v. Union of India (2019),** the Selection Committee for appointing the Director was created which includes:

- Prime Minister (Chairperson)
- Remember: Leader of Opposition / Largest Opposition Party Leader
- Chief Justice of India / SC Judge nominated by CJI

Key Judicial Pronouncements

- **Vineet Narain v. Union of India (1997):** Struck down "Single Directive"; strengthened CBI autonomy
- **Subramanian Swamy v. CBI (2014):** Section 6A of DSPE Act declared unconstitutional (prior sanction removed)
- **CBI v. Sanjiv Chaturvedi (2024):** CBI not fully exempt from RTI; corruption & human rights info disclosable

Functions

- Corruption in public services
- High-value financial and economic crimes
- Cyber and high-technology crimes
- International police cooperation (Interpol cases)

Topic: Important Aspect of Governance

PRAGATI Platform (Pro-Active Governance and Timely Implementation)

What is PRAGATI?

- PRAGATI is a **digital governance platform** for **grievance redressal and project monitoring**.
- It reviews **citizens' complaints** and tracks major **government programmes and infrastructure projects**.

Launch & Development

- Launched on **25 March 2015**.
- Works under the **direct supervision of the Prime Minister**.
- Developed by the **Prime Minister's Office (PMO)** with support from the **National Informatics Centre (NIC)**.

Key Features

- It integrates:
  - Digital data systems.
  - Video conferencing.
  - Geospatial technology.
- This enables **real-time monitoring** of projects and grievance cases.

Federal Governance Role

- Promotes **Cooperative Federalism**.
  - Brings together: Union Secretaries and State Chief Secretaries.
- Facilitates coordinated decision-making on governance issues.

Significance

- Strengthens **transparency and accountability** in governance.
- Improves **time-bound implementation** of government projects.
- Enhances **efficiency in grievance redressal**.

PANKHUDI Portal

What it is?

- **PANKHUDI** is an **integrated digital platform** launched by the **Ministry of Women and Child Development (WCD)**.
- It strengthens **corporate partnerships, voluntary contributions and stakeholder engagement** for **women and child welfare**.

Platform design

- It operates as a **single-window centralised portal** for **individuals, NRIs, NGOs, CSR entities, corporates and government agencies**.
- It enables **participation, collaboration and contribution** to women- and child-centric development programmes.

Thematic coverage

- The portal covers **nutrition, health, Early Childhood Care and Education (ECCE), child protection and rehabilitation, and women's safety and empowerment**.

Mission integration

- It supports and tracks flagship schemes such as:
  - Mission Saksham Anganwadi & Poshan 2.0
  - Mission Vatsalya
  - Mission Shakti

Operational features

- Contributors can **register, select projects, submit proposals and track progress** through defined digital workflows.
- All contributions are **non-cash, traceable and transparent**, ensuring **financial accountability and real-time monitoring**.

BHASHINI Samudaye

Overview

- **BHASHINI Samudaye** is a **collaborative ecosystem platform** under **BHASHINI**.
- It aims to **co-create, govern and scale Indian-language AI tools, datasets and services**.
- It is led by the **Digital India BHASHINI Division**

(DIBD) under the **Ministry of Electronics and Information Technology**.
- It operates as part of the **National Language Translation Mission (NLTM)**.

Key Features
- **Participatory AI governance model** involving academia, states, NGOs and startups.
- **BHASHINI APIs** support real-time **translation, speech-to-text and text-to-speech**.
- **BhashaDaan platform** enables citizen-led creation of Indian-language datasets.
- **Ethical data framework** ensures consent-based, inclusive and standardised data.
- **Live use-case demonstrations** in governance, education and public service delivery.

Sampoornata Abhiyan 2.0

Context: Launched by **NITI Aayog CEO B.V.R Subrahmanyam** for **100% indicator saturation.**

What is it?
- **Mission-mode, time-bound campaign** for **social sector saturation**
- Covers **112 Aspirational Districts** and **513 Aspirational Blocks**
- Builds upon **Phase One launched in 2024**

Campaign Timeline
- Start: January 28, 2026
- End: April 14, 2026
- Duration: Three months

Core Objectives
- Achieve **full coverage of health, nutrition, education services**
- Promote **monthly performance tracking and competitive federalism**
- Ensure scheme reach to **remote and underserved households**

Key Schemes Linked
- **ICDS** for child nutrition and Anganwadi services
- **TB Mukt Bharat** for tuberculosis notification and coverage

KPIs – Aspirational Blocks (Six Indicators)
- **Supplementary nutrition** for children under **ICDS**
- **Growth monitoring** at **Anganwadi Centres**
- **Functional toilets** in Anganwadi Centres
- **Drinking water availability** in Anganwadi Centres
- **Girls' toilets** in schools
- **Bovine vaccination** against **Foot and Mouth Disease**

KPIs – Aspirational Districts (Five Indicators)
- Newborns weighed at birth
- TB case notification rates
- VHSND and UHSND regular conduct
- Functional girls' toilets in schools
- Universal livestock vaccination coverage

Significance
- Shifts focus from **outputs to measurable outcomes**
- Strengthens **data-driven governance systems**
- Targets **India's most backward and underserved regions**

Miscellaneous

National Cadet Corps (NCC)

Context: NCC units are now present in over **90% of all districts** nationwide with nearly **20 lakh** cadets. **Girl cadets** form **40%** of NCC strength.

National Cadet Corps (NCC)
- **Nature and Composition**
  - It is a **Tri-Services organisation (Army, Navy and Air Force)**.
  - Engaged in **grooming youth into disciplined and patriotic citizens**.
- **Legal Basis and Ministry**
  - Established under **National Cadet Corps Act, 1948**.
  - Act number: **Act XXXI of 1948**.
  - Functions under **Ministry of Defence (MoD)**.
- **Voluntary Character and Cadet Recruitment**
  - NCC is a **voluntary organisation**.
  - Cadets recruited from **high schools, colleges and universities**.
  - Recruitment spread **across all parts of India**.
- **Training and Incentives**
  - Cadets receive **basic military training**.
  - Training includes **small arms handling and parades**.
  - NCC cadets given **preference in military services selection**.

Aims and Objectives of NCC
- **Personality and Value Development**
  - Develops **character, courage and comradeship** among youth.
  - Promotes **discipline, leadership and secular outlook**.
  - Encourages **adventure, sportsmanship and selfless service**.
- **Nation-Building Role**
  - Creates **trained and motivated youth**

resource.
- Prepares youth for **leadership roles in all walks of life**.
- Cadets remain **available for national service when required**.

Parole and Furlough

Parole
- Parole involves **temporary release with suspension of sentence**.
- Release is **conditional**, with **periodic reporting** to authorities.
- Parole is **not a prisoner's right**.
- Granted for **specific reasons** such as family emergencies.
- Can be **denied in public interest**, despite eligibility.

Furlough
- Furlough applies mainly to **long-term imprisonment** cases.
- Period spent on furlough is treated as **sentence remission**.
- Considered a **matter of right**, granted **periodically**.
- Granted **without specific reasons** to maintain social ties.

Common Provisions
- Both are **reformative measures** in prison administration.
- Aim to **humanise the prison system**.
- Governed under the **Prisons Act, 1894**.

Flag Code of India

Context & Nature
- The **Flag Code of India** governs the **display, usage and respect** of the National Flag.
- It permits **unrestricted public display** of the Tricolour, subject to dignity and honour.
- It consolidates earlier laws, conventions and practices. It does not replace them.

Structure of the Flag Code
- Divided into **three parts**:
  - General description of the National Flag.
  - Display rules for public, private bodies and educational institutions.
  - Display rules for governments and official agencies.
- **Design Specifications**
  - Flag must be **rectangular** in shape.
  - Length-to-width ratio fixed at **3:2**.

Key Provisions
- The Tricolour **cannot be used for commercial purposes**.
- It **cannot be dipped in salute** to any person or object.
- It **cannot be used as decoration, festoons or drapery**.
- For official use, flags must conform to **Bureau of Indian Standards (BIS)** specifications.

Important Amendments
- **2021 Amendment:** Allowed **polyester and machine-made flags**.
- **2022 Amendment:** Permitted the National Flag to be **flown day and night**.

Related Laws on National Flag
- **Emblems and Names (Prevention of Improper Use) Act, 1950:** Restricts improper use of the National Flag, State Emblem and official symbols.
- **Prevention of Insults to National Honour Act, 1971:** Prohibits insult to the National Flag, Constitution and National Anthem.
- **Punishment:** Up to 3 years imprisonment, or fine, or both.

Historical Evolution of National Flag
- **1906:** First national flag hoisted at **Parsee Bagan Square, Calcutta**.
- **1907: Pingali Venkayya** proposed a flag design to Mahatma Gandhi.
- **1908:** Tricolour adopted by the Indian National Congress.
- **22 July 1947:** Present flag adopted by the **Constituent Assembly**.

Traditional Indelible Ink

What it is
- Permanent marking ink applied on a voter's finger after voting to prevent repeat voting.
- Introduced in **1962 (Third General Election)** as a low-cost anti-impersonation measure.

Manufactured by
- Produced exclusively by **Mysore Paints and Varnish Limited**, a Karnataka government undertaking.
- Formula developed by **National Physical Laboratory (NPL), India**, and closely guarded.

Aim
- Prevents **multiple voting and impersonation** during elections.
- Ensures **integrity and credibility of large-scale electoral processes**.

Key Features

- **Silver nitrate–based formulation** that reacts with keratin and light to form a chemical stain.
- **Dark, long-lasting mark** penetrates skin and nail for high visibility.
- **Difficult to remove** using soap, water, or common chemicals.
- **Standardised application point** on left index finger across nail and cuticle.
- **Extended visibility period** of 3–4 days on skin and 2–4 weeks on nail.

Significance

- Acts as a **visible and universally recognised electoral safeguard**.
- Strengthens **public trust in free and fair elections**.
- Demonstrates **six decades of proven reliability in Indian democracy**.

Juristic Person

Meaning

- **Juristic person:** Non-human entity recognised by law as a legal person.
- **Natural person:** Human being with legal rights and duties.
- Juristic persons can **own property, sue and be sued, and hold legal obligations**.
- Represented in courts through **guardians or authorised representatives**.

Examples of Juristic Persons

- **Deities:** Hindu idols with public consecration (Prana Pratishtha).
- **Corporations:** Companies as separate legal entities.
- **Animals:** Recognised by Punjab & Haryana High Court.
- **Rivers:** Ganga and Yamuna (Uttarakhand HC; later quashed by Supreme Court).
- **Mountains:** Mount Taranaki (New Zealand).
- **Foreign example:** Whanganui River (New Zealand).

Important Judgments

- **Dakor Temple Case (1887), Bombay HC:** Hindu idols recognised as juristic persons.
- **Tata Engineering v. State of Bihar:** Corporation is a permanent legal entity.
- **Bishwanath v. Thakur Radhaballabhji (1967):** Public can approach court as "friend of deity."
- **Yogendra Nath Naskar v. CIT (1969):** Juristic status requires public consecration.
- **Sabarimala Case:** Juristic status ≠ full constitutional rights.

Key Features

- Can **hold property in own name**.
- Has **legal rights and liabilities**.
- Acts through **human representatives**.

Anna Chakra

Context: The **Department of Food and Public Distribution (DFPD)** has been named a **finalist for the 2026 Franz Edelman Award** for its **Anna Chakra** initiative, recognising its impact on optimising India's food grain logistics.

About the Initiative

- **Overview**
  - **Nature:** Operations Research–based **decision-support system**
  - **Sector: Public Distribution System (PDS)** logistics
  - **Purpose:** Optimises **state-wise movement and routing of food grains** across supply-chain nodes
- **Development & Partnerships**
  - **Lead Agency:** Department of Food and Public Distribution (DFPD)
  - **Collaborators:**
    - UN World Food Programme (India)
    - IIT Delhi
  - **Model:** Government–UN–Academia collaboration
- **Key Features**
  - **Advanced algorithms:** Identify **optimal transport routes and logistics plans**
  - **Digital integration:**
    - PM Gati Shakti National Master Plan
    - FOIS (Railways Freight Operations Information System)
    - Connected via ULIP (Unified Logistics Interface Platform)
  - **Outcome:** Faster, cost-efficient, and reliable grain movement under PDS
- **Significance**
  - Improves **last-mile food security delivery**
  - Reduces **transport costs and delays**
  - Enhances **data-driven governance** in welfare logistics

About Franz Edelman Award

- **Field:** Operations Research, Analytics, Management Science
- **Reputation:** Often called the **"Nobel Prize of Analytics"**
- **Focus:** Real-world, high-impact analytical applications
- **Prize: $10,000** for the winner

National Voters' Day (NVD)

Observed on: 25 January (since 2011)
Occasion: Foundation Day of the **Election Commission of India (ECI)** (est. 25 Jan 1950)

Purpose

- Promote **universal adult suffrage**
- Encourage **youth participation** and voter enrolment
- Strengthen **democratic values** and informed voting

Theme (2026)

- **Theme:** *"My India, My Vote"*
- **Tagline:** *"Citizen at the Heart of Indian Democracy"*

Key Features

- Celebrated at **national, state, district, constituency, and polling booth** levels
- Focus on **first-time voters** and newly eligible youth
- Public awareness drives on **electoral rights and responsibilities**
- Organised by: **Election Commission of India (ECI)**

Entry into Electoral Roll is Qualified Right

Context

- Election Commission defended Special Intensive Revision conducted in **Bihar** before the Supreme Court.A bench headed by **Chief Justice Surya Kant** examined constitutional validity of the verification process.

Constitutional Basis of Electoral Rights

- **Article 326** establishes adult suffrage with specific eligibility conditions.
- Voter must be **18 years old, an Indian citizen, and not legally disqualified**.
- Eligibility conditions must be **continuously fulfilled**, not only at initial registration.
- Entry in electoral roll described as a **"qualified right"**, not an absolute entitlement.

Election Commission's Legal Position

- EC argued SIR is a **verification exercise**, not a citizenship determination process.
- Senior advocate stated verification ensures continued compliance with constitutional eligibility.
- Distinguished between **citizenship verification** and **citizenship adjudication**.
- Emphasised no additional conditions beyond constitutional and statutory requirements.

Statutory Framework Referenced

- EC relied on **Section 16** of Representation of the People Act, 1950.
- Section 16 outlines **disqualifications for registration** in the electoral roll.
- EC cited **Section 19**, specifying **conditions of voter registration**.
- Claimed SIR aligns strictly with these statutory provisions.

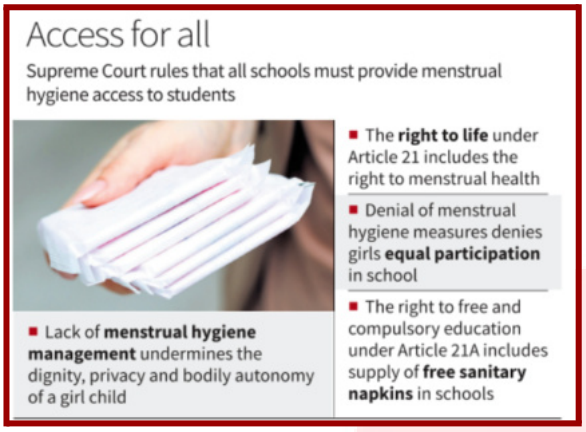
Administrative and Electoral Impact

- EC reported **no formal complaints** regarding SIR implementation in Bihar.
- Door-to-door surveys reportedly **increased voter turnout in 2025 elections**.
- Exercise helped **remove deceased and duplicate entries** from electoral lists.
- EC highlighted increased **public awareness and voter engagement**.

Judicial Scrutiny and Key Argument

- Court examined whether SIR imposed **unauthorised parameters on voter eligibility**.
- EC maintained it only **enforced existing constitutional and legal qualifications**.
- Central claim: electoral inclusion depends on **continuous proof of eligibility**.

Menstrual Health as Right to Dignity



Constitutional Recognition

- Supreme Court declared **menstrual health** integral to **right to life and dignity under Article 21**.
- Court linked **Menstrual Hygiene Management (MHM)** to privacy, bodily autonomy, and decisional freedom.
- Judgment arose from a **writ petition by Dr. Jaya Thakur** on inadequate school facilities.

Impact on Education and Dignity

- Lack of MHM measures forces **absenteeism or unsafe practices**, undermining dignified student existence.
- Court held **menstrual poverty** restricts girls' right to education on equal footing.
- Gender-specific barriers disrupt **attendance and continuity**, defeating free and compulsory education guarantees.

Directives to States and Schools

- States and Union Territories must provide **functional, gender-segregated toilets** in all schools.
- Schools must ensure **free oxo-biodegradable sanitary napkins**, preferably within toilet premises.
- **Sanitary napkin vending machines** mandated for easy and private student access.

Comprehensive MHM Infrastructure

- Schools must establish **MHM corners** with spare innerwear, uniforms, and disposable materials.
- Court emphasised **availability of water and hygienic disposal mechanisms** for meaningful autonomy.
- MHM extends beyond sanitation to include **privacy, dignity, and bodily control**.

Sensitisation and Accountability

- Court stressed **educating male teachers and students** on biological realities of menstruation.
- Objective is to prevent **harassment, stigma, and invasive questioning** of menstruating students.
- Government schools accountable under **Section 19 of the RTE Act** for compliance.
- Private schools face **de-recognition and penalties** for violating prescribed RTE norms.

New Aadhaar App

Context

- The Unique Identification Authority of India (UIDAI) launched the New Aadhaar App in January 2026 with **privacy-first design.**

What is it?

- **Next-generation mobile platform** for Aadhaar services and identity management
- Designed by **UIDAI** under **consent-based data sharing framework**

Difference from mAadhaar

- Focuses on **data minimisation** and **user-controlled information sharing**
- Aligned with **Digital Personal Data Protection Act**

Core Objectives

- Eliminates **photocopy misuse** during hotel and airport identity checks
- Provides **identity at fingertips** with **selective data sharing control**
- Reduces visits to **Aadhaar Seva Kendras** for routine updates

Offline Verification Features

- Enables **identity verification without active internet connection**
- Generates **password-protected Share ID files** with limited personal fields
- Provides **QR-based digitally signed identity verification**

Update Services from Home

- Allows **mobile number update using Face Authentication**
- Supports **address update through application interface**
- Charges **₹75 nominal fee** per update request
- Updates reflected within **fifteen days timeline**

One Family - One App

- Manages **up to five Aadhaar profiles on single smartphone**

Selective Data Sharing

- Allows sharing **photo and age only** for low-security verification

- Allows sharing **name and address only** for service access
- Masks **twelve-digit Aadhaar number completely**

Biometric Security

- Enables **one-click biometric lock and unlock feature**
- Prevents **unauthorised fingerprint and iris authentication usage**

Significance

- Aligns with **Digital Personal Data Protection (DPDP) Act** compliance for digital identity protection
- Enables safe instant verification for **service providers and gig workers**

About Unique Identification Authority of India (UIDAI)

- **Establishment**
  - Statutory body under **Aadhaar Act, 2016**
  - Operational since **July 12, 2016**
- **Headquarters and Ministry**
  - Headquarters located in **New Delhi**
  - Functions under **Ministry of Electronics and Information Technology (MeitY)**
- **Key Functions**
  - Issues **12-digit Aadhaar numbers** to residents of India
  - Provides **biometric and demographic authentication services**
  - Ensures **security and privacy of Aadhaar identity data**
  - Enables **digital inclusion through welfare and financial services**
  - Establishes **policies for Aadhaar lifecycle management**

Power Gap Index

Context: The Economic Survey 2025–26 cited the Power Gap Index, highlighting India's negative strategic performance score.

What is it?

- Secondary measure derived from **Asia Power Index**
- Measures **power efficiency** converting resources into regional influence
- Assesses **wealth and military** versus **diplomacy and networks**

Score Interpretation

- **Positive score:** Overperformer or **smart power state**
- **Negative score:** Underperformer with **unrealised strategic potential**

Developed By

- Developed by **Lowy Institute**, Sydney-based international policy think tank
- Part of **Asia Power Index project**, launched in **2018**

Core Objective

- Shows resources do not automatically create **geopolitical influence**
- Identifies failures in **diplomacy, trade, and defence networks**

Methodology

- Compares **comprehensive power score** with **expected power from resources**
- Uses **131 indicators across eight thematic measures**

Resource-Based Measures

- **Economic capability:** GDP, technology, and global connectivity
- **Military capability:** Spending, forces, and signature weapons
- **Resilience:** Internal stability, energy security, nuclear deterrence
- **Future resources:** Demographics and economic projections for 2035

Influence-Based Measures

- **Economic relationships:** Trade ties and investment leverage
- **Defence networks:** Alliances, diplomacy, and arms transfers
- **Diplomatic influence:** Global standing and foreign policy ambition
- **Cultural influence:** Ability to shape international opinion

India - Asia Power Index 2025

- Ranked **third after United States and China**
- Classified as **Major Power for first time**
- Recorded **power gap score of minus four**

INTERNATIONAL RELATION

Topic: Foreign Policy

India's Role in Global Governance

Background

- The Republic Day 2026 chief guests will represent the **European Union's institutional leadership**.
- This signals engagement with a **27-member bloc**, not a single national capital.
- Bilateral diplomacy will remain strained by **neighbourhood instability and U.S.–China strategic competition**.
- India's opportunities are identified in **global leadership gaps and diplomatic white spaces**.

Engagement with the European Union

- The presence of **Ursula von der Leyen and António Costa** highlights momentum for the **India–EU Free Trade Agreement**.
- The agreement extends beyond tariffs to **data standards, market access, and sustainability rules**.
- The EU seeks to **reduce dependence on China** and hedge against **United States unpredictability**.
- India gains stronger European access and **value chain positioning**, but faces higher compliance burdens.

BRICS as a Political White Space

- BRICS expansion has **widened representation but diluted strategic focus** among members.
- Many members demand stronger **Global South voice and development finance alternatives**.
- As **2026 chair and host**, India can leverage **New Development Bank guarantees**.
- India must avoid BRICS drifting into **anti-West rhetoric or de-dollarisation agendas**.

Quad and Regional Public Goods

- Hosting a **Quad Leaders' Summit** may involve the presence of the U.S. President.
- The Quad prioritises **maritime domain awareness and resilient port infrastructure**.
- Indian Ocean states seek **capacity-building without entanglement in power rivalries**.
- **Operation Sagar Bandhu** demonstrated rapid humanitarian deployment following a Sri Lankan cyclone.

Limits of Large Multilateral Forums

- The **United Nations** remains essential for legitimacy but weak in delivering coordinated outcomes.
- The **G20** faces strains from domestic politics and contested agenda priorities.
- The **2025 Johannesburg G20 boycott** reduced inclusivity for Global South concerns.
- Agenda narrowing under the **2026 U.S. presidency** may sideline development priorities.

New Global Platforms and Future Direction

- The **AI Impact Summit, February 2026**, aims to align governments, industry, and researchers.
- The proposed **Board of Peace** reflects emerging alternative peace-building forums.
- An invitation to **Pax Silica** signals U.S.-led coordination on artificial intelligence and semiconductors.

Conclusion

- India's 2026 strategy focuses on **functional coalitions over large forums**, maximising outcomes through **small tables and practical partnerships**.

Global South Resilience

Context and Strategic Importance

- India will host the **BRICS Summit in 2026**, following successful **G-20 hosting in 2023**.
- The Summit focus should align with **Global South priorities**, particularly climate resilience and sustainability.
- India's leadership aims to project an **inclusive green agenda** on global platforms.

Need for a Stabilising Multilateral Role

- Global multilateralism faces stress amid **U.S. withdrawal from international climate engagements**.
- The Trump administration plans to exit **66 international organisations**, including the **International Solar Alliance**.
- The U.S. absence from **COP30 in Belém, 2025**, created space for alternative leadership.
- Europe faces **domestic climate fatigue and security priorities**, reducing its climate advocacy role.
- BRICS can act as a **stabilising platform for collaborative sustainability and resilience efforts**.

Geopolitical Balancing for India

- BRICS is perceived by the U.S. as **anti-dollar and anti-American**, complicating diplomatic engagement.
- India must balance **BRICS leadership with strong India-U.S. trade and strategic relations**.
- The G-20 Delhi Summit demonstrated India's ability to **multi-align while protecting strategic**

autonomy.

Climate Change as a Shared Concern

- BRICS countries face **diverse but common climate risks** across infrastructure, health, and ecosystems.
- Vulnerabilities include **permafrost thaw, Amazon pressures, Himalayan instability, and coastal threats**.
- BASIC grouping under **UNFCCC** remains useful, but broader developing country coalitions add leverage.
- BRICS members have presided over **post-Paris climate conferences**, maintaining global momentum.

Climate Finance and Global Institutions

- The **BRICS Leaders' Framework Declaration on Climate Finance, July 2025**, highlighted Global South demands.
- Effective climate action requires engagement with **World Bank and International Monetary Fund leadership**.
- Private capital is retreating from **ESG commitments and green bonds**, limiting funding availability.

Expanded BRICS Influence

- BRICS now includes **Egypt, Ethiopia, Indonesia, Iran, and the UAE**, expanding global representation.
- The grouping represents **half of the world's population, 40% of global GDP, and 26% of trade**.

India's Opportunity

- India can shape a **collaborative green and resilience-driven agenda** for developing nations.
- Leadership can **balance Chinese ambitions** in global sustainability discourse.
- A resilience focus aligns with **Ethiopia's hosting of COP32 in 2027**.

Topic: Effect of policies and politics of developed and developing countries on India's interests, Indian diaspora.

Monroe Doctrine

Background and Origin

- The **James Monroe** articulated the **Monroe Doctrine** in **1823** as a U.S. foreign policy statement.
- It aimed to **prevent European intervention** in the American continents.
- The doctrine was primarily drafted by **John Quincy Adams**, then Secretary of State.

Core Principles

- Declared the **Western Hemisphere closed** to further European colonisation.
- Forbade **European political or military interference** in the Americas.
- Asserted **U.S. neutrality** regarding future conflicts among European powers.
- Combined hemispheric protection with **non-intervention in European affairs**.

Geopolitical Context

- Emerged amid **European attempts** to regain influence in the Americas during the 1820s.
- **Russia** sought territorial expansion in **Alaska**, alarming U.S. policymakers.
- The U.S. feared a **Spanish colonial revival** in Central and South America.
- **Britain's ambitions** in American trade and politics also shaped U.S. concerns.
- Adams opposed an Anglo-American alliance that could reduce U.S. strategic autonomy.

Evolution and Application

- Initially a **declaratory policy**, lacking enforcement capability.
- Invoked during the mid-19th century to justify **U.S. expansion and influence**.
- Reflected America's **increasingly imperial posture** in the Western Hemisphere.
- The doctrine gained force as U.S. military and economic power expanded.

Long-term Significance

- Shaped U.S. relations with **Latin American neighbours** for decades.
- Balanced advocacy of **independence and self-determination** with U.S. dominance.
- Reinforced an **isolationist outlook** central to 19th-century U.S. policy.
- The two **World Wars** eventually drew the U.S. into broader global leadership roles.

Donroe Doctrine

- **Concept:** The **"Donroe Doctrine"** represents a modern reinterpretation of the **1823 Monroe Doctrine** under Donald Trump's foreign policy outlook. It shifts from a defensive posture to a more **assertive, intervention-oriented hemispheric strategy**.
- **Core Strategic Idea:** It projects the U.S. as the **primary security guarantor of the Western Hemisphere**, discouraging strategic presence of extra-regional powers like **China and Russia**.
- **Policy Instruments:** The approach combines **economic coercion, military signalling, and regime pressure** to secure U.S. geopolitical primacy and resource access.

- **Strategic Objective:** It seeks to **reassert U.S. dominance in the Americas**, safeguarding strategic assets, trade routes, and political alignments.
- **Key Concerns:** Critics highlight risks of **sovereignty violations, erosion of international norms, and normalisation of coercive regime change** in global politics.

De-dollarisation

What is De-dollarisation?

- **De-dollarisation** refers to reducing reliance on the **US dollar** in global trade, reserves, and finance.
- It seeks to reverse historical **dollarisation**, where the dollar dominated international monetary systems.

Key Reasons Driving De-dollarisation

- **Mismatch between US economic weight and dollar dominance**, despite US GDP share declining significantly.
- **Eroding confidence in the dollar** due to rising US public debt and fiscal uncertainties.
- **Spillover impacts of US monetary tightening**, causing inflation, currency depreciation, and debt stress elsewhere.
- **Weaponisation of the dollar** through sanctions, affecting nearly **40 countries** and policy autonomy.
- **Push for a multipolar global order**, reflecting aspirations for a fairer **New International Economic Order**.
- **Strengthening alternatives**, including reforms and stability in economies like **China**, improving currency credibility.

Recent Global Trends in De-dollarisation

- **Central bank forex reserves** show the dollar's share declining to a **two-decade low**.
- **US Treasury market** witnesses falling foreign ownership, indicating reduced fixed-income dependence.
- **Commodity markets** increasingly price energy and raw materials in **non-dollar contracts**.

Major Initiatives Supporting De-dollarisation

- **mBridge Project** enables cross-border **CBDC payments**, backed by China, Thailand, and others.
- **BRICS Pay** promotes faster, cheaper cross-border trade using **local currencies**.
- **China's Digital Yuan (e-CNY)** pushes global usage via digital settlements and yuan-backed stablecoins.
- **Pan-African Payment and Settlement System (PAPSS)** facilitates African trade in **local currencies**, bypassing the dollar.
- **Russia's SPFS** ensures secure financial messaging independent of Western-dominated systems.

Challenges Associated with De-dollarisation

- **High transition costs**, including system upgrades, contract revisions, and trade renegotiations.
- **Market volatility risks**, as currency shifts generate uncertainty in global finance.
- **Geopolitical frictions**, with de-dollarisation perceived as challenging US economic influence.
- **Reserve diversification risks**, involving exposure to currency instability or commodity price fluctuations.

Conclusion

- De-dollarisation reflects gradual **systemic rebalancing**, not immediate dollar displacement.
- For **India**, de-dollarisation aligns with **rupee internationalisation**, enhancing monetary autonomy.

India-U.S. Strategic and Economic Tussle

Context

- In 2025, India–U.S. relations witnessed visible **political and economic strain**.
- **Trade frictions, sanctions, and tariff disputes** intensified bilateral tensions.
- India's exports to the U.S. declined, signalling stress in economic engagement. Further, the U.S. outreach toward **Pakistan and China** raised Indian strategic concerns.
- Despite strains, both nations retained strong **institutional cooperation frameworks**.

Trade and Tariff Flashpoints

- **Pharmaceutical Tariff Shock**
  - In September 2025, the U.S. imposed **100% tariffs on branded, patented pharma imports**.
  - Tariffs aimed to strengthen **domestic U.S. manufacturing capacity**.
  - The move disrupted global pharmaceutical supply chains. India, known as the **"pharmacy of the world,"** faced export uncertainty.
- **Energy and Sanctions Frictions**
  - U.S. tariffs targeted India's **Russian crude oil purchases**.
  - Sanctions deepened economic mistrust between partners.
  - China and Pakistan received relatively **lower tariff pressures**.

Economic Interdependence and Sectoral Exposure

- **Pharmaceutical Linkages**

- India exported nearly **$9 billion pharma goods to the U.S. (FY25)**.
- Sector valued at **$50 billion**, contributing **1.72% to GDP**.
- Generics dominate exports, providing tariff resilience.
- India supplies **40% of U.S. generic medicines**.
- Generics saved U.S. healthcare payers **$219 billion (2022)**.

- **Global Trade Landscape**
  - Global pharma exports crossed **$850 billion (2024)**.
  - U.S. pharma imports reached **$212.67 billion**.
  - EU medicinal exports stood at **€313.4 billion**.
  - India ranked **third globally by export volume**.
- **Supply Chain Vulnerabilities**
  - India imports **$5 billion APIs annually**.
  - China holds **72% share** in API supply.
  - Dependence exposes India to inflation and supply disruptions.

Economic Impact and Strategic Diversification

- **Macroeconomic Risks**
  - Pharma sector grows at **10–12% CAGR**.
  - Adds **0.5%–1% to GDP growth annually**.
  - Tariff escalation to generics may cut exports **10–15%**.
  - GDP growth could dip **0.2%–0.3%**.
  - Firms with high U.S. exposure face regulatory rerouting costs.
- **Domestic Policy Cushioning**
  - GST on medicines cut from **12% to 5%** (Sept 2025).
  - **36 essential drugs** placed under nil GST.
  - Consumers saved **$1.2 billion annually**.
  - Medical device GST reduced from **18% to 5%**.
- **Market Diversification Strategy**
  - India signed **six pharma MoUs with Trinidad & Tobago (2025)**.
  - API cooperation expanded with **Singapore**.
  - Serum Institute partnered on **dengue collaboration**.
  - Eastern partnerships may offset **20–25% U.S. tariff risks**.

Institutional and Strategic Resilience

- **Quad and Diplomatic Engagement**
  - Quad Foreign Ministers' Meeting (July 2025) advanced cooperation.
  - Initiatives covered **security, technology, humanitarian response**.
  - Quad Counterterrorism Working Group met (Dec 2025).
  - Demonstrated operational continuity despite summit delays.
- **Defence Cooperation**
  - Defence ties remain the **bedrock of bilateral stability**.
  - 10-year Defence Framework Agreement signed (Oct 2025).
  - Enhanced coordination and intelligence sharing.
  - Key foundational agreements:
    - **LEMOA (2016)**
    - **COMCASA (2018)**
    - **BECA (2020)**
    - **INDUS-X (2023)**
  - **Security of Supply Arrangement (2024)** strengthened logistics trust.
  - Joint exercises - **Yudh Abhyas, Tiger Claw, Malabar** - deepened interoperability.
- **Technology and Space Convergence**
  - **HAL–GE jet engine deal** marked industrial defence collaboration.
  - **NASA–ISRO NISAR satellite** enhanced disaster monitoring cooperation.
  - Quad **Ports of the Future Conference (Mumbai, 2025)** focused on connectivity resilience.

Strategic Outlook and Way Forward

- India–U.S. ties reflect a **dual-track dynamic** - friction with interdependence.
- Institutional frameworks cushion political volatility.
- Defence and technology cooperation sustain strategic trust.
- Economic diversification reduces vulnerability to tariff shocks.
- Deeper engagement beyond defence is vital for long-term stability.
- Expanding cooperation across trade, health, and technology can preserve partnership momentum.

Conclusion

- The India–U.S. partnership today balances **strategic cooperation with economic contestation**. Managing this tension requires safeguarding national interests while sustaining global partnerships. Ultimately, resilient diplomacy must ensure that geopolitical shifts do not undermine **public welfare, health security, and developmental priorities**.

U.S. Hegemony and Unilateralism

Context

- Recent policy shifts reflect growing U.S. preference for **unilateralism over multilateral cooperation**.

- Presidential memorandum announced withdrawal from **66 international organisations**.
- Decisions followed treaty reviews assessing alignment with **U.S. national interests**.
- Moves indicate transition from **rules-based order** toward transactional geopolitical engagement.
- Global governance increasingly shaped by power asymmetries rather than collective consensus.

Retreat from Multilateral Climate Governance

- U.S. withdrew from **UN Framework Convention on Climate Change (UNFCCC)** mechanisms.
- Exit extends to disengagement from **Intergovernmental Panel on Climate Change (IPCC)** processes.
- Withdrawal removes obligations on emissions reporting and transparency frameworks.
- U.S. loses formal negotiating authority within **Conference of Parties (COP)** platforms.
- Participation may continue only as observer without decision-making legitimacy.
- Move weakens institutional foundations of global climate diplomacy architecture.

Climate Finance and Scientific Cooperation Implications

- **UNFCCC exit** reduces U.S. influence over **Green Climate Fund** governance priorities.
- Withdrawal eases domestic resistance to international climate finance commitments.
- Developed nations mobilised **$115.9 billion climate finance in 2022**.
- Adaptation needs projected at **$310–365 billion annually by 2035**.
- Only **$26 billion adaptation finance** flowed globally during 2023.
- U.S. retreat undermines feasibility of **$300 billion COP29 climate finance target**.

Military Unilateralism and International Law Concerns

- U.S. announced unilateral military action targeting **Venezuela's political leadership**.
- Intervention publicly justified under anti-narcotics and security concerns.
- Venezuela's vast **oil reserves** signalled deeper resource motivations.
- Action violated **Article 2(4) of the UN Charter** prohibiting force.
- No **UN Security Council authorisation** or self-defence justification existed.
- Intervention reflects erosion of respect for international legal sovereignty norms.

Unipolarity and Breakdown of Balance of Power

- **Cold War bipolarity** imposed structural limits on unilateral military adventurism.
- Soviet counter-balancing restrained U.S. actions during **1971 Bangladesh crisis**.
- Strategic balancing also shaped outcomes in the **1973 Yom Kippur War**.
- Soviet collapse created a **unipolar global order** dominated by U.S. power.
- Regime change interventions occurred across **Iraq, Libya, Egypt, and Syria**.
- China's rise and Russia partnerships may gradually dilute unilateral dominance.

Global Governance Crisis and Strategic Implications

- U.S. isolationism **weakens multilateral institutions** addressing global collective challenges.
- Earlier withdrawal from **WHO** disrupted global disease surveillance systems as the **funding shortages** affected tuberculosis, malaria, and HIV control programmes.
- The retreat creates leadership vacuum potentially filled by China and Russia.
- Trade tariffs increasingly used as instruments of geopolitical coercion.
- Weakening cooperation threatens climate action, health security, and global stability.
- **India-Specific Strategic Implications**
    - **U.S. retreat** complicates climate finance flows affecting India's energy transition.
    - **Strategic unpredictability** challenges India's long-term geopolitical planning frameworks.
    - India must **strengthen indigenous defence and technological capabilities.**
    - **Multipolar diplomacy** remains essential for safeguarding India's strategic autonomy.

Conclusion

- The retreat from multilateralism **weakens humanity's collective response** to shared crises. Further, the power-based geopolitics risks **marginalising vulnerable nations'** developmental aspirations. Thus, **cooperative global governance** remains essential for equitable and sustainable futures.

Insurrection Act in the United States

Context

- U.S. President threatened invoking the **Insurrection Act** following **shootings** during immigration enforcement protests.

Legal Framework: Posse Comitatus and Insurrection Act

- Under the **U.S. Constitution**, governors normally maintain public order within state boundaries.
- The **Posse Comitatus Act** restricts federal military involvement in domestic law enforcement.

- The **Insurrection Act**, enacted in the early nineteenth century, creates a legal exception.
- It authorises the President to deploy armed forces to suppress **domestic insurrection or violence**.
    - Certain scenarios require consent from a **state governor or legislature**. The Act also specifies circumstances where **presidential approval alone** is sufficient.

Iran's Political Instability

What is the Iranian Conundrum?

- The **Iranian conundrum** denotes recurring cycles of economic distress, legitimacy crises, and external pressure.
- **Short-term control measures** suppress unrest, but **structural causes** repeatedly regenerate instability.
- Core drivers include **sanctions**, **high inflation**, **currency volatility**, **governance constraints**, and **factional power centres**.

Recent Triggers and Developments

- **Bazaar-led protests (December 2025)** erupted over currency instability and rising operational costs.
- Initial economic protests reportedly **expanded nationwide** into broader anti-government agitation.
- **Casualty figures remain contested**, reflecting information controls and reporting asymmetries.
- President **Masoud Pezeshkian** operates with **limited executive authority**, constraining reform delivery.

Historical Roots of Instability

- **Constitutional Awakening (1905–1911)** created a Majlis, but democracy remained weak.
- **Pahlavi monarchy (1925–1979)** pursued rapid modernisation amid repression and inequality.
- **1953 Mossadegh coup** entrenched distrust of foreign intervention after oil nationalisation.
- **Islamic Revolution (1979)** replaced monarchy with a theocratic republic.
- **Recurring protests** in 2009, 2019, 2022, and 2025–26 reveal persistent state–society tension.

Current Governance Architecture

- **Supreme Leader** holds ultimate authority over military, judiciary, media, and foreign policy.
- **President and Majlis** manage governance but remain **subordinate to clerical oversight**.
- **Guardian Council** vets candidates and laws for ideological compliance.
- **Assembly of Experts** appoints the Supreme Leader;
  Expediency Council resolves institutional disputes.
- **IRGC and Bonyads** dominate security and economic sectors, forming a powerful **deep state**.

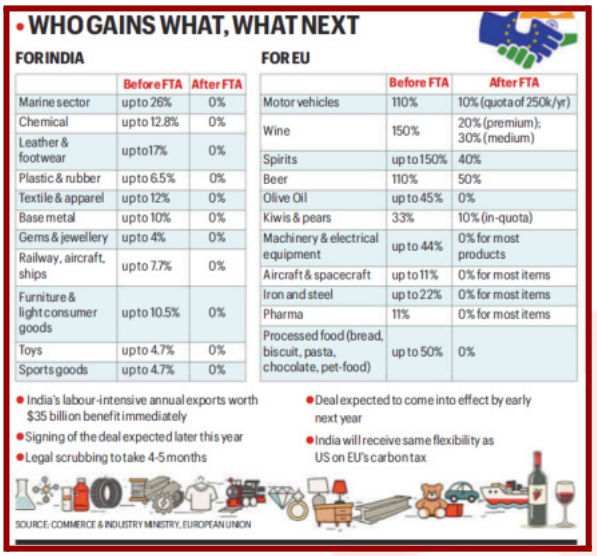
Implications of Recent Protests

- **For India**
    - **Energy security risks** emerge from Gulf instability affecting oil prices and inflation.
    - **Diaspora safety and remittances** face heightened uncertainty across West Asia.
    - **Connectivity plans** to Central Asia and Afghanistan via Iran face sanctions-related constraints.
    - **Domestic sensitivities** arise due to resonance among India's Shia community.
- **At the Global Level**
    - **Hormuz-linked escalation** can reprice global energy and shipping insurance risks.
    - Iran remains a **pressure point** in broader great-power and sanctions politics.
    - **External signalling on protests** may harden Iranian threat perceptions and intensify crackdowns.

Conclusion

- Iran's crisis reflects a **structural stress test** of currency credibility and governance capacity.
- **Containment without economic normalisation** ensures cyclical recurrence of unrest.
- India must prioritise **risk insulation**, **diaspora protection**, and **calibrated diplomacy**.

India-EU Free Trade Agreement (FTA)



Vision & Strategic Significance

- The India-EU FTA reflects a shift toward deeper economic partnership between two major democracies.
- **Aims to** expand trade, investment, technology cooperation, and mobility.
- Seen as a pillar for **rules-based globalisation** amid protectionist trends.
- Supports India's integration into **global value chains.**
- Aligns with EU's strategy of diversifying partnerships **beyond China.**

Economic and Trade Relations

- The **European Union is India's largest goods trading partner**, reflecting strong bilateral commercial ties.
- India–EU goods trade reached **USD 137.41 billion in 2023–24**.
    - **Services trade** reached a record **US$53 billion in 2023**.
- The EU accounts for about **17% of India's total exports**, making it **India's biggest export market** bloc.
- The EU remains a major investor, with **FDI stock of €140 billion in 2023**.
- Over **6,000 European companies** operate across multiple sectors in India.
- Merchandise trade grew **36% in five years**, outpacing India's trade growth with the United States.

Trade in Goods & Tariff Liberalisation

- **Market Access Gains**
    - EU will eliminate tariffs on **over 99% of Indian exports**.
    - Boost for **labour-intensive sectors:**
        - Textiles
        - Apparel
        - Leather
        - Gems & jewellery
        - Marine products
- These sectors gain duty-free entry, enhancing employment and export competitiveness.
- **India's Commitments**
    - India to reduce tariffs on **92–97% of EU goods**.
- **Sectoral Highlights**
    - **Automobiles:** Duties cut from 110% to 10% (quota-based).
    - **Premium wines:** Tariffs reduced from 150% to 20%.
    - **Spirits:** Reduced to 40%.
    - **Machinery & chemicals:** High duties largely eliminated.

Services, Mobility & Technology Cooperation

- **Services Liberalisation**
    - India gains access to **144 EU service sub-sectors**.
    - India opens **102 sub-sectors** to EU firms.
    - Gains expected in IT, finance, education, engineering, R&D.
- **Professional Mobility**
    - Framework for business travellers and intra-corporate transferees.
    - **Easier mobility** for professionals like engineers, nurses, consultants.
    - **Mutual Recognition Agreements** enable qualification acceptance.
- **Students & Social Security**
    - Post-study work rights up to **9 months** in EU.
    - Social Security Agreement proposed within five years.
    - Prevents loss of pension contributions abroad.
- **Technology Partnerships**
    - Cooperation in AI, semiconductors, and clean energy.
    - Supports India's digital and green transition.

Sustainability & Sensitive Sector Safeguards

- **Climate & Sustainability**
    - **CBAM** concerns addressed through MFN assurances.
    - EU to provide **€500 million support** for decarbonisation.
    - **Focus sectors:** steel and aluminium.
- **Labour Standards**
    - Commitment to core **ILO labour rights**.
    - Includes abolition of child labour, non-discrimination.
- **Intellectual Property & Heritage**
    - EU recognised India's **Traditional Knowledge Digital Library**.

- Protects Yoga, Ayurveda, and indigenous knowledge from biopiracy.
- **Sensitive Sector Protection**
  - India excluded dairy, wheat, rice, sugar from liberalisation.
  - Protects small farmers and food security interests.
  - GI protection negotiations ongoing for iconic products.

Benefits of FTA

- **Benefits for India**
  - Greater market access for exports.
  - Boost to textiles, agriculture, processed foods.
  - 6% of exports gain tariff reduction.
  - Easier skilled migration and remittance flows.
  - Increased EU FDI under "China+1" strategy.
  - Technology transfer and green partnerships.
  - Consumer access to high-quality EU goods.
- **Benefits for EU**
  - Access to India's **1.4 billion consumer market**.
  - Expansion in automobiles, wines, machinery, services.
  - Supply chain diversification away from China.
  - Access to Indian raw materials and intermediates.
  - Stronger digital trade and regulatory alignment.

Key Challenges

- **Market Access & Agriculture**
  - EU resists Indian demands on textiles and farm products.
  - Domestic producer lobbies influence negotiations.
- **Non-Tariff Barriers**
  - CBAM carbon costs on Indian exports.
    - CBAM imposes **20%–35% effective carbon charges** on steel, aluminium, cement, and fertilisers.
  - EU Deforestation Regulation compliance burdens.
  - Stringent SPS norms affect agri-exports.
- **Digital & Data Issues**
  - GDPR compliance increases costs for Indian IT firms.
  - Data adequacy status yet unresolved.
- **Ratification Risks**
  - European Parliament approval required.
  - Agricultural lobbies in EU may delay ratification.

Conclusion: The India–EU FTA goes beyond trade as it blends **economics, sustainability, technology, and geopolitics.** Its success will depend on balancing market access with domestic protection, and climate commitments with developmental equity.

India–EU Tech Cooperation

- India–EU FTA is guided by a **Strategic Agenda 2030** for future technologies.
- Partnership promotes joint innovation in **artificial intelligence** and **semiconductor ecosystems**.
- Collaboration links the **European AI Office** with India's **National AI Mission**.
- Focus areas include **chip design, advanced packaging, and resilient technology supply chains**.
- Cooperation aims to build **ethical, inclusive, and people-centric digital growth pathways**.

Governance Framework for Gaza

Context: Board of Peace for Gaza

- The **United States invited India** to join the proposed **Board of Peace for Gaza**. The Board will include **heads of state and international members** overseeing Gaza's governance.
- Its mandate covers **supervision of redevelopment funding** until Palestinian Authority reforms conclude.

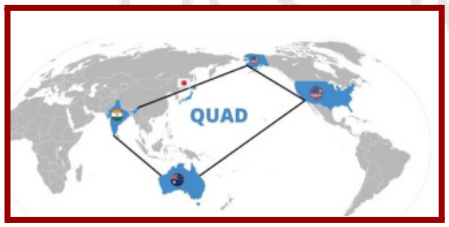
Key Elements of Trump's Gaza Peace Plan

- **Ceasefire and De-Escalation Framework**
  - **Immediate ceasefire** mandates suspension of bombings, rocket attacks, and cross-border hostilities.
  - **Hamas** to release Israeli hostages, while **Israel** undertakes structured prisoner exchanges.
  - Ceasefire aims to stabilise **civilian life** and reduce humanitarian suffering.
- **Military Withdrawal and Security Architecture**
  - Israel to undertake phased **military withdrawal** to mutually agreed security boundaries.
  - Gaza **demilitarisation** proposed through disarmament of Hamas and armed factions.
  - Security guarantees to Israel backed by **United States and regional partners**.
- **Governance Transition Framework**
  - Transitional governance entrusted to **technocratic Palestinian administrative committee**.
  - Oversight proposed through international

Board of Peace supervisory mechanism.
    - Hamas required to relinquish **political control** over Gaza administration.
    - **Palestinian Authority reforms** aim at unified, accountable governance structures.
- **Humanitarian Relief and Reconstruction**
    - Plan mandates unrestricted **humanitarian access** for essential relief supplies.
    - International funding pledged for rebuilding **homes, hospitals, schools, infrastructure**.
    - Reconstruction seeks restoring dignity and socio-economic stability in Gaza.
- **Political Settlement and Statehood Pathway**
    - Framework proposes conditional roadmap toward **sovereign Palestinian statehood**.
    - Statehood linked with sustained **demilitarisation and deradicalisation commitments**.
    - Guarantees included against **forced displacement** or territorial annexation.
    - Regional diplomatic **normalisation** encouraged between Israel and Arab nations.
- **Mediation and Long-Term Peace Vision**
    - Mediation led by **United States, Egypt, Qatar, Turkey**, and international stakeholders.
    - Plan envisions economic cooperation as foundation for durable **regional peace**.

Topic: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests

Quad Cooperation in the Indo-Pacific (2025)



Overview of the Quad

- The **Quad** comprises **India, Australia, Japan, and the United States**.
- It seeks to uphold a **free, open, and inclusive Indo-Pacific**.
- The grouping promotes a **rules-based regional order** amid intensifying **U.S.–China rivalry**.

Geopolitical Context in 2025

- **Donald Trump's return** reshaped global geopolitics and U.S. regional priorities.
- The **Indo-Pacific** emerged as the most contested strategic theatre.
- Despite uncertainties, the **Quad remained central** to U.S. Indo-Pacific engagement.

Evolution and Revival

- The Quad originated in **2004** after the **Indian Ocean tsunami**.
- It lost momentum due to **members' differing strategic compulsions**.
- The grouping was **revived in 2017** to counter **China's growing regional assertiveness**.

Quad Engagements since Revival

- Between **2021 and 2024**, the Quad held **six leader-level summits**.
- The **sixth summit** occurred in **Wilmington, U.S., in 2024**, hosted by **President Biden**.
- **Secretary of State Marco Rubio** hosted Quad Foreign Ministers in **January and July 2025**.
- **Interregnum in 2025**
    - **India was scheduled** to host a **leader-level summit** in 2025.
    - However, no such summit took place, creating a **leadership vacuum**.
    - Political transitions occurred in the **U.S. and Japan** during this period.
- **Operational Initiatives in 2025**
    - **Quad-at-Sea Ship Observer Mission** began in **June 2025**.
    - **Ports of the Future Partnership** held its first meeting in **Mumbai, October 2025**.
    - The **Malabar naval exercise** was conducted in **Guam**, involving all four Quad navies.

India-Germany Strategic Partnership

Foundational Pillars of the Relationship

- India and Germany have maintained a **Strategic Partnership since May 2000**.
- Germany was India's **12th largest trading partner** during **2023–24**.
    - **Bilateral trade** has grown steadily, although the **trade balance favours Germany**.
    - Germany is India's **9th largest foreign investor**, with **US$ 14.5 billion FDI** since 2000.
- The **India–Germany DTAA (1991)** strengthened investment and reduced double taxation.
- **Cultural ties** extend across **literature, music, films, yoga, Ayurveda, and academia**.
    - **Rabindranath Tagore's visits** in **1921,**

1926, and 1930 built early intellectual links.

- Around **2.46 lakh Indian-origin people** live in Germany as of **December 2023**.

Key Areas of Cooperation

- **Energy and Climate**
  - **Indo-German Energy Forum (IGEF)** promotes renewable and clean energy cooperation.
  - A **Green Hydrogen Task Force** was created through a **2022 Joint Declaration**.
  - Germany was invited to join the **Global Biofuels Alliance (2023)**.
- **Development and Infrastructure**
  - Germany provides technical and financial assistance in energy, environment, and urban development.
  - Total cooperation reached **€24 billion** by the end of **2023**.
  - **Siemens supports railway modernisation** and freight capacity expansion in India.
- **Science, Education and Mobility**
  - **50 years of S&T cooperation** are being celebrated in **2024**.
  - The **Migration and Mobility Partnership Agreement (2022)** facilitates legal migration.
  - **Social Security Agreement (2017)** protects posted workers' pension and contributions.
  - **49,483 Indian students** study in Germany, doubling in four years.
- **Defence and Security**
  - **Bilateral Defence Cooperation Agreement (2006)** guides military ties.
  - **Defence Industry Cooperation Agreement (2019)** promotes joint production.
  - **Naval PASSEX exercises** and **Ex TARANG SHAKTI-1 air exercise (2024)** enhanced interoperability.

Political and Institutional Framework

- **Intergovernmental Consultations (IGC)** have been held **seven times since 2011**.
- Leaders meet regularly during **G7 and G20 summits**, including **Apulia 2024**.
- **Foreign Office Consultations, S&T Committee, and High Defence Committee** guide engagement.
- Both countries cooperate in **G20, UN, and climate negotiations**.
- India and Germany support **UN Security Council reform** through the **G4 grouping**.

Recent Strategic Developments

- Cooperation is expanding into **AI, digital technologies, health, manufacturing, and agriculture**.
- **Green and Sustainable Development Partnership (GSDP)** was launched during the **6th IGC**.
- **German business engagement** deepened through **APK 2024** and **RE-INVEST 2024**.
- **Security MoU (2015)** and **Mutual Legal Assistance Treaty** support counter-terror cooperation.

India's Critical Minerals Diplomacy

Context and Rationale

- India's **clean energy transition** depends heavily on imported **critical minerals and rare earths**. **China's export controls** have increased urgency to diversify mineral supply chains.
- India pursues a **two-pronged strategy**: domestic capability building and overseas access.

Status of Critical Mineral Resources in India

- Domestic **refined copper output increased 43.5 percent in early FY26**, indicating smelting capacity recovery.
- India remains **100 percent import-dependent for 10 critical minerals**, including Lithium and Cobalt.
- India is the **second-largest aluminium producer** and **third-largest iron ore producer** globally in 2025.
- The **Geological Survey of India** completed over **368 exploration projects** in three years.
- A **₹34,300 crore sovereign fund** supports **National Critical Mineral Mission (NCMM)** implementation through 2031.

Key Bilateral and Regional Partnerships

- **Australia**
  - Considered a **reliable partner** due to political stability and large mineral reserves.
  - **India–Australia Critical Minerals Investment Partnership (2022)** identified five lithium and cobalt projects.
  - Cooperation includes **joint research, investments, and long-term supply planning**.
- **Japan**
  - Demonstrates a **resilience-based institutional model** after past Chinese export restrictions.
  - Cooperation expanded from **Indian Rare Earths Limited** to joint extraction, processing and stockpiling.
- **Africa**

- Rich mineral base combined with expectations of **local value addition**.
- Agreements with **Namibia** and asset talks in **Zambia** show renewed engagement.
- Requires a **long-term industrial approach** to remain competitive.

- **United States**
  - Cooperation limited despite "**friend-shoring**" rhetoric.
  - **Tariffs, trade volatility, and Inflation Reduction Act incentives** hinder stability.
  - Frameworks include **TRUST Initiative** and **Strategic Minerals Recovery Initiative**.
- **European Union**
  - **Critical Raw Materials Act** and **European Battery Alliance** integrate regulation with sustainability.
  - India must align with **transparency, lifecycle and environmental standards**.
- **West Asia**
  - UAE and Saudi Arabia investing in **battery materials and refining capacity**.
  - Potential **midstream processing partners**, but institutional frameworks remain weak.
- **Russia**
  - Holds significant reserves but faces **sanctions, financing and logistics constraints**.
  - Useful as a **diversification hedge**, not a primary supplier.
- **Latin America and Canada**
  - **Argentina, Chile, Peru, Brazil** emerging as new mineral frontiers.
  - **KABIL signed ₹200 crore agreement with Argentina**.
  - Canada offers promise but depends on **political stability**.

Way Forward

- **Processing and refining** are the main choke points, not ore access.
- India must integrate **upstream, midstream and downstream partnerships** strategically.
- Strengthening **domestic ESG, transparency and responsible mining frameworks** is essential.

India's West Asia Diplomacy

Context and Diplomatic Background

- India abstained from the **Trump-led Board of Peace (BoP)** charter announcement at Davos. The **BoP** constitutes Phase-II of the proposed **Gaza Peace Framework**.
- The proposal received **UN Security Council clearance (November 2025)**. However **Russia and China abstained**, signalling **limited consensus** within the multilateral system.

Rationale Behind Considering Engagement

- India has historically supported the **Palestinian cause** and humanitarian relief efforts.
- Around **20 countries joined**, including UAE, Saudi Arabia, Israel, and Türkiye.
- Participation pressures stem from **India–U.S. diplomatic and trade sensitivities**.
- Engagement reflects India's balancing between **principled diplomacy and strategic partnerships**.

Structural and Mandate Concerns

- Leaked drafts reportedly omit explicit reference to **Gaza** in the Board's mandate.
- The charter designates **Donald Trump as Chairman** of the institution.
- Executive leadership reportedly includes **close political associates**.
- The mandate proposes expansion into **other global conflicts**, beyond West Asia.
- Such expansion risks creating structures parallel to, or bypassing, the **United Nations system**.

Representation and Legitimacy Challenges

- Palestinian participation is limited to **technical experts**, excluding political leadership.
- Israeli Prime Minister **Benjamin Netanyahu** is included within governance structures.
- This inclusion persists despite **genocide allegations raised in UN forums**.
- Exclusion of the **Palestinian President** raises diplomatic legitimacy concerns.
- Countries recognising Palestine may view the mechanism as politically imbalanced.

India-Specific Strategic Risks

- **Pakistan's participation** raises sensitivities regarding possible Kashmir internationalisation.
- The charter proposes **two-tier membership structures**.
- "Permanent membership" reportedly requires a **$1 billion financial contribution**.
- India may face expectations of troop deployment in a **non-UN Stabilisation Force**.
- Such commitments could stretch India's **military, diplomatic, and normative bandwidth**.

Diplomatic and Policy Implications for India

- Membership risks reducing participants to endorsers of **unilateral geopolitical agendas**.
- Institutional design raises concerns regarding **legitimacy, accountability, and transparency**.
- India must prioritise consultation with **Palestinian stakeholders** before engagement.
- Decisions should reflect **strategic autonomy**, not external pressure.
- Engagement must align with **UN centrality, international law, and ethical diplomacy**.

Conclusion: India's West Asia diplomacy reflects a deeper moral balancing between **strategic partnerships** and **historical solidarity**. The real test lies in safeguarding **peace, justice, and multilateral legitimacy** without compromising national interests.

India-UAE Strategic Partnership

Context and Strategic Stability

- India-UAE relations display **remarkable stability** amid shifting global geopolitical equations.
- UAE President **Sheikh Mohamed bin Zayed's January 19, 2026 visit** reflected strategic depth. The visit marked the **eleventh leadership-level engagement in eleven years**, highlighting mutual priority.

Comprehensive Partnership Framework

- The **2017 Comprehensive Strategic Partnership Agreement** broadened cooperation across multiple sectors.
- Recent outcomes included a **defence cooperation framework and joint space initiative**.
- Leaders set a **$200 billion bilateral trade target** and expanded collaboration in artificial intelligence.
- Agreements covered **data embassies, infrastructure investment, and small nuclear reactor partnerships**.
- A **10-year LNG supply agreement** and **supercomputing cluster in India** were announced.
- Both sides issued a **joint condemnation of terrorism**, rejecting safe havens for perpetrators.

Infrastructure and Investment Cooperation

- The **$1 billion ADIA investment in NIIF (2017)** signalled long-term UAE commitment.
- UAE entities emerged as **major investors in India's infrastructure and development projects**.
- Talks advanced on UAE participation in **Dholera Special Investment Region, Gujarat**.
- Proposed assets include **airport, greenfield port, smart township, rail, and energy infrastructure**.
- Dholera's appeal lies in **high-technology focus on semiconductors and electric vehicles**.

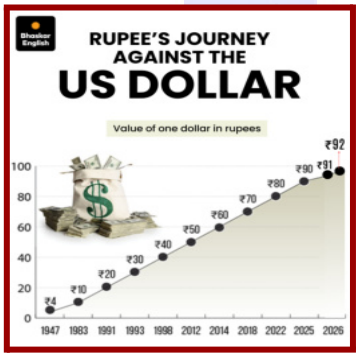
Trade, Connectivity, and Financial Linkages

- **CEPA led to a 37% rise in bilateral trade** since FY 2022–23.
- India's exports reached **$36 billion**, while imports rose to **$64 billion last year**.
- **Bharat Mart at Jebel Ali** aims to boost India's MSME exporters.
- The **Bharat-Africa Setu** leverages DP World's logistics network for African market access.
- Offices by **DP World and First Abu Dhabi Bank in GIFT City** enhance financial connectivity.

Energy and Regional Significance

- Cooperation expanded in **advanced nuclear technologies and clean energy ambitions**.
- The partnership offers a **stable pillar amid evolving intra-GCC political dynamics**.
- India pursues **strategic autonomy and multi-alignment**, avoiding regional entanglements.

Rupee Depreciation and Economic Diplomacy



Macroeconomic Context

- Rupee declined around **6% since April 2025**, despite strong domestic economic indicators.
- **Growth rate** estimated at **7.4%** for the current financial year.
- **CPI inflation** ended 2025 at **1.33%**, below RBI's lower target band consecutively.

- **Current account deficit** stood at **0.76% of GDP** in first half of 2025–26.

Primary Cause: Capital Outflows

- Trade deficit rose to **$96.58 billion** in April–December 2025, from **$88.43 billion** last year.
- Net capital inflows of **$10,615 million in 2024** turned into **$3,900 million outflows in 2025**.
- Capital exit triggered by U.S. **50% tariff** on Indian exports and geopolitical tensions.
- Additional U.S. tariff threats linked to India's **oil imports from Russia and trade with Iran**.

Shift from Economics to Diplomacy

- Capital flows driven by **political risk perceptions**, not conventional economic fundamentals.
- Earlier rupee depreciation in 2022 linked to **U.S. Federal Reserve interest rate hikes**.
- Present depreciation reflects **weaponisation of trade tariffs for geopolitical leverage**.
- Diplomatic engagement with the U.S. identified as **key stabilising factor** for rupee.

RBI's Exchange Rate Intervention Approach

- Since **1993**, India follows a **market-determined exchange rate regime**.
- RBI intervenes to **reduce volatility**, not to peg the rupee's value.
- Intervention aims to **moderate sharp declines** and ensure smooth market adjustment.
- Non-economic pressures now influencing rupee beyond traditional macroeconomic variables.

Limits of Devaluation as a Policy Tool

- Rising **import content of exports** weakens competitiveness gains from rupee depreciation.
- **High U.S. tariffs** restrict potential export expansion in American markets.
- Essential imports, especially **crude oil forming 25% of merchandise imports**, become costlier.
- Depreciation risks **fueling domestic inflation**, undermining price stability.

Strategic Implications and Outlook

- India's inflation aligned with developed economies, reducing justification for devaluation strategy.
- Real Effective Exchange Rate used to assess **relative currency competitiveness**.
- Continued capital outflows may **pressure stock markets and investment sentiment**.
- Early **trade and diplomatic resolution with the U.S.** critical for currency stabilisation.

International Patent Law and Jurisdiction in Outer Space

Context and Emerging Innovation Challenge

- Sustained human presence in space demands continuous **technological innovation** for survival systems and infrastructure.
- Multinational crews collaborate across shared habitats, laboratories, and **digitally integrated platforms**.
- Innovation increasingly occurs beyond Earth's **sovereign territorial boundaries**.
- This raises unresolved questions of **legal ownership, control, and intellectual property rights**.

Territorial Foundations of Patent Law

- Patent regimes operate on the principle of **territorial jurisdiction and sovereign legal authority**.
- Exclusive rights apply within clearly demarcated **national geographic boundaries**.
- Infringement is determined by the location of **manufacture, usage, or commercial sale**.
- This framework functions effectively due to Earth's **clear spatial and administrative demarcations**.

Outer Space Legal Framework

- International law prohibits national sovereignty over **celestial bodies**, including the Moon and Mars.
- **Article VIII — Outer Space Treaty** links jurisdiction to the **state of registry**.
- The **Registration Convention** reinforces legal control through registration rather than territorial ownership.
- Thus, space jurisdiction derives from **administrative association, not physical geography**.

Jurisdiction-by-Registration: Operational Practice

- Innovations aboard registered spacecraft are treated as occurring within the **registering state's jurisdiction**.
- Domestic patent regimes extend into space via **registry-linked legal authority**.
- The **International Space Station (ISS)** demonstrates this segmented jurisdictional arrangement.
- ISS modules function as **national legal territories** for intellectual property governance.

Structural Limits in Permanent Space Settlements

- Lunar and planetary bases involve **shared infrastructure and multinational operational collaboration**.
- Innovations arise through **incremental, collective technological refinements**, not isolated inventions.
- Remote software updates blur invention location and **jurisdictional attribution**.
- Determining ownership becomes legally complex

within **integrated extraterrestrial ecosystems**.

Governance Gaps and Normative Tensions

- **Article I** frames space as the shared heritage of humankind.
- **Article II** prohibits national appropriation of extraterrestrial territories.
- Patent exclusivity risks creating **de facto monopolies** over survival-critical technologies.
- **Paris Convention enforcement gaps** create scope for regulatory arbitrage through selective registration.
- **Artemis Accords** provide coordination but lack binding authority on intellectual property rights.
- Growing calls exist for a dedicated **Global Space Intellectual Property Framework**.

India-Arab League Partnership

Context and Strategic Setting

- **Second India–Arab Foreign Ministers' Meeting** convenes in Delhi on January 30–31, 2026.
- Meeting occurs amid **regional conflicts, global power shifts, and uncertain rules-based international order**.
- Security concerns include **Iran tensions, Syria instability, and evolving Gaza ceasefire dynamics**.
- Emerging **Saudi–UAE fault lines over Yemen and regional influence** signal potential realignment risks.

Institutional Framework of Engagement

- **League of Arab States (LAS)** formed in Cairo on March 22, 1945, now comprising **22 members**.
- India–LAS dialogue institutionalised through **MoU in March 2002**, enabling annual high-level meetings.
- **Arab–India Cooperation Forum (AICF)** launched in 2008, first meeting held in Manama in 2016.
- India's Ambassador to Egypt designated as **Permanent Representative to LAS since December 2010**.
- New platform, **India–Arab Chambers of Commerce, Industry and Agriculture**, scheduled for inauguration.

Strategic and Political Pillars

- Strategic partnerships signed with **Oman (2008), UAE (2015), Saudi Arabia (2019), Egypt (2023), Qatar (2025)**.
- Convergence observed between **Vision 2030, Centennial 2071, Vision 2035, Vision 2040, and Viksit Bharat 2047**.
- India supports LAS partners in **multilateral platforms such as BRICS and SCO**.

Trade, Connectivity, and Digital Cooperation

- **Bilateral trade exceeds $240 billion**, routed through Suez Canal, Red Sea, and Gulf of Aden.
- **CEPA agreements with UAE and Oman** expand trade targets, UAE trade reset to $200 billion by 2030.
- Major investment commitments include **UAE $75 billion, Saudi Arabia $100 billion, Qatar $10 billion**.
- **India–Middle East–Europe Economic Corridor (IMEC)** enhances logistics and strategic connectivity.
- Digital integration includes **RuPay in UAE, UPI in multiple LAS states, and rupee–dirham settlements**.

Energy and Security Cooperation

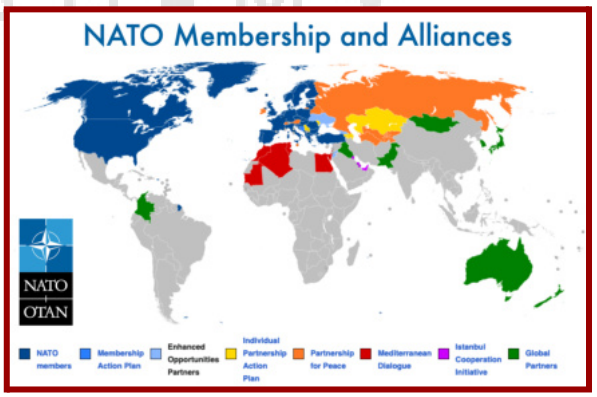
- Region supplies **60% crude oil, 70% natural gas, and over 50% fertilisers** to India.
- **Qatar LNG deal of $78 billion** ensures 7.5 million tonnes annually for 20 years.
- **ADNOC–Indian Oil LNG contract** covers 1.2 million tonnes annually for 14 years.
- **Duqm Port access in Oman** strengthens India's maritime reach and regional surveillance.
- Defence cooperation includes **Tejas, BrahMos, Aakash, cyber, space, and drone technologies**.

Future Outlook

- Partnership positioned as a **pillar of India's geopolitical, economic, and security architecture**.
- Emphasis on **trust, connectivity, and collective prosperity** to navigate a volatile global environment.

Topic: Important International institutions

North Atlantic Treaty Organization (NATO)



Genesis and Nature

- Founded in **1949** through the **North Atlantic (Washington) Treaty** to deter Soviet expansion in Europe.

- **Headquarters:** Brussels, Belgium.
- NATO is a **political and military alliance** of **32 countries** from Europe and North America.
- Founded on **collective defence** under **Article 5**, treating an attack on one as an attack on all.
- **Article 5** has been invoked **once**, following the **9/11 terrorist attacks**.

Membership and Structure

- **Founding members (12):** Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, UK, USA.
- **Finland joined in 2023**, expanding NATO's northern flank.
- **Ukraine applied in 2022** and received assurances at the **Vilnius Summit, 2023**.
- **EU members outside NATO:** Austria, Cyprus, Ireland, Malta.
- **Funding model:** Members contribute based on **Gross National Income** cost-sharing formula.

Objectives and Partnerships

- Provides a **transatlantic security link** enabling consultation, defence cooperation, and crisis-management operations.
- Maintains partnerships with **40+ non-member countries** through structured frameworks.
- **Partnership for Peace (PfP):** Euro-Atlantic cooperation; partnerships with Russia and Belarus currently suspended.
- **Mediterranean Dialogue (MD):** Engagement with Mediterranean countries.
- **Istanbul Cooperation Initiative (ICI):** Cooperation with Middle East countries.
- Cooperates with **United Nations**, **European Union**, and **OSCE**.

Strategic Concepts and Achievements

- **2022 Strategic Concept** identifies **Russia** as the most direct threat to Allied security.
- **China addressed for the first time**, citing strategic, economic, and technological challenges.
- Includes emerging threats like **terrorism, cyber, hybrid, and maritime security**.
- **Cold War:** Maintained deterrence and preserved peace.
- **Post–Cold War:** Encouraged dialogue via the NATO–Russia Founding Act.
- **Ukraine War:** Condemned Russian actions and provided substantial support to Ukraine.
- **Maritime security:** Operation Sea Guardian in the Mediterranean.
- **Humanitarian role:** Disaster response, including Türkiye earthquake relief, 2023.

Eastward Expansion and Implications

- Soviet response led to the **Warsaw Pact** in 1955.
- Post-1991, former Warsaw Pact members like Poland, Hungary, and Baltic States joined NATO.
- **Article 10 (Open Door Policy)** allows eligible European countries to join.
- Expansion created **Russia–West mistrust**, increased **militarisation**, and sharpened **European regional divisions**.

Major Challenges Faced by NATO

- **Defence spending gap:** Majority of members fail to meet the **2% GDP defence expenditure** commitment.
- **Right-wing nationalism:** Rising nationalism in Europe fuels scepticism towards NATO and multilateral institutions.
- **Uncertainty over U.S. commitment:** Past U.S. leadership questioned continued adherence to **Article 5** obligations.
- **Russian aggression:** Eastward expansion undermined trust, intensifying Russia–NATO strategic confrontation.
- **Rise of China:** China's military expansion, economic influence, and technological footprint challenge NATO's security outlook.

Other Related Concepts

- **Major Non-NATO Ally (MNNA):**
  - U.S. legal designation granting defence trade and security cooperation benefits.
  - **18 countries designated**, including Japan, Israel, Pakistan, Qatar, South Korea.
  - **India is not an MNNA**.
- **NATO Plus Five:**
  - Defence cooperation framework between NATO, the U.S., and five partner countries.
  - Includes **Australia, New Zealand, Japan, Israel, South Korea**.
  - Formalised in **2019**, primarily to address the **rising Chinese strategic challenge**.

Conclusion

- NATO must adopt **innovation, resilience, and strategic foresight** to remain a global security pillar.

Prelims

Topic: Organisation and Convention

Venezuela Crisis

India–Venezuela Oil Trade

- India imported **$255.3 million** worth of oil from Venezuela till **November 2025**.
- This constituted only **0.3% of India's total oil imports** during the period.
- In **2013**, India imported nearly **$13 billion** worth of Venezuelan crude oil.
- Since **2019**, India has steadily reduced imports due

to **U.S. sanctions**.
- Fear of **secondary sanctions** constrained commercial engagement with Venezuela.

Venezuela in Global Oil Markets
- Venezuela is a member of **Organization of the Petroleum Exporting Countries (OPEC)**.
- It contributes about **3.5% of OPEC oil exports**.
- Venezuela accounts for roughly **1% of global oil supply**.

Organization of the Petroleum Exporting Countries (OPEC)
- OPEC is a **permanent intergovernmental organisation** of **12 oil-exporting developing countries** created at the **Baghdad Conference** in 1960.
- Headquarters of OPEC is located in **Vienna, Austria**.
- **Founding members** were **Iran, Iraq, Kuwait, Saudi Arabia and Venezuela**.
- **India is not a member** of OPEC.
- Objective is to **coordinate and unify petroleum policies** of member countries.
- OPEC aims to ensure **fair and stable petroleum prices** for producers.

OPEC+
- **OPEC+ was formed in 2016** through partnership between OPEC and non-OPEC producers.
- It consists of **OPEC members plus 10 additional oil-producing countries**.
  - **OPEC members include** Algeria, Congo, Equatorial Guinea, Gabon, Libya, Nigeria and UAE.
  - **Non-OPEC members include** Russia, Azerbaijan, Bahrain, Brunei and Kazakhstan.
  - Other non-OPEC participants are **Mexico, Malaysia, Oman, South Sudan and Sudan**.

Pax Silica Initiative

Context: India will be invited to join **"Pax Silica"** as incoming **U.S. Ambassador Sergio Gor** announced on Monday.

Pax Silica Initiative: Overview
- It is a **U.S.-led strategic initiative**
- **Objective:** Build a secure, prosperous and innovation-driven silicon supply chain
- Covers the **entire value chain:**
  - Critical minerals
  - Energy inputs
  - Advanced manufacturing
  - Semiconductors
  - Artificial intelligence (AI) infrastructure
  - Logistics and transportation

Core Objectives
- **Reduce coercive dependencies** in strategic technology supply chains
- **Protect materials and capabilities** foundational to **AI development**
- Ensure **aligned nations** can:
  - Develop
  - Deploy
  - Scale transformative technologies

Countries Participating in Pax Silica
- Japan, South Korea, Singapore, Netherlands, United Kingdom, Israel, United Arab Emirates, Australia

Technology Ecosystem Focus
- Build **trusted technology ecosystems** including:
  - Information and Communication Technology (ICT) systems
  - Fiber-optic cables
  - Data centers
  - Foundational AI models
  - Technology applications

BRICS India 2026 Logo

What is the BRICS India 2026 Logo?
- Official **visual identity of India's BRICS Chairship (2026)**.
- Reflects **India's vision, values and priorities** for leading **BRICS**.

India's BRICS Chairship 2026
- **Host country:** India
- **Chairship period:** Calendar year **2026**
- **Milestone:** 20th anniversary of BRICS (2006–2026)

Theme & Symbolism
- Inspired by **India's national flower – Lotus**.
- Symbolises:
  - **Resilience and renewal**
  - **Unity in diversity**
  - **Cultural and spiritual harmony**
- Core message: **"Togetherness for global**

welfare"

- Aligns with India's philosophy of **Vasudhaiva Kutumbakam (One Earth, One Family)**.

Key Features of the Logo

- **Lotus shape:** Represents India's civilisational identity and growth through adversity.
- **Namaste hands at the centre:** Symbolise respect, dialogue and cooperation.
- **Five coloured petals:** Represent the **founding BRICS nations** – Brazil, Russia, India, China and South Africa.
- **Balanced design:** Reflects unity among diverse cultures, economies and political systems.
- **Digital platform:** Dedicated **BRICS India 2026 website** for meetings, initiatives, outcomes and public engagement.

Significance

- Projects **India's leadership role in the Global South**.
- Reinforces BRICS as a **people-centric, development-oriented platform**.
- Aligns with **India's four priorities for BRICS 2026**:
  - **Resilience**
  - **Innovation**
  - **Cooperation**
  - **Sustainability**

International Renewable Energy Agency (IRENA)

Context: 16th Assembly of International Renewable Energy Agency (IRENA) concluded in **Abu Dhabi**, urging faster global renewable energy transition.

What is IRENA?

- World's **only intergovernmental organisation** dedicated exclusively to **renewable energy**.
- Serves as a **global hub** for policy advice, data, technology cooperation, and investment support.
- **Establishment & Membership**
  - **Founded:** 26 January 2009, **Bonn (Germany)**
  - **Statute in force:** 8 July 2010
  - **Headquarters:** Masdar City, Abu Dhabi (UAE)
  - **India:** Founding member
- **Key Functions**
  - **Policy guidance:** National renewable policies and transition roadmaps.
  - **Data & analysis:** Global datasets on costs, investments, and deployment.
  - **Technology support:** Solar, wind, bioenergy, geothermal, hydro, ocean energy.
  - **Capacity building:** Training for governments and utilities.
  - **Investment facilitation:** Mobilises green finance, especially for developing countries.
  - **Global cooperation:** Platform for renewable energy diplomacy.

United Nations Economic and Social Council (ECOSOC)

Context

- ECOSOC will commemorate its **80th anniversary on 23 January 2026**.
- The milestone marks **eight decades of coordinating global development, social, and environmental governance**.

About the Body

- One of the **six principal organs of the United Nations**, coordinating global development policies.
- Serves as the **central UN platform for economic, social, and environmental cooperation**.
- **Establishment and History**
  - Established in **1945** under the **United Nations Charter.**
  - Held its first session on **23 January 1946 in London**.
- **Aim**
  - Promote **sustainable development** integrating economic growth, social inclusion, and environmental protection.
  - Ensure **global development efforts** leave no country or community behind.
- **Key Functions**
  - **Policy Coordination:** Coordinates activities of UN specialised agencies, programmes, and development bodies.
  - **Global Platform:** Facilitates international dialogue, consensus-building, and policy innovation on development challenges.
  - **SDG Review:** Conducts High-Level Political Forum (HLPF) to monitor Sustainable Development Goal implementation.
  - **Inclusive Engagement:** Grants consultative status to over 6,500 NGOs, enabling structured civil society participation.
  - **Institutional Linkage:** Oversees functional commissions, regional commissions, and expert advisory bodies.
  - **UN System Governance:** Elects executive boards of agencies like UNDP, UNICEF, and UNHCR.
- **Composition and Structure**
  - Comprises **54 Member States** elected by the UN General Assembly.
  - Members serve **three-year terms** with equitable regional representation.

World Health Organization

Context

- The **United States has completed the one-year notice period** to formally withdraw from the **WHO**, raising concerns over funding gaps and weakened global health coordination.

Overview of WHO

- The **UN's specialised agency** for global public health, responsible for health emergency response, standard-setting, and international coordination.
- **Established:** 7 April 1948 (World Health Day).
- **Headquarters:** Geneva, Switzerland.
- **Membership:** 194 Member States.
- **Historical Background**
  - Originated from **International Sanitary Conferences (1851–1938)**.
  - Absorbed the **League of Nations Health Organization** post–World War II.
- **Core Functions**
  - **Global health leadership:** Coordinates responses to **pandemics and health emergencies**.
  - **Standard-setting:** Develops **ICD** and international health regulations.
  - **Universal Health Coverage:** Promotes **equitable access** to essential services.
  - **Technical support:** Policy advice, training, and capacity building.
  - **Surveillance:** Global health data, alerts, and early-warning systems.
- **Withdrawal Mechanism**
  - **Legal requirements:**
    - One-year advance notice.
    - Settlement of outstanding financial obligations.
  - **Current status:** Legal and procedural issues flagged due to **unpaid dues**; modalities under review by the **WHO Executive Board**.

Global Future Councils (GFCs)

Context: UAE and World Economic Forum (WEF) signed an MoU for **Dubai to host GFC meetings (2026–2030)**.

What are Global Future Councils (GFCs)?

- Flagship multistakeholder knowledge network of **WEF**.
- **Invitation-only, time-bound expert think tanks** generating forward-looking policy insights.
- Focus on **emerging global risks, trends, and technologies**.

Establishment & Partners

- **Established:** 2013
- **Lead Organisation:** World Economic Forum (WEF)
- **Strategic Host (2026–2030):** United Arab Emirates

Aim

- Identify **future trends and systemic risks**.
- Convert expert knowledge into **actionable, policy-relevant outputs**.
- Support **resilient, inclusive, and sustainable governance models**.

Key Features

- **Tenure:** Two-year terms (Current: March 2025–December 2026)
- **Interdisciplinary composition:** Policymakers, academics, industry, civil society.
- **Evidence-based outputs:** Research-driven, not opinion-led.
- **Policy linkage:** Feeds into **WEF initiatives and Davos agenda**.

Core Principles

- Systems thinking & cross-sector collaboration
- Innovation & future scanning
- Research-backed global policy guidance

Topic: Defence Exercise

Operation Hawkeye

About the Operation

- **Operation Hawkeye** is a **US-led counter-terror air campaign** targeting **ISIS bases in Syria**.
- It was **launched in December 2025** by the **United States** and executed by **US Central Command (CENTCOM)**.
- The aim was to **retaliate** against ISIS, **degrade** its

networks, **prevent regrouping**, and **protect** US and coalition forces.

Key Facts about Syria

- **Syria** is **in West Asia** on the **eastern Mediterranean coast**.
- **Capital:** Damascus.
- **Neighbouring countries:** Turkey, Iraq, Jordan, Lebanon and Israel.
- **Physical Geography**
    - **Mediterranean coastline** provides strategic naval and trade access.
    - **Al-Ansariyah Mountains** separate the humid coast from the arid interior.
    - **Anti-Lebanon Range & Mount Hermon** form natural borders and water sources.
    - **Syrian Desert** dominates the eastern interior.
    - **Euphrates River** is the main irrigation and hydropower lifeline.
    - **Orontes River** supports fertile western plains and settlements.

Topic: Places in news

Venezuela

Brief Overview

- Venezuela is located on the **northern coast of South America**.
- It is bounded by **Guyana (east)**, **Brazil (south)** and **Colombia (west, southwest)**.
- Venezuela shares maritime boundaries with the **Caribbean Sea and Atlantic Ocean**.
- The capital city of Venezuela is **Caracas**.

Geographical Features of Venezuela

- Northwestern region includes the **Andes Mountains and Maracaibo Lowlands**.
- Central Venezuela consists of **plains known as Llanos**.
- Southeastern region is dominated by the **Guiana Highlands**.

Rivers and Lakes

- **Orinoco River** flows through Venezuela and is shared with **Colombia**.
- **Rio Negro** is shared with **Colombia and Brazil**.
- **Lake Maracaibo** is the **largest lake in South America**.
- **Lake Guri** is a major inland water body.

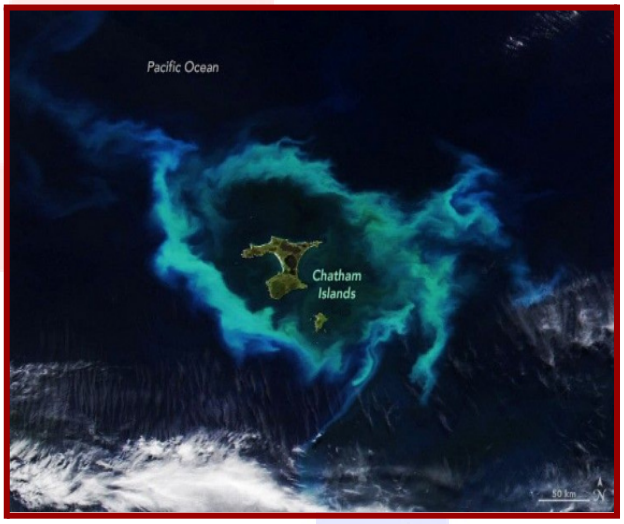
Relief and Landmarks

- **Pico Bolívar** is the **highest point of Venezuela**.
- **Angel Falls**, the **world's highest waterfall**, is located in the **Guiana Highlands**.

Natural Resources

- Venezuela possesses the **world's largest oil reserves**.
- It has significant reserves of **coal, iron ore, bauxite and gold**.

Chatham Islands



Context

- A **phytoplankton bloom** encircled the **Chatham Islands** during the recent **austral summer**, visible through satellite imagery.
- Phytoplankton blooms act as **carbon sinks**, influencing regional **climate regulation and fisheries productivity**.

About Chatham Islands

- A **remote island group** in the **South Pacific Ocean**, forming **New Zealand's easternmost territory**.
- Located about **800 km east of mainland New Zealand**.
- **Composition:** Group of **10 islands**, primarily of **volcanic origin**, with **limestone areas** indicating past geological linkage to New Zealand.

- **Main inhabited islands:**
  - **Chatham Island (largest):**
    - High **southern tableland** with cliffs.
    - **Northern lowlands** with waterways, peatlands and sandy beaches.
  - **Pitt Island:**
    - **Forested interior** with rugged cliffs, headlands and beaches.
- **Surroundings:** Smaller islands lie within a **50 km radius** of the two main islands.
- **Astronomical Significance:** The first inhabited place on Earth to see the sunrise each day.

Chabahar Port

Location and Geography

- Located in **Sistan-Baluchistan province, southeastern Iran**.
- Situated on the **Gulf of Oman at the mouth of the Strait of Hormuz**.
- **Only Iranian port with direct access to the Indian Ocean**.
- Comprises **two terminals – Shahid Beheshti and Shahid Kalantari**.

Strategic Connectivity

- Geographically close to **India, Pakistan, and Afghanistan**, enhancing regional transit potential.
- Acts as a key node on the **International North–South Transport Corridor (INSTC)**.
- INSTC links **Indian Ocean and Persian Gulf to the Caspian Sea via Iran, and onward to Russia and Northern Europe**.
- **Distance:**
  - **Kandla–Chabahar:** 550 nautical miles
  - **Mumbai–Chabahar:** 786 nautical miles.

Chabahar Project - Background

- **Tripartite agreement signed in May 2016** between **India, Iran, and Afghanistan**.
- Focused on developing the **Shahid Beheshti Terminal**.
- Recognised as **India's first overseas port development project**.

Infrastructure Components

- Development of **port terminals and cargo handling facilities**.
- Construction of **Chabahar–Zahedan railway line** to connect with Iran's national rail network.

Strategic and Economic Significance

- Enables **India to bypass Pakistan** for access to **Afghanistan and Central Asia**.
- Serves as a **transit trade hub between India, Iran, and Afghanistan**.
- Provides an **alternative trade route to traditional Silk Road corridors through China**.
- Enhances India's **geopolitical presence in West and Central Asia**.

West Bank

Overview

- The West Bank is a **landlocked territory in Western Asia**, forming the main part of Palestinian territories.
- It lies near the **Mediterranean coast** but has no direct sea access.

Geographical Location

- **East:** Jordan and the **Dead Sea**.
- **North, West, South:** Bordered by **Israel**.
- **De facto capital: Ramallah**, administrative centre of Palestine.

Historical Background

- Captured by **Jordan after the 1948 Arab–Israeli War**.
- Occupied by **Israel during the Six-Day War in 1967**.
- Remains under **Israeli occupation since 1967**.

Demography and Settlements

- Approximately **2.6 million Palestinians** reside in the West Bank.
- Around **130 formal Israeli settlements** are present in the territory.

Legal Status of Settlements

- Declared **illegal under international law** by UN bodies and ICJ.
- **Fourth Geneva Convention (1949)** prohibits population transfer into occupied territories.

Oslo Accords

- Agreements between **Israel and the Palestine Liberation Organization (PLO)**.
- **Oslo I:** Signed in **1993, Washington D.C.**
- **Oslo II:** Signed in **1995, Taba, Egypt**.
- **Key Outcomes of Oslo Accords**
  - Created the **Palestinian National Authority (PNA)**.
  - Granted **limited self-governance** in parts of West Bank and Gaza Strip.
  - Did **not establish a sovereign Palestinian state**.

Pratas Islands (Dongsha Islands)

Context

- A **Chinese reconnaissance drone** briefly flew over **Taiwan-controlled Pratas Islands**.
- Taiwan termed the move **"provocative and irresponsible"**, amid rising South China Sea tensions.

About Pratas Islands

- A **small group of three islands** located in the **northern South China Sea**.
- Also known as the **Dongsha Islands**.
- **Physical Geography**
  - Characterised by a **circular coral atoll structure**.
  - **Dongsha Island** is the only island above sea level.
  - Other two features remain **submerged reef formations**.
  - Atoll diameter: **~24 km**, enclosing a lagoon of **~16 km**.
  - Formed mainly of **clastic coral and reef flats**.
- **Location and Connectivity**
  - Lies about **445 km southwest of Kaohsiung, Taiwan**.
  - Around **320 km southeast of Hong Kong**.
  - Located near routes connecting the **Pacific and Indian Oceans**.
  - Close to **Taiwan Strait** and **Bashi Channel** maritime corridors.
- **Historical Importance**
  - Known since the **ancient Han Dynasty period**.
  - Historically used along **trade and fishing routes** in East Asia.
- **Political Status**
  - Claimed by the **People's Republic of China**.
  - Administered and controlled by **Taiwan**.
  - Declared part of **Dongsha Atoll National Park by Taiwan**.
  - No permanent civilian population; **Taiwanese marines are stationed**.
- **Ecological Significance**
  - Rich **marine and coastal biodiversity hotspot**.
  - Supports **coral reefs, diverse fish species, and migratory birds**.
  - Notable species include the **Chinese Egret**.

Chagos Islands

Location

- Archipelago of 60+ islands in **central Indian Ocean**.
- Lies **south of Maldives**, **east of Seychelles**.
- **Diego Garcia** is the largest island.

Strategic Importance

- Hosts **US–UK military base** at Diego Garcia.
- Key hub for operations in **West Asia, South Asia, East Africa**.
- Supports **intelligence, surveillance, and long-range military deployments**.

Historical Background

- Under **British control since 1814** (ceded by France).
- **1965:** Separated from Mauritius to form **British Indian Ocean Territory (BIOT)**.
- **1968:** Mauritius gained independence without Chagos.

UK-Mauritius Chagos Sovereignty Deal (2025)

- **Sovereignty transferred to Mauritius**.
- **99-year lease** of Diego Garcia to **UK–US** for military use.
- UK to pay **~£101 million annually** over lease

period.

Kamchatka Peninsula

Context

- Severe winter storm disrupted life across **Kamchatka Peninsula, Russia's Far East**.
- Heavy snowfall buried settlements and transport infrastructure.

Location & Political Status

- Part of **Russian Far Eastern Federal District**.
- Administered as **Kamchatka Krai**.
- Lies between **Sea of Okhotsk (west)** and **Pacific Ocean–Bering Sea (east)**.

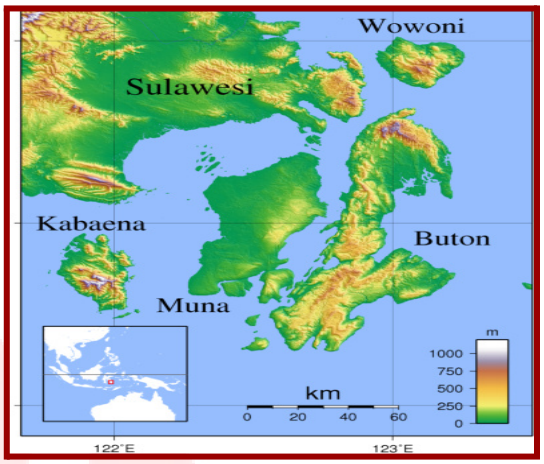
Physical Geography

- **Length:** ~1,250 km long volcanic peninsula.
- **Mountain ranges:**
  - Sredinny Range (Central Range)
  - Vostochny Range (Eastern Range)
- **Volcanism:**
  - About **29 active volcanoes**.
  - Part of the **Pacific Ring of Fire**.
  - Listed under **UNESCO "Volcanoes of Kamchatka" World Heritage Site**.

Drainage System

- **Kamchatka River** flows through the **Central Valley**.
- Drains into the **Pacific Ocean**.

Muna Island



Context:

- Researchers identified a **67,800-year-old hand stencil** in a cave on **Muna Island**, Indonesia.
- It is considered the **oldest known example of rock art** globally.

Muna Island

- **Location**
  - **Southeast Sulawesi Province**, Indonesia.
  - Lies across the **Strait of Buton** from Buton Island (east).
- **Physical Features**
  - **Area:** ~1,704 sq km
  - **Relief:** Hilly terrain; highest elevation ~445 m (1,460 ft)
  - **Vegetation:** Teak forests in northern and northeastern parts
- **Cultural & Human Geography**
  - Inhabited by the **Muna people**, known for traditional crafts and dances.
  - **Main town/port:** Raha (northeastern coast)
- **Economy**
  - **Primary sectors:** Agriculture, fishing, local handicrafts
- **Natural & Archaeological Sites**
  - **Liangkobori Cave:** Prehistoric cave paintings and rock art.
  - **Napabale Lake:** Connected to the sea through a natural tunnel.
- **Significance**
  - Key site for **early human artistic expression**.
  - Enhances understanding of **prehistoric culture in Southeast Asia**.

Donbass

About the Region

- **Definition:** Donbass is a historical and industrial region in **south-eastern Ukraine**.
- **Geographic extent:** Comprises primarily **Donetsk and Luhansk Oblasts**.

Political Status

- Since **2014**, parts of the region have been under control of **Russia-backed separatist entities**.
- These groups proclaimed the **Donetsk People's Republic (DPR)** and **Luhansk People's Republic (LPR)**.
- The area remains a **core theatre of the Russia–Ukraine conflict**.

Strategic Significance

- Major **coal and heavy industry belt** of Ukraine.
- Critical for **economic, military, and geopolitical influence** in Eastern Europe.

Chatergala Pass

Location:

- **Altitude:** ~10,500 feet
- **Region:** Bhaderwah–Chatergala axis, Jammu region, **UT of Jammu and Kashmir**
- **Connectivity:** Links **Bani (Kathua district)** with **Bhaderwah (Doda district)**

Physiographic Setting:

- Part of the **Chamba–Doda ranges** of the Greater Himalayas.
- Surrounded by **alpine meadows, dense forests, and snow-clad peaks**

Biodiversity:

- Fauna includes **Himalayan monal, ibex, and musk deer**

Strategic Relevance:

- Key high-altitude route for **civilian movement and border-area connectivity**
- Maintained under **BRO's Project Sampark**

About Border Roads Organisation (BRO)

- **Nature: Road construction executive force** supporting Indian Armed Forces in border regions.
- **Establishment:** 7 May 1960
- **Ministry:** Fully under Ministry of Defence (since 2015)
- **Functions:**
  - Develops and maintains **strategic roads, bridges, and infrastructure** in border areas.
  - Operates in **remote northern and northeastern regions** and friendly neighbouring countries.
- **Leadership:**
  - Headed by **Director General of Border Roads (DGBR)**
  - Rank: **Lieutenant General**
- **Cadre Composition:**
  - **Parent cadre:** General Reserve Engineer Force (GREF)
  - Also staffed by **Indian Army Corps of Engineers** (deputation)
- **Workforce:** Employs **2+ lakh local workers** in remote and border regions.
- **Motto: "Shramena Sarvam Sadhyam"** (Everything is achievable through hard work)

Rojava Region

Context: Renewed clashes between **Syrian forces** and **Kurdish-led SDF** threaten **DAANES autonomy** after **Assad's fall in 2024**

What is Rojava?

- **Official name:** Democratic Autonomous Administration of North and East Syria (DAANES)
- **De facto autonomous region** in **northeastern Syria**
- Lacks **international recognition**

Location in Syria

- Covers parts of **Hasakah**, **Raqqa**, **Deir ez-Zor**, **Aleppo (Kobane)**
- Lies along **Euphrates River basin**
- Includes **oil- and gas-rich eastern Syria**

Neighbouring Regions / Countries

- **Türkiye** to the north
- **Iraq (Kurdistan Region)** to the east
- **Syrian government-controlled areas** to west

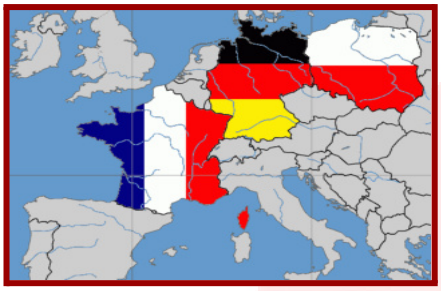
and south

Important Places

- **Kobane** - border town near Türkiye
- **Qamishli** - major Kurdish urban center

Topic: Other Important News

Weimar Triangle



Context: India participated for the **first time** in the **Weimar Triangle format**.

About Weimar Triangle

- **Basic Profile**
  - A **trilateral diplomatic grouping**.
  - Members: **France, Germany and Poland**.
- **Origin**
  - Established in **1991**.
  - Named after **Weimar city, Germany**.
  - First meeting held by **foreign ministers**.
- **Purpose**
  - Promotes **European integration**.
  - Supports **political and security coordination**.
  - Focused on **Eastern Europe and Russia-related issues**.
- **Key Functions**
  - Coordinates **EU foreign and security policy positions**.
  - Acts on **Russia–Ukraine security matters**.
  - Holds **pre-summit consultations** before **EU and NATO meetings**.
  - Supports **trilateral cooperation** in diplomacy, defence and economy.
- **Historical Role**
  - Supported Poland's NATO entry (1999), Poland's EU accession (2004).
- **Geopolitical Role**
  - Serves as a **link between Western and Central/Eastern Europe**.
  - Influences **EU policy on Russia and Ukraine**.

Orinoco Belt & Guiana Shield

Orinoco Belt (Venezuela)

- The **Orinoco Belt** holds the **world's largest extra-heavy crude reserves**, about **20% of** global proven heavy/extra-heavy oil.
- It lies in the **southern Orinoco River basin**.
- Its **extra-heavy crude** has **low API gravity** (asphalt-like) and **needs blending with diluents** to move through pipelines.
- Strategic value stems from **energy security, OPEC leverage and geopolitical competition** over Venezuela's hydrocarbons.

Guiana Shield (Northeast South America)

- The **Guiana Shield** is a **1.7–2-billion-year-old Precambrian craton**, among the oldest stable geological formations on Earth.
- It underlies Guyana, Suriname, French Guiana, southern Venezuela, NE Brazil and S.E. Colombia.
- The **Guiana Highlands** host **tepuis** (table-top mountains) including **Mount Roraima**, **Pico da Neblina (2,995 m)** and **Angel Falls**.
- It contains **~20% of global freshwater** and **~18% of tropical-forest carbon**, earning the tag **"greenhouse of the world."**
- The shield is **mineral-rich** in **gold, diamonds, bauxite and iron ore**, driving both development and environmental pressures.

Two-State Solution

Meaning / Concept:

- A proposed framework to resolve the **Israel–Palestine conflict**.
- Envisions **two sovereign states**: **Israel** and an **independent Palestine**.
- Objective is **territorial separation** ensuring self-determination for both peoples.

Origins and Historical Evolution

- **1947 UN Partition Plan:**
  - United Nations proposed separate **Arab and Jewish states**.
  - **Jerusalem** to be placed under **international administration**.
  - Jewish leadership accepted; allocated about **56% of the land**.
- **1948 Arab–Israeli War:**
  - Israel declared independence on 14 May 1948.
  - Five Arab states launched a military attack.
  - War ended with **Israel controlling about 77% of the territory**.
- **Palestinian Displacement (Nakba):**
  - Around **700,000 Palestinians** fled or were displaced.
  - Refugees settled in **Jordan, Lebanon, Syria, Gaza Strip, West Bank, and East Jerusalem**.
- **1967 Six-Day War:**
  - Israel captured **West Bank (including East Jerusalem)** from Jordan.
  - Captured **Gaza Strip** from Egypt.
  - Israel gained control from the **Mediterranean Sea to the Jordan Valley**.

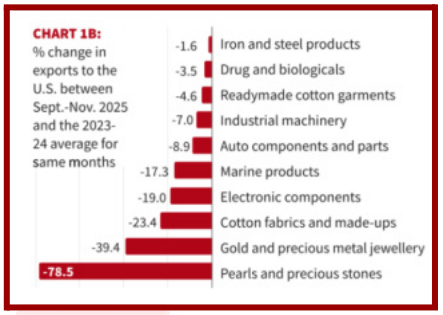
Current Status

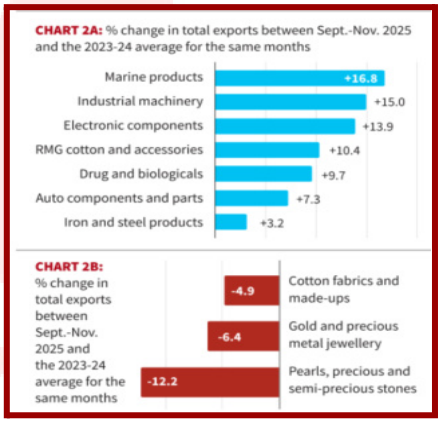
- Palestinians remain **stateless**.
- Majority live under **Israeli occupation** or as **refugees in neighbouring countries**.
- Final status issues include **borders, Jerusalem, refugees, and security**.

ECONOMICS

Topic: Indian Economy

Export Diversification Strategy





Context and Overview

- India's exports showed **resilience** in late 2025 despite rising **U.S. tariffs**.
- Overall exports grew, and shipments to the **U.S. rebounded**, masking sectoral stress.
- Analysis compares September–November 2025 data with 2023–24 monthly averages.
- Focus is on sectors with **high export dependence** on the U.S. market.

Sectors Unaffected or Benefiting

- **Telecom instruments**, mainly smartphones, surged **237%** due to tariff exemption.
- **Electrical machinery exports** to the U.S. increased by **15%**.
- Growth in these items offset tariff-induced declines elsewhere.

Sectors Hit by U.S. Tariffs

- **Pearls and precious stones** exports fell sharply by **78.5%**.
- **Gold jewellery** declined by **39%**, cotton fabrics by

23%.

- **Marine products** dropped **17%** in U.S. shipments.
- **Readymade cotton garments** declined marginally by **4.6%**.

Two-Path Adjustment Strategy

- **Path 1: Absorbing Tariff Impact**
  - Some exporters partially absorbed tariff shocks without major market shifts.
  - U.S. remained a **dominant buyer** in several sectors despite reduced volumes.
- **Path 2: Market Diversification**
  - **Marine exports** grew **17% overall**, despite U.S. decline.
  - Exports to **China increased 23%**, strengthening existing partnerships.
  - Entry into **new European markets** filled U.S. demand gaps.
  - Marine exports exceeded **$50 million to Spain** in three months.
  - Shipments rose to **Belgium (124%)**, **Netherlands (56%)**, **Germany (65%)**, and **Italy (23%)**.

Sectoral Feedback and Enablers

- Seafood Exporters Association of India urged new **Free Trade Agreements**.
- Cotton exporters highlighted **rupee depreciation** aiding market discovery.
- Cotton Textiles Export Promotion Council noted currency advantage in diversification.

Conclusion

- India offset U.S. tariff losses through **old alliances and new markets**. Thus, the **export diversification** emerged as a key buffer against trade shocks.

Central Bank Digital Currency

Context

- The **Reserve Bank of India** proposed linking **BRICS CBDCs** on the agenda for the 2026 summit. The recommendation aims to improve **cross-border payment efficiency** amid rising geopolitical and trade tensions. The initiative could reduce **reliance on the U.S. dollar** in cross-border settlements.

About CBDC

- **Definition and Legal Nature of CBDC**
  - A CBDC is a **digital form of sovereign currency** issued by the central bank.
  - It appears as a **liability on the central bank's balance sheet**.
  - The currency retains **legal tender status** equivalent to physical cash.
  - The RBI recognises CBDCs as part of the **official monetary framework**.
- **Types of CBDCs**
  - **Wholesale CBDCs** support interbank payments and settlement among licensed financial institutions.
  - They are used mainly for **securities transactions and large-value financial transfers**.
  - **Retail CBDCs** are accessible to the general public through digital wallets and mobile platforms.
  - **Token-based models** allow transactions using private and public key authentication.
  - **Account-based models** require digital identity verification for account access.
  - The **DCash system** of the Eastern Caribbean follows an account-based retail model.

India's Digital Rupee (e₹)

- The **digital rupee** is issued and regulated by the Reserve Bank of India.
- It entered **pilot mode in December 2022** with participation from fifteen banks.
- The currency is available in the **same denominations as physical notes and coins**.

- It holds **legal tender status under Section 26 of the RBI Act, 1934**.

- **Potential Benefits of CBDCs**
  - CBDCs promote **financial inclusion** for unbanked and under-banked populations.
  - They reduce **transaction costs** by eliminating multiple payment intermediaries.
  - Digital ledgers enable **better transaction tracking**, limiting corruption and tax evasion.
  - Central banks can enhance **monetary policy transmission** through direct digital transfers.
  - CBDCs improve **cross-border payment efficiency** by reducing dependence on international intermediaries.
  - **Programmable payments** allow conditional transfers with restrictions or expiration features.
- **Challenges and Risks**
  - Systems face **cybersecurity threats**, including hacking and data breaches.
  - **Privacy concerns** arise from extensive transaction tracking and identity verification.
  - The **digital divide** may exclude populations lacking technological access or literacy.
  - Differing **DLT standards** reduce efficiency in cross-border CBDC interoperability.
  - Preference for foreign CBDCs could threaten **national monetary sovereignty**.
- **Way Forward**
  - **Zero-Knowledge Proof technologies** can balance regulatory oversight with user privacy.
  - Governments should integrate CBDCs with **Direct Benefit Transfers and welfare payments**.
  - **Regulatory sandboxes** can test legal frameworks before nationwide implementation.
  - Global institutions like **IMF and BIS** can guide interoperability and international standards.

State Finances and Debt Trends

Context and RBI Assessment

- Recent data from the **RBI's Study of State Budgets 2025** and **State of State Finances Report** offers an interesting insight.
- Despite **being poll-bound**, several **States** managed to **reduce their debt burden** relative to their economic size, while continuing development spending.
- This finding **challenges the common criticism** that governments become fiscally reckless during election periods.

Debt Trends Since 2021

- Since 2021, some major States have made visible progress in managing debt levels.
- **Assam, Kerala, Tamil Nadu, West Bengal, and Puducherry** reduced their debt ratios by up to four percentage points.
- However, differences remains as **West Bengal** continues to have the highest debt burden at about **39% of GSDP**, though it declined by 4.7 percentage points.

FRBM Limits and Fiscal Reality

- Even after reductions, debt levels in these States remain above the **FRBM benchmark of 20%**.
- The RBI notes that **States have exceeded these limits** consistently since 2016.
- This cannot be viewed in isolation. Globally, **governments expanded borrowing** after the **COVID-19 pandemic**, prioritising relief, healthcare, and economic recovery over strict fiscal targets.

Development and Welfare Spending

- Importantly, fiscal consolidation did not come at the cost of development spending.
- Most States maintained or only slightly reduced expenditure on social sectors and infrastructure.
  - **West Bengal** increased development spending from **10.3% to 12% of GSDP**.
  - **Kerala** and **Tamil Nadu** sustained capital outlay around **1% and 1.9%** respectively.
  - **Assam** kept social sector spending within **11% of GSDP**.
- This indicates attempts to balance welfare commitments with fiscal discipline.

Demographic Pressures and Fiscal Strategy

- RBI also highlighted the role of demographic change in shaping State finances.
- States like **Kerala and Tamil Nadu** have ageing populations, with over **20% above 60 years**.
- This increases spending needs on **healthcare, pensions, and social security**.
- In contrast, younger States must invest more in **education, skills, and employment** to harness the demographic dividend.

Conclusion: The data reminds us that **public finance** is not merely about numbers. It reflects governments trying to **balance electoral pressures, welfare responsibilities,**

and long-term economic stability, while responding to demographic realities and post-pandemic recovery needs.

Economic Survey 2025–26

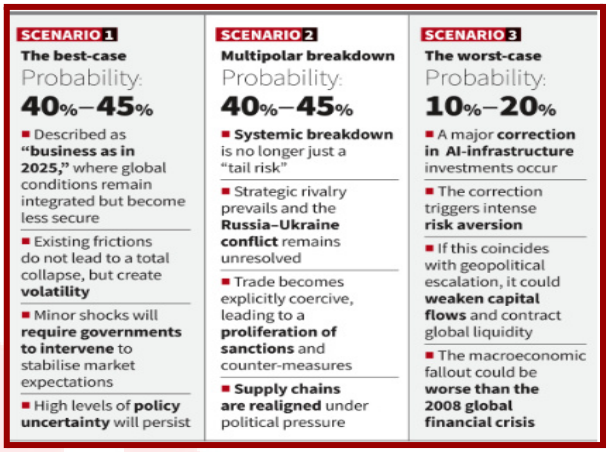
Survey Approach, Philosophy & Growth Outlook

- The Survey adopts **evidence-based analysis**, avoiding alarmism amid global economic uncertainty.
- It proposes a forward-looking **economic governance framework** for medium-term policymaking.
- Introduces the concept of an **"entrepreneurial state"** i.e. adaptive, risk-taking, innovation-driven governance.
- Encourages policy systems that **learn from failure** to accelerate long-term structural growth.
- **Growth Estimates**
  - India's medium-term growth potential revised upward to **7% from 6.5%**.
  - Upgrade reflects stronger **capital formation**, rising labour participation, and productivity gains.
  - FY26 growth estimated at **7.4%**, with Q3 nowcast at **7%**.
  - FY27 growth projected within **6.8%–7.2% range**.
  - Survey authored by **CEA V. Anantha Nageswaran** and tabled in Parliament.

Reform Momentum and Structural Growth Drivers

- Growth linked to **PLI schemes**, FDI liberalisation, and logistics modernisation.
- Public investment expanded **physical and digital infrastructure** across regions.
- Simplified tax regimes improved **compliance** and corporate financial health.
- MSME credit expansion supported **employment formalisation** and financial inclusion.
- Tax administration reforms enhanced **revenue transparency** and efficiency.

Global Risk Scenarios & External Sector Vulnerabilities



- Survey outlines **three probabilistic global economic scenarios** shaping 2026 outlook.
  - **Worst-Case Scenario (10%–20% Probability)**
    - A systemic crisis could exceed the **2008 financial meltdown** in severity.
    - Risks arise from **financial fragility**, geopolitical tensions, and technology bubbles.
    - Highly leveraged **AI investment ecosystems** flagged as emerging vulnerabilities.
    - Concerns include **optimistic timelines**, narrow markets, and long capital lock-ins.
    - Spillovers may tighten **global liquidity** and destabilise capital markets.
  - **Best-Case Scenario (40%–45% Probability)**
    - Assumes continuation of **fragile but stable** global macroeconomic conditions.
  - **Intermediate Scenario**
    - Predicts **multipolar fragmentation** amid intensifying geopolitical and technological rivalries.
- **External Sector Risks for India**
  - Capital flow disruptions may pressure **rupee stability** structurally.
  - Rising incomes will expand **import demand** despite indigenisation efforts.
  - Survey stresses building **forex buffers**, export competitiveness, and investor confidence.
  - Calls for achieving **strategic resilience** and global supply-chain indispensability.

Fiscal Strategy, Welfare Debates & Centre–State Dynamics

- Survey supports greater **fiscal flexibility** for the

Centre amid global uncertainty.
- Centre reduced fiscal deficit ratio by **over half in five years**.
- **Concerns over Unconditional Cash Transfers (UCTs)**
  - Aggregate UCT spending estimated at **₹1.7 lakh crore in FY26**.
  - Nearly half of the states remain under **revenue deficit stress**.
  - Transfers account for **0.19%-1.25% of GSDP**. Also constitute **0.68%-8.26% of State budgets**.
  - Absence of sunset clauses increases **revenue rigidity**. The transfers may crowd out **capital expenditure** during fiscal stress.

Employment, Rural Economy & Human Capital
- **Labour Markets and Gig Economy**
  - PLFS shows falling **unemployment** and rising labour participation.
  - Gig workforce expanded from **77 lakh to 1.2 crore**.
  - Growth driven by delivery, ride-sharing, and freelancing platforms.
  - Nearly **40% gig workers** earn below ₹15,000 monthly.
  - Algorithmic control shapes wages, work allocation, and performance monitoring.
  - Risks include **income volatility**, burnout, and financial exclusion.
  - Labour Codes expected to improve **security and formalisation**.
- **Rural Economy & Employment Reset**
  - Survey supports replacing **MGNREGA** citing structural inefficiencies.
  - Introduces **Viksit Bharat Rozgar and Ajeevika Mission Act, 2025**.
  - Rural unemployment fell from **3.3% to 2.5%**.
  - MGNREGA person-days declined **53%** from pandemic peak.
  - Women's participation rose to **58.1%**.
  - Issues include digital attendance manipulation and mechanisation misuse.
- **Education & Human Capital**
  - Only **17% rural** and **38% urban** schools offer secondary education.
  - Secondary Net Enrolment Ratio stands at **52.2%**.
  - Nearly **two crore adolescents** remain out of school.
  - Income supplementation drives **44% dropouts**.
  - Girls cite domestic responsibilities as primary constraint.
  - Only **0.97% adolescents** received formal skilling.
  - Bill introduced: **Viksit Bharat Shiksha Adhishthan, 2025**.

Manufacturing, Finance & Productive Capacity
- **Manufacturing & MSMEs**
  - Manufacturing framed as a **strategic national asset**.
  - MSMEs contribute **35.4% manufacturing output**.
  - Account for **48.58% exports**.
  - Employ over **32.82 crore persons**.
  - Policy shift urged from import substitution to **innovation and scale**.
- **Financial Sector Performance**
  - Bank GNPA ratio fell to **2.2%**.
  - Net NPA declined to **0.5%**.
  - Credit growth reached **14.5% YoY**.
  - Demat accounts crossed **21.6 crore**.
  - Unique investors exceeded **12 crore**.
  - Nearly **25% investors** are women.
  - Mutual fund investors reached **5.9 crore**.

Energy, Agriculture & Resource Security
- Oil imports diversified across **U.S., UAE, Libya, Egypt, Nigeria**.
- U.S. share rose to **8.1%**.
- UAE share increased to **11.1%**.
- Agricultural growth averaged **4.4%** over five years but it slowed to **3.5% in Q2 FY26**.
- Livestock and fisheries grew **7.1%** and **8.8%**.
- Foodgrain output reached **3,577.3 lakh tonnes**.

Climate, Health & Urban Governance
- Survey prioritises **climate adaptation** over near-term mitigation.
- Development itself seen as strengthening **climate resilience**.
- Flags rising **digital addiction** and mental health concerns.
- Recommends expansion of **Tele-MANAS services**.
- Maternal mortality declined **86% since 1990**.
- Infant mortality fell to **25 per 1,000 births**.
- Urban governance suffers from **fragmentation and fiscal constraints**.

Emerging Structural Risks
- Ethanol expansion may affect **food security**.
- Renewable transition involves **significant economic costs**.
- Fodder shortages threaten **agricultural sustainability**.
- Smartphone overuse linked to behavioural risks.

Conclusion
- Survey portrays India as **structurally resilient** amid global fragility. The growth hinges on **reforms, capital flows, and investor trust.** Thus **balancing fiscal prudence** with welfare expansion

remains critical. **Human capital investment** will determine India's **demographic dividend** outcomes.

Topic: Infrastructure

India's Tourism Sector: Soft Power Projection

Performance Indicators

- India received **5.6 million foreign tourists** till August 2025, despite vast cultural diversity.
- **Singapore recorded 11.6 million arrivals** by August 2025, despite a much smaller population.
- **Thailand earned over $60 billion** from tourism, while India earned roughly one-third.
- These figures reveal a strategic gap between **tourism potential and actual performance**.

Core Challenges

- **Image Deficit**
  - Global perception shaped by **safety concerns, scams, sanitation issues, and bureaucratic hurdles**.
  - Many foreign travellers view India as **unsafe for women travelling alone**.
  - Branding campaigns remain insufficient against **negative international media narratives**.
  - Proposed segmentation includes **Spiritual India, Adventure India, and Luxury India**.
- **Infrastructure Constraints**
  - Tourist experience begins at **airports, immigration counters, taxis, and digital connectivity**.
  - **Last-mile connectivity** to remote destinations remains inconsistent and unreliable.
  - **Clean public toilets, signage, Wi-Fi, and heritage maintenance** remain uneven.
  - Mid-range and luxury travel costs remain **higher than Southeast Asian competitors**.
- **Service Culture and Workforce Gaps**
  - Hospitality sector faces a **40% shortfall in trained tourism staff**.
  - Graduates prefer **stable office employment over unpredictable guest-facing service roles**.
  - Presence of **touts, scammers, and harassment** undermines tourist confidence.
- **Immigration and Visa Challenges**
  - India ranks lower on **ease-of-travel indexes** compared to Asian competitors.
  - **E-visas improved access**, but procedural delays still deter repeat visitors.
  - Reports of **foreigners denied entry for past criticisms** damage international image.
  - Proposal includes **Visa on Arrival for low-risk countries**.

Strategic Reform Measures

- Promote **tourism circuits** like Golden Triangle, Himalayan trail, and coastal belt.
- Expand **public-private partnerships** through the 'Adopt a Heritage' scheme.
- Strengthen **tourist police, multilingual support, and verified digital guide platforms**.
- Launch a nationwide **'Clean Tourism' campaign** with waste management standards.
- Encourage **eco-tourism and community-based tourism** for sustainability.

Economic and Strategic Significance

- Tourism generates **more jobs per investment unit** than manufacturing.
- Sector supports **unskilled and semi-skilled employment**, reducing youth unemployment risks.
- Hospitality shapes India's **global image and soft power projection**.
- Current **GST structure denies input tax credit**, weakening hotel sector competitiveness.

Conclusion

- India's tourism challenge reflects a need to **refine governance, service delivery, and global positioning**.
- Addressing **image, infrastructure, and experience** can transform tourism into a strategic growth engine.

Green Steel

Context

- Union Environment Minister committed **revised, ambitious NDC** at COP30 in Belém, Brazil.
- Steel sector identified as **hard-to-abate industry** critical for economy-wide decarbonisation.
- Sector currently contributes **around 12% of national carbon emissions** due to coal dependence.

Growth Imperatives and Carbon Lock-in Risks

- Steel production must rise from **125 million tonnes to over 400 million tonnes** by mid-century.
- Investments today determine **long-term emissions trajectory** and industrial competitiveness.
- High-carbon infrastructure risks **locking billions into inefficient technologies** and future market exclusion.

Global Signals and Competitive Pressures

- China expanding **scrap-based secondary steel** and investing in **green hydrogen integration**.
- European Union's **CBAM** penalises high-carbon steel exports entering European markets.
- Early adopters of **low-carbon steel** gain advantage in premium international markets.

Industry Initiatives in India

- Tata Steel piloted **hydrogen injection**, renewable power sourcing, and carbon capture exploration.
- JSW Steel and JSPL exploring **green hydrogen pathways** for low-carbon production.
- SAIL modernising blast furnaces and assessing **alternative low-emission manufacturing routes**.

Policy Framework and Progress

- Government released **Greening Steel Roadmap** outlining practical decarbonisation pathways.
- **Green Steel Taxonomy 2024** formalised national definition for low-carbon steel.
- **National Green Hydrogen Mission** and CCTS targets cover **253 steel units**.

Structural Barriers and Financing Challenges

- Limited and costly **green hydrogen supply** constrains industrial-scale adoption.
- Inadequate renewable energy dedicated for **industrial transition needs**.
- Informal scrap markets and **insufficient natural gas availability** hinder transition fuel strategy.
- Lack of **long-maturity, low-cost debt** increases risks for green steel investments.

Way Forward

- Government must set **clear short-, medium-, and long-term carbon targets** for capital planning.
- Early rollout of **carbon pricing regime** to distribute transition costs across value chains.
- Develop **public procurement market** and certification systems for green steel demand.
- Establish **regional green steel hubs** to share infrastructure for energy and carbon management.
- Fiscal support essential for **small and medium manufacturers** ensuring equitable transition.

High-Speed Rail

Context and Project Overview

- The Union government is **considering a high-speed rail corridor in Kerala**. The project will link **Thiruvananthapuram and Kannur** across the State. The estimated project cost is **₹1 lakh crore**, with a proposed **five-year completion timeline**.

Strategic Rationale

- India is positioned for **major infrastructure expansion**, focusing on a transformative **High-Speed Rail programme**.
- HSR is compared with the impact of **National Highways Development Project and renewable energy initiatives**.
- India's **per-capita GDP matches nations** that launched HSR decades earlier.
- HSR aligns with the government's **growth agenda requiring bold projects, political will, and strong institutions**.

Economic and Transport Benefits

- HSR can reduce the **₹60,466 crore passenger subsidy burden** by attracting aspirational, premium travellers.
- It offers a **competitive alternative to affordable air travel and luxury inter-city coaches**.
- Each kilometre of HSR provides **five times the capacity of conventional rail systems**.
- Improved connectivity can promote **Tier II and Tier III city development** and ease metropolitan congestion.

Critical Priorities for Successful Implementation

- **Dedicated HSR corridors** are necessary to maintain speed and operational reliability.
- Transition to **standard gauge** enables technology transfer and global vendor compatibility.
- **Long-term sustainable financing** should involve cities and States as co-developers.
- A **standalone High-Speed Rail Corporation** can bypass conservative Railway Board structures.

Indigenisation and Industrial Impact

- Localising **rolling stock and key components** reduces import dependence and strengthens domestic suppliers.
- Integration of HSR into **industrial policy** supports long-term manufacturing capacity building.
- HSR stations can evolve into **economic hubs driving regional development**.
- Studies show connected cities experience **2.7% higher GDP gains**.

Employment and Skill Development

- Project generates around **90,000 construction jobs and 4,000 direct operations roles**.
- The **Vadodara HSR Training Institute** can train **3,500 skilled personnel**.

Economic Multiplier and Long-Term Vision

- A **15-year, 10-corridor HSR programme** may require **₹20 trillion investment**.
- Economic returns could reach **₹60 trillion using a multiplier of three**.

- HSR is projected as a **national pride project supporting India's rise as a major economy**.

SHANTI Bill and Nuclear Sector Reforms

Background and Context

- Parliament passed the **SHANTI Bill**, despite Opposition demands for amendments and Select Committee review..

What is the SHANTI Bill?

- SHANTI Bill opens India's **nuclear power sector** to private and foreign participation.
- Allows **private Indian companies** to own, build, and operate nuclear power plants.
- Permits **foreign suppliers**, while limiting private participation to **49%**, retaining **51% government control**.
- Ends **NPCIL's monopoly** in plant construction and operation.
- Encourages **public–private partnerships** across fuel fabrication, equipment, operations, and R&D.
- Supports **Small Modular Reactors (SMRs)** and indigenous reactor deployment.

Role and Powers of Atomic Energy Regulatory Board (AERB)

- **AERB** granted **statutory status**, accountable directly to **Parliament**.
- Responsible for **nuclear safety, radiation protection, emergency preparedness**, and quality assurance.
- Issues licences, standards, inspections, and safety clearances across civilian nuclear installations.
- Expanded role due to increased **private sector participation**, raising concerns of power concentration.

Safeguards and Regulatory Controls

- Bill does **not explicitly permit FDI** in nuclear power.
- Mandatory **AERB authorisation** for radioactive material production, operation, disposal, and facility withdrawal.
- Government retains control over **spent fuel reprocessing**, heavy water production, enrichment, and waste management.
- Establishes a **nuclear liability fund** for accident compensation.

Changes in Nuclear Liability Regime

- Introduces **clear liability caps** for operators:
  - ₹3,000 crore for large plants (3,600 MW).
  - ₹1,500 crore for medium plants.
  - ₹100 crore for **SMRs**.
- Government bears liability beyond caps, supported by liability fund.
- **Supplier liability removed**, unlike earlier regime.
- Penalties for severe violations capped at **₹1 crore**.

Government's Rationale

- Enhances **energy security**, reduces fossil fuel dependence, and supports **24×7 baseload power**.
- Strengthens clean energy transition with **low-carbon nuclear power**.
- Supports India's **net-zero target by 2070**.
- Revives stalled civil nuclear cooperation beyond Russia.

Opposition's Criticism

- Bill **dilutes accountability**, shifting risks to State and society.
- Removal of supplier liability undermines **'polluter pays' principle**.
- Liability caps considered inadequate compared to **Fukushima and Chernobyl** costs.
- **Section 39** overrides **RTI Act**, reducing transparency and public scrutiny.
- **Section 42** excludes nuclear workers from labour safety laws.
- Lacks provisions for **public hearings, EIAs, community consent**, and Parliamentary oversight.
- Accused of being **vendor-driven**, pro-profit, and compromising public safety.

Status of Aviation Sector in India

- India ranks as the **third-largest aviation market globally**, handling over **350 million passengers annually**.
- Domestic air passenger traffic records **10–12% annual growth**, indicating sustained sectoral expansion.
- Women constitute **15% of Indian pilots**, significantly higher than the **global average of 5%**.
- Aviation **capex of ₹91,000 crore** allocated under the **National Infrastructure Pipeline (2019–20 to 2024–25)**.
- **Eighty-one airports** have transitioned to **100% green energy usage**, supporting sustainable aviation goals.
- A **uniform 5% Integrated GST** on aircraft parts promotes India as a **global MRO hub**.

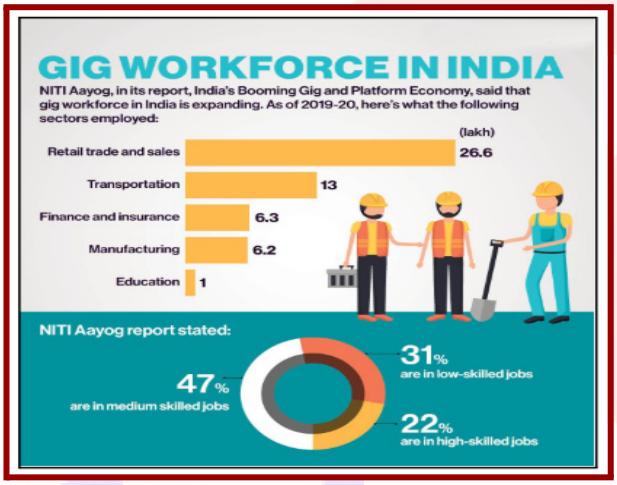
Key Aviation Institutions in India

- **Directorate General of Civil Aviation (DGCA)** regulates air transport services, safety standards, and airworthiness compliance.
- DGCA coordinates India's civil aviation regulations with the **International Civil Aviation Organization (ICAO)**.

- **Airports Economic Regulatory Authority (AERA)**, established under the **2008 Act**, regulates airport tariffs and service standards.
- **Bureau of Civil Aviation Security (BCAS)** formulates aviation security norms under **ICAO Annex 17** provisions.
- **Aircraft Accident Investigation Bureau (AAIB)** investigates major aircraft accidents under **2017 Rules**.
- AAIB probes incidents involving aircraft exceeding **2,250 kg all-up weight or turbojet aircraft**.

Topic: Employment

Social Security for Gig Workers



Context

- Nationwide strike by around **one lakh gig workers** occurred on **December 31**. The strike followed publication of **draft Rules** to operationalise refreshed labour codes.

Position of Gig Workers under Draft Rules

- Gig workers are included **only under social security**, not wages or working conditions.
- **Code on Wages** excludes gig work from an employment relationship.
- Platforms are obligated only to make **gross contributions** to a social security fund.
- Workers' demands on **algorithmic rate cuts and opaque incentives** remain unaddressed.
- **OSH&WC Rules** rely on employer-centric compliance via **Shram Suvidha Portal**.
- App-mediated work concerns are not addressed by this conventional compliance model.
- **Social Security Provisions**
  - Gig workers must **register on a designated portal** to access benefits.
  - Aggregators must upload worker details and **update data quarterly**.
  - Eligibility requires **90 days with one aggregator** or **120 cumulative days annually**.
  - One calendar day may count multiple days if earnings occur across aggregators.

Concerns with Eligibility Framework

- Thresholds may penalise workers facing **care duties, illness, or demand slumps**.
- Rules do not constrain platforms' control over **work allocation and availability**.
- Eligibility windows risk lapsing due to **temporary income disruptions**.

Need for Redesign

- Eligibility thresholds must protect against **illness, maternity, and demand collapses**.
- Rules should clearly specify **benefits, dispute resolution, and minimum fund support**.
- A **time-bound claims and appeals process** is essential, independent of platform goodwill.
- Aggregators should provide **periodic work and earnings statements** to workers.
- Workers must have the right to **contest inaccurate or irregular data**.

India's Startup Ecosystem Transformation

Overview and Institutional Framework

- **Startup India** was launched on **January 16, 2016**, to promote entrepreneurship, innovation, and investment-led economic growth.
- The initiative is implemented by a dedicated team under the **Department for Promotion of Industry and Internal Trade (DPIIT)**.
- The mission aims to transform India into a **job-creator economy** instead of a job-seeker economy.

Recent Performance and Key Statistics

- **Nearly 44,000 startups** were registered in **2025**, the highest annual increase since launch.
- India has emerged as the **third-largest startup ecosystem globally**, reflecting strong innovation momentum.
- Startup numbers expanded from **fewer than 500 in 2014** to **over 200,000 currently**.
- The country hosts **nearly 125 active unicorns**, compared to only four unicorns in 2014.
- More than **₹25,000 crore** has been invested through the **Fund of Funds for Startups**.

Funding Architecture and Policy Instruments

- **Fund of Funds 2.0**, approved in **April 2025**, carries a **₹10,000 crore corpus** for risk capital.
- The new phase prioritises **deep technology sectors**, including AI, machine learning, quantum, defence, and aerospace.
- A **Credit Guarantee Fund** is operated through **SIDBI**, with **₹500 crore annually for four years**.
- Eligible startups receive **three-year income tax exemptions** and **capital gains tax relief**.

Ecosystem Support and Institutional Features

- Startups benefit from **self-certification**, simplified compliance, and a unified digital portal.
- The initiative promotes **industry–academia partnerships** through incubators and research parks.
- **Atal Innovation Mission** supports student innovation, early-stage mentoring, and institutional incubation.
- The **Startup India Hub** serves as a single-window platform for funding, regulation, and knowledge access.

Sectoral and Regional Expansion

- The mission extends beyond technology into **agriculture, manufacturing, healthcare, education, and social enterprises**.
- Special emphasis targets **Tier-2 and Tier-3 cities**, including semi-urban and rural entrepreneurship.
- The programme supports spreading innovation ecosystems across **non-metro industrial and services clusters**.

Significance for Growth and Employment

- Startup India strengthens **job creation, innovation-driven productivity, and global market integration**.
- The ecosystem supports high-growth areas such as **renewable energy, digital services, and advanced manufacturing**.
- Risk-taking culture has gained social acceptance, encouraging **venture creation and capital mobilisation**.

Challenges and Structural Gaps

- Startups face **regulatory delays**, compliance complexity, and uneven policy implementation across States.
- **Early-stage funding access** remains limited, particularly outside major metropolitan clusters.
- Awareness gaps persist in **smaller towns**, reducing equitable access to incentives and schemes.
- Inadequate **mentorship, research infrastructure, and incubation quality** constrain deep-tech and manufacturing startups.

Way Forward

- **Enhance early-stage financing** through faster Fund of Funds disbursements and expanded seed funding mechanisms.
- **Simplify regulatory frameworks** by harmonising State-level compliance and reducing approval timelines.
- **Strengthen incubation quality** by upgrading research infrastructure and mentor networks in non-metro regions.
- **Promote deep-tech commercialisation** through stronger industry linkages and public procurement support.
- **Expand global market access** using trade missions, innovation corridors, and international startup partnerships.

Conclusion

- Startup India has reshaped India's entrepreneurial landscape through **policy support, funding access, and innovation networks**. Ensuring sustained focus on **deep technology, regional inclusion, and regulatory simplification** can consolidate India's global startup leadership.

Labour Reforms under New Labour Codes

Reform Background and Objectives

- India's **four Labour Codes** came into force in **November 2025**, consolidating **29 central labour laws**.
- Reforms aim to **simplify compliance, universalise minimum wages, and expand social protection**.
- Labour being on the **Concurrent List** earlier caused uneven enforcement across States.
- Informal, contract, and casual workers were largely **outside regulatory protection frameworks**.

Youth Employment Profile and Challenges

- India's **median age under 30** contrasts with **China's 40 and Japan's 50**.
- **PLFS 2023–24** shows youth labour participation at **46.5%**, versus **76.4%** for adults.
- Youth unemployment stands at **10.2%**, compared to **below 1%** among older workers.
- Female youth participation is **28.8%**, far below **63.5% for young men**.
- Urban youth female unemployment reached **20.1%**, highlighting sharp gendered labour gaps.
- Nearly **90% of young workers** remain in **informal employment**.

Contractual and Social Security Gaps

- **66.1% of young regular workers** lack written contracts, higher than older workers.
- Only **16.5% of youth** hold long-term contracts exceeding **three years**.
- **60.5% of young salaried workers** lack social security coverage.
- **NITI Aayog** projects gig workforce growth from **77 lakh to 2.35 crore by 2029–30**.

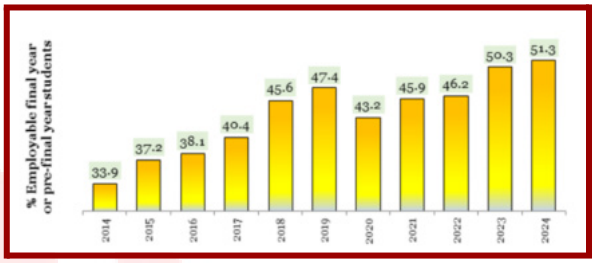
Key Provisions Affecting Youth

- **Statutory national floor wage** may raise entry-level youth earnings.
- Fixed-term employees receive **parity in wages and benefits** with permanent workers.
- **Appointment letters and wage payments during leave** enhance baseline job security.
- **Social Security Code** extends welfare to unorganised, gig, and platform workers.
- Gig workers gain **legal recognition, registration from age 16, and welfare boards**.
- Mandatory **vacancy reporting** improves labour market transparency.

Persisting Implementation Gaps

- Coverage mirrors **2008 Act**, excluding many workers in enterprises above **10 employees**.
- **42.7% of youth** still lack written contracts, limiting legal protection reach.
- Weak definitions of **platform employment** complicate effective worker identification.
- Slow progress on **labour data systems and proactive worker registration** remains evident.

India's Skilling Ecosystem and Employability Gap



Context and Background

- India built one of the world's largest skilling ecosystems over the last decade.
- **Pradhan Mantri Kaushal Vikas Yojana** trained and certified about **1.40 crore candidates between 2015–2025**.
- Despite scale, skilling has not emerged as a **first-choice career pathway** for youth.
- **Periodic Labour Force Survey** shows modest and uneven wage gains from vocational training.
- Informal employment absorbs most trainees, offering limited skill recognition and livelihood improvement.

Why Skilling Lacks Aspirational Value

- India's **Gross Enrolment Ratio** stands at **28%**, targeted to reach **50% by 2035** under **National Education Policy 2020**.
- Only **4.1% of India's workforce** has formal vocational training, marginally up from 2%.
- OECD countries show far higher vocational enrolment, reaching **70% in several European economies**.
- **India Skills Report 2025** indicates post-degree skilling is not mainstream among graduates.
- Skilling remains disconnected from formal education pathways and degree structures.

Limits to Industry Participation

- Industry faces high attrition and productivity losses, with **30–40% attrition rates** in key sectors.
- Employers rarely use public skilling certifications for recruitment decisions.
- Hiring relies on internal training, referrals, or private platforms.
- **National Apprenticeship Promotion Scheme** improved participation but unevenly across firm sizes.
- Industry lacks incentives or obligations to co-design curriculum, assessments, or certification standards.

Credibility Crisis of Sector Skill Councils

- **Sector Skill Councils (SSCs)** were mandated to anchor industry-aligned skilling and employability.
- Skilling responsibilities are fragmented across training, assessment, certification, and placement agencies.
- Absence of reputational accountability weakens outcomes compared to higher education institutions.
- Employer surveys show SSC credentials carry limited signalling value in labour markets.
- Unlike global industry certifications, SSCs do not own placement or employability outcomes.

Way Forward for Sustainable Growth

- Skilling failure reflects **accountability gaps**, not funding or intent deficits.
- Expanding apprenticeships and embedding skills within degrees can improve job readiness.
- Initiatives like **PM-SETU** and ITI modernisation strengthen industry ownership models.
- Holding SSCs accountable for placements can convert skilling into economic empowerment.

Topic: Economic Growth

Jobless Growth in India

Growth-Employment Context

- India's GDP is projected to grow around **7.4% in FY 2025–26**, driven by domestic demand and investment.
- **PLFS 2023–24** shows unemployment declining modestly to about **3.2%**, with rural–urban variations.
- Labour participation and worker population ratios improved, yet **informal and low-quality jobs** dominate.
- This divergence reflects concerns over **jobless growth**, where output rises faster than employment creation.

Primary Sector Performance

- **Agriculture and allied activities** averaged about **5% annual growth** from FY17 to FY23.
- Livestock, dairy, fisheries, and horticulture offset climate risks in crop production.
- Government focus on **irrigation, agri-infrastructure, digital agriculture, and value chains** supports productivity.
- **Mining and quarrying** supply coal, iron ore, limestone, and critical minerals for industrial expansion.
- India ranks **second in aluminium**, top-ten in refined copper, and fourth in iron ore production.

Secondary Sector Trends

- **Manufacturing growth** reached around **9.9%**, covering labour, capital, and technology-intensive industries.
- **MSMEs contribute 30% to GDP and over 45% to exports**, employing millions nationwide.
- **PLI schemes** attracted over **₹1.76 lakh crore investment**, boosting output, exports, and jobs.
- **Construction sector** is estimated to grow **9.4% in FY 2024–25**, driven by public capital expenditure.
- Infrastructure spending creates strong multiplier effects across cement, steel, transport, and allied services.
- **Utilities and renewables** contribute about **2.1% to GVA**, supported by grid modernisation and clean energy.

Tertiary Sector Expansion

- **Trade, transport, tourism, and communication services** expected to grow **7.5%** in FY 2025–26.
- Growth is supported by **7.0% rise in real PFCE** and logistics and digital connectivity expansion.
- **Financial, real estate, and professional services** projected to grow **9.9%**, driven by credit and formalisation.
- **IT, digital services, and R&D** strengthen knowledge economy, supporting high-value services-led GVA growth.

Employment Indicators

- **Unemployment rate** stands near **4.7% in late 2025**, showing gradual recovery.
- **LFPR** is about **55.8%**, reflecting increased workforce entry.
- **EPFO additions** often exceed **20 lakh net subscribers**, indicating rising formalisation.
- **Female LFPR** increased to around **35%–41%**, aided by flexible work and policy support.

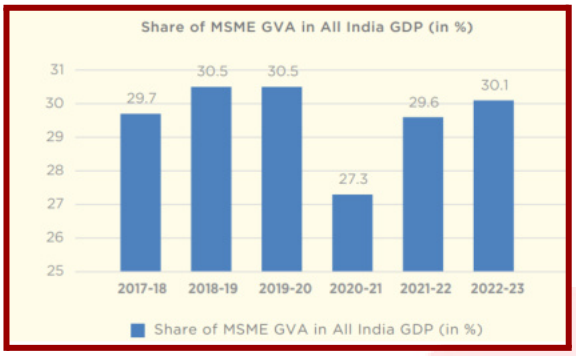
Structural Causes of Weak Job Creation

- Growth is increasingly **capital-intensive**, prioritising automation over labour absorption.
- **International Labour Organization (ILO) - Institute for Human Development (IHD) 2024** reports about **82% workforce in informal sector**, lacking security and contracts.
- Educated youth among unemployed rose from **35.2% in 2000 to 65.7% in 2022**.
- **Gig economy expansion** absorbs youth but offers limited skill progression and long-term stability.

Conclusion

- India's challenge lies in aligning **high growth** with **quality employment generation**.
- Strengthening labour-intensive sectors, MSMEs, skilling systems, and green and care economies is essential.
- A balanced approach supports **SDG-8, SDG-9, and SDG-10**, ensuring inclusive and sustainable development.

MSME Scheme Convergence



Background and Policy Context

- **NITI Aayog** released a January 2026 report proposing convergence to improve MSME scheme efficiency. The study analysed **18 centrally administered MSME schemes** for coordination and resource optimisation.
- The objective focuses on reducing duplication, strengthening outcomes, and enhancing **last-mile delivery**.

Key Facts of MSME Sector

- MSMEs contribute approximately **29–30% of national GDP**, reflecting their macroeconomic significance.
- The sector employs over **28.7 crore people**, ranking second only to agriculture.
- MSMEs account for about **45–46% of exports**, despite limited direct exporter participation.
- India hosts **6.3 crore MSMEs**, with nearly **51% located in rural areas**.
- Government budget outlay increased from **₹6,717 crore in 2019–20 to ₹22,094 crore in 2023–24**.

Opportunities for Scheme Convergence

- **Unified digital window** can reduce compliance costs and improve access to eligibility information.
- **Cluster scheme rationalisation** can improve infrastructure quality and collective industrial competitiveness.
- **Skilling programme alignment** can reduce duplication and strengthen industry-relevant employment outcomes.
- **Marketing support integration** can enhance coordinated domestic and international MSME promotion.
- **Innovation ecosystem consolidation** can strengthen rural enterprise incubation and funding efficiency.

Major MSME Initiatives Highlighted

- **Udyam Registration and Udyam Assist Platform** support formalisation and improved access to finance.
- **PMEGP and PM Vishwakarma** promote entrepreneurship and traditional artisan livelihood sustainability.
- **CGTMSE and SRI Fund** address financing gaps through collateral-free credit and equity support.
- **RAMP Programme** strengthens productivity, resilience, and global competitiveness through reforms.
- **GeM and Public Procurement Policy** ensure assured market access through transparent digital procurement.

Challenges in Convergence

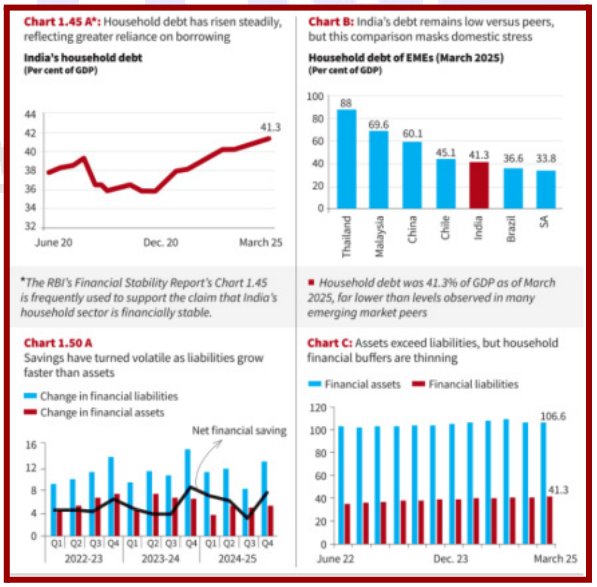
- **Inter-ministerial silos** restrict data sharing and coordinated programme implementation.
- Risks of **diluting targeted schemes** affecting vulnerable social and regional beneficiaries.
- **Field-level capacity constraints** limit effective management of integrated digital platforms.
- **Data integration barriers** hinder real-time monitoring and evidence-based policymaking.
- **Transition risks** may disrupt benefits and delay disbursements during scheme mergers.

Conclusion

- The report identifies **fragmented delivery**, not scheme availability, as the primary MSME policy challenge.

Topic: Inclusive growth and issues arising from it.

Household Finance and Macroeconomic Stability in India



Context

- Recent RBI and Budget data reveal **stable growth**, but emerging **financial stress within households**.
- Growth appears supported by **lower savings and higher borrowing**, transferring economic risks onto households.

Aggregate Indicators and Hidden Fragility

- RBI Financial Stability Report 2025 shows **household debt at 41.3% of GDP**.
- Debt levels remain **lower than peers** like China, Malaysia, and Thailand.
- Debt rose gradually from **36% of GDP in mid-2021** to current levels.
- Debt-to-GDP ratios indicate **scale of borrowing**, not households' repayment capacity.

Income, Consumption, and Credit Dynamics

- **RBI Annual Report 2024–25** highlights **uneven real income growth**, especially outside formal employment sectors.
- Consumption remains steady despite **weak income expansion**, prompting reliance on borrowing.
- Credit increasingly fills **income–expense gaps**, rather than financing long-term asset creation.
- Moderate debt becomes risky when it **substitutes for savings and income growth**.

Household Balance Sheet Trends

- Financial liabilities stood at **41.3% of GDP in March 2025**.
- Gross household financial assets reached **106.6% of GDP**, maintaining net wealth.
- Flow data shows **volatile net financial savings**, signalling underlying financial pressure.
- Net savings recovered to **7.6% of GDP in late 2024–25**, after compressing to **3–4%**.
- Faster liability accumulation than asset growth drives **savings volatility**.

Fiscal Structure and Risk Transfer

- States prioritise **capital expenditure**, limiting revenue spending for income support.
- Committed expenditures consume **30–32% of State revenues**, reducing countercyclical capacity.
- Union Budget 2025–26 allocates **₹11.2 lakh crore to capital expenditure**.
- Infrastructure investment boosts growth, but **does not stabilise short-term household incomes**.

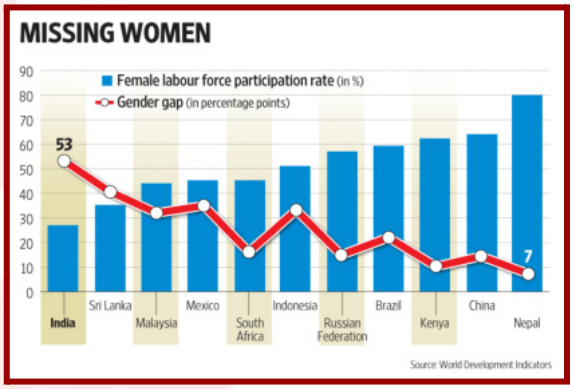
Macroeconomic Risks and Outlook

- Private consumption forms **nearly 60% of GDP**, making households key economic stabilisers.
- Rapid expansion of **unsecured retail credit** sustains consumption on weaker financial buffers.
- Volatile savings and rising liabilities reduce households' **shock-absorption capacity**.
- Economic slowdowns or interest rate rises may trigger **abrupt consumption retrenchment**.

Policy Implications for Budget 2026

- Fiscal strategy should **enhance disposable incomes and labour-intensive employment**.
- Growth must rebalance towards **income security, savings restoration, and household resilience**.

Gender Budgeting and Women's Labour Force Participation



Context: Women's Time Poverty and Economic Contribution

- Women contribute **around 18% to India's GDP**, largely due to unpaid and uncounted labour.
- About **40% of women participate in the labour force**, mainly in unpaid agricultural work.
- **60% of non-participating women** cite domestic and care responsibilities as primary constraints.
- Barriers include **care burdens, limited skills, mobility restrictions, and weak job creation**.

Evidence from Time Use and Budget Trends

- **Time Use Survey 2025** shows unpaid care work rose from **364 to 366 minutes daily**.
- Time spent on paid work increased from **68 to 76 minutes**, raising total work hours.
- Gender Budget reached **8.9% of total Union allocations**, around **1% of GDP**.
- Over **75% allocations** fall under **Part B and Part C**, indicating limited redesign of schemes.

Reimagining Infrastructure and Care Systems

- PMAY homes should be counted as **"gender-complete houses"** with water, sanitation, electricity, and clean energy.
- Budget could mandate convergence with **Jal Jeevan Mission, Swachh Bharat, Ujjwala, and rooftop solar**.
- Childcare remains fragmented across **Palna, Anganwadis, and POSHAN schemes**.

- A **"Care Infrastructure Convergence Window"** can pool funding and measure women's time saved.

Labour Demand and Employment Strategies

- Agriculture receives only **4.2% of gender budget flows**, despite employing most women.
- **PM-KISAN benefits landowners**, predominantly male, limiting women's economic mobility.
- Employment-Linked Incentive scheme targets **3.5 crore jobs**, with a proposed **50% women's share**.
- **MGNREGA/VB-GRAM G** employs over **50% women**, proposing expansion from **100 to 125 days**.

Entrepreneurship and Digital Future

- Women own **nearly 60% of unincorporated manufacturing enterprises**, but only **4% are registered**.
- **64% of Mudra accounts** belong to women, mostly in **Shishu loans below ₹50,000**.
- **₹660 crore allocation** under **India AI Mission** earmarks **33% for women-focused inclusion**.
- Emphasis needed on **digital skilling, safety, mobility, and childcare-linked entrepreneurship support**.

Conclusion:

- Budget success should measure **women's time freed, income generated, and agency expanded**, not just expenditure.

Topic: Agriculture and Food-Processing

Climate-Resilient Agriculture (CRA)

Context and Background

- Climate change **threatens India's food security** through weather unpredictability, soil degradation, and rising pollution.
- Agriculture must **adapt to ensure stable domestic food supply** under increasing climatic uncertainty.

What is Climate-Resilient Agriculture?

- **Climate-resilient agriculture (CRA)** integrates biotechnology with complementary technologies for sustainable farming.
- CRA reduces dependence on chemical inputs while maintaining or improving farm productivity.
- Key tools include **biofertilizers, biopesticides**, and soil-microbiome analysis.
- **Genome-edited crops** are developed for tolerance to drought, heat, salinity, and pests.
- **AI-driven analytics** integrate environmental and agronomic variables for locally tailored farming strategies.

Why India Needs Climate-Resilient Agriculture

- India's rapidly growing population intensifies demand for reliable agricultural productivity.
- Around **51% of net sown area is rainfed**, producing nearly **40% of national food output**.
- **Rainfed agriculture** is highly vulnerable to climate variability and extreme weather events.
- **Conventional farming** methods alone cannot withstand increasing climate-related stresses.
- CRA **enhances productivity** while simultaneously **protecting environmental and soil health.**

Current Status in India

- **ICAR launched NICRA in 2011** to enhance farmer resilience to climate variability.
- Project demonstrated location-specific CRA technologies in **448 climate-resilient villages**.
- Technologies include system of rice intensification, aerobic rice, zero till wheat, and direct seeding.
- Climate-resilient crop varieties tolerant to extreme weather conditions were promoted.
- **National Mission for Sustainable Agriculture** focuses on rainfed areas, water efficiency, and soil health.
- **BioE3 policy** identifies CRA as a priority for biotechnology-led agricultural solutions.
- Several CRA-relevant technologies are already commercialised.
- Bio-input companies support soil health and reduced chemical dependence.
- Digital agriculture sector is expanding with AI-enabled advisories and precision farming tools.

Challenges in Scaling CRA

- **Low adoption** among small and marginal farmers due to limited access, awareness, and affordability.
- **Quality inconsistencies** in biofertilizers and biopesticides undermine farmer trust.
- Slow rollout of climate-resilient seeds and uneven adoption of **gene-editing technologies.**
- **Digital divide** restricts access to AI-based decision-support tools.
- Soil degradation, water scarcity, and accelerating climate volatility compound adaptation challenges.
- **Fragmented policy** coordination risks delaying large-scale CRA implementation.

Way Forward

- Accelerate development and deployment of **climate-tolerant and genome-edited crops**.
- Strengthen quality standards and supply chains for biofertilizers and biopesticides.
- Expand digital tools and climate advisories for small landholders.

- Provide financial incentives, climate insurance, and credit support during transition phases.
- Establish a **coherent national CRA roadmap** under the BioE3 framework.

Emerging Water Stress from Rice Cultivation

Context

- India recently overtook China as the **world's largest rice producer**.
- Rice exports doubled over a decade, crossing **20 million metric tonnes**.
- Political leadership credited **resilient farmers** and enabling agricultural policies for this achievement.
- Export success strengthened food security leadership but concealed **deep ecological pressures**.

Groundwater Depletion and Regional Vulnerability

- Rice cultivation is driving **unsustainable depletion of groundwater aquifers**.
- Farmers increasingly borrow to finance **deep borewell drilling**.
- Groundwater in Punjab–Haryana was available at **30 feet** a decade earlier.
- Borewell depths now range between **80–200 feet** across recent years.
- Dependence on groundwater heightens vulnerability to **erratic monsoons**.
- Even strong monsoons failed to reduce **extraction intensity** significantly.

Policy Incentives and Extraction Dynamics

- Subsidies structurally incentivise **rice cultivation** over less water-intensive alternatives.
- **MSP for rice** rose nearly **70%** over the past decade.
- Electricity subsidies enable **unrestricted groundwater pumping** for irrigation.
- Policy architecture indirectly rewards **higher water consumption** in stressed regions.
- Many aquifers are classified as **"over-exploited"** or **"critical"**.
- Extraction exceeds recharge levels by **35%–57%** in key States.

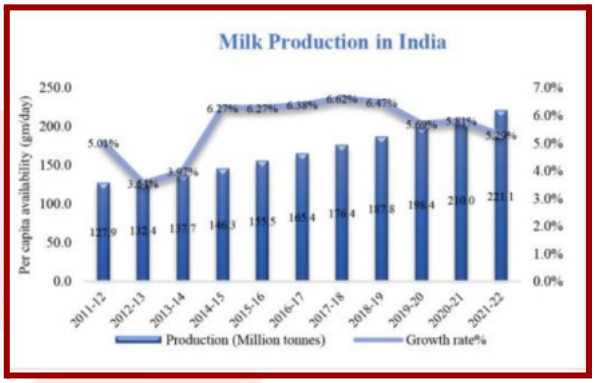
Water Intensity and Economic Burden

- Producing one kilogram of rice requires **3,000–4,000 litres of water**.
- Water intensity is **20%–60% higher** than the global average.
- Farmers incur rising costs for **deeper pipes** and powerful pumping systems.

Diversification Efforts and Policy Signals

- Haryana introduced **₹17,500 per hectare subsidy** for crop diversification.
- Incentives promote shifts toward **millets** and low-water crops.
- However, support remains limited to **single cropping seasons**.

Digitalisation of India's Dairy Sector



Overview

- India leads global milk production, contributing nearly **25% of world output**.
- Digitalisation represents the **Second White Revolution**, focusing on **traceability, efficiency, and value addition**.
- **NDDB** has generated over **35.68 crore "Pashu Aadhaar" IDs**, enabling digital livestock tracking.

Key Trends and Data

- Milk production reached **221.06 million tonnes in 2021–22**, recording a **73% decade-long increase**.
- **Per capita availability** rose to **444 grams per day**, surpassing the **global average**.
- Over **17.3 lakh producers** are integrated with the **Automatic Milk Collection System (AMCS)**.
- The dairy sector's **market value** is projected to rise sharply by **2027**.

Importance of Dairy Sector

- **Rural livelihoods**: Dairy supports over **80 million households**, especially in drought-prone regions.
- **Nutritional security**: Milk supplies **animal protein**, supported through programmes like **Mid-Day Meal**.
- **Economic contribution**: Dairy contributes more than **rice and wheat combined** to agricultural GDP.
- **Women empowerment**: Women manage most dairy activities, strengthening **financial independence and social status**.
- **Inclusive growth**: Smallholders owning **2–4 animals** drive a large share of national production.

Digital Initiatives

- **National Digital Livestock Mission (NDLM)** builds a national database of **breeding, health, and vaccination**.
- **Pashu Aadhaar** assigns **12-digit unique IDs** for complete animal traceability.
- **AMCS** ensures **digital fat testing and instant farmer payments**.
- **NDDB Dairy ERP (NDERP)** manages the **supply chain from farm to consumer**.
- **GIS route optimisation** reduces **fuel costs and procurement time**.

Challenges

- **Low productivity**: Average yield is **987 kg per lactation**, far below the **global average of 2,038 kg**.
- **Fragmented supply chain**: **75–85%** of surplus passes through the **unorganised sector**.
- **Feed and fodder scarcity** increases production costs and affects profitability.
- **Quality and adulteration** restrict India's **global dairy export share to under 1%**.
- **Limited formal credit** forces farmers to rely on **high-interest informal sources**.

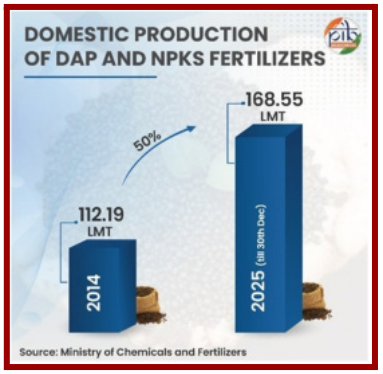
Way Forward

- **Breed improvement** through **Artificial Insemination and genomic selection** to raise productivity.
- **Cold chain expansion** with **village-level bulk milk chillers** for quality preservation.
- **Value addition** by promoting **cheese, probiotics, and organic milk**.
- **Export alignment** with **Codex Alimentarius standards** for wider global access.
- **Digital credit** using **Pashu Aadhaar-linked livestock records** as collateral.

Conclusion

- Integrating **cooperatives with digital platforms** like **NDLM and AMCS** ensures transparency and farmer empowerment.
- This digital shift positions India as a **technology-driven, sustainable dairy superpower**.

Agricultural Subsidy Reforms



Context and Overview

- Budget 2026 discussions focus on **rationalising food and fertilizer subsidies** through an expanded **PM-Kisan framework**. Combined subsidies account for **nearly 8.5 percent of total Union Budget expenditure**.

Definition and Rationale for Reform

- Agricultural subsidies provide **financial support for inputs and price stability** through fertilizers, power, and MSP.
- The current **blanket subsidy model** encourages excessive urea use and soil nutrient imbalance.
- Skewed incentives favour **cereals over pulses and oilseeds**, affecting nutrition security.
- Environmental impacts include **soil toxicity and groundwater contamination** in intensive farming regions.

Trends and Fiscal Data

- Combined food and fertilizer subsidy for **FY 2025–26 stands at ₹3.71 lakh crore**.
- Food subsidy alone reaches **₹2.03 lakh crore**, covering **813 million beneficiaries**.
- Fertilizer subsidy is **₹1.67 lakh crore**, the second-largest budgetary subsidy component.
- MSP payouts have **tripled to ₹3.33 lakh crore by June 2025**.
- Import dependence remains high, with **90 percent potash and 60 percent phosphate reliance**.

Importance of Subsidies

- Subsidies ensure **food security under NFSA and PMGKAY for vulnerable populations**.
- Input support shields farmers from **global fertilizer price volatility and supply disruptions**.
- Targeted incentives encourage **crop diversification toward pulses and oilseeds**.
- Financial assistance promotes **agricultural mechanisation and climate-resilient irrigation practices**.

Reform Initiatives

- **Digitalisation of PACS** improves transparent credit delivery across nearly **80,000 societies**.
- **Nutrient-Based Subsidy expansion** promotes balanced fertiliser usage with fortified grades.

- **PM-PRANAM scheme** incentivises states to reduce chemical fertiliser dependence.
- **Direct Benefit Transfers** under PM-Kisan reach **11 crore farmers**, reducing leakages.

Challenges Identified

- Excessive urea subsidies distort the **ideal 4:2:1 NPK nutrient ratio**.
- Subsidies consume **nearly 10 percent of the Union Budget**, limiting R&D investments.
- India approaches the **WTO Amber Box 10 percent de minimis limit**.
- Benefits remain **regionally concentrated in procurement-heavy states**.
- Fertiliser diversion persists, with **20–25 percent leakage into non-agricultural sectors**.

Way Forward and Conclusion

- Consolidating subsidies into **higher-value DBT under PM-Kisan** can improve targeting.
- Integrating urea into **NBS regime** encourages balanced fertilisation and sustainability.
- Shifting expenditure toward **WTO-compliant Green Box investments** strengthens long-term productivity.

Topic: Miscellaneous

Right to Disconnect in Digital Economy

Context and Rationale

- Digital technologies have blurred boundaries between **work and personal life**, creating an "always-on" work culture. Smartphones, emails, and laptops have extended work into **evenings, weekends, and holidays**.
- Constant availability is causing **burnout**, declining productivity, and public health concerns. A statutory **Right to Disconnect** is proposed as a labour, health, and productivity reform.

Scale of the Problem in India

- **51% of India's workforce** works more than **49 hours per week** (ILO data).
- India ranks **second globally** for excessive working hours.
- **78% of Indian employees** report experiencing job burnout.
- Overwork leads to **physical exhaustion, emotional stress, and reduced efficiency**.
- Work-related stress contributes **10–12% of mental health cases** (National Mental Health Survey).
- Lifestyle diseases linked to overwork include **hypertension, diabetes, anxiety, and depression**.
- Overemphasis on **work duration over quality** is inefficient and counterproductive.
- The 2024 death of **Anna Sebastian Perayil** highlighted risks of extreme work pressure.
- **Gaps in India's Legal Framework**
  - **Occupational Safety, Health and Working Conditions Code, 2020** limits hours only for "workers".
  - Many **employees, gig workers, freelancers, and contract staff** remain unprotected.

Key Provisions Proposed

- Legal recognition of the **Right to Disconnect** beyond specified working hours.
- Employees cannot be **penalised or discriminated** for ignoring after-hours work communication.
- Mandatory **grievance redressal mechanisms** for rights violations.
- Extension of protections to **contractual and gig workforce**.
- Integration of **mental health support** into occupational safety norms.
- **Global Precedents**
  - **France (2017)** pioneered statutory right to disconnect.
  - Similar protections adopted by **Portugal, Italy, Ireland, and Australia**.
  - Laws mandate employer–employee protocols limiting after-hours communication.
  - Global experience shows downtime supports **sustainable economic growth**.

Way Forward

- Central amendment to ensure **uniform nationwide coverage**.
- Awareness programmes and **organisational sensitisation**.
- Shift workplace culture from **presenteeism to output-based evaluation**.
- Promote counselling and **mental health support services**.
- Recognise the right to disconnect as essential for **productive, healthy workforce**.

Prelims

Topic: External Sector

Foreign Portfolio Investment (FPI)

Context: Foreign Portfolio Investors (FPIs) sold **₹35,962 crore** in **January 2025**, highest in five months. **FPIs** sold **₹1.66 lakh crore** in Indian equities during **CY2025**.

About FPI

- **Foreign Portfolio Investment (FPI)** refers to investments by foreign entities in **financial assets** like stocks, bonds, securities.
- **Distinct from Foreign Direct Investment (FDI)**: does not involve acquiring control over business operations.
- **Key Characteristics**
  - **Passive investment**: investors do not participate in company management or strategic decision-making processes.
  - **Short-term focus**: aims for capital appreciation rather than long-term strategic interests in companies.
  - **Enhances market liquidity**: provides capital flow into financial markets increasing efficiency and investment potential.
  - **Sensitive to market sentiments**: highly volatile; investors can quickly withdraw funds during economic/political instability.
- **FPI Policy in India**
  - A foreign investor can hold **up to 10% total paid-up capital** without being classified as FDI.
  - **Holding exceeds 10%**: reclassified as **Foreign Direct Investment (FDI)** with different regulatory requirements.
  - **Regulated by SEBI,** ensuring compliance with financial laws and market regulations for investor protection.

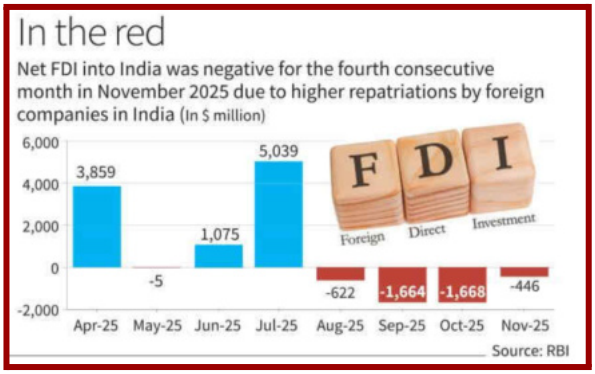
FII vs FPI

Aspect	Foreign Institutional Investors (FIIs)	Foreign Portfolio Investors (FPIs)
Definition	Subset of FPIs, including **Mutual Funds, Pension Funds, Insurance Companies, Hedge Funds**	Broad category of foreign investors, including FIIs and individual investors
Investment Approach	Structured, **strategic investment approach**	Diverse investment strategies, can include speculative investments
Hierarchical Relationship	All FIIs are FPIs, but not all FPIs are FIIs	Higher level than FIIs in terms of investor types

FDI vs FPI

Aspect	Foreign Direct Investment (FDI)	Foreign Portfolio Investment (FPI)
Definition	Involves **active management** and physical business investment, like **factories, offices**	Involves passive investment, such as **stocks, bonds** only
Management Involvement	Actively manage business assets and operations	No direct management, only financial asset purchases
Exit Strategy	Difficult to exit, involves selling physical business assets (long-term commitment)	Easier to withdraw, as securities are highly liquid (short-term investment)
Market Type	Primary market (long-term focus)	Secondary market (short-term speculative investments)
Economic Impact	**FDI** boosts **economic growth, employment, innovation**	**FPI** primarily provides **market liquidity**

Trends in Foreign Direct Investment



Context

- RBI data shows **net FDI remained negative for fourth consecutive month** in November 2025. Investor confidence weakened due to **rupee depreciation** and **uncertainty over India–U.S. trade deal**.

Investment Trends and Source Countries

- Net FDI recorded **–$446 million**, as outflows exceeded inflows during November 2025.
- Negative trend driven by **high repatriations and foreign company disinvestments**.
- Gross inward FDI reached **$6.4 billion**, showing **22.5% annual growth**.
- Inflows marginally declined from **$6.5 billion in October** and **$7 billion in September**.
- **Japan, Singapore, and the United States** contributed over **75% of total inflows**.

Sectoral Distribution of Inflows

- **Financial services sector** attracted the highest share of FDI inflows.
- Manufacturing ranked second in **foreign investment absorption**.
- Retail and wholesale trade followed as **key recipient sectors**.

Outflows, Repatriation, and Outward FDI

- Repatriation and disinvestment touched a **five-month high of $5.3 billion**.
- Outward FDI by Indian firms moderated to **$1.5 billion** in November.
- **Singapore, Mauritius, the U.S., and the U.K.** received most Indian outward investments.
- Over **70% of outward FDI** flowed into **manufacturing and financial-related services**.

Topic: Growth and Development

Purchasing Managers' Index (PMI)

What is PMI?

- **Purchasing Managers' Index (PMI)** is an indicator measuring overall business activity trends.
- It captures conditions in both **manufacturing** and **services** sectors of the economy.
- PMI is a **survey-based index**, reflecting monthly changes in business perceptions.
- Responses compare current conditions with the **previous month's performance**.
- It helps assess whether economic activity is **expanding, contracting, or stagnant**.
- PMI is calculated separately for manufacturing and services, then combined into a **composite PMI**.
- It is widely used as a **leading economic indicator** due to timely data availability.

Types of PMI

- **Manufacturing PMI**: Measures activity levels in the manufacturing sector.
- **Services PMI**: Tracks business conditions in the services sector.

Interpretation of PMI Values

- **PMI above 50** indicates expansion in business activity.
- **PMI below 50** signals contraction in economic activity.
- Distance from the **50-mark** shows strength or weakness of expansion or contraction.
- Month-on-month comparison highlights the **momentum of economic trends**.

PMI in India

- PMI data for India is released by **S&P Global**, a financial analytics firm.

Goldilocks Economy

Context:

- India's **2025 agricultural year** saw a "Goldilocks" mix of **surplus monsoon rainfall** and **moderate temperatures**, unlike **2024**, which was the **warmest year on record** despite a good monsoon.

Goldilocks Economy

- An **ideal macroeconomic phase** marked by **steady growth**, **low and stable inflation**, and **near-full employment**, supported by **neutral interest rates**.
- **Core Characteristics**
  - **Balanced growth:** Output expands without overheating.
  - **Price stability:** Inflation remains contained.

    - **Employment strength:** High job absorption.
    - **Policy support:** Coordinated **monetary and fiscal management**.
    - **Investor climate:** Favourable for **equities and long-term capital**.
- **Policy Drivers**
    - **Central bank role:** Calibrates rates to avoid both inflationary spikes and growth slowdown.
    - **Fiscal stance:** Counter-cyclical spending and credible consolidation.
- **India - Key Indicators (2025)**
    - **Weather:** Near-normal temperatures and abundant rainfall.
    - **Output: Rebound in farm production**.
    - **Inflation: Food inflation turned negative** after highs in 2023–24.
    - **Sowing: Record rabi acreage**; strong performance in **wheat and potatoes**; **mustard** faces pest stress.
    - **Stocks: Large domestic grain reserves**.
    - **Global supply: Record world crop output**, limiting price pressures.
    - **Risk:** Food inflation unlikely **absent extreme weather shocks**.

Export Preparedness Index (EPI) 2024

Context: NITI Aayog released EPI 2024 to assess export readiness of States and Union Territories.

What is Export Preparedness Index (EPI)?

- **Composite index** measuring **export readiness, competitiveness and institutional capacity** of States and UTs.
- Evaluates **sub-national contribution** to India's **export-led growth**.
- **Published by: NITI Aayog**.

History

- **First edition:** August 2020.
- **EPI 2024:** 4th edition of the Index.

Aim

- Identify **strengths, gaps and opportunities** for boosting **exports, jobs and regional development**.
- Support **global value-chain integration** at State and district levels.

Framework and Structure

- Based on **4 Pillars, 13 Sub-pillars and 70 Indicators**.
- Uses **official data** from Central Ministries, State Governments and public institutions.

Pillars and Weightage

- **Export Infrastructure (20%)** – Utilities, logistics, connectivity, industrial infrastructure.
- **Business Ecosystem (40%)** – Macroeconomy, cost competitiveness, human capital, finance, MSMEs, innovation.
- **Policy and Governance (20%)** – State export policies, institutions, regulatory environment.
- **Export Performance (20%)** – Export outcomes, diversification, market access, facilitation.

Key Features

- Introduces **macroeconomic stability and cost competitiveness** as assessment dimensions.
- Emphasises **MSME ecosystem and financial access**.
- Classifies States and UTs as **Leaders, Challengers and Aspirers**.
- Focuses on **districts as core units of export competitiveness**.
- Promotes **cluster-based and value-chain driven export strategies**.

Top Performing States and UTs

- **Large States**
    - Maharashtra>Tamil Nadu>Gujarat>Uttar Pradesh>Andhra Pradesh
- **Small States / North-East / UTs**
    - Uttarakhand>Jammu and Kashmir>Nagaland>Dadra and Nagar Haveli and Daman and Diu>Goa

Fiscal Responsibility and Budget Management (FRBM) Act, 2003

Overview

- **Objective:** Ensure **fiscal discipline**, **inter-generational equity**, and **long-term macroeconomic stability**.
- **Focus:** Guide Central Government towards **sustainable deficit and debt management**.

- **CAG Role:** Mandatory **annual compliance audit** of FRBM provisions.

Mandatory Budget Statements (Laid Before Parliament)

- **Macro-Economic Framework Statement**: Economic outlook and assumptions.
- **Medium-Term Fiscal Policy Statement**: Fiscal targets and rolling projections.
- **Fiscal Policy Strategy Statement**: Policy stance and fiscal priorities.

Key Fiscal Targets

- **Fiscal Deficit**
  - **Original target:** Less than 3% of GDP
  - **Deadline:** 31 March 2021
  - **Actual (2023–24, CAG):** 5.32% of GDP
  - **Revised path:** Less than 4.5% of GDP by FY 2025–26
- **Public Debt Limits**
  - **General Government (Centre + States):** Less than **60% of GDP**
  - **Central Government:** Less than **40% of GDP**
  - **Deadline:** End of **FY 2024–25**
  - **Current (2023–24):**
    - Central Government: **57% of GDP**
    - General Government: **81.3% of GDP**
- **Additional Guarantees**
  - **Cap:** Less than 0.5% of GDP per year
  - **Linked to:** Consolidated Fund of India
- **FRBM Amendment, 2018:**
  - **Removed targets** for **Revenue Deficit** and **Effective Revenue Deficit**.
  - Shifted focus to **debt and fiscal deficit anchoring**.

Index of Industrial Production (IIP)

Context: IIP growth reached **26-month high** of **7.8%** in **December 2025**, driven by **manufacturing** and **electricity sectors**. The **Manufacturing sector** grew at 8.1% while the **Capital goods sector** expanded 8.1%.

What is IIP?

- **Index of Industrial Production (IIP)** measures **short-term changes** in industrial output volume.
- Acts as a **key indicator** of industrial growth or contraction in the economy.
- Reflects **performance trends** across core productive sectors.
- **Publishing Authority**
  - Compiled and released by the **Central Statistics Office (CSO)**.
  - CSO functions under the **Ministry of Statistics and Programme Implementation (MoSPI)**.
- **Base Year of IIP**
  - Current base year is **2011–12**, ensuring relevance to modern industrial structure.
  - Base year revised periodically to capture structural economic changes.
  - Earlier base years included **1937, 1946, 1951, 1956**, and subsequent revisions.
- **Sectoral Composition of IIP (Weight-wise)**
  - **Manufacturing:** 77.63% weight, covering 809 industrial items.
  - **Mining:** 14.37% weight, represented by 29 items.
  - **Electricity:** 7.99% weight, represented by 1 composite item.
- **Eight Core Industries**
  - Constitute **40.27% weight** within the overall IIP index.
  - Represent foundational infrastructure and industrial inputs.
- **Core Industries (Descending Weight Order)**
  - Refinery Products
  - Electricity
  - Steel
  - Coal
  - Crude Oil
  - Natural Gas
  - Cement
  - Fertilisers

Export Promotion Mission (EPM)

Background

- Announced in the **Union Budget 2025–26** to strengthen India's export ecosystem.
- Focuses on improving export competitiveness amid rising global tariff and non-tariff barriers.

Time Span and Coverage

- Mission duration spans **six years**, from **FY 2025–26 to FY 2030–31**.
- Priority support for **tariff-impacted sectors** like textiles, leather, gems and jewellery, engineering goods, and marine products.

Institutional Framework

- Involves **Department of Commerce**, **Ministry of MSME**, **Ministry of Finance**, EPCs, Commodity Boards, financial institutions, industry bodies, and States.

- **Directorate General of Foreign Trade (DGFT)** acts as the implementing agency.
- Implemented through a **dedicated digital platform**, integrated with existing trade systems.

Structure of the Mission

- Comprises **two integrated sub-schemes**: **Niryat Protsahan** and **Niryat Disha**.

Financial Support – Niryat Protsahan

- **Credit Guarantee Scheme for Exporters (CGSE)** offers **100% credit coverage** via NCGTC.
- Provides **additional collateral-free credit up to ₹20,000 crore**.
- Enhances liquidity, especially for **MSMEs**, improving export readiness.

Non-Financial Support – Niryat Disha

- Supports compliance with **non-tariff measures** through certifications and standards.
- Assists **market access, branding, and packaging** for global competitiveness.
- Aims at **logistics cost reduction** and supply-chain efficiency.

Topic: Banking, Monetary Policy and Capital Market

Initial Public Offering (IPO)

Core Concepts

- **Public issue** refers to raising funds by issuing **equity shares to the public**.
- **IPO** is the first public issue by an **unlisted company**.
- IPO may involve a **fresh issue**, an **offer for sale**, or both.
- An **unlisted company** has shares **not traded on stock exchanges**.
- A **listed company** has securities listed on a **recognised stock exchange**.
- **Public Sector Undertakings** with listed securities are treated as **listed companies**.

Related Terms

- **Follow-on Public Offer (FPO)** is raised by an **already listed company**.
- FPO may involve **fresh issue or offer for sale**.
- **Offer for Sale (OFS)** allows promoters to **sell stake via intermediaries**.

IPO Regulation

- IPOs are regulated by **Securities and Exchange Board of India (SEBI)**.
- Company must have **net tangible assets ≥ ₹3 crore**.
- Net worth requirement: **₹1 crore in each of last three years**.
- Average **pre-tax profit ≥ ₹15 crore** in **three of last five years**.

Eligible Investors

- **Qualified Institutional Buyers (QIBs)** include FPIs, mutual funds and insurers.
- **Retail investors** invest **up to ₹2 lakh**.
- **High Net-Worth Individuals (HNIs)** invest **above ₹2 lakh**.

Gold Exchange-Traded Funds (Gold ETFs)

Core Features

- Gold ETFs are **commodity-based exchange-traded funds** and the underlying asset is **physical gold bullion**.
- Structured as **passive investment instruments** tracking gold prices. ETF units represent **physical gold in demat or paper form**.

Trading and Transparency

- Listed and traded on **National Stock Exchange of India**.
- Also traded on **Bombay Stock Exchange**.
- Offer **full transparency of holdings** due to direct gold pricing.

Exchange-Traded Fund (ETF)

- ETF is a **basket of securities** traded like a stock.
- Can include **equities, bonds, or commodities**.
- **Cost Aspect**
  - ETFs generally have **lower fees** than mutual funds.
  - Gold ETFs have **lower expenses than physical gold** investments.

Catastrophe Bonds (CAT Bonds)

What are Catastrophe Bonds?

- **Insurance-linked securities** that transfer **natural disaster risk** from governments/insurers to capital markets.
- **Hybrid financial instrument** combining **insurance + debt** features.
- Converts disaster insurance coverage into a **tradable bond**.
- Used to manage **low-probability, high-impact risks** like earthquakes, cyclones and floods.

Why CAT Bonds are Needed

- Traditionally, **financial risk of disasters is fully borne by State/Central governments**.
- CAT bonds help:
  - Reduce fiscal burden after disasters

- Ensure quick liquidity for relief and reconstruction
- Diversify risk globally

Key Stakeholders

- **Sponsor:** Sovereign governments (pay insurance premium).
- **Intermediaries:** Multilateral institutions like **World Bank** and **Asian Development Bank**.
- **Investors:** Pension funds, hedge funds, family offices, institutional investors.

How CAT Bonds Work

- Government pays premium → bond issued via intermediary.
- Investors receive **regular coupons**.
- If **no disaster occurs** → investors get principal + interest.
- If **specified disaster occurs** → investors may lose part/all principal, which is used for disaster relief.

Pricing and Risk

- **Coupon rate depends on:**
  - Probability of disaster
  - Severity and frequency
- **Earthquake bonds:** Lower premiums (~1–2%).
- **Cyclone/hurricane bonds:** Higher premiums due to greater frequency and uncertainty.
- Risks are **non-correlated with financial markets**, making them attractive for diversification.

Global Examples

- **Mexico:** Pioneer in sovereign CAT bonds for earthquake and cyclone risks.
- **Philippines:** Uses CAT bonds for typhoon and earthquake protection.

Key Advantages

- Transfers disaster risk to global capital markets.
- Provides **pre-arranged, rapid funding** after disasters.
- Reduces post-disaster borrowing and fiscal stress.
- Encourages **disaster risk management and preparedness**.

Insider Trading

Concept

- **Meaning:** Trading in a company's securities using **non-public, price-sensitive information**.
- **Nature:** Market malpractice undermining **fairness, transparency, and investor confidence**.

Who is an Insider? (SEBI Definition)

- Any person with access to **Unpublished Price Sensitive Information (UPSI)**.
- Includes individuals **associated with the company in the previous six months**.
- **Covers:**
  - Employees, directors, promoters
  - Relatives and professional advisors (bankers, lawyers, auditors)
  - Stock exchange officials, trustees
  - AMC employees linked to the company

Unpublished Price Sensitive Information (UPSI)

- **Definition:** Non-public information likely to materially affect security prices.
- **Examples:**
  - Financial results
  - Mergers and acquisitions
  - Takeovers and major investments
  - Capital restructuring, dividends, key management changes
- **Illegality:** Trading using UPSI for personal gain is prohibited.

Regulatory Framework in India

- **Regulator:** Securities and Exchange Board of India (SEBI)
- **Law:** SEBI (Prohibition of Insider Trading) Regulations, **2015**
- **Objective:** Ensure **fair trading, market integrity, and investor protection**.
- **Enforcement Powers of SEBI**
  - Impose **monetary penalties**
  - **Ban individuals/entities** from accessing capital markets
  - Order **disgorgement of illegal gains**
- **Illustrative Case**
  - Director shares confidential deal information before public disclosure.
  - Tippee trades on the basis of UPSI.
  - **Both liable** under SEBI PIT Regulations.
- **Significance**
  - Protects **retail investors**
  - Maintains **market efficiency and credibility**
  - Prevents **information asymmetry and manipulation**

Stock Exchanges in India

Bombay Stock Exchange (BSE)

- Oldest **stock exchange in Asia**
- Introduced **SENSEX in 1986**
- Tracks **top 30 listed companies**
- Ranks among **top ten valued exchanges globally**
- Offers **equities, derivatives, and commodities trading**

National Stock Exchange (NSE)

- Incorporated in **1992**, trading began in **1994**
- First **fully electronic trading exchange in India**

- Launched **NIFTY 50 Index in 1995–96**
- Introduced **dematerialised securities trading and settlement**

Multi-Commodity Exchange (MCX)

- One of **largest commodity exchanges in India**
- Used by **hedgers, traders, businesses, and companies**
- Focuses on **non-agricultural commodity derivatives**

National Commodity and Derivatives Exchange (NCDEX)

- Major **commodity exchange focused on agricultural products**
- Started operations **around same time as MCX**
- Trades **agri-commodities only**

India International Exchange (India INX)

- India's **first international stock exchange**
- Opened in **January 2017**
- Subsidiary of **BSE**
- Located at **IFSC, GIFT City, Gujarat**
- Trades **derivatives and international debt instruments**

NSE IFSC (NSE International Exchange)

- Incorporated on **29 November 2016**
- Wholly owned **subsidiary of NSE**
- Located at **IFSC, GIFT City, Gujarat**
- Offers **derivatives and debt market instruments**

Indian Commodity Exchange (ICEX)

- **SEBI-registered permanent commodity derivatives exchange**
- Only exchange offering **diamond derivative contracts**
- Trades **agri-derivatives including spices and oilseeds**

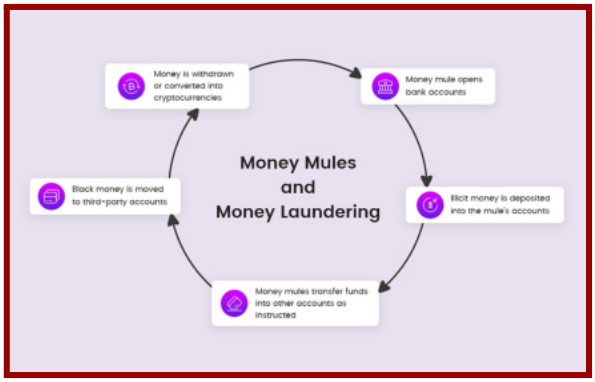
Calcutta Stock Exchange (CSE)

- One of **oldest stock exchanges in India**
- Granted **permanent recognition in 1980**
- Recognised under **Securities Contracts Regulation Act, 1956**
- Maintained index called **CSE-40**

Metropolitan Stock Exchange (MSE)

- Recognised by **Ministry of Corporate Affairs in 2012**
- Offers **futures, options, currency, and debt instruments**

MuleHunter



Overview

- **Nature:** AI/ML-based fraud detection model
- **Developed by: Reserve Bank Innovation Hub (RBIH)** (Subsidiary of RBI)
- **Purpose:** Detect and track **mule bank accounts** used in financial fraud and money laundering
- **Status:** Pilot tested with **two large Public Sector Banks**

Key Functions

- **Mule Account Detection:** Analyses transaction behaviour to flag suspicious fund movement patterns
- **Real-time Monitoring:** Enables prompt alerts and intervention during fraudulent transactions
- **Advanced Analytics:** Uses machine learning to identify trends, anomalies, and risk indicators
- **Inter-Agency Coordination:** Facilitates data sharing among banks, PSPs, and law enforcement agencies
- **Regulatory Support:** Strengthens compliance with **AML** and **CFT** norms

Significance

- Enhances **digital payments security**
- Improves **early fraud prevention** capability
- Supports **financial system integrity**
- Strengthens **RBI's tech-driven supervisory framework**

What is a Mule Bank Account?

- **Definition:** Bank account used by criminals to **launder illegal funds**
- **Ownership Pattern:** Often acquired from **financially vulnerable or low-tech literacy individuals**
- **Money Mule:** Person whose account is misused for illegal transfers, often unknowingly
- **Law Enforcement Challenge:** Account holder becomes traceable, while **actual fraudsters remain hidden**

Urban Co-operative Banks (UCBs)

Context: RBI proposed reopening the **licensing window** for UCBs after **20+ years**, seeking stakeholder feedback.

Urban Co-operative Banks (UCBs)

- **Definition**
  - **Member-owned, community-based banks** operating mainly in **urban and semi-urban areas**.
  - Provide **deposits and credit** to small borrowers, traders, salaried employees, and **MSMEs**.
  - Operate on co-operative principles: **mutual help, democratic control, one member–one vote**.
- **Origin and Evolution**
  - **Urban co-operative movement began** in the late 19th century.
  - **First urban co-operative credit society:** Kanchipuram (1904) under the Co-operative Credit Societies Act, 1904.
  - **1966:** Brought under Banking Regulation Act, 1949, creating dual control (RBI + State Governments).
  - **2004:** RBI stopped new licences after governance and financial failures.
  - **2020:** Banking Regulation (Amendment) Act strengthened RBI's supervisory powers.
  - **2024:** NUCFDC created to support technology and sector development.
- **Regulation**
  - **Dual control framework:**
    - **RBI:** Banking operations, prudential norms, supervision.
    - **State Governments/Registrars:** Management and incorporation aspects.
- **Key Functions**
  - **Mobilise deposits** from local communities.
  - **Provide credit** to MSMEs, traders, professionals, and households.
  - Support **financial inclusion** and urban informal sector.

Financial Stability Report

Context: The **Reserve Bank of India (RBI)** released its latest **Financial Stability Report**, reviewing the strength and risks of India's financial system.

What is the Financial Stability Report?

- A **periodic report** published by the RBI.
- Assesses the **stability, resilience, and risks** in the financial sector.
- Covers banks, financial institutions, and systemic vulnerabilities.

Key Banking Sector Indicators

- **Asset Quality**
  - Loan quality of banks has improved.
  - **Gross Non-Performing Assets (GNPA)** of Scheduled Commercial Banks declined to **2.1% (Sept 2025)**.
- **Capital Adequacy**
  - Banks maintain healthy capital buffers.
  - **CRAR Levels:**
    - Public Sector Banks: **16%**.
    - Private Sector Banks: **18.1%**.

Emerging Risk Flagged

- **Unsecured Loans**
  - Identified as a **major source of financial stress**.
  - Account for a significant share of retail loan defaults.

Payments Regulatory Board (PRB)

In News

- First PRB meeting held in **Mumbai**, chaired by **Sanjay Malhotra**.
- Marks **operationalisation** of the new payments governance framework.

Legal Status

- PRB is a **statutory body** for payment systems regulation.
- Established under **Section 3 of the Payment and Settlement Systems Act, 2007**.
- Came into force from **9 May 2025**.
- Replaced the **Board for Regulation and Supervision of Payment and Settlement Systems (BPSS)**.

Institutional Role

- PRB is the forum through which **Reserve Bank of India** exercises **regulatory and supervisory powers** over payment systems.

Composition

- **Chairperson:** RBI Governor.
- Includes **RBI Deputy Governor (payments)**.
- Includes **Central Government nominees**.
- Includes **domain experts** in payments, fintech and cybersecurity.
- Includes officials linked to **digital identity and payment infrastructure**.

Core Functions

- Grants and regulates **authorisation of payment systems**.
- Prescribes **technical, operational and security standards**.
- Oversees **risk management and settlement finality**.
- Conducts **inspection and enforcement** under the PSS Act.

Miscellaneous

Technical Textiles

Context: Export of technical textile goods from India declined **1.2%** to **$1.95 billion** during April-October 2025 compared to **$1.97 billion** in the same period of 2024, mainly due to **U.S. tariffs**. **United States** is largest market with **25.9% share** of India's exports, followed by **Germany (6%) and UK (5%)**.

Technical Textiles

- **Definition and Core Characteristics**
  - **Technical textiles** are textile materials prioritising technical performance over aesthetic or decorative value.
  - They are designed for functional efficiency in specialised industrial and commercial applications.
  - Alternative terms include **industrial, functional, performance, engineering, invisible, and hi-tech textiles**.
- **Material Properties and Design**
  - Technical textiles possess enhanced **physical, mechanical, thermal, and chemical properties**.
  - These properties enable use in demanding and performance-critical environments.
  - They are manufactured using **natural fibres** as well as **man-made fibres**.
- **Areas of Application**
  - Widely used in **earthworks, construction, civil engineering, transport, defence, medical, and healthcare sectors**.
  - Technical textiles may be used **independently** or as a **component of another product**.
  - Individually, they fulfil specific functions like **fire-retardant fabrics** for firefighters' uniforms.
  - Coated fabrics are used independently for applications such as **awnings and protective covers**.
  - As components, they enhance **strength, durability, and functional performance** of end products.

Classification of Technical Textiles

National Technical Textiles Mission

- **Launch and Objectives**
  - Launched by the **Ministry of Textiles** to enhance technical textile penetration in India.
  - The mission aims to position **India as a global leader** in technical textiles.
  - It leverages the sector's high growth potential and expanding industrial demand.
- **Key Components of the Mission**
  - **Research, Innovation, and Development** to promote advanced textile technologies.
  - **Promotion and Market Development** to expand domestic consumption.
  - **Export Promotion** to strengthen India's presence in global markets.
  - **Education, Training, and Skill Development** to build a skilled workforce.
- **Targets**
  - Target to raise domestic market size to **$40–50 billion by 2024**.
  - Envisions an annual growth rate of **15–20%** for the sector.

Open Network for Digital Commerce (ONDC)

About the Platform

- ONDC is an **open, interoperable digital commerce network**.
- Enables **platform-agnostic buying and selling** using **open protocols**.
- Designed to prevent **platform monopolies**.
- **Launch and Ministry**
  - Launched in **April 2022**.
  - Implemented by **DPIIT**, **Ministry of Commerce and Industry**.
- **Core Aim**
  - **Democratises e-commerce** by breaking platform silos.
  - Creates a **level playing field** for sellers, buyers and service providers.
  - Focuses on **MSMEs, competition and inclusivity**.

Operating Model

- ONDC is a **decentralised network**, not a marketplace.
- Does **not own listings** or **process orders**.
- Uses **open protocols and standard APIs** for interoperability.

Key Participants

- **Buyer apps** handle search and ordering.
- **Seller apps** manage catalogues and pricing.
- **Logistics providers** handle delivery and tracking.
- **Technology enablers** provide digital infrastructure.

Domains Covered

- Includes **Food & Beverage, Grocery and Electronics**.
- Covers **Mobility**, including autos, cabs and metro.
- Extends to **Financial Services** and **Agriculture**.
- Includes **ONEST** for **Education and Training**.

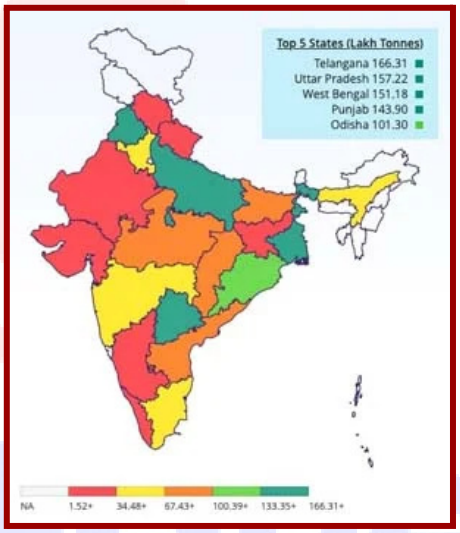
Small Industries Development Bank of India (SIDBI)

Context: Union Cabinet approved **₹5,000 crore equity infusion** into SIDBI to strengthen MSME credit flow.

About SIDBI

- **Definition**
  - **Principal financial institution** for **promotion, financing, and development of MSMEs** in India.
  - Coordinates institutions engaged in **MSME financing**.
- **Establishment & Status**
  - **Established:** April 1990
  - **Legal basis:** Act of Parliament
  - **Headquarters:** Lucknow, Uttar Pradesh
  - **History:**
    - **1990:** Set up as wholly owned subsidiary of IDBI Bank
    - **2000:** Delinked from IDBI
  - **Regulatory status:** One of five **All India Financial Institutions (AIFIs)** regulated by RBI
    - **Others:** NABARD, Exim Bank, NHB, NaBFID
- **Core Functions**
  - **Refinance Support:** Provides bulk funds to **banks, SFBs, and NBFCs** for MSME lending expansion.
  - **Direct MSME Lending:** Extends **term loans and working capital** where bank credit is limited.
  - **Collateral-Free & Digital Credit:** Promotes **data-based lending** to reduce entry barriers for small enterprises.
  - **Startup & Venture Debt:** Offers **non-equity funding** to startups and growth-stage MSMEs.
  - **Developmental Role:** Operates **Udyami Mitra** and handholding platforms for credit facilitation.
  - **Microfinance Support:** Channels funds to **MFIs** for micro-enterprise financing.
- **Significance**
  - Backbone of India's **MSME credit ecosystem**.
  - Promotes **employment, financial inclusion, and business formalisation**.

Rice Production in India



In News

- India became the **world's largest rice producer** in **2024–25**.
- India's rice output stood at **150.18 million tonnes** (China recorded ranking **second globally**).

State-wise Production (2023–24)

- **Telangana** produced **16.63 MT** of rice.
- **Uttar Pradesh** produced **15.72 MT** of rice.
- **West Bengal** produced **15.12 MT** of rice.
- **Other Major Rice-Producing States**
  - Major contributors include **Andhra Pradesh, Punjab, Odisha, Bihar, Chhattisgarh, Tamil Nadu and Assam**.

Conditions for Rice Cultivation

- **Climate and Season**
  - Rice is a **tropical Kharif crop** requiring **heat and moisture**.
  - It grows best under **hot and humid climatic conditions**.

- In **eastern and southern India**, **2–3 rice crops** are grown annually.
- In **northern and hilly regions**, **only one summer crop** is possible.

- **Water Requirement**
  - Rice needs **semi-aquatic conditions** throughout its growth period.
  - Fields are **flooded with 10–12 cm standing water** during sowing.
  - Soil should **not dry** during the growing season.
- **Rainfall Conditions**
  - Annual rainfall over 100 cm annually, with ideal zones receiving 150 cm to 300 cm.
  - Rice is grown in **low-rainfall areas** using **intensive irrigation**.
  - Irrigation enables rice cultivation in **Punjab, Haryana and western Uttar Pradesh**.
- **Relief and Terrain**
  - Rice is mainly cultivated in **plains and lowlands**.
  - Rice grown in flooded plains is called **wet or lowland rice**.
  - Cultivation occurs **below sea level** in **Kuttanad, Kerala**.
  - In hilly regions, rice is grown on **terraced slopes**.
  - Rice grown in hills with limited water is termed **dry or upland rice**.
- **Soil Conditions for Rice**
  - **Loamy soils** need **frequent irrigation** due to low water retention.
    - Loamy soil regions include **Punjab, Haryana and northern plains**.
  - **Clayey soils** have **high water-holding capacity**.
    - Clayey soil regions include **southern coastal plains, Karnataka and Telangana**.
  - Rice can grow in **both acidic and alkaline soils**.

Digital Food Currency

Context:

The Government of India will launch a **CBDC pilot in February 2026** for **PDS beneficiaries** in **Chandigarh, Puducherry, and Gujarat districts**.

What is it?

- **Programmable e-Rupee tokens** locked for foodgrain purchases at Fair Price Shops
- **Developed By**
  - **Regulator:** Reserve Bank of India (RBI)
  - **Implementer:** Ministry of Consumer Affairs, Food and Public Distribution
  - Supported by **NPCI** and **State Governments**
- **Primary Objectives**
  - Ensures **subsidy usage** strictly for foodgrain purchases
  - Enables **real-time tracking** of foodgrain distribution
  - Reduces **biometric authentication** dependency at ration shops
  - Promotes **digital-first inclusion** through RBI digital wallets
- **How It Works**
  - **Monthly digital coupons** credited to RBI-enabled beneficiary wallets
  - Beneficiary **scans Fair Price Shop QR code** for redemption
  - **Digital tokens transferred** and entitled foodgrains dispensed
  - Coupons carry **time-bound validity** to prevent accumulation
- **Key Features**
  - Covers **urban UTs and PDS-active Gujarat districts**
  - Supports **feature phones** through SMS or offline digital modes
  - Reduces **e-POS biometric machine** reliance for authentication

Green Hydrogen

Context

- Andhra Pradesh Chief Minister declared **Kakinada as the "Green Hydrogen Valley of India."** The announcement made during the **bhumi puja of a ₹15,600-crore Green Hydrogen and Green Ammonia Complex** by **AM Green (Greenko Group)** on a **495-acre campus**.

About Green Hydrogen

- **What it is?**
  - Green hydrogen is hydrogen produced by **electrolysing water using renewable energy sources** like solar, wind or hydel power.
  - The process splits **H_2O into hydrogen and oxygen** without emitting greenhouse gases.
  - It is a **zero-emission, clean energy carrier** and highly combustible, colourless, odourless gas.
- **National Context- India**
  - Anchored under the **National Green Hydrogen Mission**.
  - Objectives include:

    - Reducing dependence on **imported fossil fuels**.
    - Creating **export opportunities**.
    - Supporting India's **Net Zero by 2070** target.
- **Advantages of Green Hydrogen**
    - **Energy storage:** Enables long-term storage of renewable energy, supporting grid stability.
    - **Flexible energy carrier:** Usable across power, transport, industry and chemicals sectors.
    - **Emission reduction:** No greenhouse gas emissions during production and use.
    - **By-product value:** Oxygen from electrolysis can be monetised for industrial and medical use.
    - **Global integration:** Can be blended with natural gas for gradual energy transition.
- **Disadvantages**
    - **High production cost:** Electrolysis using renewables remains capital-intensive.
    - **High energy requirement:** More electricity needed compared to conventional fuels.
    - **Safety risks:** Highly flammable and volatile, requiring strict handling protocols.
- **Production Methods**
    - **Alkaline Electrolysis:**
        - Uses alkaline solution (KOH/NaOH) as electrolyte.
        - Mature, cost-effective, but relies on expensive electrode materials.
    - **Proton Exchange Membrane (PEM) Electrolysis:**
        - Uses solid polymer membrane.
        - Faster response and higher efficiency, but high membrane and catalyst costs.
    - **Solid Oxide Electrolysis:**
        - Operates at very high temperatures (700°C–1000°C).
        - High efficiency and supports co-electrolysis, but technologically complex.
- **Applications of Green Hydrogen**
    - **Transportation:** Fuel for **Fuel Cell Electric Vehicles (FCEVs)**, trains, ships and aviation.
    - **Energy storage and grid balancing:** Stores excess solar and wind energy for later use.
    - **Industrial use:**
        - Replaces coal in **green steel production**.
        - Used in **green ammonia and fertiliser manufacturing**.
    - **Residential and commercial use:** Power generation, heating and cooking via fuel cells.
    - **Hydrogen blending:** Mixed with natural gas in pipelines to lower carbon footprint.
    - **Global trade:** Enables export-based energy economy for renewable-rich countries.

Nagauri Ashwagandha

Context: Nagauri Ashwagandha received a **Geographical Indication (GI) tag**.

Geographical Identity

- Predominantly cultivated in **Nagaur district, Rajasthan**.
- Thrives in **dry climate and sandy soils**.

Distinctive Traits

- Possesses **longer and thicker roots**.
- Roots are **rich in alkaloids**.
- Berries show **dark, bright red colour**.
- Roots are **brittle and starchy**.
- Considered **superior variety** among arid-region Ashwagandha types.

Ashwagandha

- **Botanical Identity**
    - Scientific name: **Withania somnifera**.
    - Also known as **Indian ginseng** or **Indian winter cherry**.
- **Agro-Climatic Requirements**
    - Grows in **dry, sub-tropical regions**.
    - Soil preference: **sandy loam or light red soil**.
    - Suitable soil pH: **7.5–8.0** with good drainage.
    - Cultivated as a **late Kharif crop**.
    - Rainfall requirement: **500–750 mm**.
    - Temperature tolerance: **20°C–38°C**.

- **Major Producing States**
  - Madhya Pradesh, Rajasthan, Punjab, Haryana.
  - Uttar Pradesh, Gujarat and Maharashtra.

INTERNAL SECURITY

Topic: Threats to Internal Security

Narco-terrorism

Concept and Meaning

- **Narco-terrorism** refers to drug traffickers using violence to influence governments and societies.
- It involves systematic intimidation to obstruct enforcement of **anti-drug laws**.
- In essence, it denotes the **nexus between drug syndicates and terrorist groups**.
- Drug networks finance terrorism and indirectly influence public policy decisions.

Drug-Producing Regions

- **Golden Triangle**
  - Located at the Thailand–Laos–Myanmar border near Ruak–Mekong confluence.
  - Major global opium producer since the 1950s.
- **Golden Crescent**
  - Covers **Afghanistan, Iran, and Pakistan** across Central and Western Asia.
  - Afghanistan later emerged as the world's largest opium producer.

Factors Contributing to the Rise of Narco-terrorism

- **Geopolitical and Regional Factors**
  - India's proximity to the **Golden Crescent** enables easy access to narcotics.
  - Borders with **Pakistan** facilitate cross-border drug trafficking routes.
  - **Golden Triangle** drugs impact India, particularly through northeastern borders.
- **Socio-economic and Institutional Factors**
  - **Poverty, unemployment, and lack of opportunities** push individuals towards drug trade.
  - **Corruption and weak law enforcement**, notably in Punjab, enable trafficking networks.
  - High profits and persistent demand make drugs attractive funding sources for terrorists.
  - **Transnational syndicates** collaborate with terrorist outfits to move drugs and money.
  - Policy focus on terrorism and insurgency diluted attention on drug inflows.
- **Regional Hotspots**
  - Northeast India faces drug inflows from **Myanmar and Bangladesh**.
  - Seizures of **yaba tablets** reveal multiple exit points in Tripura, Assam, and Meghalaya.
  - Drug proceeds are diverted to **insurgent and extremist groups**.

Government Measures Against Narcotics Trafficking

- **NDPS Act, 1985** provides stringent controls and minimum ten-year punishment.
- **Narcotics Control Bureau (NCB)** acts as the nodal enforcement agency.
- India signed bilateral drug-control agreements with multiple countries.
- India is a signatory to **UN and SAARC conventions** on narcotic substances.
- **Operation Sadbhavana** focuses on de-addiction and awareness initiatives.
- **Nasha Mukt Campaign** adopts a zero-tolerance policy against drug networks.

Way Forward

- Strengthen **multilateral cooperation** and intelligence sharing.
- Deploy **advanced technologies** for border surveillance and financial tracking.
- Promote **community awareness and rehabilitation** programmes.
- Disrupt terror financing through coordinated domestic and international efforts

Unlawful Activities (Prevention) Act, 1967 (UAPA)

Features of the Act

- **Declaration of Unlawful Association**
  - Central Government may declare associations **unlawful** for supporting secession or questioning sovereignty.
  - Ban on organisations can be imposed and **extended up to five years**.
  - **Government** may **designate organisations** as **terrorist** for committing, preparing, promoting, or supporting terrorism.
- **Definition of Terrorist Acts**
  - Section 15 defines terrorist acts threatening **unity, integrity, security, or sovereignty of India**.
  - Includes acts intended to **strike terror** in India or foreign countries.
  - Covers acts under **international conventions** listed in the Act's Schedule.

- **Tribunal Mechanism**
  - Central Government may constitute **Unlawful Activities Prevention Tribunal** headed by a High Court Judge.
- **Extended Detention Provisions**
  - Police remand can extend to **30 days** instead of the usual fifteen.
  - Judicial custody before charge-sheet may extend up to **180 days**.
- **Stringent Bail Conditions**
  - Bail denied if court finds charges **prima facie true**.
  - Burden shifts to **accused to disprove allegations**.
- **Punishments**
  - **Death penalty or life imprisonment** if terrorist act causes death.
  - **Five to ten years' imprisonment and fine** for other terrorist activities.
  - Minimum **five years' imprisonment** for preparatory acts.
- **Investigating Agency**
  - **National Investigation Agency (NIA)** empowered to investigate UAPA cases.

Evaluation of the Act

- **Arguments in Favour**
  - **National security**: Enables preventive action against individuals and organisations supporting terrorism.
  - **Counterterrorism capacity**: Terrorist designation enables **asset freezes, travel bans, and sanctions**.
  - **Preventive detention**: Allows custody to avert imminent threats despite insufficient trial-ready evidence.
  - **Global commitments**: Amendments align with **UN Convention on Terrorist Financing** obligations.
  - **Effective prosecution**: Enabled conviction in **26/11 Mumbai attacks** using electronic and intercepted evidence.
  - **Deterrence**: Severe penalties discourage terrorism, exemplified by punishment in **2001 Parliament attack** cases.
- **Issues with UAPA**
  - **Vague definitions**: Broad meanings of **"unlawful activity"** risk covering legitimate political dissent.
  - **Pre-emptive arrests**: Permits arrests and prolonged detention based on suspicion or anticipated offences.
  - **Low conviction rate**: PUCL report shows **below 3% convictions (2015–2020)**, questioning efficacy.
  - **State overreach**: Phrases like **"likely to threaten"** allow labelling without completed violent acts.
  - **Denial of rights**: **Section 43D(5)** severely restricts bail if accusations appear prima facie true.
- **Judicial Perspective**
  - Justice **Rohinton Nariman** urged striking down **offensive provisions** of the Act.
  - **Arup Bhuyan (2011) Case**: Mere membership of banned groups is insufficient without violence or incitement.
  - **PUCL (2004) Case**: Counterterrorism through **human rights violations** is counterproductive.
  - **K.A. Najeeb (2021) Case**: Constitutional courts may grant bail to protect **fundamental rights**.
  - **MKSS (2018) Case**: Peaceful, non-violent protests against government actions are constitutionally protected.

Way Forward

- **Amend definitions**: Narrow vague terms to exclude peaceful protest and constitutionally protected dissent.
- **Restore burden of proof**: Place evidentiary responsibility on prosecution, not the accused.
- **Independent review**: Create transparent mechanisms to review and challenge terrorist designations.
- **Last-resort use**: Reserve UAPA for extreme cases; avoid suppressing criticism or opposition.
- **Dialogue and reconciliation**: Prefer negotiation to address grievances, reducing reliance on coercive laws.

Conclusion

- Balancing **individual liberty** and **state security** requires coordinated action by State, judiciary, and civil society.

Post-Maoism Stabilisation Strategy

Context: Maoism in Rapid Retreat

- Maoism has weakened sharply with **mass surrenders since October 2025** across Dandakaranya and adjoining regions.
- The movement had been declining since **2011–12**, with a major setback in **2018**.
- In **August 2024**, CPI (Maoist) reorganised into smaller units to evade security force encirclement.
- The party adopted a **defensive strategy**, avoiding attacks unless compelled by circumstances.

Leadership Losses and Surrenders

- Internal splits followed leadership disagreements over **peace talks versus armed struggle**.
- **General Secretary Basavaraju** was killed in **May 2025** in Narayanpur, Chhattisgarh.
- **PLGA Battalion-1 in-charge Madvi Hidma** was killed in Andhra Pradesh.
- Multiple Central Committee members have surrendered or been neutralised across regions.
- As of October 2025, **only seven LWE-affected districts** remain, with **three most affected in Chhattisgarh**.

Development Priorities

- **Health Infrastructure**
  - Extend medical facilities to interior areas to address **anaemia, malaria, dysentery, and snakebites**.
  - Strengthen primary health centres in areas freed from Maoist influence.
- **Livelihood and Agriculture**
  - Support tribals with **quality seeds, fish seeds, irrigation, and check dams**.
  - Establish **forest produce processing units** near habitations to improve incomes.
- **Education and Rehabilitation**
  - Expand **educational ashrams** due to scattered village populations.
  - Reverse Maoist ideological schooling through **formal government education**.
  - Utilise vocational skills of surrendered cadres for productive employment.
- **Social and Rehabilitation Measures**
  - Provide **free reverse vasectomy procedures** and reproductive healthcare support.
  - Promote awareness on **women's consent in marriage** through village elders.
- **State Initiatives**
  - **Niyad Nellanar scheme** delivers around **25 government benefits** near security camps.
  - The scheme should be **extended to all previously Maoist-affected villages**.

Prelims

Line of Control (LoC)

Context: Security forces detected **suspicious drone activity** near the **LoC in Poonch district**, recovering explosives and contraband.

What is the Line of Control (LoC)?

- The **Line of Control (LoC)** is the **de facto military boundary** between India and Pakistan.
- It divides the **former princely state of Jammu and Kashmir** into Indian- and Pakistani-controlled areas.
- The LoC is **not an internationally recognised border**, but functions as the effective ground boundary.

Historical Evolution

- **1949**: Emerged as the **Ceasefire Line** after the first India–Pakistan war.
- Established following the **Karachi Agreement** under **United Nations mediation**.
- **1972**: Renamed the **Line of Control** after the **Simla Agreement**, post the 1971 war.
- The Simla Agreement committed both countries to **bilateral dispute resolution**, reducing UN involvement.
- Over decades, especially after the **2000s**, the LoC became **heavily militarised**.

Key Features of the LoC

- **Length**: Approximately **740 kilometres**, stretching from **Jammu to the Siachen Glacier**.
- **Highly militarised zone** with frequent **ceasefire violations** and armed patrols.
- **Partial fencing**: India has fenced around **550 km** to prevent infiltration and smuggling.

- Equipped with **surveillance systems**, forward posts, and layered security infrastructure.
- **Distinct from LAC**: Separate from the **Line of Actual Control (LAC)** with China.

Strategic and Security Significance

- Central to **India–Pakistan security dynamics** and military preparedness.
- Acts as a **frontline defence** against cross-border infiltration and terrorism.
- Used for **arms trafficking, narcotics smuggling, and drone-based deliveries**.
- Frequent flashpoint during periods of **bilateral tensions and ceasefire breakdowns**.

National Improvised Explosive Device Data Management System (NIDMS)

In News: Inaugurated by the **Union Home Minister** at **NSG Garrison, Manesar**.

System Profile

- NIDMS is a **secure national digital IED database platform**.
- Stores **IED and bomb-blast data since 1999**.
- Provides **single-window access** to investigation agencies.

Institutional Framework

- **Policy authority**: Ministry of Home Affairs (MHA).
- **Operational host**: National Security Guard (NSG).
- **Technical backbone**: National Bomb Data Centre (NBDC), NSG.

User Agencies

- State Police Forces.
- Central Armed Police Forces (CAPFs).
- National Investigation Agency (NIA).
- Anti-Terrorism Squads (ATS).

Core Objective: Create **"One Nation, One IED Data Repository"**.

Database Features

- **Pan-India IED archive** since **1999**.
- **Two-way system**: upload and retrieval of data.
- **Signature-based linking** of incidents.
- Parameters include **location, device type, circuit, timer, explosive**.

Analytics Capability

- **AI-enabled pattern detection**.
- Supports **modus-operandi analysis**.
- Enables **predictive threat mapping**.

Inter-Operable Systems

- **Integrated with**
  - Crime and Criminal Tracking Network and Systems (CCTNS)
  - Interoperable Criminal Justice System – Phase II (ICJS-2)
  - National Automated Fingerprint Identification System (NAFIS)
  - e-Prisons
  - e-Prosecution
  - Forensics databases
- **Data Standards**
  - Uses **uniform data formats**.
  - Includes **evidence tagging**.
  - Ensures **secure data sharing**.

HISTORY, ART &CULTURE

Prelims

Topic: Modern Indian History

Savitribai Phule

Basic Profile

- Savitribai Phule was born in **1831** and died in **1897**.
- She was a **social reformer, poet and educator**.
- She is regarded as the **first female teacher of modern India**.
- **Early Life**
  - Born in **Naigaon**, present-day **Maharashtra**.
  - Married in childhood to **Jyotirao Phule**.
  - Later shifted residence to **Pune**.

Education and Training

- Learned **reading and writing** under guidance of **Jyotirao Phule**.
- Received **teacher training in Ahmednagar and Pune**.
- Became a **qualified teacher in 1847**.

Contribution

- **Education**
  - Co-founded **India's first girls' school** in **1848**.
  - First girls' school located at **Bhidewada, Pune**.
  - Helped establish **18 schools** for girls and marginalized communities.
- **Social Reform Activities**
  - Opened **shelters for widows and destitute women** in **1854**.
  - Shelter activities expanded further in **1864**.
  - Actively opposed **child marriage, caste discrimination and untouchability**.
- **Institutional Role**
  - Associated with **Satyashodhak Samaj**.
  - Satyashodhak Samaj opposed **caste hierarchy**.
  - Promoted **marriages without priests and dowry**.
- **Public Service**
  - Served victims during the **plague epidemic of 1897**.
  - Died while **serving plague-affected people**.

Rani Velu Nachiyar

Core Profile

- Rani Velu Nachiyar lived from **1730 to 1796**.
- She was the **queen of Sivaganga** in present-day **Tamil Nadu**.
- She belonged to the **Ramnad (Ramanathapuram) kingdom**.
- Also known by the title **Veeramangai**.
- **Family and Marriage**
  - Daughter of **Raja Chellamuthu Vijayaragunatha Sethupathy**.
  - Married **Muthuvadugananthur Udaiyathevar**, prince of Sivaganga, at **age 16**.

Skills and Learning

- Trained in **weapon handling, horse riding and archery**.
- Skilled in **Silambam and Valari** martial traditions.
- Proficient in **Tamil, English, French and Urdu**.

Resistance and Administration

- Formed alliances with **Hyder Ali of Mysore** and **Gopala Nayaker**.
- Organised an army including a **women's battalion named "Udaiyaal"**.
- Regarded as the **first Indian queen to resist British rule**.
- Delegated administrative authority to the **Marudu brothers in 1780**.

Swami Vivekananda

Basic Facts

- Original name: **Narendranath Datta**
- Born on: **12 January 1863**
- Birthplace: **Kolkata**
- **12 January** observed as **National Youth Day** to commemorate his birth anniversary

Spiritual and Organizational Role

- Disciple of **Sri Ramakrishna**
- After Ramakrishna's death in **1886**, formed a **monastic brotherhood**
- This brotherhood later became the **Ramakrishna Mission**
- Lived as a **wandering monk** across the **Indian subcontinent**

Key Philosophical Ideas

- Promoted **Universal Vedanta**
- Advocated **religious pluralism**
- Popularised idea: **"Truth is one, expressed in many ways"**
- Emphasised **practical spirituality** based on:
  - Compassion
  - Discipline
  - Service
- Propagated the **Four Yogas**:
  - Karma Yoga
  - Bhakti Yoga
  - Jnana Yoga
  - Raja Yoga
- Supported **rational interpretation of Indian scriptures**

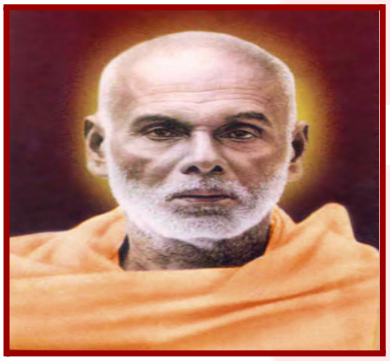
Chicago Parliament of Religions, 1893

- Spoke at the **World's Parliament of Religions**
- Presented **Vedanta as a universal philosophy**
- Advocated **religious tolerance and pluralism**
- Projected India as a **civilizational contributor**

Major Works

- Raja Yoga
- Karma Yoga
- Lectures from Colombo to Almora
- Interpreting the Gita

Sree Narayana Guru



Birth and Background

- Born on **22 August 1856** at **Chempazhanthy, Kerala**.
- Belonged to the **Ezhava community**, classified as *avarna* under prevailing caste hierarchy.

Philosophy and Ideology

- Advocated **social equality, universal education, and spiritual humanism**.
- **Core slogan:** "One Caste, One Religion, One God for All."
- Prominent proponent of **Advaita Vedanta**, emphasising non-dualistic spiritual unity.

Social Reform Initiatives

- Led movements against **caste discrimination and social exclusion**.
- Founded **Sree Narayana Dharma Paripalana Yogam (SNDP Yogam)** for community upliftment.
- Promoted **temple entry, education, and self-respect among marginalised communities**.

Aruvippuram Movement (1888)

- Installed a **Shiva idol at Aruvippuram**, defying caste-based religious restrictions.
- Symbolised **assertion of spiritual equality and challenge to social orthodoxy**.

Institutions Established

- Founded **Sivagiri Mutt in 1904** as a centre for spiritual learning and reform.

Literary Contributions

- **Authored key philosophical and devotional works:**
  - Advaitha Deepika
  - Atmavilasam
  - Daiva Dasakam
  - Brahmavidya Panchakam

Significance

- Pioneer of **Kerala's social renaissance and reform movement**.
- Influenced later leaders and movements for **social justice and inclusive spirituality**.

Tantya Mama Bhil

Context: Statue installation in **Khargone (MP)** on **Tribal Pride Day** highlighted public focus on tribal freedom fighters.

Tantya Mama Bhil

- **Identity & Early Life**
  - **Born:** 1840, **Badda village**, Khandwa district, Madhya Pradesh
  - **Original name:** Tantia Bhil
  - **Title "Tantya":** Means *fighter*, earned through resistance against British rule
  - **Community:** Bhil tribe
- **Inspiration & Methods**
  - Inspired by **Tatya Tope (1857 Revolt leader)**
  - Adopted **guerrilla warfare tactics**
  - Conducted **swift attacks** on British targets, including **trains**
  - Redistributed looted resources among the poor → **"Robin Hood" image**
- **Social Role**
  - Assisted the poor and distressed communities
  - Supported women and arranged marriages for underprivileged girls
  - Earned the honorific **"Mama" (Uncle)** for mass connect
- **Martyrdom**

- **Executed by hanging:** 4 December 1889
- **Body dumped near:** Patalpani station, Khandwa railway line

Topic: Art and Culture

Somnath Temple

In News: 2026 marks **1,000 years** since the **1026 CE attack** by **Mahmud of Ghazni**.

Religious Significance

- Somnath Temple is one of the **12 Jyotirlingas of Lord Shiva**.
- Often referred to as the **"Eternal Shrine"**.

Location

- Located at **Prabhas Patan**, near **Veraval**, in **Saurashtra, Gujarat**.
- Situated on the **Arabian Sea coast**.
- At the **Triveni Sangam** of **Kapila, Hiran and Saraswati** rivers.

Historical Milestones

- Attacked in **1026 CE** by **Mahmud of Ghazni**.
- Historical records indicate **multiple destructions and reconstructions**.
- Rebuilt by rulers including **Kumarapala (12th century)** and **Chudasama kings**.
- Documented as **destroyed six times and rebuilt each time**.

Architecture

- Constructed in the **Chaulukya (Solanki) architectural style**.
- Features a **shikhara**, **ornate stone carvings**, and **garbhagriha**.
- Inscription mentions **no landmass southwards till the South Pole**.

Modern Reconstruction

- Reconstruction initiated by **Vallabhbhai Patel** after Independence.
- Rebuilt during **1947–1951** using traditional techniques.
- Inaugurated on **11 May 1951** by **Rajendra Prasad**.
- Currently managed by the **Somnath Trust**, chaired by the **Prime Minister of India**.

Zehanpora Stupa Site

Context: Kushan-period Buddhist complex excavated at **Zehanpora, Baramulla**.

Location

- Situated in **Zehanpora village**, **Baramulla district**, **Jammu & Kashmir**.
- Lies on the **ancient Silk Route corridor**.
- Route linked **Kashmir with Gandhara (Afghanistan–Pakistan)**.

Chronology

- Dated to **Kushan period (1st–3rd century CE)**.
- Kashmir was a **Buddhist centre** under **Kanishka and Huvishka**.
- Buddhism in Kashmir began under **Ashoka (3rd century BCE)**.
- Region associated with **Mahayana Buddhism**.

Cultural Network

- Zehanpora was part of the **Gandhara Buddhist network**.
- Network connected **monasteries, trade routes and learning centres**.

Site Components

- Contains **multiple stupas**.
- Includes **apsidal chaityas (prayer halls)**.
- Includes **viharas (monk residences)**.
- Includes **urban-type settlements**.
- Spread over **nearly 10 acres**.

Structural Evidence

- Presence of **stupa-base mounds**.
- **Clustered mounds** indicate multiple stupas.
- Evidence of **wooden super-structures**.
- Shows **layered construction**.

Survey Methods

- Used drones.
- Used remote sensing.
- Used aerial photography.
- Used ground mapping.

Kathputli

What it is

- **Kathputli** is a **traditional string-puppet theatre of Rajasthan** and among the **oldest folk art forms** of the state.
- The term comes from **"kath" (wood)** and **"putli" (doll)**, indicating **wooden puppets** used for performances.

Material and Construction

- A kathputli is made of **wood, cloth, thread and metal wire**.
- **Upper body is wooden**, while the lower part is made of **cotton and fabric**.
- **Legs are absent** and puppets are covered with **long flowing skirts**.

Control and Performance

- Puppets are controlled by the **puppeteer using 2–5 strings** tied to the fingers.
- Performances are accompanied by **folk music on dholak and harmonium**.

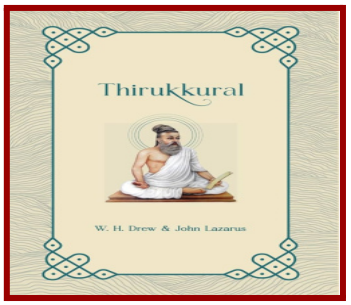
Physical Features

- Puppets have **large eyes, oval faces, thick lips and arched eyebrows**.
- **Colourful costumes** reflect **royal courts and desert traditions** of Rajasthan.

Themes and Cultural Role

- Traditionally used to narrate stories of **Rajput kings, warriors, folk heroes and moral tales**.
- Performances combine **humour, music, satire and social messages** through folk narratives.

Tirukkural And Thiruvalluvar



Context

- Prime Minister paid homage to **Thiruvalluvar on Thiruvalluvar Day**.
- Citizens were urged to read **Tirukkural for ethical and social values**.

About Thiruvalluvar

- Celebrated Tamil poet–philosopher associated with **Sangam or post-Sangam intellectual tradition**.
- Revered across South India as a **moral teacher and ethical guide**.
- Estimated period ranges between **300 BCE and 600 CE** in scholarly traditions.
- Popularly associated with **Mylapore region of present-day Chennai**.
- Emphasised **practical morality for individuals, society, and rulers through concise couplets**.
- Advocated **truth, compassion, self-control, non-violence, and universal humanism**.
- Presented ideals of **just governance, public welfare, and ethical statecraft**.

About Tirukkural

- Classical Tamil text consisting of **1,330 short ethical couplets called kurals**.
- Traditionally attributed to **Thiruvalluvar as the sole author**.
- Structured into three books**: Aram, Porul, and Inbam**.
    - **Aram** focuses on virtue and moral conduct in personal life.
    - **Porul** deals with governance, economy, leadership, and public administration.
    - **Inbam** addresses love, family life, and emotional relationships.
- Written in **concise aphoristic style, easy to memorise and interpret**.
- Covers **justice, friendship, social harmony, leadership, and civic responsibility**.
- Widely regarded as **secular and universally applicable moral literature**.
- Popularly referred to as the **"Tamil Veda" in cultural tradition**.

Sammakka–Saralamma Jatara

Context

- Telangana is preparing for the **biennial Sammakka–Saralamma Jatara beginning 28 January 2026**.
- The State is undertaking **large-scale redevelopment** of the sacred precinct at **Medaram** to manage massive pilgrim inflow.

About Sammakka–Saralamma Jatara

- **What it is?**
  - A **biennial tribal spiritual festival** honouring **Sammakka and Saralamma**, ancestral goddesses of the **Koya Adivasi community**.
  - Recognised as **Asia's largest tribal festival** and among the **largest human congregations globally**.
- **Location and Timing**
  - **Venue: Medaram village**, Mulugu district, Telangana.
  - **Setting:** Inside **Eturnagaram Wildlife Sanctuary**, part of the **Dandakaranya forest belt**.
  - **Time:** Celebrated during the **full moon of Magh (Hindu calendar)**.
- **Origin and Tradition**
  - Rooted in **Koya tribal legend** of Sammakka and her daughter Saralamma.
  - Tradition recalls their **resistance to Kakatiya rulers' tax oppression** and martyrdom.
  - Deities are **symbolically brought from the forest**, not housed in permanent temples.
- **Key Features**
  - **Ritual leadership:** Conducted exclusively by **Koya tribal priests**.
  - **Offerings:** Devotees present **"Bangaram" (jaggery)** instead of money or gold.
  - **Worship style:** Focus on **sacred trees, bamboo totems, clan symbols and flags (dalgudda)**, not idols.
  - **Scale:** Attracts **over one crore devotees**, second only to the **Kumbh Mela** in India.
  - **Infrastructure:** Expanded platforms, arches and granite flooring for **crowd management**.

Bagurumba Dance

Context

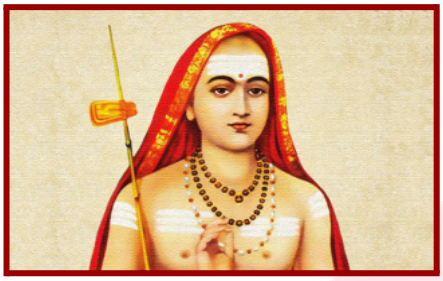
- Prime Minister witnessed a **mass Bagurumba dance performance in Assam**.
- Over **10,000 Bodo artistes** participated, highlighting cultural heritage and community harmony.

About Bagurumba Dance

- Traditional **folk dance of the Bodo community**, inspired by nature and seasonal cycles.
- Represents **peace, fertility, joy, and collective harmony** within tribal cultural life.
- **Associated Festivals**
  - Closely linked with **Bwisagu**, the Bodo New Year celebration.
  - Also performed during **Domasi** and other community festivals.
- **Key Features**
  - Symbolises **blooming flowers and harmony between humans and the natural world**.
  - Movements imitate **butterflies, birds, leaves, and flowing floral patterns**.
  - Performed in **groups forming circles or lines**, enhancing visual elegance.
  - Traditionally **performed by women**, with men playing accompanying musical instruments.
- **Dance Attire**
  - Dancers wear **handwoven dokhna, jwmgra, and aronai in bright red, yellow, and green**.
  - Costumes reflect **Bodo identity, vibrancy, and traditional weaving heritage**.
- **Musical Instruments Used**
  - **Kham:** Wooden drum with goatskin, providing rhythmic base.
  - **Sifung:** Bamboo flute creating melodic accompaniment.
  - **Jota, Gongwna, Tharkha:** Traditional wooden and percussion instruments.
- **Significance**
  - Preserves **Bodo tribal identity and intangible cultural heritage of Assam**.

- Strengthens **community bonding and intergenerational cultural transmission**.

Adi Shankara



About:

- Known as **Adi Shankara**, born **11 May 788 AD** at **Kaladi, Kerala**.
- Attained **Samadhi at age 33** at **Kedarnath (Kedar Tirth)**.
- Devotee of **Lord Shiva**.
- Propounded **Advaita Vedanta (Non-dualism)**.
- Authored Sanskrit commentaries on **Upanishads, Brahma Sutra, and Bhagavad Gita**.
- Actively debated and opposed **Buddhist philosophical schools**.

Major Works:

- **Brahmasutrabhashya**: Commentary on Brahma Sutra.
- **Bhaja Govindam**: Devotional and philosophical hymn.
- **Nirvana Shatakam**: Verses on self-realisation.
- **Prakarana Granthas**: Introductory philosophical treatises.

Other Contributions:

- Revived **Hindu philosophical traditions** during Buddhist influence.
- Established **four Mathas** for Sanatana Dharma propagation:
  - **Sringeri (South)**
  - **Puri (East)**
  - **Dwarka (West)**
  - **Badrinath/Joshimath (North)**

Advaita Vedanta- Core Ideas:

- Philosophy of **radical non-dualism**.
- Ultimate reality is **Brahman**, derived from Upanishadic teachings.
- **Atman (Self) is identical with Brahman**.
- Brahman transcends **individuality and material plurality**.
- Reality is **one, infinite, and without a second**.
- Atman is **pure, non-intentional consciousness**.

Lakkundi Excavation

Overview

- **Nature:** ASI-supervised archaeological excavation at **Kote Veerabhadreshwar (Veerabhadraswamy) Temple**.
- **Objective:** Uncover buried structures and cultural layers to support **heritage conservation** and **UNESCO nomination**.

Location

- **Village: Lakkundi** (historical name: **Lokkigundi**)
- **District: Gadag**, Karnataka
- **Proximity: ~12 km** from Gadag town

Historical Background

- **Period of prominence:** 10th–13th centuries
- **Rulers:** Kalyana Chalukyas, later Hoysalas
- **Epithet:** "Village of a hundred wells and temples"
- **Cultural patronage:** Linked to Queen Attimabbe (11th century), noted Jain philanthropist
- **Religious landscape:** Hindu temples, Jain basadis, stepwells, and a later Muslim dargah
- **Architecture:** Known for the "Lakkundi school" of Chalukyan temple architecture

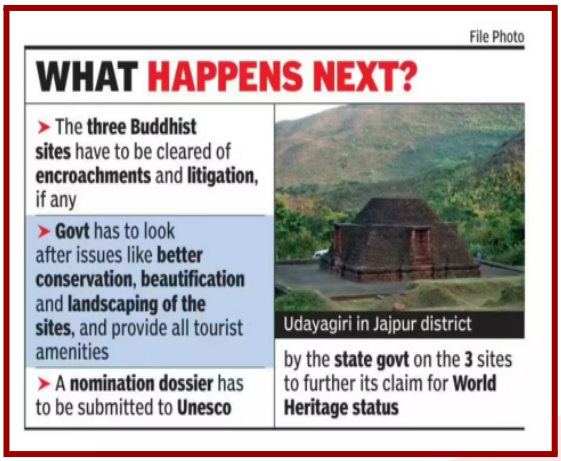
Key Discoveries

- **Neolithic layer:** Grey clay pot fragments, stone axe, cowrie shells, cross-shaped pedestal
- **Early historic–medieval layer:** Stone pedestal with Jina carving, inscriptions, buried temple remains
- **Continuity:** Evidence of occupation from prehistoric to early medieval phases.

Significance

- Extends Lakkundi's timeline beyond medieval history to **prehistoric settlement**.
- Strengthens Karnataka's case for **UNESCO World Heritage** nomination of Lakkundi monuments.

Buddhist Diamond Triangle - UNESCO Tentative List



What is Buddhist Diamond Triangle?

- **Serial cultural nomination** of three Buddhist monastic complexes
- Located in **Jajpur** and **Cuttack districts**
- Represents **1,500 years** of continuous Buddhist history
- Shows evolution of **Theravada, Mahayana, Vajrayana** schools.
- **Three Component Sites**
  - Lalitgiri
  - Udayagiri
  - Ratnagiri
- **Lalitgiri**
  - Located in **Cuttack district**
  - Oldest site, dated to **2nd–3rd Century BCE**
  - Massive **stupa** with **gold, silver, stone relic caskets**
  - Contains **east-facing apsidal chaityagriha**
  - Inscriptions mention **"Sri Chandraditya Vihara"**
- **Udayagiri**
  - Largest complex in the triangle
  - Flourished during **1st–13th Century CE**
  - Features **double-storeyed monastery**
  - Houses **Madhavapura Mahavihara**
  - Known for **Avalokiteswara** and **Pancha Dhyani Buddhas** images
- **Ratnagiri**
  - Major center of **Vajrayana Buddhism**
  - Compared with **Nalanda** for learning significance
  - Sculptures of **Tara, Vajrapani, Jambhala**
  - Evidence of **female patronage** by **Queen Karpurashri**
  - Stupas show **Buddhist–Brahmanical architectural blend**

ENVIRONMENT, ECOLOGY AND BIODIVERSITY

Topic: Environmental pollution and degradation

Aravalli Hills: Strategic Exemptions and Illegal Mining

Context

- India faces growing tension between **environmental conservation** and **critical mineral extraction** for strategic needs.
- The debate intensified after the **Supreme Court permitted limited mining under "strategic exemptions."**
- This reflects governance challenges in balancing **national security imperatives** with **ecological sustainability.**

Ecological and Strategic Significance

- **Ecological Importance**
  - The Aravallis function as a natural barrier against **westward desertification** from the Thar Desert.
  - They play a critical role in **groundwater recharge** across north-western India.
  - The range supports **climate moderation, biodiversity corridors, and regional ecological stability.**
  - Environmental degradation here threatens **water security, air quality, and human habitability.**
- **Strategic Mineral Importance**
  - The region contains deposits of **critical minerals, base metals, and energy-transition resources.**
  - India's defence establishment flagged import dependence as a **strategic vulnerability.**
  - Global mineral supply chains remain geopolitically concentrated and vulnerable to **export restrictions.**
  - The **National Critical Mineral Mission** aims to build secure domestic value chains.

Supreme Court Intervention and Definition Debate

- The Supreme Court froze **new mining leases** pending sustainable regulatory frameworks.
- Mining was prohibited in **core and inviolate ecological zones.**
- However, extraction of **strategic and atomic minerals** was permitted as exemptions. This carve-out was formally termed a **"strategic exemption."**

- The Court issued an operational definition to classify **Aravalli hills and ranges.**
- Experts warned the definition could fragment landscape protection into isolated ecological units.
- The Court later kept the definition **in abeyance** and ordered reconsideration.

Governance Concerns in Strategic Exemptions

- **Environmental clearances** are increasingly shaped by **executive discretion** rather than statutory clarity.
- Strategic projects often bypass **public consultation** under environmental impact assessment provisions.
- **Ad hoc administrative tools** enable opaque environmental approvals.
- Absence of objective criteria makes **"national interest" determinations** arbitrary.
- Repeated regulatory dilutions have weakened long-term environmental safeguards.
- This raises concerns about balancing **industrial expansion** with ecological stewardship.

Illegal Mining Crisis- Rajasthan Case Study

- **Aravalli districts** report a disproportionately high share of **illegal mining cases.**
- **Enforcement data** reveals significant **concentration of FIRs** within Aravalli-dominated regions.
- This reflects **weak monitoring, regulatory capture, and governance capacity constraints.**
- Definitional **ambiguities** enabled boundary manipulation and mining regularisation loopholes.
- Courts recognised **inconsistent hill classification** as enabling illegal extraction networks.

Environmental and Strategic Implications

- Unregulated mining accelerates **desertification and groundwater depletion** across fragile landscapes.
- It disrupts **wildlife corridors** and weakens regional ecological resilience.
- Strategic **mineral extraction** supports defence manufacturing but risks ecological destabilisation.
- Overuse of exemptions may **erode credibility** of environmental governance frameworks.
- Long-term sustainability requires balancing **security needs** with **intergenerational ecological justice.**

Challenges of Data Centres in India

Context and Concept

- Data is increasingly treated as the **new oil** in the global digital economy. India risks becoming a destination for **"data dumping"** through poorly planned data centres.
- **Data dumping** refers to locating **resource-intensive, environmentally harmful facilities** in weakly regulated jurisdictions.

Good versus Bad Data Centres

- Data centres can benefit the economy if **efficiently designed, well located, and properly regulated**.
- A **good data centre** requires reliable power supply, grid upgrades paid by developers, and high server utilisation.
    - It must include **efficient cooling**, such as airflow management, higher inlet temperatures, ambient or liquid cooling.
    - Dependence on **potable water and backup power** should be minimised through recycled water and clean alternatives.
    - Continuous **measurement and monitoring** of energy, water, and cooling parameters are essential.
- A **bad data centre** is one located in unsuitable areas or using outdated, water-intensive or inefficient cooling systems.

Global Resistance and Lessons

- In the **United States**, communities increasingly resist data centres due to water, power, and land concerns.
- In **Chile**, Google was forced to change cooling technology after environmental court scrutiny.
- In **North Carolina and Minnesota**, projects were cancelled or delayed due to secrecy and environmental fears.

Why India Faces High Risk

- India is actively courting data centres through **land, power incentives, and fast-track clearances**.
- Forecasts project data-centre capacity to rise from **1.8 GW by 2028** to **over 4.5 GW by 2030**.
- Many Indian cities and river basins are already **highly water-stressed**.
- Large clustered loads strain the **electricity grid**, requiring costly infrastructure upgrades.
- The **CAG, Supreme Court, and NGT** have flagged gaps in environmental clearance and monitoring systems.

Safeguards and Watchpoints

- Data centres need **grid capacity, fibre networks, and legal land titles**, preventing unchecked siting.
- India has **judicial and tribunal mechanisms** that can deter environmental violations.
- **Civil society organisations** can hold authorities accountable through scrutiny and public pressure.
- Warning signs include **excessive subsidies, weak zoning, opaque contracts, and unclear cost-sharing rules**.
- Each data centre must declare **water budgets, cooling methods, peak power loads, and audit**

disclosures.

Environmental Impact of Artificial Intelligence

Context and Significance

- Artificial Intelligence is expanding rapidly across **healthcare, agriculture, governance, and industry** sectors.
- Environmental consequences of AI development and deployment receive **limited public and policy attention**.
- An OECD working paper highlights **carbon-intensive nature of AI compute systems**.

Related Issues

- **Carbon and Energy Footprint of AI**
  - Global ICT sector contributes **1.8–2.8% of global greenhouse gas emissions**, possibly higher.
  - Some estimates place ICT emissions at **2.1–3.9% of global GHG output**.
  - Carbon footprint data of AI models is often **incomplete or non-transparent**.
  - A 2025 Google report claimed one AI text prompt uses **0.24 watt-hours**, attracting criticism.
  - Critics argue such estimates **ignore lifecycle and cumulative energy consumption**.
- **Water Use and Lifecycle Impacts**
  - A 2024 issue note by United Nations Environment Programme warned of severe resource stress.
  - AI servers may consume **4.2–6.6 billion cubic metres of water by 2027**.
  - Training one Large Language Model can emit **around 300,000 kilograms of carbon dioxide**.
  - A 2019 study estimated **6,26,000 pounds of CO_2** from training a single AI model.
  - This equals the **lifetime emissions of five passenger cars**.
- **AI Usage and Comparative Energy Demand**
  - A 2024 UNEP study found **ChatGPT queries consume ten times more energy** than Google searches.
  - Rising AI adoption increases **aggregate electricity demand and climate risks**.

Responses

- **Global Policy Responses**
  - In 2021, UNESCO adopted **AI Ethics Recommendations**, covering environmental harms.
  - Around **190 countries adopted these non-binding guidelines**.
  - The United States and European Union proposed **AI-specific environmental legislations**.
- **Policy Imperatives for India**
  - India must recognise **environmental costs of AI model development**, not only benefits.
  - Environmental Impact Assessment under **EIA Notification, 2006** could be expanded to AI systems.
  - Establish **standardised metrics** for emissions, energy, water, and resource consumption.
  - Stakeholder engagement with **tech firms, think tanks, and NGOs** is essential.
- **Disclosure and Sustainability Measures**
  - AI environmental impacts can be integrated into **ESG disclosure frameworks**.
  - The EU's CSRD requires emissions disclosure from **data centres and high-compute activities**.
  - Sustainable practices include **pre-trained models, renewable-powered data centres, and transparent reporting**.

Topic: Conservation

Environmental Governance and Regulatory Uncertainty

Shift in the Supreme Court's Role

- Over the past decade, the Supreme Court has moved beyond legality review to **forward-looking regulation**.
- This shift emerged as regulators failed, drawing the Court into a **managerial and supervisory role**.
- Instead of correcting regulatory processes, the Court often **substituted itself for regulators**.
- Prolonged involvement through **continuing mandamus** has created uncertainty for all stakeholders.

Key Judicial Interventions and Revisions

- **Eco-Sensitive Zones (ESZ):**
  - June 2022 order mandated **minimum one-kilometre ESZ** around protected areas.
  - April 2023 modification exempted areas with existing notifications due to implementation difficulties.
- **Diesel and Petrol Vehicles:**
  - December 2015 ban on diesel vehicles above **2,000 cc** in Delhi-NCR.
  - August 2016 relaxation with a **compensatory charge**.
  - In 2025, protection for older vehicles

narrowed to those **below Bharat Stage-IV**.

- **Firecrackers:**
  - Near-total bans imposed due to air pollution, later relaxed for festivals and **"green crackers"**.
- These shifts show the Court beginning with **broad prohibitions**, then narrowing them citing enforcement realities.

Doctrine versus Consequences

- In **May 2025 (Vanashakti case)**, the Court held ex post facto clearances violated environmental principles.
- By November 2025, this position was **recalled**, citing disruption to ongoing economic activity.
- Doctrinal clarity often became secondary to **managing economic and social fallout**.

Role and Limits of Expertise

- Expert committees have guided decisions, such as defining **Aravalli hills** for mining control.
- Subsequent concerns led to **orders being kept in abeyance** and new committees constituted.
- Uniform rules, like ESZ buffers, ignored **ecological and geographical diversity**, inviting resistance.
- The Court's fluctuating reliance on expertise has resulted in **policy U-turns**.

Impact on Public Participation

- Early judicial approvals force project proponents to approach the Court prematurely.
- This creates a **false sense of finality**, discouraging later statutory and public challenges.
- Judicial entry reshapes **who is heard and what evidence matters**.

Need for Stability and Course Correction

- Frequent interim orders correct direction but undermine **regulatory certainty**. The Court should discipline regulators through **time-bound actions**, transparency, and public data.
- Avoiding sweeping rules and clarifying modification thresholds can reduce uncertainty. A steadier approach would ensure **clear rules**, accountable governance, and meaningful public contestation.

Conservation of Western Ghats

Context: Madhav Gadgil, a pioneering ecologist and people's conservationist, passed away in **Pune on Wednesday** after a brief illness at the age of **83**. He shifted the global conservation paradigm by giving primacy to **human rights over exclusive wildlife protection**, advocating for marginalised forest communities.

Western Ghats

- **Overview and Significance**
  - The **Western Ghats** are a **UNESCO World Heritage Site** and among the world's eight biodiversity hotspots.
  - They extend along the western Deccan Plateau across **Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu**.
  - The region hosts over **7,400 species**, with exceptionally **high endemism** in plants and animals.
  - They act as the **origin of major peninsular rivers** like Godavari, Krishna, and Kaveri.
  - By intercepting monsoon winds, the Ghats generate **high rainfall** and regulate regional climate.
  - The terrain includes **lateritic plateaus, escarpments, valleys**, and peaks like **Anai Mudi (2,695 m)**.
- **Geological Formation**
  - The Western Ghats are part of the **Precambrian Peninsular Shield**, older than 600 million years.
  - They formed through **cratonic uplift and volcanism**, not through fold-mountain orogeny.
  - Massive **Deccan Trap basaltic lava flows** created step-like highlands during volcanic eruptions.
  - As India drifted from Gondwana, **faulting and subsidence** along the western edge formed escarpments.
  - Over time, **monsoon-driven erosion** carved deep valleys, leaving residual plateaus and lateritic caps.
- **Key Ecological and Governance Issues**
  - **Flawed forest governance** relies on outdated, inflated data, undermining ecological planning.
  - **Industrial pollution** persists in fragile zones, often with state support and weak accountability.
  - **Forest Rights Act, 2006** remains poorly implemented, denying Community Forest Rights to tribals.
  - **Monoculture plantations** of eucalyptus and acacia degrade biodiversity and soil health.
  - **Pesticide-intensive practices** reduce pollinators and microbial diversity.
  - **Anthropogenic forest fires**, linked to tendu leaf collection, threaten wildlife habitats.
  - **Aggregated forest data** masks local degradation due to delayed, district-level reporting.

Conservation Committees

- **Western Ghats Ecology Expert Panel (2011)** under Madhav Gadgil advocated Ecologically Sensitive Areas (ESA) zoning, Community Forest Rights enforcement, and Gram Sabha-led governance.
- **Kasturirangan Committee (2013)** diluted ESA coverage, prioritising development over participatory conservation.

Way Forward

- Implement **Community Forest Rights** to empower local stewardship and sustainable livelihoods.
- Strengthen **democratic decentralisation** through empowered Gram Sabhas.
- Modernise monitoring using **real-time, open-access satellite data** for transparency.
- Restrict **ecologically destructive industries** in sensitive zones and wildlife corridors.
- Promote **biodiversity-compatible livelihoods** like NTFPs, eco-tourism, and agro-forestry.

Conclusion

- The Western Ghats are critical for **ecological stability, water security, and climate resilience**.
- Sustainable conservation requires **community empowerment, scientific data, and just governance**.

Joint Forest Management (JFM) in India

Concept and Evolution

- **Joint Forest Management (JFM)** is a **community-based forest conservation** and management approach in India.
- It emerged in response to **forest degradation** and the need for **sustainable forest use**.
- JFM marked a shift from **state-centric control** to **community participation** in forest governance.
- It was initiated under the **National Forest Policy, 1988** to involve local communities.
- Forest Departments support **forest-dwelling and fringe communities** to protect and manage forest resources.
- Communities receive **shares from final and intermediate forest products** of regenerated forests.
- These shares are **higher than traditional entitlements** under earlier forest revenue settlements.

Joint Forest Management Committees (JFMCs)

- **JFMCs** are the **core village-level institutions** implementing Joint Forest Management.
- They function as **democratic bodies** representing local forest-dependent communities.
- Forest Departments and village communities act as **partners** in JFMC operations.
- The **General Body** includes all willing adult villagers and elects a **President**.
- An **Executive Body** manages daily work, led by the same President.
- Policy guidelines ensure **meaningful participation of women and weaker sections**.
- JFMCs are called **FPC, VFC, or VSS** in different States.

Micro Planning and Activities

- Each JFMC prepares a **Micro Plan** for **five to ten years** of activities.
- The plan records **village data** and locally identified development priorities.
- Activities include **afforestation, nursery raising, soil conservation, forest protection, and awareness**.
- Livelihood improvement and **forest development** are also integrated in Micro Plans.

Benefits of JFM

- Provides **fuelwood, timber, and non-timber produce** supporting **marginalised households**.
- Acts as **substitute income** during agricultural distress periods.
- Generates **employment**, asset creation, and **poverty reduction** through wage work.
- Improves **forest cover, soil moisture, and crop protection** while reducing erosion.
- Promotes **livelihood security** through SHGs, bamboo crafts, honey processing, and eco-tourism.
- Encourages **women's participation**, supporting **equitable growth** and social inclusion.

Key Challenges

- **Weak Gram Panchayats** often lack capacity for effective forest management.
- **Benefit-sharing disputes** create tensions within communities.
- **Technical knowledge gaps** limit sustainable forest practices.
- **Encroachment and illegal activities** undermine conservation efforts.

Conclusion

- JFM has improved **forest health, livelihoods, and conflict reduction** through **community partnership**.
- Addressing governance and capacity gaps is vital for its **long-term sustainability**.

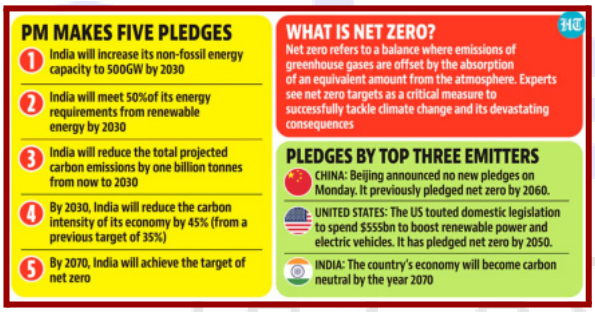
Land-Use Efficiency: Solar vs Biofuels

- **Biofuels** were promoted in the early 2000s as low-carbon alternatives to petroleum fuels.
  - Nearly **99% of global biofuel output** is

consumed in road transport.
    - Major feedstocks include **sugarcane, corn, soybean, and palm oil.**
    - These crops meet only about **4% of global transport energy demand.**
    - Around **32 million hectares** of land are used exclusively for biofuel production.
    - This land area is comparable to the size of **Germany or Poland.**
- Solar installations on this land could generate **32,000 TWh annually.**
    - This is **23 times higher** than present global liquid biofuel energy output.
    - Plants convert **less than 1%** of sunlight into usable biomass.
    - Solar panels convert **15–20%**, with advanced systems reaching **25% efficiency.**
    - Electrified global road transport needs about **7,000 TWh annually.**
    - Solar on biofuel land could power transport using **less than one-quarter** of the area.
    - Remaining land could support **food production, aviation fuels, or ecological restoration.**

Topic: Climate Change

India's Climate Commitments



Background and Paris Commitments

- India committed to **four quantified climate targets** at the Paris Summit, 2015.
- Targets based on **Common but Differentiated Responsibilities (CBDR)** principle.
- Key pledges included **33–35% emissions-intensity reduction** by 2030 from 2005 levels.
- Other commitments were **40% non-fossil power capacity**, **175 GW renewables**, and **2.5–3 billion tonnes carbon sink**.
- India's per capita emissions remained historically low, though it is now the **third-largest absolute emitter**.

Emissions Intensity: Partial Success

- India reduced **GDP emissions intensity by about 36% by 2020**, exceeding targets early.
- Expansion of **non-fossil power sources** reduced electricity-related carbon intensity.
- Non-fossil capacity crossed **43% by 2023** and reached **~50% by mid-2025**.
- Economic shift towards **services and digital sectors** lowered emissions per GDP unit.
- Efficiency schemes like **PAT** and **UJALA** achieved measurable energy savings.
- However, **absolute GHG emissions remained high**, around **2,959 $MtCO_2e$ in 2020**.
- GDP growth outpaced emissions growth, leading to **incomplete decoupling**.
- Emissions continue rising in **cement, steel, and transport sectors**.

Renewable Capacity versus Generation Gap

- Non-fossil capacity increased from **29.5% (2015) to 51.4% (June 2025)**.
- **Solar power** expanded sharply, from **2.8 GW (2014) to ~110.9 GW (2025)**.
- **Wind capacity growth** slowed due to land, grid, and regulatory constraints.
- Renewables supplied only **~22% of electricity generation in 2024–25**.
- Coal remains dominant, providing **over 70% of electricity** with ~240–253 GW capacity.
- **Energy storage** is a major bottleneck; **336 GWh needed**, only **500 MWh operational**.
- Renewable targets mask gaps between **installed capacity and actual generation**.

Forest Carbon Sink: Accounting versus Ecology

- India reported **30.43 billion tonnes CO_2 stock** in forest carbon by 2023.
- Only **0.2 billion tonnes** remain to meet the 2030 carbon sink target.
- Forest definition includes **plantations and monocultures**, not just natural forests.
- Actual forest cover increased marginally by **156 sq km between 2021 and 2023**.
- **CAMPA funds (~₹95,000 crore)** face uneven utilisation across States.
- Climate stress reduces **net productivity**, despite satellite "greening" indicators.

Way Forward

- India must convert **intensity gains into absolute emission reductions**.
- Priorities include **battery storage scaling**, **coal transition roadmap**, and **forest governance reform**.
- Next five years are critical for **grid upgrades, land acquisition**, and **data transparency**.

India's Carbon Market Strategy

Background: Operationalisation of Article 6

- **Article 6 carbon markets** were fully operationalised at **COP29** to enhance climate finance efficiency.
- As per **A6 Implementation Partnership**, 89 cooperation arrangements exist across **58 Parties**.
- Adoption of **Article 6.4 Paris Agreement Crediting Mechanism** marked transition from **CDM** to a robust framework.
- In **August 2025**, India signed the **Joint Crediting Mechanism (JCM)**, operationalising **Article 6.2**.

Significance of Article 6 for India

- Article 6 enables **bilateral and plurilateral cooperation** for emissions reduction transfers.
- It ensures **rigorous accounting** and prevents **double counting** of mitigation outcomes.
- For India, A6 offers access to **advanced technologies**, **R&D support**, and **climate finance**.
- It strengthens **bilateral relations** and supports **socio-economic transformation** aligned with climate goals.
- Beyond carbon credit revenues, A6 can drive **low-carbon industrial and technological transition**.

India's Strategic Sectoral Focus

- India identified **13 eligible activities** balancing **developmental needs and climate objectives**.
- Priority sectors include **renewable energy with storage**, **offshore wind**, and **solar thermal power**.
- Other sectors include **green hydrogen**, **compressed bio-gas**, and **sustainable aviation fuel**.
- Emerging mobility solutions like **fuel cells** and **high-end energy efficiency technologies** are covered.
- **Carbon capture, utilisation and storage (CCUS)** targets hard-to-abate sectors like cement.
- These choices align with **deep decarbonisation** and long-term **sustainable growth** objectives.

From Intent to Implementation: Key Challenges

- India has appointed a **Designated National Authority**, but detailed operational rules are pending.
- Clear rules are needed for **Letters of Authorisation** and **corresponding adjustments**.
- **Project approvals are slow**, with voluntary projects taking over **1,600 days** in India.
- A **single-window clearance system** is essential for Article 6 projects.

Way Forward

- Build a **domestic removals market** for biochar and enhanced rock weathering.
- Use Article 6 to strengthen **South–South cooperation** and shared climate systems.
- Article 6 is a strategic tool for **technology access, finance mobilisation, and global partnerships**.

Prelims

Topic: Biodiversity

Global Environment Facility (GEF)

In News

- GEF approved **US$52.8 million** for **four UNEP-led projects**.
- Approval taken at the **70th GEF Council meeting**.

About GEF

- GEF is a **multilateral environmental financing mechanism**.
- Provides **grants and blended finance** to developing countries.
- Supports **economies in transition**.
- **Establishment**
  - Established in **1991**.
  - Set up **ahead of the 1992 Rio Earth Summit**.
- **Core Mandate**
  - Supports **country-driven projects** with **global environmental benefits**.
  - Integrates action on **climate change, biodiversity and land degradation**.
  - Covers **oceans, chemicals and pollution**.
- **Financial Mechanism For**
  - Convention on Biological Diversity (CBD).
  - UN Framework Convention on Climate Change (UNFCCC).
  - UN Convention to Combat Desertification (UNCCD).
  - Stockholm Convention on POPs.
  - Minamata Convention on Mercury.
  - BBNJ (Biodiversity Beyond National Jurisdiction) Agreement.
  - Also supports the Montreal Protocol.
- **Key Functions**
  - Provides **grants and concessional financing**.
  - Mobilises **co-financing from public and private sources**.
  - Supports **capacity building and technology transfer**.
  - Funds **climate reporting under the Paris Agreement**.
- **Importance of the Body**

- Largest multilateral funder of **biodiversity projects globally**.
- Has provided **over US$26 billion in grants**.
- Mobilised **over US$153 billion in co-financing**.
- Active in **160+ countries**.

United Nations Framework Convention on Climate Change (UNFCCC)

Context: U.S. President withdrew the United States from the **UNFCCC**, a bedrock climate treaty, drawing strong condemnation from the **European Union.**

About UNFCCC

- **Core Profile**
  - UNFCCC is the **principal global climate treaty**.
  - Provides the framework for **Kyoto Protocol** and **Paris Agreement**.
- **Adoption and Context**
  - Adopted at the **Rio Earth Summit, 1992**.
  - One of the **three Rio Conventions**.
  - Sister conventions include United Nations Convention on Biological Diversity **(UNCBD)** and **United Nations Convention to Combat Desertification (UNCCD).**
- **Objective**
  - Aims to **limit global temperature rise**.
  - Seeks to **enable adaptation** and **protect food security**.
- **Membership and Process**
  - Has **198 Parties** (197 States + **European Union**).
  - Parties meet annually at the **Conference of the Parties (COP)**.
- **Science Interface**
  - UNFCCC relies on assessments by the **Intergovernmental Panel on Climate Change (IPCC)**.
  - IPCC established in **1988** by **United Nations Environment Programme** and **World Meteorological Organization**.

Aquatic Biodiversity Conservation

Context

- Multiple aquatic biodiversity initiatives were launched at **Wildlife Institute of India, Dehradun**, under the **Namami Gange Mission**.
- Focused on strengthening **freshwater species protection, habitat restoration, and scientific monitoring** along the Ganga basin.
- Initiatives emphasise **Gangetic dolphins, gharials, Indian skimmers, and river ecosystem restoration**.

Key Initiatives Launched

- **Aqua Centre – Aqua Life Conservation Monitoring Centre**
  - Established as a **national research and policy hub for freshwater biodiversity conservation**.
  - Operates under the **Namami Gange Programme framework**.
  - Houses laboratories for **ecotoxicology, aquatic ecology, spatial ecology, and microplastics analysis**.
- **Dolphin Response System**
  - **Dolphin Rescue Ambulance** launched for rapid emergency response to distressed **Gangetic dolphins**.
  - Aims to improve **species survival and real-time field intervention capacity**.
- **Indian Skimmer Conservation Project**
  - Launched in collaboration with **Bombay Natural History Society (BNHS)**.
  - Focuses on **habitat protection and population monitoring of Indian Skimmer birds**.
- **Gharial Habitat Frameworks**
  - Introduced new conservation frameworks for **critically endangered gharial habitat restoration**.
  - Supports **riverine sandbank protection and breeding ground recovery**.
- **Afforestation Campaign**
  - **'Ek Ped Maa Ke Naam'** launched to strengthen **river ecosystem conservation through tree plantation**.
  - Links **community participation with riparian zone restoration efforts**.

About Namami Gange Mission

- A **Central Sector Programme** to rejuvenate the **River Ganga and its tributaries**.
- **Launch and Administration**
  - **Launched:** 2014
  - **Implementing Agency:** National Mission for Clean Ganga (NMCG)
  - **Ministry:** Ministry of Jal Shakti
- **Core Objectives**
  - **Pollution abatement** through sewage and effluent treatment.
  - **River rejuvenation**, including biodiversity and ecological conservation.
- **Strategic Pillars (8)**
  - Sewerage infrastructure development.
  - Biodiversity conservation and habitat

protection.
    - Afforestation and catchment area treatment.
    - Riverfront development and cultural integration.
    - Ganga Gram and rural sanitation initiatives.
    - Industrial effluent monitoring and compliance.
    - Public awareness and community participation.
    - River-surface cleaning and waste management.
- **Mission Extension:** Extended up to **March 2026** as **Namami Gange Mission-II**.

UN Biodiversity Beyond National Jurisdiction (BBNJ) Treaty

Context

- The **BBNJ Treaty** entered into force after crossing the **60-ratification threshold** in September 2025.
- It creates the **first legally binding global framework** to protect biodiversity in **international waters**.

About the Treaty

- **What it is?**
    - A **legally binding international agreement** under **UNCLOS** to conserve and sustainably use high-seas biodiversity.
    - Applies to **areas beyond national jurisdiction**, covering nearly **two-thirds of the global ocean**.
- **Origin and History**
    - Negotiations initiated in **2008** due to concerns over unregulated high-seas exploitation.
    - Finalised in **March 2023** after fifteen years of multilateral negotiations.
    - Entered into force **120 days after the 60th ratification milestone**.
- **Targets and Vision**
    - Supports the global **"30 by 30" ocean protection target by 2030**.
    - Expands conservation governance across **international marine commons**.
- **Key Features**
    - **Marine Protected Areas (MPAs):** Enables designation of MPAs in international waters to protect vulnerable marine ecosystems.
    - **Environmental Impact Assessments (EIAs):** Mandates prior assessment of high-seas activities with potential significant ecological harm.
    - **Marine Genetic Resources (MGRs):** Establishes equitable benefit-sharing mechanisms for biotechnology and pharmaceutical applications.
    - **Capacity Building and Technology Transfer:** Supports developing states through training, scientific cooperation, data access, and marine technologies.
    - **Ecosystem-Based and Precautionary Approach:** Promotes decisions based on best scientific evidence and precautionary principles.
    - **No Sovereignty Clause:** Reaffirms that no nation can claim ownership or sovereign rights over high-seas biodiversity.
- **Significance**
    - Strengthens **global ocean governance** beyond national maritime zones.
    - Protects **marine biodiversity, genetic resources, and fragile deep-sea ecosystems**.
    - Enhances **equity between developed and developing countries** in ocean resource utilisation.

NIRANTAR Platform

Context

- Union Minister for Environment, Forest and Climate Change chaired a meeting of the **NIRANTAR platform**.
- **NIRANTAR** – *National Institute for Research & Application of Natural Resources to Transform, Adapt and Build Resilience.*

Nature of Platform

- Institutional coordination platform for **collaboration among research and policy institutions**.
- Focuses on linking **scientific research with**

policymaking and sustainable development.

- **Initiating Ministry:** Ministry of Environment, Forest and Climate Change (MoEFCC).

Aim and Objectives

- Consolidation and sharing of environmental knowledge with multiple stakeholders.
- Interdisciplinary research development while maintaining institutional independence.
- Support evidence-based environmental and development policymaking.
- Create repository of international treaties and conventions documents.
- Review ongoing research and scientific projects.
- Balance environmental protection with industrial and economic development.
- Promote sustainable and wise utilisation of natural resources.

Leadership and Governance

- Led by a **High-Powered Steering Committee**.
- Chaired by the **Union Environment Minister**.
- Members include Secretaries from:
    - Science and Technology
    - Tribal Affairs
    - Agriculture
    - Department for Promotion of Industry and Internal Trade (DPIIT)

Operational Structure

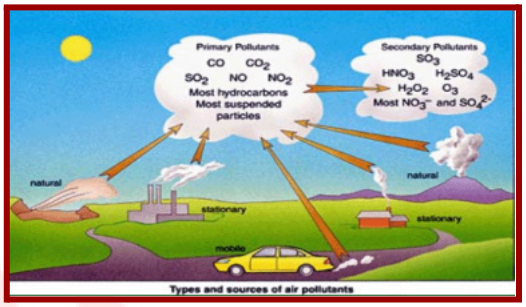
- **Four-Vertical Approach**:
    - Research coordination
    - Assessment of outcomes
    - Policy linkage
    - Practical application of natural resource management

Core Focus Areas

- Research and scientific innovation
- Policy integration and advisory role
- Future planning and institutional capacity building
- Human resource development for environmental governance

Topic: Pollution

Primary and Secondary Air Pollutants



Air Pollutants: Definition

- Substances present in air as **solids, liquids, or gases** causing environmental or health harm.
- Can be **natural** or **anthropogenic (man-made)**.
- Classified into **Primary** and **Secondary** pollutants.

Primary Air Pollutants

- **Meaning:** Pollutants **directly released** into the atmosphere from sources.
- **Major Sources**
    - Fossil fuel combustion (vehicles, power plants, industries)
    - Volcanic activity
    - Industrial and agricultural processes
- **Key Primary Pollutants**
    - **Oxides of Sulphur (SOx)**
        - Main form: **Sulphur Dioxide (SO_2)**
        - Sources: Coal, petroleum, industries, volcanoes
        - Effect: Forms **sulphuric acid → Acid rain**
    - **Oxides of Nitrogen (NOx)**
        - Formed during **high-temperature combustion**
        - Major gas: **Nitrogen Dioxide (NO_2)**
        - Effect: Urban brown haze, respiratory irritation, smog formation
    - **Oxides of Carbon**
        - **Carbon Monoxide (CO):**
            - Source: Incomplete combustion, vehicle exhaust
            - Nature: Colourless, odourless, highly toxic
        - **Carbon Dioxide (CO_2):**
            - Source: Combustion, industries, respiration
            - Effect: Global warming, ocean acidification
    - **Volatile Organic Compounds (VOCs)**

        - Includes **Methane (CH_4)** – Greenhouse gas
        - **NMVOCs:** Benzene, Toluene, Xylene, 1,3-butadiene
        - Effect: Carcinogenic, smog formation
    - **Particulate Matter (PM)**
        - Fine solid or liquid particles suspended in air
        - Includes **PM10 and PM2.5**
        - Health impact: Lung and cardiovascular diseases
    - **Toxic Metals**
        - Examples: **Lead, Cadmium, Copper**
        - Source: Industrial emissions
        - Effect: Neurological and organ damage
    - **Chlorofluorocarbons (CFCs)**
        - Source: Refrigerants, aerosols (now banned/restricted)
        - Effect: **Ozone layer depletion**
    - **Ammonia (NH_3)**
        - Source: Agriculture, fertilisers, livestock waste
        - Role: Forms secondary particulates in air

Secondary Air Pollutants

- **Meaning:** Pollutants **formed in the atmosphere** by chemical reactions involving primary pollutants.
- **Major Types**
    - **Ground-Level Ozone (Tropospheric Ozone)**
        - Formed from **NOx + VOCs + sunlight**
        - Source gases: Vehicles, industries, solvents
        - Effect: Respiratory problems, crop damage
    - **Smog**
        - **Photochemical Smog:**
            - Formed from NOx and VOCs under sunlight
            - Common in urban areas
        - **Classical Smog:**
            - Smoke + sulphur dioxide + fog
            - Associated with coal burning
    - **Persistent Organic Pollutants (POPs)**
        - Toxic, long-lasting chemical compounds
        - Accumulate in food chains
        - Cause hormonal and immune system disorders.

Aerosols

What are Aerosols

- **Aerosols** are **tiny solid or liquid particles** suspended in the **atmosphere**.
- They influence **air quality, weather and climate processes**.

Sources

- **Natural sources:** Desert dust, sea spray, volcanic ash, forest fires.
- **Anthropogenic sources:** Vehicle emissions, industries, biomass burning, coal and diesel use.
- **Primary aerosols:** Emitted directly into atmosphere.
- **Secondary aerosols:** Formed from gases like **SO_2 and NOx**.

Key Characteristics

- **Very small size:** Can penetrate deep into lungs.
- **Atmospheric lifetime:** Remain suspended for **days to weeks**.
- **Condensation nuclei:** Facilitate **fog and cloud droplet formation**.
- **Radiative effect:** Can **scatter or absorb sunlight**.

Impacts

- **Health impact:** Cause respiratory and cardiovascular diseases.
- **Fog formation:** Increase **density and persistence of fog**.
- **Climate cooling:** Reflective aerosols reduce surface temperature.
- **Climate warming: Black carbon** absorbs heat.
- **Rainfall alteration:** Modify cloud properties and precipitation patterns.

Solid Waste Management (SWM) Rules, 2026

Context: The Solid Waste Management (SWM) Rules, 2026 has been notified by **MoEFCC**, effective from **April 1, 2026 nationwide.**

What is it?

- Regulatory framework under **Environment Protection Act, 1986**
- Integrates **Circular Economy** and **Extended Producer Responsibility principles**
- Aims for **zero waste to landfill through compliance enforcement**

Legal Evolution

- **1986:** Parent law established national environmental

and waste regulation framework

- **2016:** Introduced segregation norms and scientific landfill management standards
- **2026:** Emphasises digital tracking and economic penalties for compliance

Four-Stream Segregation at Source

- **Wet waste:** Kitchen waste directed for composting and bio-methanation facilities
- **Dry waste:** Plastic, paper, metal, glass sent to recovery facilities
- **Sanitary waste:** Diapers and tampons securely wrapped before disposal
- **Special care waste:** Paint cans, bulbs, medicines to designated collection points

Features

- **Bulk Waste Generator (BWG) Definition**
  - Entities generating **100 kilograms waste daily** or 20,000 square meters area
  - BWGs contribute nearly thirty percent of total municipal solid waste
- **Extended BWG Responsibility (EBWGR)**
  - BWGs must process wet waste onsite or purchase EBWGR certificates
  - Promotes decentralised waste management and on-site processing compliance
- **Polluter Pays Framework**
  - CPCB levies environmental compensation for non-registration and violations
  - Penalises false reporting, forged documents, and improper disposal practices
- **Digital Monitoring System**
  - Centralised online portal tracks waste from generation to final disposal
  - Enables digital registration, audits, and compliance reporting nationwide
- **Refuse Derived Fuel (RDF) Mandate**
  - Industries must replace **fifteen percent** solid fuel with RDF
  - Applies mainly to cement plants over **six-year transition** period
- **Hilly Areas and Islands Provisions**
  - Local bodies regulate tourist inflow based on waste handling capacity
  - Mandatory user fees collected from tourists for waste management funding
- **Landfill and Legacy Waste Measures**
  - Higher landfill charges discourage dumping of unsegregated municipal waste
  - Mandates time-bound biomining and bioremediation of existing dumpsites
  - Requires quarterly progress tracking by local authorities and regulators

Topic: Species in News

Hemileccinum Indicum

About

- **Newly discovered bolete mushroom species** belonging to the genus *Hemileccinum*.
- **Discovery Site:**
  - **Bageshwar district, Uttarakhand**
  - Found in **temperate Himalayan forests**, growing under oak (Quercus) trees.
- **Scientific Significance: First record** of genus *Hemileccinum* in India.
- **Morphological Features:**
  - **Bolete type:** Pores instead of gills under the cap.
  - **Cap:** Wrinkled, violet-brown, fading to leathery brown with age.
  - **Pore surface:** Pastel yellow, **no colour change on bruising**.
  - **Spores:** Tiny, intricate pits visible microscopically.
  - **Stem:** Smooth surface, unlike scaly stems in related species.
- **Ecological Role:**
  - **Ectomycorrhizal fungus** forming symbiotic association with tree roots.
  - Enhances **nutrient exchange and forest ecosystem health**.

Indiaphonte Bijoyi

Context

- Scientists discovered a new microscopic crustacean species in **Kavaratti lagoon, Lakshadweep**.
- The species was named **Indiaphonte bijoyi**, marking the introduction of a **new genus Indiaphonte**.

About the Species

- A **microscopic crustacean species** belonging to the **Copepoda class**.
- Placed under the family **Laophontidae** within the order **Harpacticoida**.
- **Location and Habitat**
  - Discovered in sediment-rich waters of **Kavaratti lagoon, Lakshadweep Islands**.
  - Lives as **benthic meiofauna** in aquatic sedimentary environments.
- **Physical Characteristics**
  - Has a **semi-cylindrical, dorsoventrally depressed body** with tapered posterior end.
  - Possesses **antennae-like appendages** at the anterior region for **sensory functions**.

- **Females are slightly larger than males**, showing mild sexual dimorphism.
- Classified as **meiofauna,** measuring **less than one millimetre** in body size.

Sirkeer Malkoha

Context

- The **Sirkeer Malkoha** was recorded for the **first time in Uttarkashi district**, Uttarakhand.
- Earlier sightings were largely limited to the **plains of Uttarakhand**, marking a notable range extension.

About Sirkeer Malkoha

- Common name: **Sirkeer malkoha / Sirkeer cuckoo**.
- Scientific name: ***Taccocua leschenaultii***.
- Belongs to the **cuckoo family**, but does **not practise brood parasitism**.
- Unlike many cuckoos, it **lays eggs in its own nest**.

Geographical Distribution

- Widely distributed across the **sub-Himalayan Indian subcontinent**.
- Found in **India, Bangladesh, Sri Lanka**, and patchily in **Pakistan and Rajasthan**.
- Recent record confirms presence in **Uttarkashi**, indicating habitat adaptability.

Habitat Preferences

- Inhabits **scrublands and thin forests**.
- Prefers **hilly terrain**, generally below **1,500 metres above sea level**.
- Often observed moving quietly through dense undergrowth.

Physical Characteristics

- Medium-sized bird, measuring **42–44 centimetres** in length.
- Distinctive **long tail** and **olive-brown upper plumage**.
- Underparts are **lighter, sometimes yellowish**.
- Features a **curved red beak with a yellow tip**.
- Legs are **grey**, and both sexes appear **morphologically identical**.

Conservation Status

- Listed as **Least Concern** under the **IUCN Red List**.

Constitutional Morality

Cetacean Morbillivirus

Basic Identification

- Cetacean morbillivirus is a **highly infectious viral disease**.
- It affects **marine mammals** such as whales and dolphins.
- **Affected Species:** Known to infect **whales, dolphins, porpoises and pilot whales**.
- **Virus Family**
  - Closely related to **measles virus**.
  - Also related to **canine distemper virus**.
- **Geographical Presence**
  - Reported in North Atlantic Ocean, Mediterranean Sea, Pacific Ocean and Arctic waters
- **Transmission**
  - Spreads through **direct contact**.
  - Transmitted via **respiratory droplets**.
  - Can spread through **aerosolised whale blow**.
- **Pathology**
  - Affects the **respiratory system**.
  - Affects the **immune system**.
  - Affects the **nervous system**.
- **Detection Method**
  - Detected using **drone-collected whale blow samples**.
  - Drone sampling is a **non-invasive technique**.

White-bellied Heron

Context: Environmental clearance recommended for **Kalai-II Hydropower Project** on **Lohit River**. The river forms part of the **species' natural habitat**.

Species Profile

- White-bellied heron (**Ardea insignis**) is a **large heron species**.
- It is the **second largest living heron**.
- Also called **imperial heron** or **great white-bellied heron**.

Habitat and Distribution

- Inhabits **wetlands in tropical and subtropical forests**.
- Found along **eastern Himalayan foothills**.
- Distribution spans **northeast India, Bhutan and northern Myanmar**.

Ecology

- Prefers **free-flowing rivers with minimal disturbance**.
- Diet consists mainly of **fish from river rapids**.

Threats

- Threatened by **habitat loss and degradation**.
- Impacted by **wetland conversion and settlement expansion**.

Conservation Status

- **IUCN Red List:** Critically Endangered.
- **Wildlife (Protection) Act, 1972:** Schedule I.

Olive Ridley Sea Turtle

Species Profile

- It is **one of the smallest sea turtle species.**
- Named after its **olive-green, heart-shaped carapace**.
- It is known for **mass nesting behaviour called arribada**.

Habitat and Distribution

- Found in **tropical Indian, Pacific and Atlantic Oceans**.
- In India, major nesting occurs along **Odisha coast**.
  - Key Odisha sites include **Gahirmatha, Rushikulya and Devi river mouth**.
- **Solitary nesting** reported along **Tamil Nadu, Andhra Pradesh and Andaman coasts**.
- Spends most time in **open ocean**, migrates to **sandy beaches for nesting**.

Physical Characteristics

- Carapace has **5–9 pairs of lateral scutes**.
- Each flipper bears **one or two claws**.

Reproductive Traits

- Females attain maturity at **12–15 years**.
- Lay **around 100 eggs per clutch**.
- Nest **1–3 times per season**.
- **Sand temperature determines hatchling sex**.

Conservation Status

- **IUCN Red List:** Vulnerable.
- **Wildlife (Protection) Act, 1972:** Schedule I.

Constitutional Morality

Calamaria Mizoramensis

Context: A **new reed snake species** was discovered in **Mizoram**. The species is named **Calamaria mizoramensis** after the state.

Species Profile

- Calamaria mizoramensis is a **non-venomous reed snake**.
- It belongs to the genus **Calamaria**.
- Family classification: **Colubridae**.

Habitat and Behaviour

- The species is **nocturnal** and **semi-fossorial**.
- Inhabits **humid, forested hill regions**.
- Recorded at elevations between **670 and 1,295 metres**.
- Found in areas **close to human settlements**.

Physical Characteristics

- Small-sized snake with **dark brown to blackish coloration**.
- Displays **faint body stripes**.
- Underside is **yellow in colour**.

Distribution

- Confirmed occurrence limited to **Mizoram**.
- Presence in **Manipur, Nagaland and Assam** remains unverified.

Reed Snakes

- Reed snakes are **small, slender and non-venomous**.
- They are native to **South and Southeast Asia**.
- Prefer **moist forests and leaf-litter habitats**.
- Commonly found **under logs, stones and soil**.
- Mostly **fossorial or semi-fossorial** in nature.
- Feed on **small, soft-bodied invertebrates**.

Orobanche aegyptiaca (Parasitic Weed)

About

- **Orobanche aegyptiaca** (locally called **Margoja**) is a **root-parasitic flowering weed** that attacks mustard and other crops.
- It **attaches to crop roots** and extracts water, carbon and nutrients, causing severe yield loss.
- It is native to the **Mediterranean-West Asian region** and has spread to South Asia, North Africa and parts of Europe.

Distribution and Spread

- It is widespread in mustard-growing areas of **Rajasthan and Haryana**.
- Seeds remain viable in soil for **up to 20 years**, enabling repeated infestations.
- It spreads through **wind, irrigation water, farm implements and contaminated soil**.

Key Biological Features

- **Obligate parasite**: cannot survive without a host plant.
- **Attacks underground** before emerging, making early detection difficult.
- **Very high** reproductive capacity

Impact on Agriculture

- Causes **wilting, yellowing, stunted growth and heavy yield loss in mustard**.
- Forces farmers to **shift away from mustard cultivation**.
- Poses a risk to **India's edible-oil security**, as mustard contributes **over 4 million tonnes** to domestic oil output.

Gharial (Gavialis Gangeticus)

Context

- Comprehensive Ganga basin survey recorded **3,037 gharials across 13 rivers**.

About the Species

- **Classification**
  - **Order:** Crocodylia.
  - **Family:** Crocodylidae.
  - **Scientific name:** *Gavialis gangeticus*.
- **Distribution Range**
  - Native to rivers of **Bangladesh, Bhutan, India, Myanmar, Nepal, and Pakistan**.
  - Major populations in **Chambal and Girwa Rivers (India)** and **Rapti–Narayani (Nepal)**.
- **Gharial Reserves in India:** Located in Uttar Pradesh, Madhya Pradesh, and Rajasthan.
- **Physical Features**
  - Among the **largest crocodilians**, males reach **5–6 metres in length**.
  - Females typically grow **3.5–4.5 metres**, smaller than males.
  - Possesses **longest and thinnest snout among all crocodilian species**.
  - Adult males have a **bulbous nasal structure called "ghara"**.
  - Skin covered with **smooth, non-overlapping epidermal scales**.
- **Habitat and Behaviour**
  - **Most aquatic crocodilian**, rarely leaves water except for basking and nesting.
  - Prefers **freshwater rivers with sandy banks for egg-laying**.
- **Reproduction**
  - **Mating season:** November to January.
  - **Egg-laying period:** March to May.
- **Conservation Status**
  - Listed as **Critically Endangered** under the IUCN Red List.
- **Ecological Significance**
  - **Specialised fish-eater**, indicating healthy freshwater river ecosystems.

Pufferfish Poisoning

Context

- Scientists confirmed **India's first documented case of pufferfish poisoning**, highlighting emerging riverine public health risks.

Pufferfish

- Belongs to **Order Tetraodontiformes**, commonly called **toadfish, patkafish, balloonfish, and fugu**.
- Global catalogues list **approximately 190–193 valid pufferfish species worldwide**.
- **Ecology and Habitat**
  - **Omnivorous and benthic species**, living close to riverbeds and aquatic substrates.
  - Freshwater pufferfish in India are **often endemic and indicate healthy river ecosystems**.
- **Status in India**
  - Indian waters support **eight genera and 32 species of pufferfish**.
  - Distribution concentrated in **Western Ghats and major basins like Ganga, Brahmaputra, and Mahanadi**.
- **Conservation Status**
  - Dwarf pufferfish classified as **Vulnerable** on the **IUCN Red List.**
  - Threats include wastewater pollution and collection for the aquarium trade.
- **Poisoning-Toxin**
  - Some species carry **tetrodotoxin (TTX)**, a potent neurotoxin blocking nerve sodium channels.
  - Causes paralysis, respiratory failure, and

potentially fatal outcomes.
    - Heat-stable toxin with no known antidote, even after cooking.
- **Ecological Significance**
    - Pufferfish act as **bio-indicators of freshwater ecosystem health and water quality**.
    - Their decline reflects **pollution stress and ecological imbalance in river systems**.

Indian Skimmer

Context

- **Bombay Natural History Society (BNHS) and National Mission for Clean Ganga (NMCG)** launched a conservation initiative to protect **Indian Skimmer breeding habitats** across the **Ganga Basin**.
- Focus on **sandbar protection and river ecosystem restoration**.

Overview

- A **riverine bird species** specialised in surface-feeding using an **elongated lower mandible** to skim water for fish.

Scientific Classification

- **Scientific name:** *Rynchops albicollis*
- **Family:** Laridae
- **Common group:** Skimmers

Habitat and Distribution

- Prefers **large, slow-flowing rivers** with sandy islands and exposed sandbars.
- **Breeding rivers:** Ganga, Chambal, Yamuna, Mahanadi and tributaries.
- Non-breeding presence in **coastal and estuarine zones**.

IUCN Conservation Status

- Endangered (EN)
- **Global population:** ~3,700–4,400 individuals.
- **India hosts:** Nearly **90% of global population**.

Ecological Role

- **Indicator species** of healthy riverine and sediment systems.
- Reflects **natural flow regimes and sandbar stability**.

Major Threats

- **Dams and flow regulation** altering sediment deposition.
- **Sand mining** destroying nesting sites.
- Human disturbance and river pollution.
- **Climate variability** affecting breeding success.

Significance

- Acts as a **flagship species for river conservation**.
- Population decline signals **degradation of freshwater ecosystems**.

Red-Eared Slider Turtle

Context

- An **invasive red-eared slider turtle** population is threatening **freshwater ecosystems in Coimbatore** due to pet releases.

Identity

- **Scientific name:** *Trachemys scripta elegans*
- **Type:** Freshwater turtle (aquatic invasive species)
- **IUCN Status:** Least Concern

Habitat & Distribution

- **Habitat:** Predominantly aquatic; terrestrial during range expansion
- **Global spread:** Established on **all continents except Antarctica**
- **Introduction route:** International **pet trade**

Key Features

- **Distinctive mark:** Red stripe behind each ear
- **Adaptability:** Tolerates sub-optimal temperatures
- **Behaviour:** Opportunistic and aggressive feeder during breeding phases
- **Lifespan:** 20–50 years (wild)

Ecological Impacts

- **Rapid breeding:** Expands unchecked, few natural predators
- **Competition:** Displaces native turtles from basking and nesting sites
- **Food pressure:** Preys on fish and aquatic fauna, disrupting ecosystems
- **Biodiversity risk:** Alters freshwater habitat balance

Asiatic Wild Dog (Dhole)

Context: First camera-trap record in **Ratapani Tiger Reserve, Madhya Pradesh**, indicating improved habitat and prey base.

Overview

- **Common name:** Dhole
- **Scientific name:** *Cuon alpinus*
- **Group:** Wild canid (family Canidae)
- **IUCN Status:** Endangered (EN)

Habitat & Distribution

- **Preferred habitat:** Dense forests, forest–grassland mosaics, hilly and undulating terrain.
- **India:** Central Indian landscapes, Western Ghats, Eastern Ghats.
- **Ecological need:** Large, **connected habitats** with strong prey availability.

Key Characteristics

- **Social predator:** Hunts in **cooperative packs**.
- **Diet:** Medium-to-large ungulates (chital, sambar, deer).
- **Morphology:** Reddish coat, rounded ears, specialised carnivorous dentition.
- **Coexistence:** Shares range with tiger and leopard; niche separation via pack hunting.

Significance

- **Indicator species:** Presence reflects **healthy prey base and habitat quality**.
- **Ecological role:** Maintains **trophic balance** as a top/meso-level predator.

Dugong Conservation Centre

Context

- **EAC (MoEFCC)** recommended a **design overhaul** of the proposed **International Dugong Conservation Centre**.
- **Location:** Manora, Thanjavur, Tamil Nadu.

Dugong (Dugong dugon)

- **Overview**
  - **Type:** Large **marine mammal**, also called **"sea cow"** and **"farmer of the sea"**.
  - **Size:** Grows up to **10 feet**; weighs about **420 kg**.
  - **Tail:** Dolphin-like, fluked tail.
- **Habitat & Diet**
  - **Habitat: Shallow, warm coastal waters** (<10 m depth), bays and lagoons.
  - **Diet: Strictly herbivorous**, feeds on **seagrass meadows**.
- **Distribution in India**
  - Gulf of Kutch
  - Gulf of Mannar–Palk Bay
  - Andaman and Nicobar Islands
- **Behaviour & Reproduction**
  - **Social pattern:** Solitary or in small pairs.
  - **Lifespan:** Up to **70 years**.
  - **Maturity:** Reaches sexual maturity at **9–10 years**.
  - **Breeding interval:** One calf every **3–5 years**.
- **Conservation Status**
  - **IUCN: Vulnerable (VU)**
  - **CITES: Appendix I** (international trade prohibited)
  - **India: Schedule I**, Wildlife (Protection) Act, 1972

Seagrass

- **Overview**
  - **Type: Underwater flowering plant** forming vital **coastal wetland ecosystems**.
  - **Functions:** Stabilises seabed, supports fisheries, **carbon sequestration**, shelters marine biodiversity.
- **Distribution in India**
  - **Highest diversity:** Gulf of Mannar and Palk Bay, Tamil Nadu.
  - **Species richness:** Over 13 species recorded.
  - **Limited populations:** Lakshadweep, Kachchh, Andhra Pradesh, Odisha.
  - **Threat status:** Increasingly degraded and fragmented.
- **Significance**
  - **Dugongs depend directly** on healthy seagrass ecosystems.
  - **CRZ-I overlap** highlights conservation–development trade-offs in coastal infrastructure planning.

Hoya Nagaensis

What is Hoya Nagaensis?

- **New flowering plant species** under **Hoya genus**
- Known for **ornamental, waxy flowers**
- Described through **taxonomic research**
- **Location**
  - **Kavünhou Community Reserved Forest** in Phek district, Nagaland
  - It is part of Eastern Himalayan biodiversity region

Key Features

- **Distinctive leaf morphology** and **unique floral traits**
- Found in **high-altitude temperate forest**
- **Extremely restricted distribution**, single recorded location
- Provisionally assessed as **Critically Endangered**

Significance

- Confirms **Eastern Himalaya** as **global biodiversity hotspot**
- Highlights **community-led forest management model**
- Adds to **global plant taxonomy** records
- Research published in **Kew Bulletin**

Topic: Protected Areas

Nilgiri Biosphere Reserve (NBR)

Location and Extent

- Located in the **Nilgiri Mountains of the Western Ghats**.
- Spans **Tamil Nadu, Kerala and Karnataka**.
- Covers an area of **5,520 sq km**.
- It is the **largest protected forest area in India**.

Status and Recognition

- Established in **1986**.
- India's **first Biosphere Reserve**.
- India's **first Biosphere Reserve under UNESCO's Man and the Biosphere Programme**.

Protected Areas Within NBR

- Bandipur National Park.
- Nagarhole National Park.
- Mudumalai Wildlife Sanctuary.
- Wayanad Wildlife Sanctuary.
- Mukurthi National Park.
- Silent Valley National Park.

Vegetation Types

- Supports **tropical evergreen forests**.
- Includes **montane sholas and grasslands**.
- Contains **semi-evergreen and moist deciduous forests**.
- Also has **dry deciduous and thorn forests**.

Climate

- Annual rainfall ranges from **500 mm to 7,000 mm**.
- Temperature ranges from **0°C in winter to 41°C in summer**.

Tribal Communities

- Indigenous groups include **Todas, Kotas, Irulas, Kurumbas and Paniyas**.
- Also includes **Adiyans, Cholanaickens and Edanadan Chettis**.

Flora

- Hosts around **3,300 flowering plant species**.
- About **132 plant species are endemic** to the reserve.

Fauna

- Contains the **largest known population of Nilgiri Tahr**.
- Contains the **largest known population of Lion-tailed macaque**.
- Also supports large populations of **elephant, tiger, gaur, sambar and chital**.

Ratapani Tiger Reserve

Context: Newly notified **Ratapani Tiger Reserve** named

after **Dr. Vishnu Shridhar Wakankar**.

Location
- Located in **Raisen and Sehore districts**, **Madhya Pradesh**.
- Lies in the **Vindhya Range** hills.
- Runs along the **northern bank of the Narmada River**.
- **Kolar River** forms the **western boundary**.

Area & Landscape
- Total area **1,271 sq km**.
- Terrain includes **hills, plateaus, valleys and plains**.

Water Bodies
- Barna Reservoir.
- Ratapani Dam (Barrusot Lake).

Heritage Sites
- Contains **Bhimbetka rock shelters**.
- Bhimbetka is a **UNESCO World Heritage Site**.
- Includes **Ginnourgarh Fort**, **POW camp**, **Keri Mahadeo**, **Ratapani Dam**, **Jholiyapur Dam**.

Vegetation
- Forest type: **dry deciduous and moist deciduous**.
- Dominant tree: **Teak (*Tectona grandis*)**.
- Teak covers **about 55%** of the area.

Wildlife
- **Tiger** is the **apex predator**.
- Tiger population **~40 individuals**.
- **Chinkara** present (endangered).
- **Other fauna:** Panther, Hyena, Jackal, Indian Fox, Wild Dog, Jungle Cat, Small Indian Civet, Nilgai, Blackbuck, Chausingha, Spotted Deer, Barking Deer.

Aralam Butterfly Sanctuary

Location and Extent
- **Aralam Butterfly Sanctuary** is located in **Kerala**.
- It shares boundaries with **Brahmagiri Wildlife Sanctuary (Karnataka)**, **Kottiyoor Wildlife Sanctuary**, and **North Wayanad Forest Division**.

Physical and Ecological Setting
- The sanctuary consists mainly of **evergreen and semi-evergreen forests**.
- **Cheenkanni River**, originating from the **Brahmagiri ranges**, flows through its dense forest landscape.

Butterfly Diversity
- The sanctuary supports **over 266 butterfly species**, forming **more than 80% of Kerala's butterfly diversity**.
- Several species are **endemic and endangered**, making the area a **major butterfly hotspot**.

Unique Ecological Features
- The region is famous for **large-scale butterfly migration** and **mud-puddling behaviour**.
- It is also a **special habitat of the Schedule-I Slender Loris**, giving it high conservation value.

Fauna and Conservation Activities
- Apart from butterflies, it hosts **elephants, leopards, giant squirrels, and many bird species**.
- A **Butterfly Migration Study** is conducted **every January–February** to monitor and understand this seasonal phenomenon.

Valley of Flowers National Park

Location
- Located in **Chamoli district, Uttarakhand**, within the **Nanda Devi Biosphere Reserve**.

Altitude and Area
- Spread over **87 sq. km**.
- Lies **3500 metres** above sea level.

Protected Status
- Declared a **National Park in 1980**.
- Inscribed as a **UNESCO World Heritage Site in 1988**.
- Part of **Nanda Devi Biosphere Reserve**, recognised as UNESCO Man and Biosphere (MAB) Reserve in 2004.

Physiography and Natural Features
- Situated in the **transition zone between the Zanskar and Great Himalaya ranges**.
- Characterised by **alpine meadows, dense forests, waterfalls and snow-covered peaks**.

River System
- **Pushpawati River**, originating from the **Tipra Glacier**, flows through the valley.
- It later joins the **Alaknanda River**.

Flora and Fauna

- **Plant Diversity**
  - Hosts **520–650 species of flowering plants**, including orchids, primulas, poppies, daisies and brahmakamal.
  - **Vegetation by Altitude**
    - **Sub-alpine (3,200–3,500 m):** Maple, fir, birch, rhododendron.
    - **Lower alpine (3,500–3,700 m):** Juniper, willow, geranium.
    - **Higher alpine (above 3,700 m):** Mosses, lichens, blue Himalayan poppy.
- **Fauna**
  - Home to **Asiatic black bear, snow leopard, musk deer, brown bear, red fox**.
  - Notable bird species include the **Himalayan monal**.

Kaziranga National Park

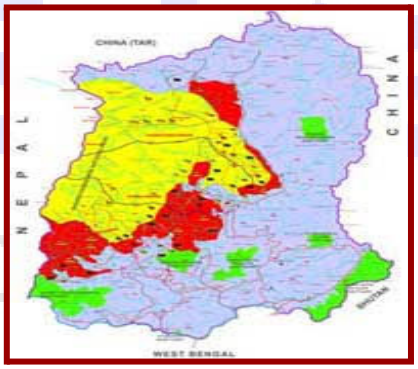
Context

- **Kaziranga National Park** reported three tiger deaths within a fortnight, attributed to territorial infighting. The **2024 tiger census** recorded a rise in Kaziranga's tiger population from **104 to 148**.

Kaziranga National Park

- **Location and Extent**
  - Located in **Assam** between the **Brahmaputra River and Karbi (Mikir) Hills**.
  - Forms the **largest undisturbed floodplain** ecosystem in the Brahmaputra Valley.
- **Legal and International Status**
  - Declared a **National Park in 1974**.
  - Recognised as a **UNESCO World Heritage Site in 1985**.
  - Notified as a **Tiger Reserve in 2006**.
- **Terrain and Physical Features**
  - Characterised by **tall elephant grass, marshes, shallow pools, and alluvial grasslands**.
  - Includes **wetlands, beels, sandbars, and seasonal floodplains**.
- **River System**
  - **Diffalu River**, a tributary of Brahmaputra, flows through the park.
  - **Mora Diffalu River** forms the southern boundary of the protected area.
- **Flora**
  - Dominated by **dense tall elephant grasses and tropical moist deciduous forests**.
  - Aquatic vegetation includes **water lilies, lotus, and water hyacinths**.
- **Fauna**
  - Hosts the **world's largest population of one-horned rhinoceros (Rhinoceros unicornis)**.
  - Major mammals include **Bengal tiger, Asian elephant, wild water buffalo, and swamp deer**.
  - Primate species include **Hoolock gibbon and capped langur**.
  - Aquatic fauna includes the **Gangetic river dolphin in riverine habitats**.
- **Ecological Significance**
  - Represents a **globally important floodplain grassland and wetland ecosystem**.
  - Acts as a **critical biodiversity corridor** between Eastern Himalayas and Indo-Burma regions.

Pangolakha Wildlife Sanctuary



Context

- **Forest fire since 20 January 2026** near the **Indo–China border**, affecting ~**12 hectares** of forest land.

About the Sanctuary

- **Description**
  - **High-altitude protected area** and **Important Bird Area (IBA)**.
  - Located in the **Eastern Himalayas biodiversity hotspot**.
- **Location:** East Sikkim, Sikkim

- **Extent & Terrain**
  - **Area:** ~12,400 hectares
  - **Altitude range:** ~1,300 m to >4,000 m
  - **Ecosystems:** Subtropical, temperate, alpine
- Established: **2002**

Boundaries & Connectivity

- **East:** Bhutan
- **North:** China (Tibet Autonomous Region) via **Nathu La–Jelep La corridor**
- **South:** Connects to **Neora Valley National Park (West Bengal)**

Biogeographical Zones

- Eurasian High Montane (Alpine/Tibetan)
- Sino-Himalayan Temperate Forest
- Sino-Himalayan Subtropical Forest

Flora

- Rhododendron forests
- Silver fir, juniper, oak
- Bamboo thickets
- Alpine meadows
- High-altitude wetlands: *Bedang Tso Lake*

Fauna

- **Mammals:** Tiger, Leopard, Takin, Musk Deer, Goral, Serow, Asiatic Black Bear
- **Birds:** Himalayan Monal, Snow Partridge, Pallas's Fish Eagle,
  - Wood Snipe (Vulnerable)
  - Tibetan Eared Pheasant (Near Threatened)

Achanakmar Tiger Reserve

Context: Young male tiger found dead due to **territorial infighting** inside the Achanakmar tiger reserve

About the Reserve

- **Location**
  - Situated in **Chhattisgarh**
  - Part of **Achanakmar-Amarkantak Biosphere Reserve**
- **Status and Importance**
  - One of **three tiger reserves** in **Chhattisgarh**
  - Forms key **tiger corridor network** in Central India
  - Connects **Kanha** and **Bandhavgarh Tiger Reserves**
  - Supports **tiger dispersal and genetic connectivity**
- **River System**
  - **Maniyari River** flows through the **core area**
  - Acts as major **ecological lifeline**
- **Tribal Communities**
  - Inhabited by **Baiga (PVTG)** community
  - Also home to **Gond** and **Yadav** groups
- **Vegetation Type:** Dominated by **tropical moist deciduous forests**
- **Flora**
  - **Trees:** Sal, teak, bamboo, haldu, bija, saja
  - Contains **600+ medicinal plant species**
- **Fauna**
  - **Mammals:** Tiger, leopard, bison, chinkara, wild dog, hyena
  - **Deer:** Sambar, chital
  - **Avifauna:** 150+ bird species

Sunabeda Wildlife Sanctuary

Context: The Sunabeda wildlife sanctuary declared **Maoist-free in January 2026**, enabling enhanced **wildlife monitoring.**

What is it?

- **Wildlife Sanctuary** and **proposed Tiger Reserve** in **western Odisha**
- Part of **Deccan Peninsula biogeographic zone**
- Established in **1983**

Location

- **Nuapada district**, **Odisha**
- Borders **Sitanadi** and **Udanti Sanctuaries**, **Chhattisgarh**

Area

- Sanctuary area approximately **600 square kilometres**
- Proposed Tiger Reserve extends up to **956 square kilometres**

Terrain and Geography

- **High-altitude plateau** with **deep gorges and valleys**
- Characterised by **grass-covered tablelands and canyons**

River System

- Primary catchment of **Jonk River**
- **Jonk** is a **tributary of Mahanadi**
- Source of **Sunder** and **Indra rivers**

Vegetation

- Dominated by **tropical dry deciduous forests**
- Key species include **Bija, Teak, Sissoo, Sandalwood**

Avifauna

- Records **200 plus bird species**

- Includes **Forest Owlet** and **Banded Bay Cuckoo**

Miscellaneous

National Green Tribunal (NGT)

Basic Profile

- NGT is a **specialised judicial body** for **environmental protection matters**.
- It deals with cases concerning **forests and natural resources**.

Legal Basis and Timeline

- Concept traced to **UNCED Rio Summit, 1992**.
- **Law Commission 186th Report (2003)** recommended environmental courts.
- Established under **National Green Tribunal Act, 2010**.
- Tribunal became **operational in 2011**.

Composition

- Headed by a **Chairperson**.
- Includes **10–20 Judicial Members**.
- Includes **10–20 Expert Members**.

Qualifications

- **Chairperson:** Supreme Court Judge or Chief Justice of High Court.
- **Judicial Members:** SC Judge / HC Judge / former HC Judge.
- **Expert Members:** Technical degree with **15 years experience**, including environment-related work.

Appointment and Tenure

- Chairperson appointed by **Central Government in consultation with CJI**.
- Members appointed by a **Selection Committee**.
- Tenure is **five years or age 65**, whichever is earlier.
- **No reappointment** permitted.

Benches

- **Principal Bench** located in **New Delhi**.
- Four **Regional Benches** at **Bhopal, Pune, Chennai and Kolkata**.
- **Circuit Benches** may be constituted as required.

Jurisdiction

- NGT hears civil cases under laws listed in **Schedule I of NGT Act, 2010**.
- Covers **Water Act 1974, Air Act 1981, Environment Protection Act 1986**, among others.
- Does **not** cover **Wildlife Protection Act, 1972** and **Forest Rights Act, 2006**.

Guiding Principles

- Guided by **principles of natural justice**.
- Applies **sustainable development principle**.
- Applies **precautionary principle**.
- Applies **polluter pays principle**.

Appeal Provision

- NGT orders are appealable before the **Supreme Court**.
- Appeal must be filed within **90 days**.

Environmental Protection Fund

Context

- Union Government notified detailed rules in **January 2026** to operationalise the **Environmental Protection Fund**.
- Rules implement provisions introduced under the **Jan Vishwas Act, 2023**, which decriminalised offences but retained monetary penalties.

About

- **What it is**
  - A **statutory Government of India fund** to utilise environmental penalties for **pollution control, restoration, monitoring, research, and institutional strengthening**.
- **Legal Basis**
  - Provided under the **Environment (Protection) Act, 1986**.
  - Operational framework notified through **2026 Rules**.
  - Strengthened by **Jan Vishwas Act, 2023**.
- **Nodal Authority**
  - **Ministry of Environment, Forest and Climate Change (MoEFCC)** or a notified Central Government body.
- **Aim**
  - Recycle pollution penalties into **remediation, clean technology promotion, and regulatory capacity building**.
- **Sources of Funds**
  - Penalties under:
    - Air (Prevention and Control of Pollution) Act, 1981
    - Environment (Protection) Act, 1986
  - Interest from investments.
- **Permitted Uses**
  - Pollution prevention and mitigation.
  - Remediation of contaminated sites.
  - Environmental monitoring systems and equipment.
  - Clean technology research and innovation.
  - IT-enabled compliance platforms.

    - Laboratory and institutional capacity building.
- **Revenue Sharing Formula**
    - **75%** credited to **State/UT Consolidated Fund**.
    - **25%** retained by the **Central Government**.
- **Oversight and Transparency**
    - **CAG audit** of the Fund.
    - **CPCB** to develop and maintain a national online monitoring portal.

SCIENCE, TECHNOLOGY AND HEALTH

Topic: IT, Computer, Robotics, Bio-Technology

India's Biomanufacturing Opportunity

Concept and Scope

- **Futuristic biotechnology** explores extreme environments like **deep oceans** and **outer space** for biological innovation.
- **Marine biotechnology** studies microorganisms, algae, and marine life for bioactive compounds and biomaterials.
- Marine organisms survive **high pressure, salinity, low light, and nutrient-poor conditions**, enabling unique biochemical properties.
- **Space biotechnology** examines biological behaviour under **microgravity and radiation** conditions.
- It focuses on microbes, plants, and human systems relevant for space missions.

Strategic Relevance for India

- India has a **coastline exceeding 11,000 km** and an **EEZ over 2 million sq. km**.
- Despite this, India's **global marine output share remains low**, indicating untapped potential.
- Marine biomanufacturing can generate **food, energy, chemicals, and biomaterials** sustainably.
- It reduces dependence on **land, freshwater, and agriculture-based systems**.
- **Space biotechnology** supports India's ambitions in **human spaceflight and long-duration missions**.
- Together, these sectors can position India as a **global biomanufacturing leader**.

Current Status in India

- India's annual **cultivated seaweed output is about 70,000 tonnes**, indicating limited scale.
- The country imports **agar, carrageenan, and alginates** for food and pharmaceutical uses.
- Initiatives under **Blue Economy**, **Deep Ocean Mission**, and **BioE3** aim to integrate value chains.
- Private players like **Sea6 Energy** and **ClimaCrew** are scaling marine biomass applications.
- **ICAR–CMFRI** and state-led platforms support marine biotechnology research and deployment.
- **ISRO's microgravity biology programme** studies microbes, algae, food systems, and human health.
- **Private-sector participation in space biotechnology remains limited** due to early-stage technologies.

Global Approaches

- **European Union** supports marine bioprospecting and algae-based materials through shared infrastructure.
- **China** has expanded seaweed aquaculture and marine bioprocessing at scale.
- The **United States**, through NASA and ISS, leads in space biotechnology research.

Way Forward

- Marine and space biotechnology are **strategic first-mover domains** with long-term advantages.
- **Fragmented and slow R&D** remains the primary risk for India.
- A **dedicated national roadmap** with defined timelines and outcomes is essential.

Submarine Cable Infrastructure

Background and Context

- Submarine cable networks are expanding continuously to meet **exponential global data demand growth**.
- These systems underpin international connectivity across digital, financial, and communication platforms worldwide.

About Submarine Cable Networks

- Subsea cables are **fiber-optic systems laid on ocean floors** connecting continents digitally.
- Cable structure includes **optical fibers, metal sheathing, steel armor, and polyethylene coating**.
- They transmit **over 99% of international digital communication**, including Internet and financial transactions.

Global Subsea Network Overview

- The world has **over 550 active and planned cable systems** spanning **1.5 million kilometers**.
- These networks carry more than **6,400 terabits per**

second of global digital information.
- **Repeater stations every 50–100 kilometers** amplify signals for long-distance transmission integrity.
- Major systems include **SEA-ME-WE 6, Marea, Dunant, Equiano, and the 2Africa Project**.

Subsea Cables and India
- India hosts **18 operational subsea cable systems**, with four additional systems under development.
- Primary **Cable Landing Stations** operate in **Mumbai, Chennai, and Kochi**.
- The **Visakhapatnam Open CLS** is proposed as a future regional connectivity hub.
- **Island CLS expansion** links Andaman and Nicobar, and Lakshadweep through BSNL local networks.
- These initiatives enhance **network redundancy, resilience, and digital economy connectivity**.

Strategic Importance of Subsea Cables
- Subsea connectivity forms the **economic backbone** of banking, cloud services, and cross-border trade.
- Optical fiber provides a **latency advantage** over satellites for high-volume data transfer.
- Countries treat cables as **critical information infrastructure** for sovereignty and national security.

Challenges and Security Vulnerabilities
- Global cables cluster at **strategic chokepoints**, creating concentrated infrastructure risks.
- Key chokepoints include the **Suez corridor, Strait of Malacca, and English Channel**.
- **Foreign ownership and jurisdictional exposure** limit national oversight and data protection.
- Risks include **espionage, hybrid warfare, sabotage, and attribution difficulty**.
- Single-point failures can disrupt **financial systems, stock exchanges, and business operations**.

Global and National Policy Responses
- Around **500,000 kilometers of new cables** may add **20,000 terabits per second capacity**.
- Trends include **open-access CLS models and public-private infrastructure collaboration**.
- **TRAI** recommended **Critical Information Infrastructure status** for subsea cables in India.
- The **National Telecommunications Policy 2025** emphasizes resilience and security of cable systems.
- Australia established a **Cable Connectivity and Resilience Centre** for Indo-Pacific cooperation.

AI Infrastructure and Digital Sovereignty

Context and Conceptual Foundation
- Government white paper **"Democratising Access to AI Infrastructure"** reframes AI as an infrastructure challenge.
- It highlights **compute access, datasets, and model ecosystems** as strategic national assets.
- The paper argues AI progress depends on **infrastructure depth**, not merely algorithms or applications.
- **Compute power, data pools, and model ecosystems** now shape innovation and governance capacity.
- Infrastructure concentration risks nations becoming **technology consumers rather than global innovators**.

AI as a Public Digital Utility
- The framework treats AI infrastructure as a **digital public good** enabling research and governance.
- **Physical layer** includes data centres, GPUs, high-performance computing, and energy systems.
- **Digital layer** comprises datasets, model repositories, access rules, and governance protocols.
- Public AI infrastructure supports **innovation diffusion, regulatory oversight, and equitable access**.
- It strengthens **institutional capacity** and reduces barriers for start-ups and researchers.

India's Infrastructure Gap and National Initiatives
- India generates nearly **20% of global data** but hosts only **3% of data centres**.
- Domestic researchers depend heavily on **foreign cloud and compute ecosystems**.
- This imbalance weakens **innovation autonomy, bargaining power, and technological sovereignty**.
- **Key National Initiatives**
  - **IndiaAI Mission** and **National Supercomputing Mission** expand sovereign compute capacity.
  - **AIRAWAT** and national **GPU clusters** enhance advanced AI research capabilities.
  - Digital Public Infrastructure platforms like **AI Kosh, Bhashini, and TGDeX** enable interoperability.
  - These initiatives promote **shared datasets, accountable access, and standards-based governance**.

Strategic Risks, Sustainability, and Partnerships
- **Global Concentration Risks**
  - Few corporations control **advanced chips, hyperscale compute, and frontier AI models**.
  - High entry barriers create **market dominance and geopolitical technology leverage**.
  - External dependence exposes **critical**

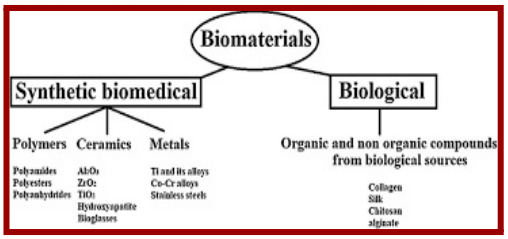
sectors to strategic vulnerabilities.

- **Sustainability Imperative**
  - AI expansion requires **energy-efficient computing architectures and advanced cooling systems**.
  - Integration with **renewable energy** reduces carbon, water, and power stress.
  - Environmental planning is essential for **long-term AI scalability**.
- **Public-Private Partnerships**
  - Government alone cannot meet **infrastructure scale and geographic distribution demands**.
  - PPPs can expand **data centres, sovereign clouds, and GPU access networks**.
  - Transparent governance ensures **public interest alignment and equitable infrastructure access**.

Strategic Way Forward

- Advanced sectors like **finance, IT, and e-commerce** lead AI adoption.
- Agriculture, healthcare, education, and governance remain **relatively under-digitised**.
- Affordable infrastructure enables **precision farming, diagnostics, and vernacular AI platforms**.
- Trust-centric regulatory frameworks balance **innovation expansion with citizen safeguards**.
- Nations controlling AI infrastructure will shape **future economic power and innovation hierarchies**.
- India's pathway blends **Digital Public Infrastructure, sovereign compute, and global partnerships**.

Biomaterials



Background

- Global shift toward cleaner manufacturing is accelerating demand for **biomaterials** in multiple sectors.
- Biomaterials are emerging as a key frontier in **materials engineering** for low-carbon transitions.

What are Biomaterials?

- Biomaterials are materials derived partly or wholly from **biological sources or processes**.
- They are designed to replace or interact with **conventional petroleum-based materials**.
- Used across **packaging, textiles, construction, and healthcare** industries.
- **Drop-in biomaterials** are chemically identical to fossil materials and fit existing systems.
- Example includes **bio-PET**, usable without changing current manufacturing infrastructure.
- **Drop-out biomaterials** differ chemically and require new processing or disposal systems.
- Examples include **polylactic acid (PLA)** requiring composting or specialised recycling.
- **Novel biomaterials** offer new properties like self-healing, bioactivity, or advanced composites.

Why Biomaterials Matter for India

- Biomaterials support **environmental sustainability, industrial growth, and revenue generation** simultaneously.
- Indigenous biomanufacturing reduces dependence on **fossil-based imports** for plastics and chemicals.
- Agricultural residues and feedstocks offer **diversified farmer income** beyond food markets.
- Aligns Indian exports with **global low-carbon and circular economy regulations**.
- Supports domestic priorities like **single-use plastic bans** and climate commitments.

India's Current Position

- India's biomaterials sector includes **bioplastics, biopolymers, and bio-derived materials**.
- Bioplastics market valued at **$500 million in 2024**, with strong growth projections.
- Some segments still depend on **foreign technologies** for feedstock-to-product conversion.

Way Forward

- Scaling must avoid **food-feedstock competition**, water stress, and soil degradation.
- Weak waste management and composting infrastructure could dilute environmental benefits.
- Fragmented policy coordination risks slowing adoption and increasing import dependence.
- Priorities include scaling **biomanufacturing infrastructure**, improving feedstock productivity, and R&D investment.
- Clear **regulatory definitions, labelling norms, and end-of-life pathways** are essential.
- Government procurement, incentives, and shared pilot facilities can **de-risk early investments**.

Topic: Awareness in the fields of Space

India's Space Programme: A People-Centric Space Journey

Evolution of India's Space Vision

- India's space programme has evolved beyond

missions into a **symbol of national pride**.
- Space achievements increasingly shape **collective identity and technological self-confidence**.
- Display of **Tricolour aboard ISS** by Group Captain Shubhanshu Shukla symbolised shared national achievement.
- The ISS moment was termed a defining milestone of **Amrit Kaal and national resurgence**.
- Space exploration is now linked with **India's developmental aspirations and civilisational confidence**.

Landmark Lunar and Planetary Missions
- **Chandrayaan-1 (2008)** confirmed presence of water molecules on the lunar surface.
- **Chandrayaan-2 (2019)** generated high-resolution lunar maps for future exploration planning.
- **Chandrayaan-3 (2023)** achieved first soft landing near the lunar south pole.
- **Vikram lander** and **Pragyan rover** functioned for one complete lunar day.
- The mission inspired **scientific curiosity and mass public imagination** across generations.
- **Mars Orbiter Mission (2014)** made India first Asian nation reaching Mars orbit initially.

Expanding Scientific and Technological Frontiers
- India launched **400+ foreign satellites**, strengthening global commercial and technological trust.
- **Aditya-L1 (2023)** studies solar corona and space weather dynamics.
- **XPoSat (2024)** advances black hole research through X-ray polarimetry observations.
- **SpaDeX (2024)** demonstrated in-orbit docking essential for future space stations.
- These missions expand India's footprint in **deep-space science and orbital technologies**.

Future Roadmap and Human Spaceflight Ambitions
- Planned missions include **Gaganyaan, Chandrayaan-4/5, Venus mission**, and advanced explorations.
- **Bharatiya Antariksh Station** targeted for completion by 2035.
- India envisions a **human Moon landing mission by 2040**.
- Gaganyaan programme approved outlay exceeds **₹20,000 crore**.
- Four Indian Air Force test pilots undergoing **astronaut training**.
- First indigenous **human spaceflight mission targeted for 2027**.
- Vision reflects transition from **exploration capability to sustained human presence**.

Significance
- **Space for Governance and Citizens**
  - Satellites enable **disaster warnings, fisheries advisories, crop mapping, and railway safety**.
  - Space data strengthens **insurance claims assessment and climate risk monitoring**.
  - Systems power geospatial backbone of **PM Gati Shakti infrastructure planning**.
  - Space increasingly functions as a **democratic public utility**.
- **Ecosystem and Economic Expansion**
  - Policy reforms enabled **350+ private space start-ups**.
  - Space budget rose from **₹5,615 crore (2013-14) to ₹13,416 crore (2025-26)**.
  - Nearly **₹5,000 crore** added through user-funded programmes.
  - India's space economy valued at **$8 billion**, projected to reach **$44 billion**.
- **Youth, Innovation, and Capacity Building**
  - Government plans to train **40–50 astronauts** for future missions.
  - Astronomy Olympiad 2025 hosted **300 participants from 60 countries**.
  - Initiatives like **ISRO Robotics Challenge** and **Antariksh Hackathon** engage students.
  - National Meet 2.0 produced **5,000+ pages shaping 15-year roadmap**.
- **Global Cooperation and Space Diplomacy**
  - **South Asia Satellite** provides communication support to neighbouring countries.
  - **G-20 Satellite (2023)** focuses on climate and environmental monitoring.
  - Joint missions include **NISAR (NASA), TRISHNA (CNES), LUPEX (JAXA), Proba-3 (ESA)**.
  - India's diplomacy reflects **Vasudhaiva Kutumbakam,** space as global commons.

ISRO's Recent Setbacks

Introduction and Context
- Consecutive failures of **PSLV-C61 and PSLV-C62** mark a rare reliability concern for ISRO.
- The **PSLV "workhorse"** historically symbolised cost-efficient and dependable access to space.
- Both failures centred on the **third stage (PS3)**, triggering confidence and credibility challenges.

Technical Dimensions: Third-Stage Anomalies
- The **PSLV is a four-stage vehicle**, using solid and liquid propulsion systems alternately.
- **C61 failure (May 2025)** showed a pressure drop in the PS3 combustion chamber.
- **C62 failure** indicates a similar terminal-phase

anomaly in the solid motor stage.
- The mature PSLV design suggests **manufacturing or quality assurance lapses**, not design flaws.

Implication
- **Strategic Implications: Loss of EOS-N1**
  - The primary payload, **Earth Observation Satellite EOS-N1 (Anvesha)**, supported national security and governance objectives.
  - **Hyperspectral imaging** enables material identification across hundreds of narrow spectral bands.
  - The failure creates a **gap in space-based surveillance** during heightened regional tensions.
  - Civil applications in **precision agriculture, mineral mapping, and environmental monitoring** face delays.
- **Commercial and Global Market Impact**
  - **NewSpace India Limited (NSIL)** operates in a competitive global small-satellite launch market.
  - Competitors like **SpaceX and Rocket Lab** provide frequent and highly reliable launch services.
  - **International payloads** from Spain, Brazil, and Nepal risk shifting to alternative providers.
  - Repeated failures increase **insurance premiums**, eroding India's low-cost launch advantage.
- **Institutional and Reputational Dimensions**
  - The **"Chandrayaan-3 effect"** raised public and policy expectations across all ISRO missions.
  - The PSLV's **92% historical success rate** appears weaker due to clustering of recent failures.
  - Simultaneous priorities like **Gaganyaan, Aditya, and lunar missions** strain human resources.
  - The setbacks highlight a need for **modernising production lines and quality systems**.
- **Impact on Future Missions**
  - Although **Gaganyaan uses LVM3**, ecosystem-wide failures prompt safety audits and timeline reviews.
  - The **Bharatiya Antariksha Station 2035 goal** depends on sustained, high-frequency launch reliability.
  - Assembly-line manufacturing models require reassessment under heightened quality scrutiny.

Way Forward and Reform Measures
- Conduct a **transparent Root Cause Analysis** at Satish Dhawan Space Centre production units.
- Deploy **digital twins and AI-based monitoring** for real-time anomaly detection in assembly.
- Expand **private sector integration** through HAL–L&T consortium for routine launch manufacturing.
- Restore confidence via **proactive partner communication and subsidised re-launch commitments**.

Conclusion
- Consecutive failures represent a **systemic stress test** for ISRO's quality and manufacturing ecosystem.
- Strengthening **industrial-grade controls and public–private collaboration** can restore global credibility.
- Reforms ensure the PSLV remains a **reliable pillar for India's strategic and commercial space ambitions**.

Sustainable Space Access

Context and Commercial Transformation
- Commercial space economy is expanding rapidly, projected to exceed **$1 trillion market value by 2030**.
- **Reusable launch technologies** are reducing mission costs while improving frequency and operational sustainability.
- Space access is shifting from **state-led exploration** to **market-driven transportation ecosystems**.
- Private firms now drive innovation, investments, and commercial applications in global space activity.

Changing Economics of Space Missions
- **Partial rocket reusability** reduced launch costs by nearly **5–20 times per kilogram**.
- Human spaceflight missions remain **three to five times costlier** than satellite launches.
- Life-support systems, safety redundancies, and training infrastructure increase mission expenditure significantly.
- Satellite launches rely on comparatively **simpler payload, navigation, and software architectures**.

Rocket Science and Structural Constraints
- Rockets must overcome **gravity, drag, and atmospheric resistance** during initial ascent phases.
- **Tsiolkovsky rocket equation** links achievable velocity to propellant mass and structural design.
- Nearly **90% rocket mass** consists of propellant and fuel storage systems.
- Less than **4% structural mass** remains available for payload delivery to orbit.
- **Multi-stage separation** improves fuel efficiency by discarding spent propulsion modules mid-flight.

Reusability Revolution and Global Innovations

- **SpaceX pioneered vertical integration**, modular engineering, and 3D-printed rocket manufacturing.
- Reusability transformed rockets from **disposable launch systems** into reusable transport platforms.
- **Falcon 9 first stage** performs controlled descent using engine braking and aerodynamic drag.
- SpaceX has recovered Falcon 9 boosters **over 520 times**, proving operational feasibility.
- Global firms like **Blue Origin** and **LandSpace** are advancing reusable booster recovery technologies.

Technological Limits and Sustainability Challenges

- Repeated launches cause **material fatigue and microfractures** in engines and propellant tanks.
- Extreme thermal cycles weaken structural reliability over successive launch operations.
- **Refurbishment and inspection costs** may eventually outweigh reuse-related economic benefits.

India's Strategy and Way Forward

- **ISRO** is developing Reusable Launch Vehicle (RLV) systems, including winged and vertical recovery models.
- Research focuses on **retro-propulsion landing** and aerodynamic braking technologies.
- Future launch systems may adopt **fewer stages with partial or full recovery**.
- Advances in propulsion efficiency enable **two-stage sustainable mission architectures**.
- Long-term sustainability requires balancing **energy use, refurbishment costs, and reliability metrics**.

Topic: Science and Technology - developments and their applications and effects in everyday life.

Space Technology and Healthcare Innovations

Overview of Space Research Spinoffs

- Space exploration has generated **healthcare spinoffs** improving diagnostics, treatment, and service delivery on Earth.
- NASA has documented **2,000+ technologies since 1976** benefiting civilian medical applications.
- ISRO, with a smaller budget, transferred **350+ technologies** to Indian industries, including biomedical sectors.
- ISRO's annual budget stands at **₹13,416 crore**, around **6% of NASA's allocation**.

Diagnostics and Medical Imaging Innovations

- Digital image processing in **ultrasound, CT, MRI, and mammography** originated from planetary image analysis.
- NASA developed **contrast enhancement, noise reduction, segmentation, and fusion techniques** for low-signal medical imaging.
- Engineers refined **edge detection, deblurring, and filtering** while analysing lunar and planetary data.
- **Infrared ear thermometers** evolved from stellar temperature measurement technologies.

Wearables and Point-of-Care Technologies

- Astronaut **bio-telemetry systems** inspired modern heart rate, ECG, respiration, and movement monitors.
- **Lab-on-chip blood analysers** were developed for testing in microgravity environments.
- Smart garments with **strain gauges and accelerometers** originated from space-suit biomonitoring systems.

Telemedicine, Logistics, and Public Health

- **Satellite-based telemedicine** supports healthcare delivery in remote and disaster-prone regions.
- Earth-observation data enables **global disease surveillance and epidemiological mapping**.
- **Solar-powered vaccine refrigerators** emerged from off-grid space field operations.
- **Drone-based medical deliveries** rely on satellite navigation developed through space missions.

Devices, Rehabilitation, and Advanced Materials

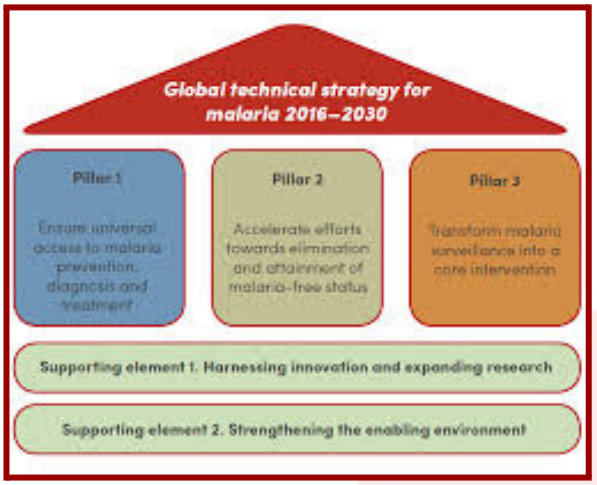
- **Ventricular Assist Devices** used NASA flow-dynamics for compact, low-shear blood pump designs.
- ISRO developed a **titanium heart pump in 2016**, capable of pumping **3–5 litres per minute**.
- **Cochlear implant patent in 1977** was supported by NASA research assistance.
- Space materials improved **prosthetics, orthoses, and antimicrobial clinical surfaces**.
- **Space blankets and scratch-resistant lenses** became widely used medical and consumer safety products.

Healthcare Systems and Clinical Applications

- Astronaut studies informed **osteoporosis, muscle atrophy, and cardiovascular deconditioning treatments**.
- Space radiobiology models guide **cancer risk assessment and radiotherapy safety protocols**.
- Spacecraft interface designs improved **ICU monitoring and operating room alarm systems**.

Topic: Achievements of Indians in science & technology

Malaria Elimination Strategy in India



National Framework and Targets

- India launched the **National Framework for Malaria Elimination 2016–2030** with phased national targets.
- The framework aims for **zero indigenous cases by 2030** across all States and Union Territories.
- An interim goal seeks **interruption of indigenous transmission nationwide by 2027**.
- By 2025, **160 districts across 23 States and UTs** reported zero indigenous cases during 2022–2024.

Progress and WHO Assessment

- The **World Malaria Report 2025** recorded India's exit from the **High Burden to High Impact Group**.
- Malaria cases reduced by **around 80% between 2015 and 2023** nationally.
- India contributed **73.3% of South-East Asia's 2.7 million cases in 2024**.
- India remains on track for the **WHO Global Technical Strategy target of 75% reduction by 2025**.

Testing, Treating, and Tracking Protocol

- The **National Strategic Plan 2023–2027** prioritises surveillance as the core elimination intervention.
- Universal access to **diagnosis, treatment, and case tracking** strengthens case management.
- Enhanced **vector control measures** ensure universal access to malaria prevention.
- States intensify **migrant worker surveillance** to prevent cross-border and inter-State transmission.

State-Level Illustration

- Tamil Nadu reduced cases from **5,587 in 2015 to 321 in 2025**.
- **33 of 38 districts** achieved zero indigenous cases, entering **Category O phase**.
- Remaining districts fall under **Category I**, maintaining API below one per 1,000 population.

Key Challenges Highlighted

- Migration and **cross-border importation** risk reintroducing malaria into low-transmission regions.
- **Urban, forest, tribal, and border areas** require targeted subnational strategies.
- **Plasmodium vivax**, causing nearly two-thirds of regional cases, complicates elimination efforts.
- The WHO warns of **emerging artemisinin resistance** in multiple African countries.

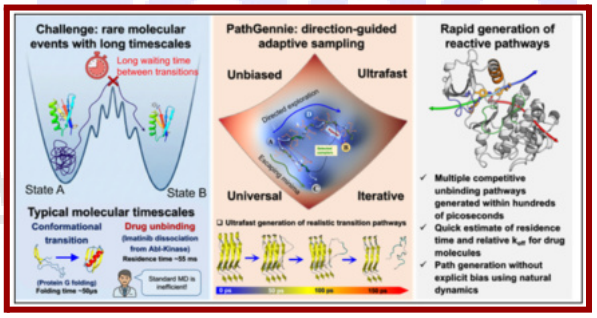
Strategic Priorities and Innovations

- **Real-time, case-based surveillance** across public, private, defence, and urban health systems.
- **Project-mode interventions** for hotspot States, while near-elimination regions prevent resurgence.
- **RTS,S and R21 vaccines** evaluated as complementary tools alongside vector control and diagnostics.
- India strengthened **pharmacovigilance, therapeutic efficacy studies, and combination therapy adherence**.
- Sustained national investment essential to avoid **resurgence, productivity losses, and preventable mortality**.

Prelims

Topic: Health and Diseases

PathGennie Software for Fast-Tracking Drug Discovery



Context

- Ministry of Science and Technology developed **PathGennie**, an open-source drug discovery software.
- The software significantly accelerates drug discovery by simulating drug–protein unbinding accurately.

What is PathGennie?

- **PathGennie** is an open-source computational framework for simulating rare molecular events.
- It focuses on accurately modelling **drug unbinding**

from protein targets.
- The software avoids artificial distortions commonly introduced in conventional simulation techniques.
- It enables prediction of **drug residence time**, critical for drug efficacy and safety.

Developing Institution
- PathGennie was developed by scientists at **S. N. Bose National Centre for Basic Sciences**, Kolkata.

Aim and Rationale
- To overcome limitations of traditional molecular dynamics simulations.
- Conventional simulations struggle to capture **slow and rare molecular transitions**.
- PathGennie seeks to reduce computational cost while maintaining physical accuracy.
- It aims to generate realistic drug–protein interaction pathways efficiently.

Working Mechanism
- The software allows molecules to move **naturally**, without applying external force or bias.
- It runs numerous short and parallel simulations simultaneously.
- **Simulations progressing** in the correct direction are selectively continued.
- Unproductive simulation paths are terminated early to conserve computing resources.
- This selection-based approach resembles **natural selection**, without artificial heat or pressure.
- The framework supports complex pathways, including those identified using **artificial intelligence**.

Key Features
- Ensures physically accurate simulation of molecular unbinding processes.
- Reduces overall simulation time and computational power requirements.
- Highly adaptable to diverse molecular and chemical systems.

Applications
- Predicts drug unbinding pathways and residence times accurately.
- Successfully applied to **imatinib–Abl kinase** interaction studies.
- Enhances understanding of **protein–ligand kinetics** for rational drug design.
- Applicable in chemical reactions, catalysis, phase transitions, and self-assembly processes.

Candida Auris

Context
- An Indian-led study warns **Candida auris** is becoming more virulent and globally widespread.
- High mortality persists despite treatment, raising serious global public health concerns.

What is Candida auris?
- **Candida auris** is a multidrug-resistant fungal pathogen causing severe invasive infections.
- It primarily affects hospitalised and **immunocompromised patients**.
- First identified in **2009**, it is now recognised as an emerging global health threat.
- High fatality rates and frequent treatment failures distinguish it from other Candida species.

Vector and Reservoir
- Candida auris mainly spreads within **healthcare settings** such as hospitals and care facilities.
- It persists on **human skin**, enabling prolonged colonisation without symptoms.
- The fungus survives for long periods on **medical devices and inanimate surfaces**.
- Environmental persistence complicates infection control and eradication efforts.

Key Features
- **Multidrug resistance** limits effectiveness of standard antifungal therapies.
- Resistance spans multiple antifungal drug classes, narrowing treatment options.
- **High virulence** leads to mortality rates exceeding 50%, even after therapy.
- Exhibits **morphological flexibility**, switching between yeast and filamentous forms.
- Rapid adaptation enables effective **immune evasion** and environmental stress tolerance.

Transmission Pathways
- Spreads through direct contact with infected or colonised individuals.
- Asymptomatic carriers significantly contribute to unnoticed transmission.
- Transmission occurs via **contaminated surfaces and medical equipment**.
- Invasive devices such as catheters and ventilators heighten infection risk.

Typhoid Fever

About the disease
- Typhoid is a **life-threatening bacterial infection** caused by **Salmonella Typhi**.

- It spreads mainly through the **faecal–oral route via contaminated food and water**.
- After ingestion, bacteria **multiply and enter the bloodstream**.
- Common symptoms include **prolonged fever and gastrointestinal disturbances**.
- Severe cases may cause **complications or death**, confirmed through **blood testing**.

Disease Burden and Risk

- In **2019**, an estimated **9.24 million cases** and **~1.1 lakh deaths** occurred globally.
- Majority of cases and deaths occurred in **South-East Asia and Africa**.
- Risk is higher in areas with **unsafe water and poor sanitation**, especially among children.

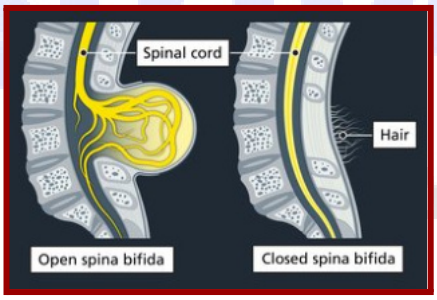
Treatment and Resistance

- **Antibiotics** are the primary treatment for typhoid fever.
- **Antimicrobial resistance** has reduced effectiveness of standard antibiotics.

Prevention and Vaccination

- Prevention depends on **safe water, sanitation and hygiene**.
- **World Health Organization** recommends **typhoid conjugate vaccines** in endemic countries.
- **Gavi, the Vaccine Alliance** supports vaccine rollout in eligible nations.
    - Gavi was established in **2000** as a **global health partnership**.

Spina Bifida



Core Concept

- Spina bifida is a **congenital neural tube defect**.
- Occurs due to **incomplete spinal cord development**.
- Develops within the **first 28 days after conception**.

Nature of Condition

- It is a **non-communicable birth defect**.
- Strongly associated with **maternal folate deficiency**.

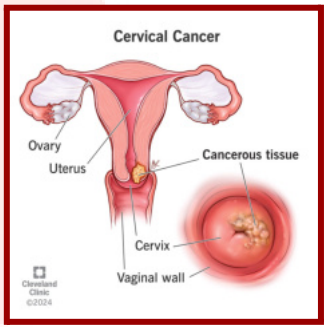
Primary Causes

- **Inadequate folic acid intake** during early pregnancy.
- **Poor maternal nutrition or anaemia**.
- **Unplanned pregnancies** without supplementation.
- Possible **genetic and environmental interaction**.

Management

- **Early surgical closure** of spinal defect.
- **Ventriculo-peritoneal shunt** for hydrocephalus.
- **Long-term rehabilitation therapy**.
- **Orthopaedic correction** using surgery or braces.

Cervical Cancer



What is Cervical Cancer?

- Cervical cancer is a disease where **cells in the cervix grow uncontrollably**.
- The **cervix connects the vagina to the uterus**.
- It is the **fourth most common cancer in women globally**.
- It is the **second most common cancer among women in India**.
- Most cases occur in **women above 30 years of age**.
- **Main Cause**
    - Caused mainly by **persistent infection with Human Papillomavirus (HPV)**.

Human Papillomavirus (HPV)

- **HPV is a sexually transmitted infection (STI)** affecting skin, genital area and throat.
- HPV includes **more than 200 related viruses**.
- Two categories:
    - **Low-risk HPV** – rarely causes cancer.
    - **High-risk HPV** – causes cancers.
- **High-risk HPV Types**
    - There are **12 high-risk HPV types**.
    - **HPV-16 and HPV-18** cause **most HPV-related cancers**, including cervical cancer.
- **HPV-Related Cancers**
    - Cervical
    - Anal

  - Oropharyngeal
  - Penile
  - Vaginal and Vulvar
  - In most people, the immune system clears HPV naturally.
  - Persistent infection may lead to abnormal cell growth and cancer.
  - There is no treatment for HPV infection itself.
- **HPV Vaccination**
  - **Six HPV vaccines** are available globally.
  - All protect against **HPV-16 and HPV-18**.
  - Recommended age: 9–14 years (1 or 2 doses).
  - **CERVAVAC** is **India's first indigenous cervical cancer vaccine**, developed and manufactured by the Serum Institute of India.
- **Screening & Prevention**
  - Screening **every 5–10 years** from age 30.
  - From 25 years for women living with HIV.
  - Early detection and treatment prevents cervical cancer.

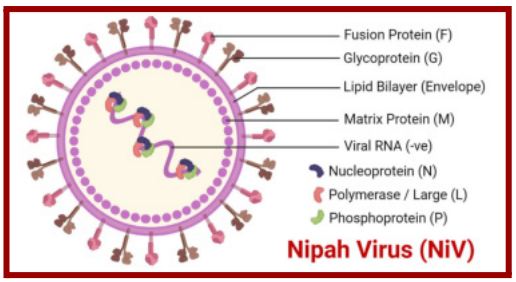
WHO Cervical Cancer Elimination Initiative (90-70-90 by 2030)

- **90%** of girls **vaccinated by age 15**.
- **70%** of women **screened by 35 and 45 years**.
- **90%** of women with **pre-cancer treated** and **90% with invasive cancer managed**.

India's Initiative

- **HPV vaccination programme** announced in **Interim Budget 2024–25**.
- Targets **girls aged 9–14 years** to prevent cervical cancer.

Nipah Virus (NiV)



Context: Two persons suspected of being infected by **Nipah virus** in **West Bengal** are undergoing treatment, officials said on Monday. The **Union Health Ministry** responded by deploying a **national joint outbreak response team** to manage the situation.

Nipah Virus (NiV)

- **Nipah virus (NiV)** is a **zoonotic virus**, spreading from **animals to humans**, food, and **human-to-human contact**.
- It is an **RNA virus** of the **Paramyxoviridae family** and **Henipavirus genus**, closely related to the **Hendra virus.**
- **Natural host:** Fruit bats (Pteropus genus); virus is present in their urine, faeces, saliva and birthing fluids.
- **Intermediate hosts** include pigs, dogs, cats, goats, horses and sheep.
- **Case fatality rate:** 40%–75%, making it one of the deadliest viral infections.
- **Disease caused:** Encephalitis with fever, headache, drowsiness, disorientation, confusion, coma and death.
- **Diagnosis: RT-PCR** from body fluids and **ELISA-based antibody detection**.
- **Prevention: No vaccine** available for humans or animals.
- **WHO status:** Listed as a **Priority Disease** for research and emergency preparedness.

Menkes Disease

What is Menkes Disease?

- **Rare genetic disorder** affecting the body's ability to **absorb, transport and utilise copper**.
- Also known as **"Kinky Hair Disease"**.

Genetic Basis

- Caused by mutation in **ATP7A gene**.
- **Gene location:** X chromosome.
- **Inheritance pattern:** X-linked recessive.
- Therefore, **mostly affects male infants**.

Role of Copper (Normal Physiology)

- Required in **very small amounts**, but essential for:
  - Brain and nervous system development
  - Blood vessel and blood cell formation
  - Iron metabolism (conversion into usable form)
  - Immune function
  - Wound healing and metabolism
- Copper is **naturally present in food and supplements**.

Pathophysiology

- Impaired copper transport → **low copper levels** in:
  - Blood plasma
  - Liver
  - Brain
- Reduced activity of **copper-dependent enzymes**.
- Copper may **accumulate abnormally in kidneys and other tissues**.
- Leads to **severe neurological damage and developmental delay**.

Key Clinical Features

- **Coarse, brittle, kinky (crinkly) hair** – hallmark feature.
- **Failure to thrive** and poor growth.
- **Neurological symptoms:**
  - Seizures
  - Hypotonia (floppy muscles)
  - Developmental delay
- Progressive damage to **brain and nervous system**.

Epidemiology

- Occurs in about **1 in 35,000 live male births**.
- Extremely rare in females.

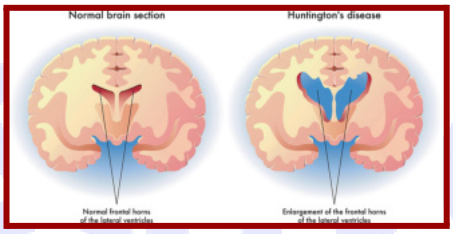
Treatment

- **No permanent cure** available.
- **Early copper replacement therapy** improves outcomes.
- Treatment includes:
  - **Copper histidine injections** (parenteral copper supplementation).
- Early initiation can **reduce symptom severity and prolong life**.

Prognosis

- Without treatment, **most children do not survive beyond 3 years of age**.
- Early diagnosis is critical for survival benefit.

Huntington's Disease (HD)



What it is

- **Rare, inherited neurodegenerative disorder** causing progressive breakdown of brain neurons.
- Primarily affects **basal ganglia** (movement control) and **cerebral cortex** (thinking and memory).
- Leads to **motor, cognitive and psychiatric disturbances**.

Cause

- Caused by **genetic mutation in the HTT gene**.
- Inherited in an **autosomal dominant pattern**.
- **50% chance of inheritance** if one parent is affected.
- Mutation produces **abnormal huntingtin protein**, which damages and destroys neurons.

Affected Brain Regions

- **Basal ganglia:** Regulates voluntary movements.
- **Cerebral cortex:** Controls thinking, decision-making and memory.

Prevalence

- Affects **3–7 per 100,000 people globally**.
- More common among populations of **European ancestry**.

Types

- **Adult-onset HD:** Most common, symptoms begin **after 30 years of age**.
- **Juvenile HD:** Rare, symptoms begin **before 20 years of age**.

Key Symptoms

- **Chorea:** Involuntary, dance-like movements.
- Abnormal postures and tremors.
- **Cognitive decline:** Memory, thinking and decision-making problems.
- **Psychiatric symptoms:** Emotional disturbances, personality and behaviour changes.
- **Abnormal eye movements**, often early sign.
- Symptoms **progressively worsen over time**.

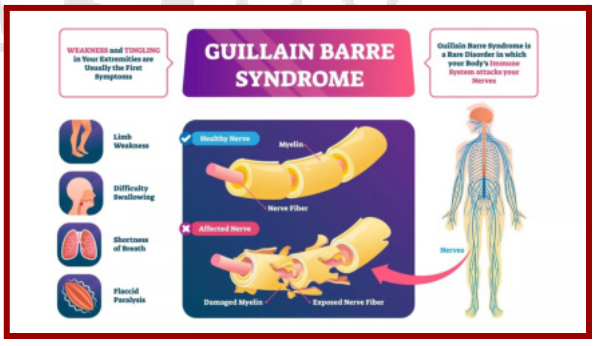
Disease Progression

- Gradual loss of independence.
- Requires **constant care and supervision** in advanced stages.
- **Life expectancy:** Death usually occurs **15–20 years after symptom onset**.

Treatment

- **No cure or disease-reversing therapy available.**
- Medications used for **symptom management only**, including movement and psychiatric symptoms.

Guillain-Barré Syndrome (GBS)



What it is?

- An autoimmune neurological disorder where the immune system attacks peripheral nerves.
- Leads to **progressive muscle weakness**, sensory disturbances, and potential paralysis.

Epidemiology

- Rare condition affecting **1–2 persons per 100,000 annually worldwide**.
- More commonly reported among **adults and male populations**.

Triggers and Causes

- Often follows **viral or bacterial infections affecting immune response**.
- Common triggers include **Campylobacter jejuni, influenza, Epstein-Barr, and Zika viruses**.
- Rarely associated with **vaccination-induced immune activation**.

Pathophysiology

- Immune system produces antibodies that **damage peripheral nerve myelin or axons**.
- Results in **disrupted nerve signal transmission and muscle control impairment**.

Symptoms

- **Early Signs**
  - Tingling and numbness starting in **legs and progressing upwards gradually**.
  - Pins-and-needles sensation accompanied by **lower limb weakness and back pain**.
- **Severe Manifestations**
  - Progressive paralysis affecting **arms, facial muscles, and respiratory function**.
  - Difficulty in **breathing, speaking, and maintaining vision clarity**.
- **Complications**
  - Involvement of autonomic nervous system causing **irregular heartbeat and blood pressure fluctuations**.
  - Risk of **respiratory failure** requiring mechanical ventilation support.

Treatment and Management

- **Plasma exchange therapy** removes harmful antibodies circulating in the blood.
- **Intravenous immunoglobulin therapy** neutralises immune-mediated nerve damage.
- Supportive care includes **ventilator support, physiotherapy, and long-term rehabilitation**.

Recovery and Prognosis

- Most patients recover gradually over **months to years with medical support**.
- Early diagnosis and treatment significantly **reduce severity and long-term disability**.

Coconut Root Wilt Disease

Context

- Coconut Root Wilt Disease is **rapidly spreading** across major coconut-growing regions of **Kerala, Tamil Nadu and Karnataka**. The outbreak is **affecting lakhs of palms**, threatening livelihoods and regional coconut productivity.

About Coconut Root Wilt Disease

- A **chronic, non-fatal phytoplasma disease** of coconut causing long-term decline and severe yield loss.
- Infected palms remain alive and act as **persistent inoculum sources** for further transmission.
- **Origin and Spread**
  - **First reported:** Over **150 years ago** from **Erattupetta, Kerala**.
  - **Endemic persistence:** Continues as a major disease in southern India.
  - **Spread drivers:**
    - **Vector-borne transmission** in continuous coconut belts.
    - **Wind-assisted movement** of insect vectors.
    - **Abiotic stress:** Temperature extremes weakening palms.
    - **Biotic stress:** New sucking pests like **whiteflies** increasing susceptibility.
- **Vector**
  - Transmitted by **sap-sucking insect vectors**.
  - Commonly cited vectors in endemic zones:
    - **Stephanitis typica**
    - **Proutista moesta**
- **Key Symptoms**
  - **Drooping leaves:** Leaflets lose stiffness and hang down.
  - **Tip yellowing:** Yellowing begins at leaf tips and spreads inward.
  - **Leaf curling:** Leaflets cup inward, giving a ribbed appearance.
  - **Poor flowering:** Reduced inflorescence and **premature nut fall**.
  - **Chronic decline:** Root decay, poor growth, and **tapered trunk top** in advanced stages.
- **Management and Solutions**
  - **Select tolerant palms:** Identify high-yielding, disease-tolerant palms and multiply through nurseries.
  - **Field sanitation:** Remove severely affected, low-yielding palms to limit inoculum sources.
  - **Soil and water management:** Ensure **green manuring, proper irrigation and drainage**.
  - **Organic nutrition:** Apply **farmyard manure, green manure and neem cake** annually.
  - **Stress reduction:** Follow **intercropping practices** to improve soil health and palm resilience.

Rabies

Nature and Classification

- Rabies is a **vaccine-preventable**, zoonotic, viral disease affecting humans and animals.
- It is caused by the **Rabies virus (RABV)**, targeting the central nervous system.
- Rabies infects all mammals, including dogs, cats, livestock, and wildlife species.
- It is classified as a **Neglected Tropical Disease (NTD)**.
- The disease disproportionately affects poor, marginalised, and vulnerable populations.

Transmission Pathways

- Rabies spreads through **saliva** of infected animals.
- Transmission usually occurs via bites and scratches.
- Direct contact with mucosa, such as eyes or mouth, can transmit infection.
- Open wounds exposed to infected saliva also facilitate viral entry.

Clinical Forms of Rabies

- Rabies manifests in two distinct clinical forms.
- **Furious rabies** is marked by hyperactivity, agitation, and hallucinations.
- Patients may show hydrophobia and erratic behaviour in this form.
- **Paralytic rabies** is characterised by muscle weakness progressing to paralysis.
- Paralytic form gradually leads to coma and eventual death.

Incubation Period

- The incubation period typically ranges between **2–3 months**.
- In some cases, incubation may be as short as one week.
- In rare instances, symptoms may appear after one year.

Symptoms and Disease Progression

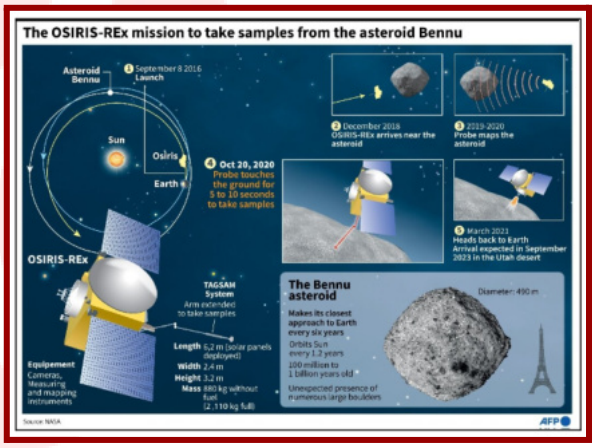
- Early symptoms include fever, pain, and general discomfort.
- Patients often experience tingling, pricking, or burning at the bite site.
- As the virus reaches the central nervous system, severe neurological symptoms emerge.
- Progressive inflammation of the brain and spinal cord develops.
- Once clinical symptoms appear, rabies is **fatal in 100% of cases**.

Prevention and Control

- Rabies prevention focuses on interrupting transmission at the animal source.
- **Vaccinating dogs**, including puppies, is the most cost-effective prevention strategy.
- Dog vaccination significantly reduces human rabies cases by blocking viral spread.

Topic: Space and Defence

Asteroid Bennu



- **Bennu is a Near-Earth Asteroid (NEA)** located about **200 million miles from Earth**.
- It was **discovered in 1999** by the **NASA-funded Lincoln Near-Earth Asteroid Research team**.
- Bennu is classified as a **B-type asteroid**, indicating **carbon-rich composition**.
- Around **20–40% of Bennu's interior is empty space**.
- Estimated age of Bennu is **about 4.5 billion years**.

Asteroids

- **Asteroids are rocky minor planets** that **orbit the Sun**.
- They are **remnants of solar system formation**, dating back **~4.6 billion years**.
- **NASA has identified about 994,000 asteroids** so far.

Classification of Asteroids

- **Main Asteroid Belt** lies between **Mars and Jupiter**.
  - It contains approximately **1.1–1.9 million asteroids**.
- **Trojans share orbits with larger planets**, such as **Jupiter, Neptune and Mars**.

- **Near-Earth Asteroids (NEAs)** have orbits that pass **close to Earth**.
  - More than **10,000 NEAs** are currently known.
- **1,400+ asteroids are classified as Potentially Hazardous Asteroids (PHAs)**.

OSIRIS-REx Mission

- **OSIRIS-REx** (Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer) **is a NASA asteroid sample-return mission**.
- **Target asteroid of the mission is Bennu**.
- It is the first U.S. mission to collect and return **asteroid samples**.
- The spacecraft was **launched in 2016**. It **reached Bennu** in 2018.

Aditya-L1 Mission

Context: On the **second anniversary** of **Aditya-L1** reaching the **Lagrangian point (L1)**, **ISRO** announced the **first Announcement of Opportunity (AO) cycle** soliciting proposals from Indian scientists for observations.

About the Mission

- **Launch and Orbit**
  - Aditya-L1 was launched using **PSLV XL**.
  - Launch site was **Satish Dhawan Space Centre**.
  - Mission placed in a **halo orbit** around the **L1 Lagrangian Point**.
- **Mission Profile**
  - Aditya-L1 is **India's first solar observatory mission**.
  - It carries **seven scientific payloads**.
  - Mission performs **multi-wavelength observations** of the Sun.
- **Payloads on Aditya-L1**
  - **Remote Sensing Payloads**
    - **VELC** (Visible Emission Line Coronagraph) studies the **solar corona** and **CME dynamics**.
    - **SUIT** (Solar Ultra-violet Imaging Telescope) images the **photosphere and chromosphere** in **near-UV**.
    - **SoLEXS** (Solar Low Energy X-ray Spectrometer) observes **soft X-ray solar flares**.
    - **HEL1OS** (High Energy L1 Orbiting X-ray Spectrometer) observes **hard X-ray solar flares**.
  - **In-situ Payloads**
    - **ASPEX** (Aditya Solar Wind Particle Experiment) studies **solar wind and energetic ions**.
    - **PAPA** (Plasma Analyser Package for Aditya) analyses **plasma properties in interplanetary space**.
    - **MAG** (Advanced Tri-axial High-Resolution Digital Magnetometers) measures **interplanetary magnetic field**.
    - Magnetometer sensors placed on a **6-metre deployable boom**.

Capabilities of Aditya-L1

- Provides **first spatially resolved solar disk images in near-UV band**.
- Observes **CME dynamics close to the solar disk** (~1.05 solar radius).
- Enables study of **CME acceleration region**.
- Equipped with **onboard intelligence** for detecting **CMEs and solar flares**.
- Studies **directional and energy anisotropy of solar wind**.
- Uses **multi-directional observations** of solar wind.

Major Scientific Objectives

- Studies **coronal heating mechanisms**.
- Examines **solar wind acceleration processes**.
- Investigates **initiation of CMEs and solar flares**.
- Analyses **Sun–Earth space weather interactions**.
- Studies **solar atmosphere coupling and dynamics**.

PSLV-C62 Mission

Mission Overview

- **PSLV-C62** is a **multi-payload ISRO mission** carrying **one primary and eighteen secondary satellites**.
- It is **ISRO's first space launch of 2026**, scheduled from **Sriharikota launch centre**.

Primary Payload – EOS-N1 (Anvesha)

- **EOS-N1 (Anvesha)** is an **Earth-observation hyperspectral imaging satellite** developed mainly for **DRDO**.
- Hyperspectral imaging allows **material and object identification using hundreds of spectral wavelengths**.
- Provides **high-precision data** for **border surveillance, strategic monitoring and national security**.
- Also supports **civilian uses** such as **agriculture planning, urban mapping, mineral detection and environment monitoring**.

European Payload – Kestrel Initial Demonstrator (KID)

- **KID** is a **small experimental re-entry capsule** developed with a **Spanish startup**.
- The capsule will **re-enter Earth's atmosphere and splash down in the South Pacific Ocean**.

Commercial and Academic Payloads

- **Seventeen commercial payloads** from India, Mauritius, Luxembourg, UAE, Singapore, Europe and the United States are onboard.
- Indian payloads include **AayulSAT, CGUSAT-1, DA-1, SR-2, Lachit-1, Solaras-S4 and DSAT-1**.

Project Suncatcher

Context

- Google Research proposed **Project Suncatcher** to explore space-based, solar-powered AI data centres.

What it is

- Concept and research programme to **deploy AI datacentres in low-Earth orbit (LEO)**.
- Uses **continuous solar power** to run energy-intensive artificial intelligence workloads.
- Launched by: **Google Research (Google)**.

Aim

- Reduce **AI energy footprint using uninterrupted space-based solar power**.
- Decouple AI growth from **terrestrial grids, land use, and water-based cooling systems**.

How it Works

- Uses **densely clustered satellites**, not a sparse global constellation.
- Operates in **sun-synchronous orbits to ensure constant sunlight exposure**.
- Distributes AI workloads through **ultra-high-bandwidth inter-satellite communication links**.
- Limits Earth downlinks to **input and output data only**.
- Employs **radiation-tolerant TPUs and specialised thermal systems for vacuum operations**.

Key Features

- **Always-on solar energy** due to continuous sunlight in selected orbital paths.
- **Petabit-scale inter-satellite networking** for distributed AI training and inference.
- **Radiation-hardened compute systems** tested for multi-year space operation.
- **Minimal dependence on Earth-based bandwidth and infrastructure**.
- **Modular, scalable constellation architecture** with periodic satellite replacement.

Significance

- Provides a **sustainable pathway for expanding global AI compute capacity**.
- Reduces **pressure on terrestrial power grids, water resources, and land availability**.

Chang'e-6 Mission

Context

- Lunar samples returned by **Chang'e-6** reveal evidence supporting the **giant impact theory** of Moon's origin.
- Analysis suggests Moon formed from debris after an **ancient Earth–protoplanet collision**.

About Chang'e-6 Mission

- World's **first successful sample return mission from the Moon's far side**.
- Part of China's **Chang'e Lunar Exploration Programme**, named after the Moon goddess *Chang'e*.
- **Launch and Timeline**
  - **Launched:** 3 May 2024.
  - **Launch Vehicle:** Long March-5 rocket.
  - **Launch Site:** Wenchang Space Launch Center, Hainan Island.
  - **Landed:** 1 June 2024.
  - **Returned to Earth:** Nearly one month after sample collection.
- Consists of **four modules**:
  - Orbiter
  - Lander
  - Ascender
  - Returner
- **Landing Site**
  - **South Pole–Aitken Basin**, lunar far side.
  - One of the **oldest and largest impact craters**, around **4 billion years old**.
  - Basin spans approximately **2,500 kilometres** across the lunar surface.
- **Sampling Methods**
  - **Subsurface drilling** to collect underground regolith.
  - **Robotic arm sampling** to collect surface material.
- **Scientific Instruments**
  - Equipped with **microwave, laser, and optical imaging sensors**.
  - Measures terrain, distance, speed, and identifies surface obstacles.
- **Technological Significance**
  - Second mission to reach Moon's far side after **Chang'e-4 (2019)**.
  - Uses **relay satellites** for communication,

as Earth signals cannot reach far side directly.

- **Scientific Significance**
  - Samples may contain **deep lunar interior material** excavated by ancient impact.
  - Strengthens evidence for the **giant impact hypothesis** of Moon's formation.
  - Enhances understanding of **early Earth–Moon system evolution**.

Artemis II Mission

Context:

- NASA has fixed **6 February** as the target launch date for **Artemis II**.
- It will be the **first crewed lunar mission since Apollo 17 (1972)**, sending astronauts around the Moon.

Artemis II Mission

- **Nature:** First **crewed mission** of NASA's Artemis programme.
- **Mission type: Lunar flyby** (no surface landing).
- **Spacecraft: Orion** crew module.

Organisations Involved

- **NASA:** Lead agency.
- **Canadian Space Agency (CSA):** International partner.

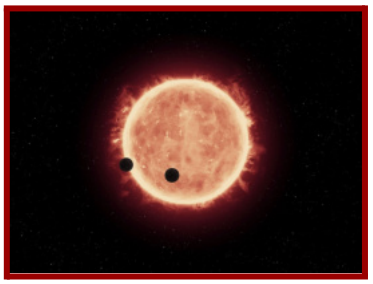
Objectives

- Validate **human-rated deep-space systems** in real mission conditions.
- Prepare for **Artemis III lunar landing**.
- Support long-term **human presence beyond Earth orbit** and future Mars missions.

Key Features

- **Crewed far-side orbit:** Four astronauts will travel around the Moon.
- **Free-return trajectory:** Uses Earth–Moon gravity for safe return.
- **System testing:** Life support, navigation, communications, radiation shielding, manual piloting.
- **Distance milestone:** ~230,000 miles from Earth, farther than any previous human mission.
- **Mission duration:** ~10 days.
- **Recovery:** Pacific Ocean splashdown.

ExoMiner++: Planet Spotter



Overview

- **Nature:** Deep-learning Artificial Intelligence (AI) model for exoplanet detection
- **Developed by:** NASA researchers
- **Successor to:** ExoMiner (Kepler mission-based)

Purpose

- Identifies **exoplanets** by analysing stellar brightness data
- Detects **transit signals**—dip in star's brightness when a planet passes in front

Data Sources

- Kepler Space Telescope
- TESS (Transiting Exoplanet Survey Satellite)

Working Mechanism

- Analyses **light curves** (brightness vs time graphs)
- Differentiates **true planetary transits** from false positives such as:
  - Binary stars
  - Background stellar objects
  - Instrumental noise

Key Features

- **Explainable AI:**
  - Assigns probability score for planetary signal
  - Explains reasoning behind classification
- **High-throughput:**
  - Can compare thousands of stars simultaneously
- **Open-source:**
  - Released on **GitHub** for global scientific use

Achievements

- **ExoMiner (earlier version):**
  - Validated **370 exoplanets** from Kepler data
- **ExoMiner++:**
  - Identified **~7,000 potential exoplanet candidates** from TESS data

Scientific Significance

- Enhances **speed and accuracy** of exoplanet validation
- Reduces dependency on slow manual verification methods

- Supports **future missions** like:
    - **Nancy Grace Roman Space Telescope**

Graviton

Context

- Researchers from **Stevens Institute of Technology** and **Yale University** are developing an experiment to **detect gravitons**, aiming to link **quantum mechanics** with **general relativity**.

About Graviton

- **Overview**
    - **Definition:** A **hypothetical elementary particle** proposed to mediate the **gravitational force**.
    - **Analogy:** Similar to **photons** carrying electromagnetic force.
    - **Scientific value:** Confirmation would establish **gravity as a quantum force**.
- **Proposed Detection Method**
    - **Detector type:** Superfluid helium resonator.
    - **Operating condition:** Cooled to **quantum ground state** to minimise background noise.
    - **Mechanism:**
        - A passing **gravitational wave** may transfer a **single quantum of energy (graviton)**.
        - This generates a **phonon (quantum vibration)** inside the resonator.
        - **Lasers** are used to detect the vibration signal.
- **Detection Challenges**
    - **Weakest fundamental force:** Gravity is far weaker than electromagnetic, strong, and weak nuclear forces.
    - **Low interaction probability:** Gravitons can pass through matter with near-zero interaction.
    - **Signal ambiguity:** Observed vibrations may still be explained by classical gravity effects.
- **Limitations**
    - **Practical feasibility:** Theoretical studies suggest single-graviton detection may be technologically unachievable.
    - **Noise sensitivity:** Extreme isolation and precision are required to avoid false signals.
- **Significance**
    - **Theoretical breakthrough:** Would support a quantum theory of gravity.
    - **Scientific impact:** Bridges the gap between Einstein's general relativity and quantum mechanics.
    - **Cosmological insight:** Enhances understanding of the fundamental structure of the universe.

Pralay Missile

Context

- DRDO successfully conducted a **salvo launch** of two Pralay missiles from the same launcher.
- The launch was executed off the **Odisha coast** during user evaluation trials.
- The test marked a key milestone in validating rapid, successive firing capability.

What is Pralay Missile?

- **Pralay** is an indigenously developed, solid-propellant, quasi-ballistic surface-to-surface missile.
- It is designed for **high-precision conventional strikes** against diverse battlefield targets.
- The missile is intended for deployment by the **Indian Army** and the **Indian Air Force**.

Aim and Operational Role

- To provide armed forces with a **rapid-response, high-accuracy strike capability**.
- To strengthen **tactical deterrence** and enhance battlefield dominance through precision attacks.
- To enable swift conventional responses without escalating to nuclear thresholds.

Key Features

- **Quasi-ballistic trajectory** reduces predictability and complicates enemy air defence interception.
- Missile range varies approximately from **150 kilometres to 500 kilometres**.
- Classified as a **quasi-ballistic surface-to-surface missile** for tactical operations.
- Uses **solid propellant**, ensuring quick launch readiness and operational reliability.
- Equipped with **advanced guidance and navigation systems** for high targeting accuracy.
- Capable of carrying **multiple warhead types** for different mission requirements.
- Features **salvo launch capability**, enabling multiple missiles to be fired rapidly.
- Salvo firing enhances **saturation attack potential** against adversary defences.

Suryastra Rocket System

In News

- Indian Army signed a **₹293-crore emergency procurement contract** for **Suryastra**.
- Contract executed with **NIBE Limited**, in collaboration with **Elbit Systems**.

System Profile

- Suryastra is **India's first indigenous universal multi-calibre long-range rocket launcher**.
- Designed for **surface-to-surface precision strikes**.
- Supports **150 km and 300 km strike ranges**.

Technology Base

- Based on **Israeli PULS (Precise & Universal Launching System)**.
- Adapted for Indian needs under a **Technology Collaboration Agreement (July 2025)**.

Key Capabilities

- **Universal launcher** compatible with **multiple calibres**.
- Supports **122 mm, 160 mm and 306 mm** munitions.
- Achieved **Circular Error Probable (CEP) below 5 metres** during trials.
- Capable of **simultaneous multi-range engagements**.
- Platform adaptable to **4×4, 6×6 and 8×8 wheeled chassis**.

Man Portable Anti-Tank Guided Missile (MPATGM)

About the Missile

- **MPATGM** is a **third-generation, fire-and-forget, man-portable anti-tank guided missile system**.
- It is designed to destroy **modern main battle tanks and armoured vehicles**.
- The system has been **indigenously developed by Defence Research and Development Organisation (DRDO)**.
- Lead laboratory: **Defence Research & Development Laboratory (DRDL), Hyderabad**.

Key Technical Features

- **Fire-and-forget capability**: Missile self-guides after launch.
- **Imaging Infrared (IIR) seeker**: Enables **day, night and low-visibility operations**.
- **Top-attack mode**: Targets weakest armour on tank roof.
- **Tandem HEAT warhead**: Neutralises reactive armour before penetrating main armour.
- **Engagement range**: **200 m to 4,000 m**.
- **Man-portable launcher**: Soldier-carried; can also be tripod- or vehicle-mounted.

Operational Significance

- Enhances **infantry anti-armour capability** in high-intensity conflicts.
- Reduces dependence on **imported ATGM systems**.
- Supports **Aatmanirbhar Bharat** in defence manufacturing.

RBS-15 Missile

What it is

- RBS-15 is a **fire-and-forget, anti-ship missile** with surface-to-surface and air-to-surface capability.
- It also possesses **land-attack capability** for engaging coastal and land-based targets.
- Developed by **Saab Bofors Dynamics, Sweden**.

Physical Specifications

- **Length:** 4.35 metres.
- **Fuselage diameter:** 0.5 metres.
- **Wingspan:** 1.4 metres.
- **Launch weight:** 800 kilograms.
- **In-flight weight:** 650 kilograms.

Performance

- **Range:** Up to 200 kilometres.
- **Speed:** Subsonic, approximately **Mach 0.9**.
- **Warhead:** 200 kg high-explosive, pre-fragmented blast warhead for maximum target damage.

Guidance and Navigation

- **Inertial Navigation System (INS)** combined with **GPS receiver**.
- **Radar altimeter** for low-altitude flight control.
- **Ku-band radar seeker** for terminal target acquisition.

Key Features

- **Low sea-skimming flight profile** with unpredictable evasive manoeuvres.
- **Low radar cross-section and infrared signature** for reduced detectability.
- **Advanced target discrimination and selection capability**.
- **High resistance to electronic countermeasures**, including chaff, jammers, and decoys.

Operational Support System

- **Missile Engagement Planning System (MEPS)** enables mission planning for multiple combat scenarios.

C295 Transport Aircraft

About:

- New-generation **tactical transport aircraft** in the light–medium airlift category.
- Designed and manufactured by **Airbus (Europe)**.
- Multi-role platform for **troop and cargo transport, ISR, maritime patrol, MEDEVAC, VIP transport, and airborne support missions**.

Key Features:

- **Payload capacity:** Up to **9 tonnes** or **71 troops**.
- **Endurance:** Up to **13 hours**.
- **Cruise speed:** Around **260 knots**.
- **Low-speed capability:** Can fly at **110 knots** for tactical operations.
- **Engines: Twin turboprop** configuration.
- **STOL capability:** Operates from **short and unprepared airstrips**.
    - **STOL (Short Take-Off and Landing)**
        - It refers to an aircraft's ability to take off and land on very short runways or unprepared airstrips, making it suitable for **remote, hilly, or battlefield conditions**.
- **Rear ramp door:** Enables **rapid loading, paradropping, and troop deployment**.
- **All-weather operations** with strong low-level flight performance.

Long-Range Anti-Ship Hypersonic Glide Missile (LR-AShM)

Context

- India to **publicly debut LR-AShM at the 77th Republic Day parade**, showcasing indigenous hypersonic maritime strike capability.

LR-AShM - Overview

- **Definition:** An **indigenous hypersonic glide missile** designed to destroy **high-value naval targets**, including **aircraft carrier battle groups**, at very long ranges.
- **Developer: DRDO** for the **Indian Navy**.
- **Primary role: Coastal battery and maritime strike** missions.

Objectives

- Strengthen **maritime deterrence** in the **Indian Ocean Region (IOR)**.
- Enable **standoff engagement** beyond conventional cruise missile ranges.
- Enhance **A2/AD (Anti-Access/Area Denial)** through **shore-based mobile launchers**.

Key Features

- **Speed:** Operates in the **hypersonic regime (Mach 5+)**, drastically reducing enemy reaction time.
- **Range:** Approx. **1,500 km** (future variants under development).
- **Architecture:** Boost-glide system, solid rocket boost followed by unpowered, manoeuvrable hypersonic glide.
- **Guidance: Inertial navigation + satellite support + active radar seeker** for engaging moving naval targets and resisting ECM.
- **Flight profile:** Low-altitude, evasive trajectory to reduce detection and interception.
- **Deployment:** Land-based mobile launchers initially; ship-borne and air-launched variants planned.

Significance

- Positions India among **select hypersonic-capable nations** (US, Russia, China).

Strengthens **sea-denial and power-projection** across the **Arabian Sea and Bay of Bengal**.

V-BAT Autonomous Drones

Context: Indian Army selected **Shield AI** for **V-BAT drones** with Hivemind A.

What is V-BAT?

- **Group 3 VTOL Unmanned Aircraft System (UAS)**
- Performs **vertical take-off and horizontal transition flight**
- Uses **ducted-fan, enclosed-rotor design**

Developer and Partner

- **OEM: Shield AI**, United States
- **Indian partner: JSW Defence**
- Manufacturing hub in **Hyderabad**, investment **$90 million**

Primary Role

- Provides **Intelligence, Surveillance, and Reconnaissance (ISR)**
- Operates in **GPS-denied and communication-jammed environments**
- Deployable from **ships, rooftops, and forward military posts**

Hivemind AI Software

- Enables **autonomous navigation without GPS or human control**
- Supports **dynamic threat avoidance during electronic warfare**
- Allows **multi-drone collaborative mission operations**

Operational Features

- Requires **12×12 feet launch area** only
- Suitable for **Himalayan ridges and naval ship decks**
- Uses **heavy-fuel engine compatible with military logistics**

Performance Specifications

- **Endurance:** Over **12 hours continuous flight**
- **Payload:** High-definition ISR and targeting sensors

Strategic Significance

- Suitable for **LAC, LOC, and Indian Ocean Region** operations
- Enables **sovereign AI development** through Hivemind SDK
- Supports **Make in India** defence manufacturing ecosystem

Pechora Missile System

Context: Alpha Design Technologies Limited upgraded the Indian Air Force's Pechora system under indigenous modernisation.

What is it?

- Soviet-origin **medium-range surface-to-air missile** system
- Designed for **low and medium-altitude** aerial target interception
- **Official Name:** Known as S-125 Neva/Pechora
- **Service in India:** Operational in Indian air defence network **since 1970s**

System Components

- Consists of **radar-guided missile launcher and fire control unit**
- Typically employs **V-600 surface-to-air missile**

Radar System

- Uses **4R90 Yatagan radar with five parabolic antennas**
- Performs **target detection, tracking, and engagement lock**

Operational Capabilities

- Effective against **slow-moving and low-flying aerial threats**
- Suitable for **drones and cruise missile interception**

Network Integration

- Operates **independently or within integrated air defence networks**
- Functions under **heavy electronic jamming environments**

Range and Altitude

- Operational firing range up to **thirty to thirty-five kilometres**
- Engages targets from **twenty meters to twenty-five kilometres altitude**

Detection and Accuracy

- Radar detects targets up to **one hundred kilometres distance**
- Kill probability around **ninety-two percent success rate**

Engagement Capacity: Can engage **two targets simultaneously at nine hundred meters speed**

Topic: IT and Computer

Electronics Components Manufacturing Scheme (ECMS)

Basic Profile

- **ECMS is a flagship incentive scheme** for electronics manufacturing.
- It promotes **domestic manufacturing of electronic components and sub-assemblies**.
- The scheme aims to **reduce import dependence** in the electronics sector.
- Implemented by the **Ministry of Electronics and Information Technology (MeitY).**

Tenure

- **Turnover-linked incentive** tenure: **6 years**.
- Includes **1-year gestation period**.
- **Capex incentive** tenure: **5 years**.

Incentive Structure

- Provides **turnover-linked incentives**.
- Provides **capex-based incentives**.
- Allows **hybrid incentive structures**.

Target Segments

- Printed Circuit Boards (PCBs).
- Camera Modules.
- Copper-Clad Laminates.
- Polypropylene Films.
- Electronics capital equipment.

Performance Criteria

- Incentives linked to **incremental production** and employment generation
- Scheme rewards **early movers**.

Strategic Targets

- **100% domestic demand** target for **Copper-Clad Laminates**.
- **20% domestic demand** target for **PCBs**.
- **15% domestic demand** target for **Camera Modules**.

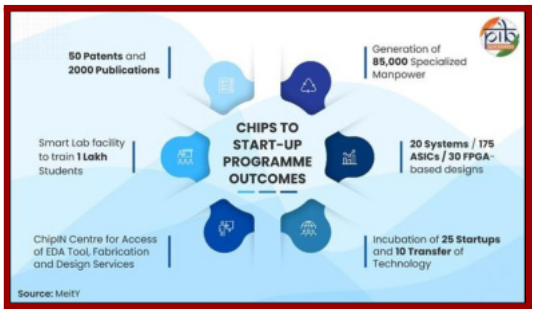
Mpemba Effect

Context: Indian scientists simulated the **Mpemba effect** using a **supercomputer model**.

Core Concept

- Mpemba effect describes **hot water freezing faster than cold water** under certain conditions.
- It is a **counterintuitive physical phenomenon**.
- **Discovery and Naming**
  - Named after **Erasto Mpemba**.
  - Scientifically reported in **1969**.
  - Phenomenon noted earlier by **Aristotle, Francis Bacon and René Descartes**.
- **Scientific Nature**
  - Occurs only under **specific experimental conditions**.
  - **No single universal mechanism** explains the effect.
  - Classified as a **non-equilibrium thermodynamic phenomenon**.
- **Scientific Relevance**
  - Relevant to **phase transitions** in physics.
  - Studied using **computational and experimental methods**

Chips to Start-up (C2S) Programme



What it is?

- A national initiative to build **industry-ready chip design talent and indigenous semiconductor ecosystem**.
- Focuses on **hands-on training, R&D exposure, fabrication access, and start-up enablement**.

Launch and Implementation

- Launched in **2022** by the **Ministry of Electronics and Information Technology (MeitY)**.
- Implemented through academic institutions, national labs, and industry partnerships.

Aim

- Create a **robust pipeline of skilled chip designers and semiconductor innovators**.
- Promote **IP creation, start-ups, and technological self-reliance in critical technologies**.

Financial Outlay

- **₹250 crore** allocated for a **five-year national capacity-building programme**.

Human Resource Targets

- Train **200 PhDs** in advanced semiconductor and chip design domains.
- Support **7,000 M.Tech students in VLSI and chip design specialisations**.
- Cover **8,800 M.Tech students in allied engineering streams with VLSI exposure**.
- Enable **69,000 B.Tech students** with foundational and applied chip design skills.

Infrastructure and Tools Access

- Provides **shared EDA tools, high-performance computing, FPGA boards, and SMART laboratories**.
- Ensures **nationwide academic access to advanced semiconductor design infrastructure**.

Hands-on Fabrication Support

- Facilitates **shared wafer runs through Semiconductor Laboratory, Mohali**.
- Enables students to **fabricate and test real silicon prototypes and ASIC designs**.

Chip Design Enablement Platform

- Operates **National ChipIN Centre under C-DAC, Bengaluru**.
- Supports **SoC design, IP core development, and national chip repositories**.

Innovation and Industry Linkages

- Encourages **patent filings, IP generation,** and semiconductor **start-up incubation**.
- Partners with **global EDA firms** and semiconductor industries for **advanced training.**

ICE Cloud (Integrated Cloud Environment)

Context: C-DAC announced a major capability expansion of the **ICE platform**, strengthening open-access supercomputing and AI infrastructure for national R&D.

ICE Cloud

- **Overview**
  - **Indigenous cloud platform** for **AI- and HPC-driven scientific research**.
  - Enables **reproducible, scalable, and remote access** to advanced computing resources.
- **Developed by:** Centre for Development of Advanced Computing (C-DAC)
- **Funding:** Department of Biotechnology (DBT)
- **Users:** Students, scientists, researchers, start-ups, and industry
- **Core Capabilities**
  - Supercomputing access (HPC)
  - AI & ML toolchains
  - Quantum computing tools
  - Simulation and modelling environments
  - Software development platforms
- **Services**
  - Cloud storage
  - Bioinformatics tools
  - Virtual hosting
  - Pipeline execution
  - AI visualisation
  - Collaborative workspaces
- **Significance**
  - Democratizes access to **national compute infrastructure**.
  - Supports **innovation, startups, and interdisciplinary research**.
  - Strengthens **Atmanirbhar Bharat** in digital and scientific ecosystems.

ASC ARJUN Humanoid Robot

Context: Indian Railways has deployed a humanoid robot named **"ASC ARJUN"** at **Visakhapatnam Railway Station** to assist the Railway Protection Force (RPF) in passenger safety and station surveillance.

Overview

- **ASC ARJUN:** An indigenously developed **humanoid robot** for railway station security and passenger assistance.
- **Developer:** Designed and built in **Visakhapatnam** using home-grown technology.
- **Role:** Works alongside **RPF personnel** during peak passenger movement and routine patrols.

Key Features

- **AI Surveillance:** Face Recognition System (FRS) for intrusion detection and identity monitoring.
- **Crowd Management:** AI-based crowd analysis with **real-time alerts** to RPF control rooms.
- **Public Communication:** Automated announcements in **English, Hindi, and Telugu**.
- **Navigation:** Semi-autonomous movement with **obstacle avoidance**.
- **Patrolling:** 24/7 platform surveillance to optimise manpower deployment.
- **Emergency Response:** Built-in **fire and smoke detection systems**.
- **Human Interaction:** Passenger assistance interface; gestures like **'Namaste'** and **salutes** for RPF staff.

Significance

- **Enhances station security** through continuous AI-assisted monitoring.
- **Improves passenger experience** with multilingual information and guidance.
- **Promotes indigenous innovation** in public-sector robotics and smart infrastructure.

Miscellaneous

Hydrokinetic Turbine Technology

In News

- **Tripura government** identified **10 river sites** for **185 MW** power generation.
- Power generation proposed using **hydrokinetic turbine technology**.

Technology Profile

- Hydrokinetic turbines generate electricity from **moving water currents**.
- They are installed **directly within river channels**.
- Technology functions **without constructing dams or barrages**.
- Uses **kinetic energy of flowing water**, not potential head.

Energy Characteristics

- Operates with **near-zero hydraulic head**.
- Classified as a **renewable energy technology**.

Environmental Aspect

- Causes **minimal alteration of river flow**.
- Has a **smaller ecological footprint** than conventional hydropower.

Operational Features

- Suitable for **single units or multi-turbine arrays**.
- Requires **lower maintenance** due to fewer mechanical components.

White Dwarf System

In News

- **National Aeronautics and Space Administration's IXPE mission** probed a **white dwarf binary system**.
- Study focused on **EX Hydrae** using **X-ray polarisation**.

Basic Concept

- A white dwarf system contains a **white dwarf and a companion star**.
- White dwarf is a **dense stellar remnant of a Sun-like star**.

Formation

- Forms after a star **exhausts nuclear fuel**.
- Outer layers expelled as a **planetary nebula**.
- Core left behind becomes a **white dwarf**.

Binary Interaction

- White dwarf **accretes gas from companion star**.
- Gas transfer occurs due to **strong gravitational pull**.

Intermediate Polars

- EX Hydrae belongs to **intermediate polar systems**.
- White dwarf has a **moderate magnetic field**.
- Magnetic field **partially disrupts accretion disc**.
- Gas flows along **magnetic field lines** onto surface.

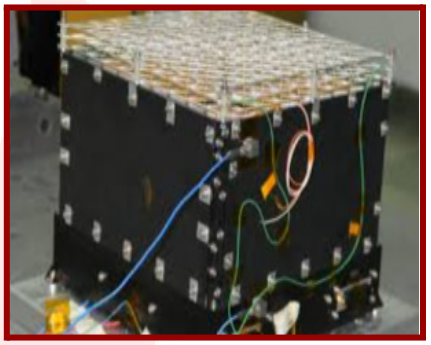
Physical Characteristics

- Mass comparable to the **Sun**.
- Size similar to the **Earth**.
- Matter supported by **electron degeneracy pressure**.
- Does **not undergo nuclear fusion**.

Radiation and Limits

- Accreting matter emits **X-rays at very high temperatures**.
- **Chandrasekhar limit** for white dwarf mass is **~1.4 solar masses**.

Dust EXperiment (DEX)



Context: ISRO confirmed **one IDP enters Earth's atmosphere every ~16 minutes** using DEX data.

About DEX

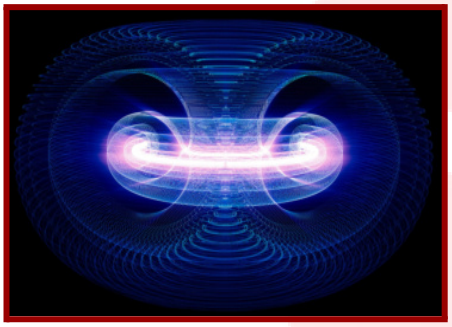
- DEX is **India's first indigenous cosmic dust detector**.
- Detects **interplanetary and orbital dust** in Earth's upper atmosphere.
- **Developers and Platform**
  - Developed by **Indian Space Research Organisation**.
  - Built by **Physical Research Laboratory**, Ahmedabad.
  - Flown on **POEM** of **PSLV-C58** mission.
- **Mission Aim**
  - Measures **cosmic dust flux** in near-Earth space.
  - Generates data for **space environment monitoring** and **satellite safety**.
- **Key Technical Features**
  - Detects **hypervelocity impacts (>4 km/s)**.
  - Payload mass **~3 kg**; power **~4.5 W**.
  - **140° field of view** for higher hit probability.
  - Operated in **LEO ~350 km**, **~9.5° inclination**.
- **Measurements**
  - Detection rate **~1 particle per 1,000 seconds**.
  - Measured flux **~6.5×10^{-3} particles m^{-2}**

s^{-1}.

Interplanetary Dust Particles (IDPs)

- IDPs are **microscopic fragments** from **comets, asteroids and meteoroids**.
- Continuously enter **planetary atmospheres**.
- **Origins:** From **cometary debris**, **asteroidal collisions**, and **cosmic erosion**.
- **Relevance**
  - Pose **risk to spacecraft** at hypervelocity.
  - Inform **near-Earth space environment** assessments.

Greenwald Limit



Overview

- **Greenwald Limit** is a **theoretical upper limit on plasma density** in a **tokamak fusion reactor**.
- It links **maximum stable plasma density** to the **plasma current and reactor size**.

Why it Matters

- Nuclear fusion requires **high plasma density, temperature and confinement time**.
- The Greenwald limit has acted as a **key bottleneck** to achieving **self-sustaining fusion (ignition)**.

Key Characteristics

- **Tokamak-specific limit:** Applies to **donut-shaped magnetic fusion reactors**.
- **Stability threshold:** Crossing the limit normally causes **plasma instability and collapse**.
- **Energy relevance:** Higher plasma density increases **collision rates and fusion output**.
- **Design constraint:** Long treated as a **fixed ceiling** in reactor engineering.

Recent Development

- China's **EAST fusion reactor** achieved **1.3–1.65 times the Greenwald limit** with stable plasma.
- Achieved through **divertor cooling** and **reduction of tungsten impurities**.
- Validates **Plasma–Wall Self-Organisation (PWSO) theory**, indicating a **new high-density operating regime**.

Soft Matter

What it is?

- Soft matter is a **sub-field of condensed matter physics studying easily deformable materials**.
- These materials **change structure under small thermal fluctuations or weak external stress**.

Constituents / Types

- Includes **colloids, polymers, foams, gels, liquid crystals, and biological materials**.
- Many **living systems and industrial mixtures fall within this category**.

Structural Scale

- Dominated by **mesoscopic structures between atomic and macroscopic scales**.
- Material behaviour depends on **interactions among these intermediate-scale building blocks**.

Binding Forces

- Building units are held together by **weak intermolecular forces, not strong atomic bonds**.
- This makes properties **highly sensitive to temperature, pressure, time, and environment**.

Key Properties

- **Viscoelasticity:** Shows both solid-like and liquid-like responses under stress.
- **High deformability:** Easily changes shape without permanent structural damage.
- **Environmental sensitivity:** Small changes cause large variations in material behaviour.

Everyday Examples

- **Curd, toothpaste, shampoo, soap bubbles, and living cells**.
- Widely encountered in **food products, cosmetics, and biological systems**.

Applications

- **Medical:** Drug delivery systems, biomaterials, tissue engineering.
- **Industrial:** Food processing, automotive materials, construction composites.
- **Technology:** Electronics coatings, flexible displays, and advanced manufacturing.

Significance

- Bridges the gap between **solid-state physics and fluid dynamics**.
- Supports **innovation** in healthcare, materials engineering, and sustainable manufacturing.

- Enhances understanding of **biological systems, smart materials, and complex industrial fluids**.

Solid–Liquid Hybrid State of Matter

Context

- Scientists reported a **new nanoscale state of matter** showing **simultaneous solid and liquid behaviour**.
- Observed using **high-resolution transmission electron (HRTE) microscopy**.

What it is?

- A **metal nanoparticle state** where atoms display **solid-like order and liquid-like mobility simultaneously**.
- Challenges the traditional **sharp phase boundary** between solid and liquid.

Key Features

- **Dual behaviour:** Retains crystal-like structure while allowing atomic flow.
- **Sub-freezing liquidity:** Remains liquid-like **below normal freezing temperatures**.
- **Nanoscale phenomenon:** Seen only at **atomic and nanoparticle dimensions**.
- **Phase ambiguity:** Indicates solid–liquid transitions are **gradual, not absolute**, at small scales.

Observation Method

- **High-Resolution Transmission Electron Microscopy (HRTE):**
  - Enables **real-time atomic-level imaging** of nanoparticle structure and motion.

Significance & Applications

- **Catalyst durability:** Prevents **clumping and poisoning** in heterogeneous catalysts.
- **Energy systems:** Improves performance of **fuel cells and hydrogen technologies**.
- **Industrial use:** Relevant for **pharmaceuticals, petrochemicals, and pollution control**.
- **Materials science:** Opens pathways for **phase-engineered nanomaterials**.

Forever Chemicals (PFAS)

Overview

- **Forever chemicals = PFAS (Per- and Polyfluoroalkyl Substances)**
- Large family of **thousands of synthetic, toxic, and highly persistent chemicals**
- Called "forever" due to **extreme resistance to environmental degradation**

Chemical Basis

- Built on **carbon–fluorine (C–F) bonds**
- One of the **strongest chemical bonds**, causing long environmental and biological persistence
- **Bioaccumulate** in humans and wildlife over time

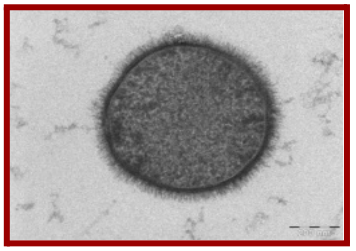
Uses

- **Consumer Products**
  - Cosmetics and skin-care products
  - Non-stick cookware (frying pans, baking equipment)
  - Food packaging (microwave popcorn bags)
  - Textiles and fabric treatments
  - Outdoor clothing and footwear
  - Car and floor polishes
  - Dishwasher rinse aids
- **Industrial Applications**
  - Firefighting foams
  - Grease- and water-resistant coatings
  - Manufacturing of durable, non-stick, and anti-grease materials
- **Environmental Pathways**
  - **Leak into soil, water, and air** during use and disposal
  - Spread through **contaminated drinking water, food chains, and air**

Human Exposure

- Consumption of **PFAS-contaminated water or food**
- Use of **PFAS-containing consumer products**
- Inhalation of **PFAS-laden air or dust**
- **Health Impacts**
  - Immune system suppression
  - Liver and thyroid disorders
  - Increased cholesterol and hypertension
  - Developmental delays in infants
  - Elevated risk of kidney and testicular cancers
- **Regulation & Global Framework:** Stockholm Convention on Persistent Organic Pollutants (POPs)

Bacillus Subtilis

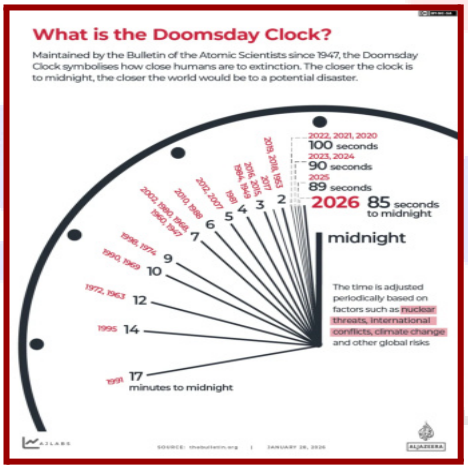


About

- **Gram-positive, rod-shaped, spore-forming bacterium** used as a probiotic and model organism.
- **Status:** Declared **State Microbe of Kerala**.

- **Habitat:**
  - Naturally found in **soil, vegetation, human gut, and fermented foods**.
  - Optimal growth temperature: **25°C–35°C**.
- **Key Characteristics:**
  - **Motile, facultative aerobe, Gram-positive**.
  - Produces **endospores** resistant to heat and UV radiation.
  - Possesses **five signal peptidase genes** aiding antibiotic secretion.
- **Antibiotic Production:** Secretes polymyxin, difficidin, subtilin, and mycobacillin.
- **Biological Importance:**
  - Model organism for endospore formation studies.
  - Non-pathogenic, but opportunistic in immunocompromised individuals.
- **Applications:**
  - Used as **biological fungicide** in agriculture.
  - Competes with plant pathogens in root zones.
  - Certain strains act as **insecticidal agents**.
  - Endospores used to **test sterilants and sporicides**.

Doomsday Clock



Context: Doomsday clock set to **85 seconds to midnight** by **Bulletin of the Atomic Scientists**, **January 2026.**

What is the Doomsday Clock?

- **Symbolic indicator** of proximity to **global catastrophe**
- **Midnight** denotes **human annihilation** or "doomsday"
- Time reflects **perceived global risk levels**

Threat Parameters Considered

- Nuclear weapons risk
- Climate change threats
- Disruptive technological developments

Origin and Evolution

- Created in **1947**
- Developed by **Bulletin of the Atomic Scientists (BAS)**
- Initially set at **7 minutes to midnight**
- Reset **27 times** since inception
- **Latest Record:** 85 seconds to midnight is closest ever recorded

Bulletin of the Atomic Scientists (BAS)

- **Nonprofit organization** focused on **nuclear risk awareness**
- Founded in **September 1945**
- Established by **Atomic Scientists of Chicago**
- Based at **University of Chicago**
- **Founding Personalities**
  - Albert Einstein
  - J. Robert Oppenheimer
  - Eugene Rabinowitch

Black Box (Flight Recorder)

What is a Black Box?

- **Aircraft recording device** capturing **flight and cockpit data.**
- Used for **air accident investigation** and event reconstruction.
- Discovered by **David Warren**, **Australian scientist**

Physical Features

- **Bright orange or yellow** rectangular casing
- Designed to withstand **fire, explosions, water pressure, and impact**
- Outer unit made of **steel or titanium**
- Insulated against **extreme heat, cold, and moisture**

Types of Black Boxes

- **Cockpit Voice Recorder (CVR)**
  - Records pilot conversations and radio transmissions
  - Captures engine and cockpit ambient sounds
- **Flight Data Recorder (FDR)**
  - Records 80+ flight parameters
  - Includes altitude, airspeed, heading, pitch,

roll, acceleration
  - Captures autopilot and system status

Placement in Aircraft
- Installed near **tail section** of aircraft
- Area faces **least impact** during crashes

Bio-Bitumen

In News
- India became the **first country to commercially produce bio-bitumen**.
- Bio-bitumen production aimed at **road construction**.

What is Bio-Bitumen
- Bio-bitumen is a **bio-based substitute for petroleum bitumen**.
- Used as a **binder in road construction**.
- Produced mainly from **agricultural residues**, especially **rice straw**.

Key Features
- Can replace **20–30% of conventional bitumen**.
- Successfully tested for **rutting, cracking and durability**.
- Helps reduce **emissions from crop residue burning**.
- Demonstrated on **NH-40 (Jorabat–Shillong Expressway), Meghalaya**.

Production Process
- Produced using **pyrolysis of rice straw**.
- Biomass heated at **high temperature without oxygen**.
- Generates **bio-oil**, later blended with petroleum bitumen.

Significance
- Reduces **dependence on fossil-fuel-based bitumen**.
- Converts **agricultural waste into infrastructure input**.
- Supports **green and sustainable highway construction**.

Steel Slag Technology

Context:
- **Union Minister** advocated **wider use of steel slag–based roads**, especially in hilly and Himalayan regions.

About Steel Slag Technology:
- **Steel slag:** Byproduct formed during iron and steel smelting at high temperatures.
- Processed slag is used as a substitute for natural aggregates in road construction.
- **Converts industrial waste** into **construction material**, supporting circular economy.

ECOFIX (Pothole Repair Mix):
- Developed by **CSIR–Central Road Research Institute (CRRI)**.
- Uses processed iron and steel slag.
- Enables rapid, durable pothole repair in diverse climatic conditions.

Key Features:
- High strength and durability compared to conventional aggregates.
- Good skid resistance and surface stability.
- Faster setting time, suitable for emergency repairs.
- Performs well in high rainfall and temperature-variation zones.

Benefits:
- Reduces mining of natural stone aggregates.
- Lowers construction costs and waste disposal burden.
- Promotes sustainable and green infrastructure.
- Enhances road longevity in fragile terrains.

Significance:
- Supports waste-to-wealth and circular economy initiatives.
- Strengthens indigenous road construction technology.
- Improves connectivity in ecologically sensitive regions.

Sonic Boom

Overview
- **Sonic boom:** Loud explosive sound produced when an object travels **faster than the speed of sound (Mach 1)**.
- Commonly generated by **supersonic aircraft, rockets, or re-entering space debris**.

Formation Mechanism
- Moving object **compresses air molecules**, forming **shock waves** along its flight path.

- Pressure builds up and is released suddenly, reaching the ground as a **boom-like sound**.

Factors Affecting Intensity

- **Altitude:** Higher altitude → weaker boom at ground level.
- **Size & mass:** Larger, heavier objects displace more air → stronger shock waves.
- **Shape & design:** Aircraft geometry influences wave pattern.
- **Maneuvers:** Turns and acceleration alter shock wave strength.
- **Atmospheric conditions:** Temperature, pressure, and wind affect sound propagation.

Types

- **Single boom:** Typical for compact or shorter aircraft.
- **Double boom:** Long aircraft produce two shocks (nose and tail).

Visible Phenomenon

- **Vapor cone/cloud:** Temporary cloud of condensed water vapour due to rapid pressure and temperature drop around the aircraft.
- Not the sound itself, but a **visual effect of shock waves**.

Impacts

- Can **rattle structures and shatter glass** at low altitude.
- Generally **low direct risk to humans** on the ground.

Key Terms

- **Mach number:** Ratio of object speed to local speed of sound.
- **Shock wave:** Thin region of abrupt pressure, temperature, and density change.

SOCIETY AND SOCIAL JUSTICE

Topic: Social Issues

Acid Attacks in India

Context and Case Background

- A Delhi court acquitted accused in a **2009 acid attack case** on December 24, 2025. Survivor **Shaheen Malik**, attacked at age 26, lost vision in one eye. She underwent **25 reconstructive surgeries** and fought a **16-year legal battle**.

What are Acid Attacks?

- Acid attacks involve throwing or administering **corrosive substances** to cause harm.
- Common acids used include **sulphuric, hydrochloric, and nitric acids**.
- Effects include **severe burns, disfigurement, blindness, maiming**, and psychological trauma.
- Victims are predominantly **women and young girls**, while perpetrators are usually men.

Trends and Statistics

- **NCRB 2023** recorded **207 acid attack cases**, up from 202 in 2022.
- **65 cases** of attempted acid attacks were also reported in 2023.
- **703 cases** were pending in courts during 2023.
- Only **16 convictions** and **27 acquittals** occurred in that year.
- Worst affected States were **West Bengal (57)**, **Uttar Pradesh (31)**, and **Gujarat (15)**.
- It is estimated actual cases may be **around 1,000 annually**, indicating under-reporting.

Reasons for Under-reporting and Low Convictions

- Social stigma, family pressure, and **fear of retaliation** deter reporting.
- Police investigations are often **delayed or poorly conducted**.
- Judicial delays result in **prolonged trials**, weakening survivor confidence.
- Survivors are frequently pushed towards **out-of-court settlements**.

Legal Framework

- **Bharatiya Nyaya Sanhita, Section 124** prescribes **10 years to life imprisonment**.
- Attempted acid attacks attract **5–7 years' imprisonment**.
- Hospitals must provide **free treatment** to survivors.
- Supreme Court (2013) mandated **regulated acid sales**, but enforcement remains weak.

Support and Way Forward

- Survivors demand a **comprehensive ban on acid sales** and stricter monitoring.
- **Bangladesh's 2002 laws** reduced attacks significantly through strict enforcement.
- Need for **fast-track courts**, judicial sensitisation, and penalising delays.
- **Justice J.S. Verma Committee** recommendation for a national survivor rehabilitation fund must be implemented.

The Struggle to Count Women's Labour

Context and Scale of the Issue

- Women's labour remains **systematically undercounted**, despite its centrality to social

functioning.
- A **2023 United Nations report** shows women spend **2.8 extra hours daily** on unpaid care work.
- Domestic labour has entered discourse, but **emotional and mental labour** remains invisible.

Nature of Unrecognised Labour
- Includes sustaining relationships, managing households, and supporting emotional well-being.
- This labour ensures **family stability and social reproduction**, yet remains unpaid and unmeasured.
- Such work is rarely included in **economic accounting or policy design**.

Structural and Ideological Causes
- Feminist scholars highlight **systemic marginalisation of care work** in economic frameworks.
- Care work is framed as secondary to **male-dominated "productive" labour**.
- Economic models privilege **GDP growth and physical infrastructure** over social infrastructure.
- Public spending often sidelines **childcare, elder care, and mental health services**.
- These sectors are predominantly staffed and sustained by **women's unpaid or underpaid labour**.

Gender Division of Labour
- Gendered separation between **production and social reproduction** sustains power inequalities.
- Biological reproduction was used to mask **historical and social subordination of women**.
- Exclusion of women's labour reinforces its treatment as **non-productive**.

Global Legal Recognition: Limited and Uneven
- Institutional recognition of unpaid care work is **fragmented across countries**.
- **Bolivia's Constitution (Article 338)** recognises household work as economic activity.
- **Trinidad and Tobago (1996)** mandates measurement and valuation of unremunerated work.
- **Argentina** provides pension credits for unpaid care work related to child-rearing.
- No framework recognises **mental and emotional labour** explicitly.

Indian Scenario
- India lacks a **legal framework** recognising or compensating unpaid care labour.
- **Madras High Court (2023)** recognised household labour as contributing to family assets.
- The ruling granted wives **equal property rights** for indirect economic contribution.

Way Forward
- Recognition must accompany **structural reconfiguration of gendered social relations**.
- Men must actively **co-shoulder care responsibilities**.
- Without change, unpaid care work will remain **disproportionately feminised**.

Victim Dignity in Criminal Justice

Context and Significance
- Suicide of a young doctor in **Phaltan, Maharashtra (October 2025)** exposed systemic and societal failures.
- Victim alleged **rape and harassment by a police official**, indicating institutional apathy.
- Case highlights **primary crime** of violence and **secondary crime** of victim character assassination.

Secondary Victimisation and Institutional Failure
- Public comments by Maharashtra State Commission for Women revealed private victim communications.
- Such statements reinforced **victim-blaming culture**, even within women-protection institutions.
- This reflects persistent social prejudice undermining women-centric legal reforms.

Legal Framework Protecting Victim Dignity
- **Criminal Law (Amendment) Act, 2013 (Nirbhaya Act)** aimed to curb character assassination.
- **Section 53A, Indian Evidence Act** (now Section 50, BSA, 2023) bars using victim's character.
- **Section 146, Indian Evidence Act** (now Section 48, BSA) prohibits questions on sexual history.
- Focus of trial must remain strictly on **facts of the alleged offence**.
- **Supreme Court Directives**
  - **State of Punjab vs Gurmit Singh (1996)**: Victim testimony not to be doubted on moral grounds.
  - Courts condemned excessive scrutiny as adding **"insult to injury"** to survivors.
  - **Section 228A IPC** (now Section 72, BNS) bans disclosure of victim identity, even posthumously.
  - Media scrutiny of dying declarations violates dignity and investigation integrity.

Gaps Between Law and Practice
- Extra-judicial victim shaming by public functionaries undermines legal safeguards.
- Institutional commentary creates a damaging **"social verdict"** against victims.
- Reveals contradiction between progressive law and regressive societal mindset.

Way Forward
- **Training and sensitisation** of police, prosecutors, and judges on victim trauma.
- **Zero tolerance** for victim-blaming attitudes in

investigations and public discourse.
- **Resource strengthening**: forensic labs, women's desks, digital evidence systems, legal aid.
- Emphasis on **constitutional morality**, solidarity, and dignity-centred justice delivery.

Conclusion
- Phaltan case underscores that **laws alone are insufficient** without ethical implementation.
- Protecting victim dignity requires institutional accountability and societal transformation.

UGC Regulations on Caste-Based Discrimination

Why in News
- **UGC notified new regulations** to address caste-based discrimination in higher education institutions.
- Regulations **replace the 2012 anti-discrimination framework** with stronger legal and enforcement mechanisms.
- Final rules **corrected draft gaps** by including OBCs and removing penalties for false complaints.
- Focus shifts from **advisory norms to mandatory, duty-based institutional compliance**.

Expanded Scope of Discrimination
- Coverage now **explicitly includes SCs, STs, and OBCs** in all higher education institutions.
- Aligns with **Articles 15(4) and 15(5)** on special provisions in education.
- Discrimination defined as **explicit or implicit unfair, biased, differential treatment**.
- Grounds include **caste, religion, gender, disability, race, and place of birth**.
- Acts impairing **human dignity, equality, or educational access** are treated as violations.

Institutional Mechanisms Introduced
- **Mandatory Equal Opportunity Centres (EOCs)** in every higher education institution.
- EOCs tasked with promoting **inclusion, equity, and non-discriminatory campus environments**.
- EOCs must submit **bi-annual reports** to institutional authorities.
- **Equity Committees established under EOCs** for monitoring and case review.
- Committees chaired by **Head of Institution** with SC, ST, OBC, women, and PwD representation.
- Mandatory **minimum two meetings annually** for compliance assessment.

Monitoring and Accountability Framework
- Institutions must submit **annual equity compliance reports to UGC**.
- **Head of Institution personally responsible** for enforcement of regulations.
- UGC to establish a **National Monitoring Committee** at the central level.
- Committee includes members from **statutory bodies, commissions, and civil society**.
- Mandated to **review cases, assess implementation, and recommend preventive measures**.

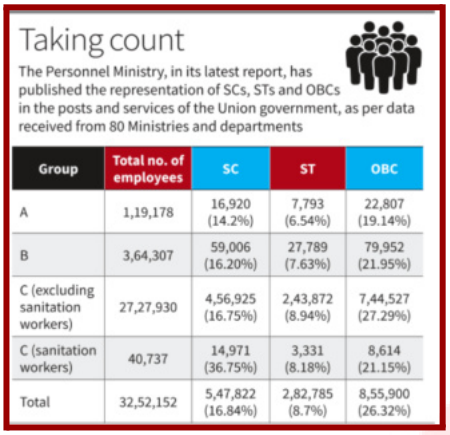
Enforcement and Penalties
- UGC empowered to **debar institutions from UGC schemes and funding**.
- Authority to **ban degree, online, and distance learning programmes**.
- Institutions can be **removed from UGC-recognised lists for violations**.
- Establishes **regulatory consequences instead of moral or advisory compliance**.

Dropped Draft Provisions
- **Removed fines for false complaints** against students.
- **Reinstated OBC inclusion** after exclusion in draft version.
- Replaced **vague discrimination definitions** with human dignity framework.

Significance of the Regulations
- Shifts from **symbolic safeguards to enforceable institutional accountability** in higher education governance.
- Strengthens constitutional mandates under **Articles 14, 15, 21, and 46**.
- Formally addresses **institutional casteism** highlighted by Thorat Committee and IIT Delhi findings.
- Ensures **representation of marginalised groups** in equity and decision-making structures.
- Converts discrimination into a **regulatory compliance risk**, not merely an ethical concern.
- Enhances **legal clarity** through a human dignity-based definition of discrimination.

Challenges and Limitations
- **Admission-stage discrimination remains unaddressed** in the regulatory framework.
- Removal of ban on **separate educational systems** weakens earlier safeguards.
- Effectiveness depends on **independence and operational autonomy of Equal Opportunity Centres**.
- Risk of **institutional capture** if committees lack external oversight.
- Enforcement capacity may vary due to **uneven administrative commitment across institutions**.

Reserved Categories in Central Government Employment



Social Composition in Sanitation Workforce

- Over **66% of Group C safai karmacharis** belong to **SC, ST, and OBC communities**.
- Reflects persistent concentration of reserved groups in **sanitation and manual service roles**.
- Raises questions regarding **occupational mobility and vertical social representation**.

Representation Across Service Groups

- **Group A Services**
  - **SC:** 14.2% representation in higher civil services.
  - **ST:** 6.54% representation in Group A posts.
  - **OBC:** 19.14% presence in senior administrative positions.
- **Group B Services**
  - **SC:** 16.2% representation in middle-level administrative posts.
  - **ST:** 7.63% representation across Group B services.
  - **OBC:** 21.95% participation in supervisory and executive roles.
- **Group C (Excluding Sanitation Workers)**
  - **SC:** 16.75% representation in clerical and support services.
  - **ST:** 8.94% representation in Group C workforce.
  - **OBC: 27.29% presence, nearing prescribed reservation levels.**

Overall Workforce Distribution

- **SCs:** 16.84% representation across total Union Government workforce.
- **STs:** 8.7% overall share in central employment.
- **OBCs:** 26.32% representation in aggregate government services.

Trend Comparison with 2018–19

- **SC representation** declined from **17.49% to 16.84%**.
- **ST representation** rose marginally from **8.47% to 8.7%**.
- **OBC representation** increased significantly from **21.57% to 26.32%**.

Topic: Urbanization

Transforming a Waste-Ridden Urban India

Global Context and Circularity Focus

- COP30 (Belem, 2025) placed **waste reduction** at the centre of the global climate agenda.
- The **No Organic Waste (NOW)** initiative targets methane emission reduction through circular waste management.
- Circularity was highlighted as essential for **inclusive growth, cleaner air, and public health**.
- India's **Mission LiFE**, proposed at COP26, emphasised conscious consumption and circular resource use.

Urban India and the Waste Challenge

- Rapid urbanisation is irreversible, presenting a choice between **sustainable cities or waste-ridden urban spaces**.
- Indian cities lag behind global standards in providing **clean and healthy urban environments**.
- NCR and several Indian cities rank among the **most polluted globally**, despite regulatory and judicial interventions.
- Under **Swachh Bharat Mission (SBM)**, eliminating open defecation and achieving garbage-free cities remains a priority.
- Urban India may generate **165 million tonnes of waste annually by 2030**, emitting over **41 million tonnes of GHGs**.
- By 2050, urban population may reach **814 million**, increasing waste generation to **436 million tonnes**.
- Achieving **Garbage Free Cities (GFC) by 2026** is an existential environmental necessity.

Shift from Linear to Circular Waste Management

- About **1,100 cities** are rated dumpsite-free under **SBM Urban 2.0**.
- Sustainable outcomes require **all 5,000 cities** adopting circular economy principles.
- Circularity focuses on **waste minimisation and recovery of energy and materials**.

Plastic, Organic, and Construction Waste

- Over **50% of municipal waste is organic**, suitable for composting and bio-methanation.
- **Compressed Biogas (CBG) plants** enable green fuel and power generation from wet waste.

- Plastic dominates dry waste, posing severe **ecological and public health risks**.
- Recycling depends on **household-level segregation** and expanding material recovery facilities.
- Construction and demolition waste generates **12 million tonnes annually**, degrading urban spaces.
- Recycling capacity remains **inadequate** relative to construction activity.
- Enforcement of **C&D Waste Management Rules, 2016**, and upcoming **2025 Rules** is crucial.

Wastewater and Circular Water Use

- Wastewater recycling supports **agriculture, horticulture, and industrial reuse**.
- Urban water security depends on **complete wastewater and faecal sludge management**.
- Missions like **AMRUT and SBM** emphasise recycling as essential amid water scarcity.

Barriers to Circularity

- Challenges include weak segregation, logistics gaps, poor product quality, and market constraints.
- **Extended Producer Responsibility (EPR)** remains limited across dry waste categories.
- Inter-departmental coordination, incentives, monitoring, and municipal resources remain inadequate.
- Knowledge-sharing initiatives like **Cities Coalition for Circularity (C-3)** support urban transformation.

10-Minute Deliveries App

Context: Gig workers from Swiggy, Zomato, Blinkit, and Zepto held nationwide strikes during Christmas and New Year. Workers demanded a ban on **10-minute delivery models**, citing safety, health, and labour concerns.

What is the 10-Minute Delivery Model?

- Promises ultra-fast doorstep delivery of food and groceries.
- Operates through **algorithm-driven task allocation** and real-time tracking systems.
- Relies on dense **dark-store networks** and high-speed last-mile delivery.
- Penalties and incentives are tightly linked to strict time targets.

Trends in 10-Minute Delivery

- Rapid expansion since **2021**, with platforms competing primarily on delivery speed.
- Increasing dependence on **algorithmic management** to enforce tight timelines.
- Heavy reliance during festivals and late-night hours, intensifying work pressure.
- Rising worker mobilisation and strikes globally against hyper-speed delivery practices.

Arguments for Banning 10-Minute Deliveries

- **Road Safety and Public Risk**
  - Compressed timelines incentivise traffic violations to avoid penalties and income loss.
  - Bengaluru police reports show spikes in wrong-way driving during instant delivery hours.
- **Occupational Health Crisis**
  - Algorithmic gamification creates prolonged high-stress work cycles for riders.
  - Clinics near Delhi-NCR dark stores report injuries, exhaustion, and anxiety disorders.
- **Human Rights and Labour Dignity**
  - Treating workers as time-optimised delivery nodes undermines dignified working conditions.
  - Rider protests highlight absence of toilets, shade, and basic rest facilities.
- **Externalisation of Costs**
  - Platforms retain speed-based profits while transferring fuel, repairs, and accident risks to workers.
  - Riders report declining per-order earnings despite rising operational expenses.
- **Regulatory Misalignment**
  - Platforms shift safety risks onto individuals, bypassing employer duty of care.
  - Model conflicts with the **Code on Social Security** provisions for gig-worker protection.

Challenges in Regulating Instant Delivery

- **Consumer dependency** creates political resistance to regulating hyper-convenience services.
- **Algorithmic opacity** hides penalties through ranking and visibility controls.
- **Policy arbitrage** enables platforms to exploit uneven State-level labour regulations.
- **Revenue–safety trade-offs** make workers fear income losses from speed restrictions.
- **Evasive business models** rebrand speed promises without reducing delivery pressure.

The Way Ahead

- Introduce **mandatory safety windows** aligned with distance and traffic conditions.
- Enforce **algorithmic accountability** through disclosure and explainable AI audits.
- Implement **inflation-indexed earnings** linked to fuel and maintenance costs.
- Establish **judicial oversight** via dedicated grievance redressal mechanisms.
- Ensure **universal social security** through state-mandated welfare frameworks.

Conclusion

- The 10-minute delivery promise imposes a hidden **time tax on worker safety**.
- India must shift towards a **safe delivery economy** with enforceable protections and transparency.

Topic: Vulnerable Sections

Public Geriatric Care in India

Demographic Shifts Across States

- RBI projects **Kerala** and **Tamil Nadu** as ageing States by **2036**. Elderly population will exceed **22% in Kerala** and **20% in Tamil Nadu**.
- **Bihar, Uttar Pradesh, and Jharkhand** will experience rising working-age populations beyond **2031**.
- **Karnataka and Maharashtra** occupy a middle position between growth and ageing pressures.

RBI's Fiscal Recommendations

- RBI advises ageing States to **rationalise subsidies** to manage rising pension expenditures.
- Youthful States are urged to **invest heavily in human capital** development.
- Southern States face reduced **Central tax devolution** due to population-based Finance Commission weightage.
- Upcoming **delimitation exercise** may further lower their parliamentary representation.

Challenges for Youthful States

- Education spending shares have **stagnated or declined** in high-growth population States.
- Questions persist regarding **employability** of the expanding workforce.
- Workers will enter labour markets during **manufacturing automation and AI expansion**.
- RBI's call to boost **labour-intensive sectors** may risk ageing before achieving prosperity.

Gendered Impact of Ageing

- Research shows ageing disproportionately affects **women with fewer financial assets**.
- Many elderly women lack pensions due to **absence from formal workforce participation**.
- RBI's workforce-focused model assumes **continued family support systems**.
- Migration and nuclear families are weakening traditional **informal safety nets**.

Policy Gaps and Social Security Needs

- Fiscal measures alone cannot manage **demographic transition complexities**.
- Large-scale job creation is needed in **green energy and care economy sectors**.
- Youthful States must develop **healthcare and pension infrastructure proactively**.
- Expansion of **social pensions** conflicts with RBI's emphasis on fiscal consolidation.
- Without public investment, **geriatric care access will remain limited to the wealthy**.

Ragging in India

Definition of Ragging

- The Supreme Court defined ragging in **Vishwa Jagriti Mission v. Union of India (2001)**.
  - Ragging includes **disorderly conduct**, spoken or written, humiliating freshers or juniors.
  - It covers **rowdy or undisciplined behaviour** causing psychological or physical harm.
  - Acts instilling **fear, shame, or apprehension** among students qualify as ragging.
  - Forcing students to perform acts causing **embarrassment or distress** constitutes ragging.
  - Ragging may involve **physical, verbal, psychological, or sexual abuse**.

Recent Incidents and Statistics

- **Kerala (2025)**: Ragging incident at Government Nursing College, Kottayam, surfaced via video.
- **UGC Helpline (2009–2023)** recorded **over 8,000 ragging complaints** nationwide.
  - Complaints rose **208%**, from **358 (2012)** to **1,103 (2022)**.
- **78 student deaths** allegedly linked to ragging between **2012–2023**.
  - Highest deaths reported in **Maharashtra (10)**, **UP and Tamil Nadu (7 each)**.
  - Highest complaints from **Uttar Pradesh (1,202)** and **Madhya Pradesh (795)**.

Consequences of Ragging

- **Impact on Victims**
  - Causes **physical injuries**, disabilities, and occasionally deaths.
  - Leads to **anxiety, depression, and suicidal tendencies**.
  - Results in **academic disruption**, absenteeism, and poor performance.
  - Triggers **stress-related health disorders** and substance abuse.
- **Legal and Academic Consequences**
  - Punishable under **IPC Sections 323, 506, 509, and 306**.
  - Penalties include **suspension, expulsion, blacklisting**, and scholarship cancellation.
  - Criminal records adversely affect **future employment prospects**.

- **Institutional and Social Impact**
  - Institutions face **reputational damage** and declining admissions.
  - Non-compliance risks **UGC funding cuts and de-recognition**.
  - Parents suffer **emotional trauma and financial burdens**.

Challenges in Combating Ragging

- **Weak enforcement** of Supreme Court and UGC regulations persists.
- **Clause 9.4 of UGC Regulations** remains unenforced since 2009.
- **Fear of retaliation** discourages victims from reporting.
- **Cultural acceptance** of ragging as an initiation ritual continues.
- Anti-ragging committees often lack **authority and effectiveness**.

Committees and Legal Framework

- **Unny Committee (1999)** emphasised student safety and grievance redressal.
- **Raghavan Committee (2007)** recommended affidavits, FIRs, and strict discipline.
- **UGC Regulations (2009)** prescribe penalties for institutions failing to prevent ragging.
- **Bharatiya Nyaya Sanhita, 2023** addresses offences linked to ragging.
- Several States enacted **specific anti-ragging laws**.

Way Forward

- Enforce **UGC Clause 9.4** and ensure swift legal action.
- Strengthen **technology-based monitoring** and anonymous reporting systems.
- Promote **awareness, mentorship, and behavioural change** initiatives.

Prelims

Scheduled Tribes (STs) Status

Context: Coordination Committee of Tribal Organisations of Assam (CCTOA) rejected the recommendations to grant **Scheduled Tribe (ST) status** to six **OBC communities**.

Process of Listing of Scheduled Tribes (STs)

- **State Government Proposal**
  - State or Union Territory identifies a community seeking **Scheduled Tribe status**.
  - Ethnographic and socio-cultural studies are conducted at the State level.
  - Proposal is forwarded to the **Union Ministry of Tribal Affairs**.
  - Ministry sends the proposal to the **Office of the Registrar General of India (ORGI)**.
- **Review by Registrar General of India (RGI)**
  - RGI functions under the **Ministry of Home Affairs**.
  - It examines historical, cultural, and anthropological evidence of the community.
  - Upon verification and approval, the proposal is forwarded to the **NCST**.
- **Review by National Commission for Scheduled Tribes (NCST)**
  - NCST evaluates **socio-economic conditions** and cultural distinctiveness.
  - It assesses isolation from mainstream society and degree of social backwardness.
  - After examination, **NCST recommends** inclusion to the Union Government.
- **Final Approval and Implementation**
  - Approved proposals are placed before the **Union Cabinet**.
  - Cabinet initiates amendment to the **Constitution (Scheduled Tribes) Order, 1950**.
  - Final decision rests with the **President of India**.
  - Notification is issued under **Articles 341 and 342** of the Constitution.

Criteria for Inclusion in ST List

- **Lokur Committee Criteria (1965)**
  - Presence of **primitive traits** within the community.
  - Existence of **distinctive cultural practices**.
  - **Geographical isolation** from mainstream populations.
  - **Shyness of contact** with wider society.
  - **Economic backwardness** compared to other social groups.
  - ORGI continues to follow these criteria for verification.

Status of Scheduled Tribes in India

- The Constitution does not define specific criteria for recognising Scheduled Tribes.
- Census 1931 classified STs as "**backward tribes**" in excluded areas.
- Government of India Act, 1935 provided political representation to backward tribes.
- **Constitutional Provisions for STs**
  - **Article 366(25)** defines Scheduled Tribes with reference to Article 342.
  - **Article 342(1)** empowers the President to notify STs after Governor consultation.
  - **Article 342(2)** authorises Parliament to modify the ST list.
  - ST status is **State/UT specific**, varying across regions.

- **Fifth Schedule** governs Scheduled Areas excluding Sixth Schedule States.
- **Sixth Schedule** applies to tribal areas of Assam, Meghalaya, Tripura, and Mizoram.

Lambadi (Banjara / Sugali) Tribe

Context

- The **Supreme Court** is hearing a renewed challenge to **Parliament's decision granting Scheduled Tribe status** to the Lambadi community in **Telangana**.

Identity & Distribution

- **Also known as:** Banjara, Sugali
- **Regions:** Telangana, Andhra Pradesh, Karnataka
- **Traditional lifestyle:** Historically nomadic traders and transporters.

Language

- **Gor Boli / Lambadi**
- **Language family:** Indo-Aryan
- **Script:** None (oral tradition)

Belief System

- Predominantly **Hindu**
- Elements of **animistic traditions** integrated into rituals and worship

GEOGRAPHY

Prelims

Cannabis

Context:
Himachal Pradesh government is moving towards legalising and regulating **cannabis cultivation**, with projections indicating potential annual revenues of **₹1,000-2,000 crore** for the State.

Cannabis: Distribution and Nomenclature

- Cannabis is mainly found across the **Indo-Gangetic plains** and parts of the Deccan region.
- Major regions include Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Bihar, and West Bengal.
- In regional languages, cannabis is called **Ganzai** in Telugu and **Ganja** in Tamil.
- It is referred to as **Bangi** in Kannada, reflecting wide cultural familiarity.

Products Derived from Cannabis

- The cannabis plant yields three major products: **fibre**, **oil**, and **narcotics**.
- **Bhang** is prepared using seeds and leaves, which are dried and powdered.
- The powdered bhang is filtered and consumed as a beverage.
- Bhang is traditionally mixed with cold flavoured milk or **thandai** during Holi.

Industrial and Medicinal Uses

- **Hemp-seed oil** is used in varnish industries as a substitute for linseed oil.
- It is also utilised in the manufacturing of **soft soap**.
- Hemp-seed oil possesses several medicinal applications.
- According to **ICAR**, cannabis ash treats haematoma in animals.
- Haematoma involves blood clotting outside blood vessels in animals.

Cultivation Areas and Practices

- Cannabis is cultivated in Chhota and Bada **Bhangal** regions of Kangra district.
- It is also grown in the **Karsog** area of Mandi district, Himachal Pradesh.
- Cultivation for addictive narcotics extraction remains illegal nationwide.
- States permit controlled cultivation for **fibre and seed** extraction.
- Such cultivation is allowed strictly for industrial or horticultural purposes.

Agricultural and Traditional Applications

- Treating paddy seeds with bhang improves seed germination efficiency.
- This practice is common in temperate areas of **Jammu and Kashmir**.
- Cannabis plants help control **threadworms** in paddy nurseries.
- Farmers in Solki area of Rajouri district use cannabis for pest control.
- Heated and crushed cannabis leaves form paste for treating bee or wasp stings.

Bomb Cyclone

Context

- Winter Storm Ezra rapidly intensified into a **bomb cyclone** over the United States.
- The storm disrupted peak holiday travel with flight cancellations, blizzards, and power outages.
- Several states experienced **hurricane-force winds**, whiteout conditions, and infrastructure disruptions.

What is a Bomb Cyclone?

- A bomb cyclone is a powerful **mid-latitude storm system**.
- It undergoes **explosive cyclogenesis**, marked by extremely rapid intensification.
- Intensification is defined by a sharp fall in **central air pressure within 24 hours**.
- Such storms generate severe, widespread, and multi-hazard weather impacts.

Formation Process

- Bomb cyclones form when **cold, dense polar air** collides with warm, moist air masses.
- This interaction typically occurs over **oceans**, where strong temperature contrasts exist.
- Warm air rises rapidly, releasing latent heat that fuels storm intensification.
- Rapid uplift sharply lowers surface pressure, accelerating inward air movement.
- The inflow strengthens winds and drives explosive storm development.

Key Features

- Rapid Pressure Fall
- Central pressure drops by **24 millibars or more within 24 hours**.
- This reflects extreme atmospheric instability rather than gradual storm evolution.
- **Extreme Weather Conditions**
  - Generates **blizzards, freezing rain, flooding rainfall, and hurricane-force winds**.
  - Frequently produces dangerous whiteout conditions, reducing visibility to near zero.
- **Sharp Temperature Swings**
  - Advancing cold fronts can cause **40–50°F temperature drops within hours**.
  - Sudden cooling stresses human health, transport infrastructure, and energy systems.
- **Large Spatial Extent**
  - Bomb cyclones span **hundreds of kilometres**, affecting multiple regions simultaneously.
  - Aviation, road transport, shipping routes, and electricity networks face widespread disruption.

Significance

- Bomb cyclones combine snowstorms, high winds, rain, and ice into a single event.
- This multi-hazard nature overwhelms **single-disaster preparedness frameworks**.
- Rapid intensification leaves minimal time for warnings, shutdowns, or rerouting measures.
- Airports, power grids, ports, and supply chains are especially vulnerable to sudden impacts.

Chenab River

Origin and Course

- Chenab River **originates at Tandi, Himachal Pradesh**, from **Chandra–Bhaga confluence**.
- It flows through **Himachal Pradesh and Jammu & Kashmir**.
- The river **enters Pakistan** after flowing northwest.
- Chenab **joins the Sutlej River in Pakistan**, which later joins the **Indus**.
- **Major tributaries** include **Marusudar, Jhelum and Sohan rivers**.

Important Dams on Chenab River

- **Salal Dam**
  - Located in **Reasi district**, commissioned **1987–1995**.
  - It is a **run-of-the-river project** with **690 MW capacity**.
- **Baglihar Dam**
  - Located in **Ramban district**.
  - It is a **run-of-the-river with storage project**, commissioned in **2009**.
  - Has an installed capacity of **450 MW (Stage-I)**.
- **Dul Hasti Dam**
  - Located in **Kishtwar district**.
  - It is a **run-of-the-river project** with **390 MW capacity**.

Important Upcoming Projects on Chenab

- **Pakal Dul Project**
  - Located in **Kishtwar district**.
  - Itis a **storage-cum-hydropower project** with **1,000 MW capacity**.
- **Kiru Project**
  - It is a **run-of-the-river project** of **624 MW** in **Kishtwar**.
- **Ratle Project**
  - It is a **run-of-the-river project** with **850 MW capacity**.

Popocatépetl Volcano

Context: Scientists obtained **first 3D images from inside the volcano**.

About the Volcano

- **Basic Facts**
  - Name **Popocatépetl** means **"Smoking Mountain"** in **Nahuatl**.
  - Located in **central Mexico**, about **72 km southeast of Mexico City**.
  - Lies on the **border of México and Puebla states**.
- **Tectonic Setting**
  - Part of the **Trans-Mexican Volcanic Belt**.
  - Formed due to **Cocos Plate subducting beneath North American Plate**.
- **Volcanic Characteristics**
  - Classified as a **stratovolcano**.
  - Elevation is **5,452 m above sea level**.
  - Among **Mexico's most active volcanoes**.
  - Eruptions recorded **since 1519**.
  - Considered **one of the most dangerous volcanoes** in the **Pacific Ring of Fire**.

Stratovolcano

- Stratovolcanoes are **tall, steep, cone-shaped volcanoes**.
- Commonly found at **subduction zones**.
- Dominant volcano type in the **Ring of Fire**.
- Account for **about 60% of Earth's volcanoes**.
- Built from **alternating lava and pyroclastic layers**.
- Typically associated with **explosive eruptions**.
- Usually possess a **small summit crater**.

Shaksgam Valley (Trans-Karakoram Tract)

About the Valley

- **Shaksgam Valley**, also known as the **Trans-Karakoram Tract**, is a **disputed territory claimed by India** but currently under Pakistan's control as part of Pakistan-Occupied Kashmir (POK).
- It is located in the **Hunza–Gilgit region** and borders **China (Xinjiang)** to the north, **Northern Areas of POK** to the south and west, and the **Siachen Glacier region** to the east.
- In **1963**, Pakistan **ceded the Shaksgam Valley to China** through the **Sino-Pakistan Boundary Agreement**, despite India's unresolved sovereignty claim over the region.
- **Article 6 of the 1963 Agreement** clearly states that after the final settlement of the **Kashmir dispute between India and Pakistan**, the boundary will be **reopened for renegotiation** with the legitimate sovereign authority.
- The agreement laid the strategic foundation for the **Karakoram Highway**, constructed jointly by China and Pakistan in the **1970s**, enhancing military and economic connectivity.

Vrindavani and Karan Fries Cattle Breeds

Context

- India has registered **two high-yielding synthetic cattle breeds**: **Karan Fries** and **Vrindavani**.

About Karan Fries

- Developed by **National Dairy Research Institute (NDRI), Karnal, Haryana**.
- Crossbreed of **indigenous Tharparkar cows** and **Holstein-Friesian bulls**.
- Synthetic breed combining **high milk productivity with climatic resilience**.
- Produces **over 3,500 kilograms of milk** in a **10-month lactation period**.
- Achieves **peak daily milk yield up to 46.5 kilograms** under optimal conditions.

About Vrindavani

- Developed by **ICAR–Indian Veterinary Research Institute (IVRI), Bareilly, Uttar Pradesh**.
- Synthetic breed created by blending **Holstein-Friesian, Brown Swiss, and Jersey**.
- Crossed with **indigenous Hariana cattle** for adaptability and disease resistance.
- Designed to combine **high milk yield with suitability to Indian agro-climatic conditions**.

Lake Natron

Context

- Lake Natron in Tanzania glows blood-red due to volcanic origin and extreme chemical composition.

Location and Geography

- Located in **Arusha region of northern Tanzania, near the Kenya border**.
- Lies in the **Gregory Rift, eastern branch of the East African Rift System**.
- Designated as a **Ramsar Site of International Importance in 2001**.
- **Extinct Gelai Volcano**, rising 2,942 metres, is visible southeast of the lake.
- Primarily fed by the **Ewaso Ng'iro River originating in central Kenya**.
- Measures **approximately 57 kilometres in length and 22 kilometres in maximum width**.

Hydrology and Chemical Features

- The lake has **no outlet, causing extremely high evaporation rates throughout the year**.
- Evaporation leaves behind **natron and trona, increasing salt and mineral concentration**.
- Water shows **extreme alkalinity, making it one of the world's harshest aquatic environments**.
- The **red colour is caused by algae pigments thriving in highly alkaline waters**.

Ecological Significance

- Saline conditions make the lake **inhospitable for most plants and animal species**.
- Surrounding marshes support **large breeding populations of flamingos in East Africa**.
- Flamingos feed primarily on **spirulina, a green algae with red pigmentation**.
- Hosts **one of the highest concentrations of lesser and greater flamingos regionally**.

Indo-Pacific Oceans Initiative (IPOI)

Context:

- **Spain formally joined IPOI** by submitting its **Declaration of Accession** to India's External Affairs Minister.
- Marks growing **European engagement** in Indo-Pacific maritime cooperation.

About IPOI

- A **voluntary, non-treaty, cooperative framework** for **practical maritime collaboration** among Indo-Pacific partners.
- **Non-military and non-bloc** in nature.
- **Launch & Origin**
  - **Launched:** 2019
  - **Forum:** East Asia Summit, Bangkok
  - **Proposed by:** India
  - **Doctrinal basis: SAGAR** (Security and Growth for All in the Region)
- **Objectives**
  - Promote a **free, open, inclusive, and rules-based Indo-Pacific**.
  - Address maritime challenges through **capacity building and cooperation**, not alliances.
  - Integrate **security, development, and sustainability** in ocean governance.
- **Thematic Pillars**
  - Maritime Security
  - Maritime Ecology
  - Maritime Resources
  - Capacity Building & Resource Sharing
  - Disaster Risk Reduction & Management
  - Science, Technology & Academic Cooperation
  - Trade, Connectivity & Maritime Transport
- **Key Features**
  - **Voluntary leadership:** Countries may lead specific pillars.
  - **Maritime Domain Awareness (MDA)** emphasis.
  - Focus on **sustainable infrastructure and resilience**.
- **Significance**
  - Enhances **global legitimacy** with European participation.
  - Reinforces India's role as an **Indo-Pacific agenda-setter**.
  - Promotes **inclusive multilateralism** amid strategic rivalry.

Tailings

Context:

The Union Government has announced **India's first Tailings Policy**, setting guidelines to recover **critical minerals** from primary mining and secondary sources such

as **mine dumps and existing tailings**.

Overview

- **Tailings:** Residual material left after processing mined ore.
- **Composition:** Finely ground rock, uneconomic metals, processing chemicals, organic matter, and liquid effluents.
- **Form:** Usually a **liquid slurry** of fine mineral particles produced during crushing, grinding, and extraction.
- **Purpose of management:** Ensures **safe, sustainable, and environmentally responsible** mineral production.

Storage & Management

- **Storage facilities:** Known as **Tailings Storage Facilities (TSFs)**.
- **Common methods:** Dams, embankments, and surface impoundments.
- **Design factors:**
  - Local topography
  - Rainfall patterns
  - Seismic activity
  - Type of mineral mined
  - Proximity to settlements
- **Note:** No standard model and each TSF is **site-specific**.

India's First Tailings Policy (2026)

- **Objective:** Enable recovery of **critical and companion minerals** from:
  - Primary ores
  - Tailings
  - Mine dumps
  - Anode slimes, slags, and industrial residues
- **Core idea:** Promote **secondary mining** and resource efficiency.

Companion Metals Concept

- **Copper tailings may contain:** Selenium, Tellurium, Molybdenum, Cobalt, Rhenium, Gold, Silver.
- **Zinc tailings may contain:** Germanium, Silver, Cadmium, Indium.

Significance

- **Strategic minerals access:** Supports lithium, cobalt, nickel, and REE supply chains.
- **Clean energy link:** Inputs for **solar panels, wind turbines, batteries, and EVs**.
- **Sustainability:** Reduces waste, improves resource recovery, and lowers environmental footprint.

Pandoh Dam

Context: The **Bhakra Beas Management Board (BBMB)** released **silt-laden water** from Pandoh Dam into the **Sutlej River** instead of the **Beas**, drawing objections from the Punjab Government.

Overview

- **Type:** Concrete gravity / embankment dam (run-of-the-river design)
- **River:** Beas River
- **Location: Mandi district, Himachal Pradesh** (~10 km from Manali)
- **Completed: 1977** (Beas Project)
- **Administered by:** Bhakra Beas Management Board (BBMB)

Technical Features

- **Height:** ~76 m
- **Length:** ~492 m
- **Power Design:** Diverts Beas waters through **~38 km canals and tunnels**
- **Power Station:** Dehar Power House
- **Installed Capacity:** 990 MW
- **Discharge Basin:** Sutlej River

Hydrology & Geography

- **Reservoir: Pandoh Lake** (tourism site, ~19 km upstream of Mandi)
- **River System Link:** Beas → diversion → Dehar Power House → Sutlej
- **Connectivity: NH-21** passes over the dam

Significance

- **Major inter-basin transfer** within the Indus river system.
- **Key hydroelectric node** in northern India's power grid.
- **Environmental sensitivity:** Silt discharge affects downstream river ecology and inter-state water concerns.

Java Island

Context: Recent **landslide event** highlights high **geological and disaster risk** due to volcanic terrain and

dense population.

Location & Setting

- **Country:** Indonesia
- **Region:** Part of the **Greater Sunda Islands** (with Sumatra, Borneo, Sulawesi).
- **Boundaries:**
  - **North:** Java Sea (Borneo across it)
  - **South:** Indian Ocean
  - **Northwest: Sunda Strait** (separates Java from Sumatra)

Physical Geography

- **Global rank:** 13th largest island in the world; **5th largest in Indonesia**.
- **Geological origin: Volcanic island arc** formed by **Australian Plate subducting beneath the Sunda Plate**.
- **Terrain:** Mountainous volcanic spine with fertile plains and river basins.

Human Geography

- **Population:** ~156.4 million (≈ **56% of Indonesia's population**) — **most populated island globally**.
- **Capital: Jakarta** (northwest coast).

Historical Significance

- Centre of **Hindu–Buddhist kingdoms** → later **Islamic sultanates**.
- Core of the **Dutch East Indies** administration.
- Major role in **Indonesia's independence movement (1930s–1940s)**.

Living Root Bridges - Meghalaya

Context

- The Government of India submitted the **UNESCO nomination dossier** for **Jingkieng Jri Cultural Landscape** in **2026–27 evaluation cycle**.

What is it?

- Pedestrian bridges grown from **aerial roots of living trees**
- Structures **strengthen over time** through natural biological growth
- Known locally as **Jingkieng Jri** among indigenous communities (Khasi and Jaintia).

Location

- Located in **Meghalaya state of northeastern India**
- Concentrated in **East Khasi Hills and West Jaintia Hills**
- Notable villages include **Nongriat, Riwai, and Mawlynnong**

Historical Background

- Developed as **monsoon survival strategy for river crossings**
- Oral traditions suggest **some bridges over five hundred years old**

Tree Species Used

- Grown from **Ficus elastica**, the Indian Rubber Tree

Construction Process

- Trees planted on **opposite riverbanks for root guidance**
- Roots guided using **bamboo or hollowed Areca palm trunks**
- Roots **entwined and fused** to form stable walking surface
- Stones placed between roots for **flat and durable pathway**

Timeframe and Durability

- Bridges become functional after **ten to fifteen years**
- Structures can **last for several centuries**

Silver

Context:
Silver prices projected to rise ~20% due to global supply deficits and strong industrial demand.

About Silver

- **Nature:** Precious, noble metal with high economic and industrial value.
- **Role:** Acts as a **store of value** and a **critical industrial input**.
- **Appearance:** Brilliant white lustre.

Key Characteristics

- **Conductivity:** Highest **electrical and thermal conductivity** among all metals.
- **Physical properties:** Highly **malleable, ductile, and corrosion-resistant**.
- **Uses:** Electronics, solar PV cells, jewellery, alloys, precision instruments.

Silver in India

- **Production (2022–23): 7,13,768 kg**, **~10% increase** over previous year.
- **Mining pattern:** Mostly **by-product** of lead, zinc,

copper, and gold ores.
- **Native deposits:** No major standalone silver deposits.
- **Top Producing States:**
  - **Rajasthan:** ~99% output.
  - **Karnataka:** Minor output (Hutti Gold Mines, Raichur).
  - **Andhra Pradesh:** Limited associated resources.
- **Reserves/Resources:**
  - **Total:** ~30,267 tonnes (metal content).
  - **Rajasthan share:** ~**86%** of national ore resources.

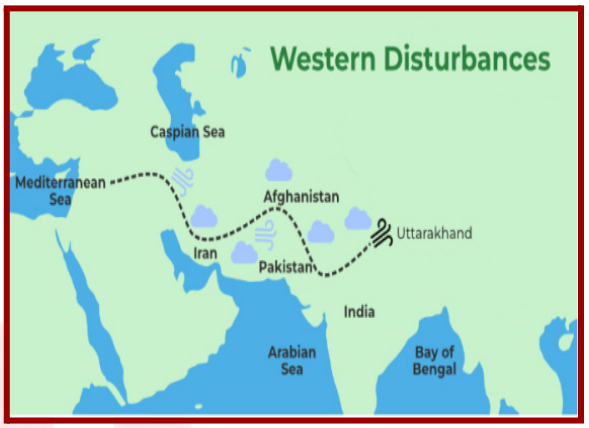
Global Scenario
- **Top producers:** Mexico (≈26% share), China, Peru.
- **Other major producers:** Poland, Russia, Chile, Bolivia.
- **India globally:** ~1% of world reserves, but significant in refining and smelting.

Polavaram Project

Basic Profile
- Polavaram is a **multi-purpose irrigation project**.
- Constructed on the **Godavari River**.
- Located in **West and East Godavari districts**, Andhra Pradesh.
- Accorded **National Project status** by the Union Government.

Structural Features
- Dam length is about **1.2 km**.
- Pier height measures **54 metres**.
- Equipped with **48 radial gates**.
- Each gate measures **16 m × 20 m**.
- **Spillway Capacity**
  - Designed for **once-in-1000-year flood events**.
  - Spillway discharge capacity is **50 lakh cusecs**.
  - Claimed to be **highest spillway capacity globally**.
  - Exceeds spillway capacity of **Three Gorges Dam, China**.
- **Irrigation and Water Transfer**
  - Creates **4,36,825 hectares** of gross irrigation potential.
  - Diverts **80 TMC water** to the **Krishna River basin**.
  - Supplies drinking water to **28.50 lakh people**.
  - Covers **611 villages**.
- **Power Generation**
  - Planned hydropower capacity of **960 MW**.

Western Disturbance



Context
- The India Meteorological Department issued an alert for consecutive Western Disturbances from **January 31 to February 3, 2026**.

What is a Western Disturbance?
- **Extra-tropical low-pressure system** originating over the **Mediterranean region**
- Travels eastward across **Middle East, Iran, Afghanistan, and Pakistan**
- **Origin**
  - Develops over the **Mediterranean Sea region**
  - Receives moisture from **Caspian Sea and Black Sea**
- **Formation Mechanism**
  - **Cold polar air** interacts with **warm moist Mediterranean air**
  - Forms **extra-tropical depression system**
  - Guided by **Subtropical Westerly Jet Stream** toward Indian subcontinent
  - **Himalayan barrier** forces uplift, causing condensation and precipitation

Impacts on India
- **Winter Precipitation**
  - Primary source of **non-monsoonal winter rainfall in India**
  - Causes **snowfall in Western Himalayas** and **rain in northern plains**
- **Agricultural Effects**
  - Benefits Rabi crops like wheat, mustard, and gram
  - Causes hailstorms and crop damage during intense disturbances
- **Temperature Effects**
  - Raises **night temperatures before arrival due to cloud cover**
  - Triggers **cold waves after departure due to northerly winds**
- **Water Security**

- Feeds **Himalayan glaciers and perennial river systems**
- Supports **Ganga, Yamuna, and Indus river flows**

Critical Minerals

What are Critical Minerals?

- **Essential minerals** for **modern technologies** and **national security**
- Face **supply chain risks** due to **limited availability** or **geographical concentration**
- **Criticality changes** with **technology demand** and **supply dynamics**
- **Major Applications**
  - Used in **electronics**: mobiles, computers, semiconductors, fibre-optic cables
  - Used in **low-emission technologies**: EVs, wind turbines, solar panels, batteries
  - Used in **defence, aerospace, and medical equipment**
  - Used in **stainless steel** and **common electronic products**
- **Top Global Producers**
  - Chile
  - Indonesia
  - Democratic Republic of Congo
  - China
  - Australia
  - South Africa
- **India - Official List (2023)**
  - Issued by **Ministry of Mines**
  - Identified **30 critical minerals** for India
  - Includes **Lithium, Cobalt, Nickel, Graphite, REEs, Gallium, Germanium, PGE**
  - Also includes **Potash, Tungsten, Vanadium, Titanium, Zirconium, Selenium**
- **Legal and Policy Framework**
  - **24 minerals** added to **Part D, Schedule I, MMDR Act, 1957**
  - Grants **Central Government exclusive auctioning powers**
  - Establishes **Centre of Excellence for Critical Minerals (CECM)**
  - CECM to **review list** and **advise policy**

National Critical Mineral Mission (NCMM), 2025

- Launched for **self-reliance in critical minerals sector**
- Covers **entire value chain**: exploration to recycling
- **Exploration Targets**
  - **GSI to conduct 1,200 projects** from **2024–25 to 2030–31**
  - Target **domestic production of 15 minerals**
  - Focus on **Lithium, Graphite, Potash, REEs**
  - Aim to acquire **50 overseas mining assets**
- **Recycling and Stockpiling**
  - **₹1,500 crore incentive scheme** for mineral recycling
  - Target **400 kilotonnes** recovered material
  - Create **National Critical Minerals Stockpile**
  - Stockpile to include **at least 5 critical minerals**
- **Research and Infrastructure**
  - Target **self-sufficiency in processing 5 minerals**
  - Goal of **1,000 patents by 2031**
  - Establish **4 mineral processing parks**
  - Set up **3 Centres of Excellence**
- **Governance Mechanism**
  - Formation of **Empowered Committee on Critical Minerals**
  - Coordinates **implementation and monitoring** of NCMM

Polar Vortex

Context: A polar vortex–driven winter storm affected nearly **17 U.S. states** in **January 2026**, causing snow, freezing rain, and severe cold.

Polar Vortex

- **Definition**
  - **Large, persistent low-pressure system** of extremely cold air circling Earth's **polar**

regions.
    - Present mainly during **winter**, strongest in the **Northern Hemisphere**.
- **Types**
    - **Tropospheric Polar Vortex:**
        - Located in the **lower atmosphere**.
        - Directly influences **day-to-day weather**.
    - **Stratospheric Polar Vortex:**
        - Located in the **upper atmosphere**.
        - Strongest in **winter** and influences large-scale circulation.
- **Formation**
    - **Reduced solar heating** at poles during winter cools air strongly.
    - Cold, dense air creates a **low-pressure system**.
    - **Strong circular winds** form, usually confining Arctic air near the poles.
- **Disruption Factors**
    - **Jet stream waviness:** Weak vortex allows cold air to move southward.
    - **Sudden Stratospheric Warming (SSW):** Rapid stratospheric heating weakens or splits vortex.
    - **Arctic amplification:** Faster Arctic warming reduces temperature gradient, destabilising winds.
    - **Blocking high-pressure systems:** Redirect cold air into mid-latitudes.
- **Impacts**
    - **Local:** Extreme cold waves, heavy snow, ice storms, power outages, transport disruption.
    - **Health risks:** Increased hypothermia and frostbite cases.
    - **Global:** Cold surges in **North America, Europe, and Asia**.
    - **Climate link:** Highlights changing atmospheric circulation amid global warming.

DISASTER MANAGEMENT

Topic: Disaster and disaster management

Himalayan Ecology and Disaster Risks

Context

- Year **2025 witnessed 331 days of climate disruptions**, reflecting escalating ecological instability.
- Over **4,000 disaster-related deaths** highlighted growing human vulnerability in mountain regions.
- **Himachal Pradesh and Uttarakhand** faced the heaviest toll from floods and landslides.
- Towns like **Dharali, Harsil, Uttarkashi, Chamoli, Kullu, Mandi, Kishtwar** saw severe devastation.
- Frequent **cloudbursts and flash floods** signal a shift toward a climate-driven disaster normal.

Infrastructure Expansion in Fragile Himalayan Zones

- **43 hectares of forest land** diverted for infrastructure expansion in Uttarakhand.
- Nearly **7,000 Devdar trees** marked for felling under the Char Dham project.
- Road design follows **DL-PS standard** with a **12-metre paved width**.
- Project zone lies north of the **Main Central Thrust**, a geologically fragile belt.
- Scientific advisories discourage heavy infrastructure in such tectonically sensitive zones.

Ecological Significance of Devdar Forest Ecosystems

- **Devdar root systems** stabilise slopes, reducing landslide and avalanche debris risks.
- Forests safeguard **Ganga water quality** within the Bhagirathi Eco-Sensitive Zone.
- Trees release **antimicrobial compounds**, supporting healthy mountain stream ecosystems.
- Dense cover sustains **cool microclimates** and dissolved oxygen for aquatic biodiversity.
- Forest removal weakens natural ecological buffers against extreme climatic events.

Project Design Flaws and Environmental Consequences

- Project bypassed full **Environmental Impact Assessment** through regulatory fragmentation.
- Nearly **800 active landslide zones** reported along 700 km widened stretches.
- **Vertical hill-cutting** violated the natural angle of repose of Himalayan geology.
- Indiscriminate **muck dumping** polluted rivers and destabilised fragile slopes.
- Infrastructure expansion intensified ecological stress in already hazard-prone terrains.

Policy Contradictions and Governance Concerns

- Development contradicts **National Mission for Sustaining the Himalayan Ecosystem (2014)** mandates.
- Mission emphasises glacier monitoring, biodiversity conservation, and hazard risk mitigation.
- High-altitude Himalayas warmed **50% faster than global averages since 1950**.
- Governance gaps weaken alignment between climate commitments and infrastructure policies.

Climate Change and Risk Multiplication

- **Erratic rainfall** and rapid glacial melt intensify flash flood probabilities.
- Forest clearance removes natural soil anchors, accelerating erosion and slope collapse.
- Rising tourism and vehicular pressure strain fragile mountain carrying capacity.
- Climate change multiplies disaster intensity in already geologically unstable landscapes.

Conclusion

- **Sustainable Himalayan development** must prioritise ecological resilience over infrastructure expansion.
- Long-term safety lies in aligning development with fragile mountain ecosystem limits.

Climate Communication and Language Barriers in India

Language Gap in Climate Science Communication

- Climate science communication often fails due to **technical jargon** and inaccessible academic language.
- Absence of relatable terminology weakens **public understanding** and grassroots climate engagement.
- Communities struggle to connect scientific warnings with **daily lived realities**.
- Effective climate action requires **clear, contextualised, and localised communication frameworks**.

Understanding the Idea of 'Loss and Damage'

- Globally, **Loss and Damage** refers to climate harms beyond adaptation capacities.
- It includes **crop losses, cultural erosion, ecosystem decline, and ancestral land disappearance**.
- In India, translated as **nuksaan aaklan** and **haani purti**, focusing on compensation.
- Climate impacts get framed as **aapda relief**, narrowing long-term governance responses.
- International climate finance becomes viewed merely as **post-disaster assistance**.

Governance Implications of Linguistic Narrowing

- Complex climate impacts reduce into **measurable and compensable administrative categories**.
- This creates a policy gap between **global commitments** and local implementation realities.
- Language limitations constrain **planning frameworks** and long-term climate resilience strategies.
- Governance responses remain reactive rather than **preventive and transformational**.

Science Capacity Versus Usability Gap

- India possesses advanced **district heat projections, flood models, and crop simulations**.
- Attribution science helps link disasters to **anthropogenic climate change drivers**.
- Decision-makers struggle translating technical indices into **actionable district policies**.
- Communities receive fragmented warnings with **inconsistent terminology and urgency levels**.

Limits of Information-Driven Climate Action

- People respond when information aligns with **livelihood realities and survival priorities**.
- Heat advisories assume work stoppage, ignoring **informal labour compulsions**.
- Flood alerts presume **literacy and smartphone access**, excluding vulnerable populations.
- Risk dashboards remain technically strong but **socially underutilised**.

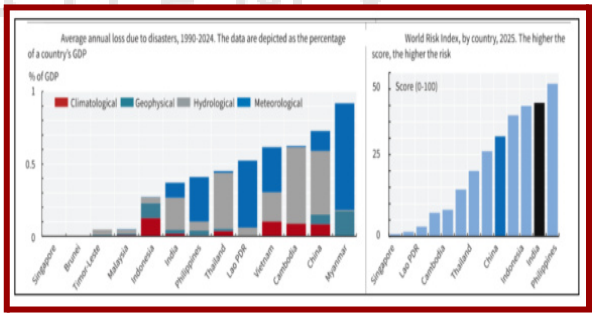
Trust and Preparedness as Climate Infrastructure

- **Odisha's cyclone preparedness** shows trust as critical climate governance infrastructure.
- Credible early warnings improved **evacuation rates and community cooperation**.
- Institutional trust enhances response speed and reduces **disaster mortality risks**.

What Climate Communication Must Deliver

- Translate climate projections into **daily governance decisions** on health, labour, schooling.
- Co-create messaging with **panchayat leaders, farmers, teachers, and journalists**.
- Institutionalise communication capacity across **government departments and media systems**.
- Simplify, localise, and humanise science to build **shared resilience and policy credibility**.

Economic Impact of Natural Disasters in India



Regional Disaster Risk Context

- Emerging Asian economies face **increasingly frequent and intense natural disasters**.
- India, China, and **ASEAN-11** experience around **100 disasters annually**.
- These disasters affect nearly **80 million people**

each year across the region.
- Disaster types vary by geography across Asian economies.

India's Disaster Profile
- **Floods and storms** are the primary disaster risks in India.
- India's vulnerability is largely **hydrological**, including floods and landslides.
- Loss patterns differ regionally; **Myanmar faces meteorological risks**, unlike India.
- China and Indonesia face **higher seismic risks** compared to India.

Economic Losses and GDP Impact
- From **1990 to 2024**, India incurred disaster losses averaging **0.4% of GDP annually**.
- Rising economic losses have elevated **disaster risk finance** in policy priorities.
- Landmark disasters have highlighted India's **human and economic vulnerability**.

Risk Assessment Framework
- Regional risk includes **meteorological, hydrological, climatological, and geophysical hazards**.
- Climatological risks cover **droughts and wildfires**.
- Geophysical risks include **earthquakes and volcanic activity**.

Global Risk Ranking
- India ranks **second highest in Asia** on the **World Risk Index**, after the Philippines.
- The index measures risk using **exposure and vulnerability**.
- Vulnerability combines **structural susceptibility, coping capacity, and long-term adaptation**.
- **Policy Implication**
  - Escalating losses underline the need for **data-driven disaster risk finance strategies**.

GOVERNMENT - SCHEMES

Tex-RAMPS Scheme

Context: The **Ministry of Textiles** has signed MoUs with 15 States as part of the **'Textiles focused Research, Assessment, Monitoring, Planning And Start-Up' (Tex-RAMPS) scheme.**

About the Scheme
- **Scheme Profile**
  - Tex-RAMPS is a **Central Sector Scheme** for the **textiles sector**.
  - Implemented by the **Ministry of Textiles**, Government of India.
  - Focuses on **research, data systems, planning and start-up support**.
- **Approval and Funding**
  - Total outlay of **₹305 crore**.
  - Scheme period: **2025–2031**.
  - Fully **centrally funded** for uniform implementation.
- **Core Components**
  - Supports **research and innovation** in advanced textile technologies.
  - Builds **data and analytics systems** for employment and supply chains.
  - Establishes **Integrated Textiles Statistical System (ITSS)**.
  - Promotes **capacity development** at State level.
  - Encourages **textile start-ups and incubators**.
- **Institutional Mechanism**
  - **ITSS** enables **real-time monitoring and analytics**.
  - Focus on **cluster- and district-level planning**.
  - Covers **handlooms, handicrafts, apparel and technical textiles**.
- **State Participation**
  - **MoUs signed with 15 States** under the scheme.
  - Each State/UT receives **₹12 lakh annually**.
  - Each district receives **₹1 lakh per year** for action plans.

Ayushman Arogya Mandir (AAM)

Overview
- **Ayushman Arogya Mandir** aims to shift India's healthcare from **selective care to comprehensive primary healthcare**.
- Delivers **preventive, promotive, curative, rehabilitative and palliative care** at community level.

Components (Two-Pillar Structure)
- **Component 1: Comprehensive Primary Health Care (CPHC)**
  - **1.5 lakh Ayushman Arogya Mandirs** to be established nationwide.
  - Provides **universal, free primary healthcare services**.
  - Focus on **wellness, disease prevention and early diagnosis** close to communities.
- **Component 2: Pradhan Mantri Jan Arogya Yojana (PM-JAY)**

- Provides **₹5 lakh per family per year** health insurance cover.
- Covers **secondary and tertiary hospitalisation**.
- Targets **over 10 crore poor and vulnerable families**.

Ayushman Bharat - PM-JAY

- **Flagship health scheme** of Government of India, launched as per **National Health Policy 2017**.
- Aims to achieve **Universal Health Coverage (UHC)**.
- **World's largest health assurance scheme**.
- Covers **₹5 lakh per family per year** for hospitalisation.
- Beneficiaries: **Over 12 crore families (~55 crore people)**, bottom **40% of population**.

NPS Vatsalya Scheme

Context

- **PFRDA issued the NPS Vatsalya Scheme Guidelines, 2025,** which target long-term financial security for minors under the **National Pension System framework**.

What it is

- **Contributory savings and pension scheme** designed exclusively for **minors**.
- Aims to build **early-life retirement and long-term financial corpus**.
- **Regulatory Authority:** Pension Fund Regulatory and Development Authority (PFRDA).

Eligibility

- Open to **all Indian citizens**, including **NRI and OCI**.
- **Age limit:** Below **18 years**.

Account Structure

- Account opened **in the name of the minor**.
- Operated and managed by the **guardian**.

Contributions

- Minimum initial contribution: ₹250.
- Minimum annual contribution: ₹250.
- Maximum contribution: No upper limit.
- Contributions can be gifted by relatives and friends.

Partial Withdrawal Rules

- Allowed **after three years** from account opening.
- **Maximum withdrawal:** Up to **25% of own contributions** (excluding returns).
- Permitted for:
  - Education
  - Medical treatment
  - Specified disabilities
- **Frequency:**
  - Up to **two times before 18 years**
  - Up to **two times between 18–21 years**, subject to conditions.

NPS Swasthya Pension Scheme (NSPS)

Context: The **Pension Fund Regulatory and Development Authority** launched NSPS as a pilot under the Regulatory Sandbox Framework.

What is it?

- **Proof of Concept scheme** under **National Pension System framework**
- Integrates **health-related financial benefits with pension savings**
- Operates within **Multiple Scheme Framework of NPS**
- Offered to **Indian citizens on voluntary basis**

Regulatory Framework

- Implemented under **PFRDA Regulatory Sandbox Framework**
- Certain **PFRDA Exits and Withdrawals Regulations, 2015** relaxed
- Launched by **Pension Funds with prior PFRDA approval**

Pilot Design

- Enrolment limited to **restricted number of subscribers**
- Implemented for **limited and controlled period**

Eligible Subscribers

- Open to **all Indian citizens**
- Requires **Common Scheme Account under NPS**

Contribution Rules

- Allows **flexible contributions under non-government NPS guidelines**
- Subscribers above **40 years** may transfer **30 percent contributions**

Withdrawals for Medical Expenses

- Allows **partial withdrawal up to 25 percent** of contributions
- Requires **minimum corpus of ₹50,000**
- Permits **100 percent premature withdrawal** for critical inpatient treatment

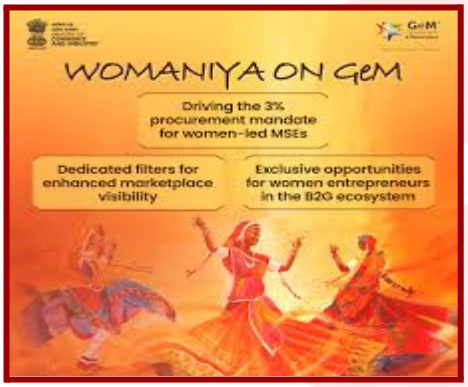
Claim Settlement Mechanism

- Payments made to **Health Benefit Administrator or Third Party Administrator**
- Hospitals receive funds based on **verified medical bills**
- Surplus transferred back to **Common Scheme Account**

Implementation Support

- Allows collaboration with **FinTech firms and health administrators**

Womaniya Initiative



Context

- The **Government e-Marketplace (GeM)** marked **seven years of the Womaniya Initiative**, highlighting its role in integrating **women-led MSEs and SHGs into public procurement**.
- The initiative underscores the government's push towards **gender-inclusive economic participation through digital platforms**.
- Womaniya operates as a **dedicated marketplace segment on GeM**, offering direct access to government buyers.

About Womaniya Initiative

- A **flagship programme** to strengthen participation of **women-led Micro and Small Enterprises (MSEs)** and **Self-Help Groups (SHGs)** in government procurement.
- Provides a **direct, transparent and fully digital interface** between women entrepreneurs and public buyers.
- **Launch and Administration**
  - **Launched on:** 14 January 2019
  - **Implemented through:** Government e-Marketplace (GeM)
  - **Nodal Ministry:** Ministry of Commerce and Industry
- **Objectives**
  - Expand **market access** for women entrepreneurs in government procurement.
  - Reduce **entry barriers and intermediary dependence**.
  - Promote **formalisation and financial inclusion** of women-led enterprises.
  - Support **gender-inclusive economic growth**.
- **Key Features**
  - **Dedicated platform segment:** Exclusive visibility for women sellers on GeM.
  - **Digital onboarding:** Simplified registration and compliance process.
  - **Direct government linkage:** Enables sales to Ministries, Departments, PSUs and institutions.
  - **Transparency:** Online pricing, bidding and order tracking.
  - **Nationwide reach:** Access to buyers across Central and State Governments.

About Government e-Marketplace (GeM)

- A **national digital public procurement platform** for buying and selling goods and services.
- **Launch and Ministry**
  - **Launched:** August 2016
  - **Ministry:** Ministry of Commerce and Industry
- Coverage: Used by **Central and State Government Ministries, Departments, PSUs and affiliated bodies**.
- **Purpose**
  - Improve **efficiency, transparency and speed** in public procurement.
  - Promote **competition, cost-effectiveness and accountability**.

PLI Scheme for White Goods (Air Conditioners & LED Lights)

Context: Five companies selected in **4th round**; committed investment **₹863 crore**.

Overview

- **Type:** Central Sector Production-Linked Incentive (PLI) Scheme
- **Objective:** Boost **domestic manufacturing of key AC and LED components** through incentives on incremental sales.
- **Launch:** FY 2021–22
- **Tenure:** Till FY 2028–29
- **Implementing Ministry:** Ministry of Commerce & Industry
- **Monitoring Authority:** Empowered Group of Secretaries (EGoS), chaired by Cabinet Secretary

Target Segments

- **Air Conditioners (ACs)**
  - **High-value intermediates:** Compressors, copper tubes, aluminium foils
  - **Low-value intermediates:** PCB

assemblies, BLDC motors, service valves, cross-flow fans
    - **Sub-assemblies:** Indoor Units (IDUs) and Outdoor Units (ODUs)
- **LED Lights**
    - **Core components:** LED chip packaging, ICs, resistors, fuses
    - **Other components:** LED drivers, engines, modules, mechanicals, wire-wound inductors

Key Features

- **Incentive Rate:** 4%–6% on **incremental domestic sales**
- **Base Year:** FY 2019–20 (benchmark for growth measurement)
- **Incentive Window:** 5 years + 1-year gestation
- **Eligibility:** Greenfield and brownfield manufacturing investments only
- **Thresholds:** Mandatory **investment + sales targets**
- **Priority:** Core components and large-scale investments
- **Fiscal Cap:** Incentives limited to Cabinet-approved outlay

Scale & Impact

- **Total Outlay:** ₹6,238 crore
- **Beneficiaries:** 85 companies (4 rounds)
- **Expected Investment:** ~₹11,198 crore
- **Expected Production:** ~₹1.9 lakh crore
- **Employment:** Significant direct and indirect job creation

PM E-DRIVE Scheme

Context:
Cabinet-approved flagship initiative to accelerate **electric vehicle (EV) adoption** and strengthen **charging infrastructure** and **domestic manufacturing**.

PM E-DRIVE Scheme

- **Overview**
    - **Full form:** Prime Minister Electric Drive Revolution in Innovative Vehicle Enhancement
    - **Outlay:** ₹10,900 crore
    - **Duration:** October 2024 – March 2026
    - **Nodal Ministry:** Ministry of Heavy Industries (MHI)
    - **Objective:** Expand EV adoption, build nationwide charging network, support **Aatmanirbhar Bharat** in EV manufacturing.
- **Background**
    - Builds on **FAME-I (2015)** and **FAME-II (2019)**.
    - Focuses on scaling **electric two-wheelers and three-wheelers** and clean public transport.
- **Eligibility Conditions**
    - Only **EVs with advanced batteries** qualify.
    - **Government-procured EVs excluded** to avoid internal fund transfers.
    - Vehicles must be registered under **Central Motor Vehicles Rules, 1989**.
    - **e-2Ws and e-3Ws** must be manufactured and registered within scheme period.

Key Components of the Scheme

- **Target Beneficiaries**
    - Commercial and private **e-2Ws and e-3Ws** with advanced batteries.
    - **e-ambulances**, **e-trucks** with valid scrapping certificates.
    - **Electric buses** for public transport systems.
- **Demand Incentives**
    - Incentive capped at **15% of ex-factory price** or **fixed per-vehicle ceiling**, whichever is lower.
    - Only **EVs below specified price thresholds** are eligible.
- **Charging Infrastructure**
    - **Target: 72,300 public fast chargers** across major cities and highways.
    - **BHEL** to develop a **digital "Super App"** for charger booking, payments, and real-time availability.
- **Testing Agencies Upgradation**
    - **₹780 crore** allocated for upgrading MHI testing facilities.
    - Supports certification and quality assurance for **green mobility technologies**.

PANCHAM - Panchayat Assistance and Messaging Chatbot

Context: PANCHAM was recently launched by **Union Ministry of Panchayati Raj** as national **digital governance initiative**

What is PANCHAM?

- **Digital chatbot platform** for Panchayat governance support
- Developed in collaboration with **UNICEF**
- Aimed at **Panchayat Elected Representatives and Functionaries**

Objective / Aim

- Provides **timely guidance** for day-to-day Panchayat governance
- Enables **simplified workflows** and **service delivery support**
- Acts as **digital companion** for grassroots administration

Key Features

- **Direct digital connect** between **Government of India** and Panchayats
- Integrated with **BHASHINI language platform**
- Supports **22 Indian languages**
- Enables **QR-code-based citizen access**
- Facilitates **two-way communication** with Ministry officials
- Allows **feedback, queries, and local issue reporting**
- Supports **faster decision-making** and **field-level resolution**
- Enables **direct dissemination of circulars and advisories**

Atal Pension Yojana (APY)

Context:

- Union Cabinet approved **continuation of APY up to FY 2030–31**.
- Reinforces long-term pension coverage for the **unorganised sector**.

Atal Pension Yojana (APY)

- **Overview**
  - **Launched:** 9 May 2015
  - **Objective:** Promote voluntary retirement savings with **defined pension benefits**.
  - **Regulator/Administrator:** Pension Fund Regulatory & Development Authority (PFRDA)
- **Eligibility**
  - **Target group:** Unorganised sector workers
  - **Age:** 18–40 years at entry
  - **Exclusion:** Income-tax payers ineligible from 1 October 2022
- **Pension Benefits**
  - **Guaranteed monthly pension:** ₹1,000 / ₹2,000 / ₹3,000 / ₹4,000 / ₹5,000
  - **Linked to:** Entry age and contribution amount
- **Government Support (Legacy)**
  - **Co-contribution:** 50% of subscriber contribution or **₹1,000/year** (whichever lower)
  - **Period:** 2015–16 to 2019–20
  - **Eligibility:** Subscribers enrolled **1 June 2015–31 March 2016** meeting criteria
- **Exit & Withdrawal**
  - **At 60 years:** Regular pension starts
  - **Before 60:** Only on **death or terminal illness**
  - **Voluntary exit:** Refund of own contributions with interest; **govt co-contribution forfeited**

SPREE 2025

Context

- **ESIC** launched **Scheme for Promotion of Registration of Employers and Employees (SPREE)** 2025 to expand ESI coverage and formalise informal workforce participation.

What is SPREE?

- A **special amnesty scheme** to register unregistered employers and employees under ESI framework.
- Focuses on contractual, temporary, and unorganised workers lacking formal social security coverage.

Implementing Authority

- Launched by **Employees' State Insurance Corporation (ESIC)**.
- Administered under the **Ministry of Labour and Employment, Government of India**.

Objective

- Promote voluntary compliance and expand social security through formalisation of informal employment.

Key Features

- Digital registration enabled through **ESIC portal, Shram Suvidha portal, and MCA portal**.
- No retrospective contribution, inspection, or legal action for the pre-registration period.
- Registration treated as valid from the **date declared by the employer**.
- Removes litigation fears for employers regarding past non-compliance.
- Extends ESI coverage to **temporary, contractual, and unorganised sector workers**.
- One-time amnesty encourages large-scale participation without penal consequences.

Others

Responsible Nations Index (RNI)

Context:

- **World Intellectual Foundation (WIF)** to launch **Responsible Nations Index (RNI)**.
- **Collaborators:** Jawaharlal Nehru University, IIM Mumbai, Dr Ambedkar International Centre.

What it is?

- **Global ranking framework** assessing how responsibly nations govern society, environment, and global conduct.

Aim:

- Shift benchmarking from **GDP/power-centric metrics** to **values-based governance**, dignity, sustainability, and international responsibility.

Key Features:

- Covers **154 countries** worldwide.
- Uses **transparent, globally sourced datasets**.
- Three core dimensions:
  - **Internal Responsibility:** citizen dignity, justice, welfare.
  - **Environmental Responsibility:** climate action, resource stewardship.
  - **External Responsibility:** peace, cooperation, global stability.
- **Comparable, objective, policy-relevant** design.

Significance:

- Adds an **ethical lens** beyond economic or military power.
- Incentivises **human development, sustainability, and peace**.
- Aligns with **SDGs, climate commitments, and human rights**.

Sahitya Akademi Awards

Background and Purpose

- The **Sahitya Akademi Award** honours outstanding literary works published in recognised Indian languages.
- The award promotes **literary excellence, cultural dialogue, and multilingual literary development** nationwide.
- It recognises books of **high literary merit** across constitutionally and institutionally approved languages.

Languages Recognised

- The Akademi covers **22 languages listed in the Constitution of India**.
- It additionally recognises **English and Rajasthani** for implementation of its literary programmes.
- Literary activities are conducted across **24 Indian languages**, ensuring inclusive cultural representation.

Nature of the Award

- Awardees receive a **plaque, ceremonial shawl, and ₹1 lakh cash prize**.
- The honour is conferred upon **authors and poets** for exceptional published literary contributions.
- The selection focuses on **originality, literary quality, and cultural relevance** of the work.

Institutional Profile of Sahitya Akademi

- The Sahitya Akademi was **formally inaugurated on 12 March 1954** by the Government of India.
- It is registered under the **Societies Registration Act, 1860**, ensuring legal institutional status.
- The Akademi functions as the **central institution for literary promotion and publication** in India.
- It is the **only national body** undertaking coordinated literary activities in 24 languages.

Administrative and Organisational Structure

- The Akademi operates as an **autonomous**

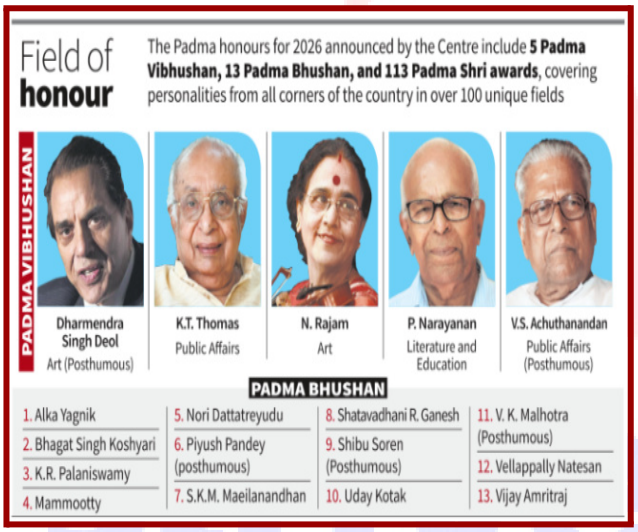
organisation under the Ministry of Culture.

- This structure ensures **functional independence with institutional oversight** from the central government.
- The **head office is located in New Delhi**, serving as the administrative and coordination hub.

Cultural and National Significance

- The Akademi strengthens **inter-lingual literary exchange and national cultural integration**.
- It supports **preservation, promotion, and dissemination of India's diverse literary heritage**.
- The award enhances **global recognition of Indian authors and multilingual literary traditions**.

Padma Awards 2026



Overview

- **Nature:** National civilian honours of India
- **Instituted: 1954**
- **Announcement: Annually on the eve of Republic Day (26 January)**
- **Purpose:** Recognise **distinguished public service and excellence** across diverse fields
- **Conferred by: President of India** (Ceremony in **March/April**)

Categories (Order of Precedence)

1. **Padma Vibhushan**: Exceptional and distinguished service
2. **Padma Bhushan**: Distinguished service of high order
3. **Padma Shri**: Distinguished service

Disciplines Covered

- Art and Culture
- Social Work
- Public Affairs
- Science and Engineering
- Trade and Industry
- Medicine
- Literature and Education
- Sports
- Civil Service
- Other fields involving public service

Eligibility

- Open to **all persons**
- No distinction of **race, sex, occupation, or position**
- Includes **Indian citizens, NRIs, foreigners, and OCI holders**

Selection Mechanism

- **Padma Awards Committee** reviews nominations
- **Appointed annually by:** Prime Minister
- **Chairperson:** Cabinet Secretary
- **Members include:**
  - Home Secretary
  - Secretary to the President
  - 4–6 eminent persons
- **Final approval:** Prime Minister → President of India

Key Features

- **Maximum awards per year: 120 (***Excludes posthumous, NRI, foreigner, and OCI recipients)*
- **Form of award:**
  - Sanad (certificate)
  - Medallion
  - Replica for ceremonial use
- **No monetary grant**

Rules & Limitations

- **Not a title:** Cannot be used as prefix/suffix to the name
- **Posthumous awards:** Generally avoided
- **Higher category:** Minimum **5-year gap**, unless waived by Committee
- **Years not conferred:** 1978–79 and 1993–97

Constitutional & Legal Status

- **Article 18(1):** Prohibits titles, except military and academic distinctions
- **Supreme Court (Balaji Raghavan v. Union of India, 1996):**
  - Bharat Ratna and Padma Awards **are not titles**
  - Recognise merit and public service, hence constitutional

Bharat Ratna

Overview

- **India's highest civilian honour**, conferred by the **President of India**.
- Awarded for **exceptional service in any field**, without discrimination of gender, profession, or nationality.

Establishment & Authority

- **Instituted:** 2 January 1954
- **By:** President Dr. Rajendra Prasad
- **Recommendations:** Made by the **Prime Minister** to the President.

Recognition & Nature

- **Award includes:**
  - **Sanad (certificate)** signed by the President.
  - **Medallion** (no cash component).
- **Not a title:**
  - Article **18(1)** prohibits use as prefix/suffix.
  - Permitted usage: "Recipient of Bharat Ratna" in biodata and official documents.

Eligibility & Limits

- **Open to Indians and non-Indians.**
- **Annual cap:** Maximum **three awards per year**.
- **Exceptions:** 1999 (4 awards), 2024 (5 awards).
- **Posthumous awards:** Allowed since **1966**.

First & Notable Recipients

- **First recipients (1964):**
  - Dr. Sarvepalli Radhakrishnan
  - Dr. C.V. Raman
  - C. Rajagopalachari
- **First posthumous award:** Lal Bahadur Shastri (1966).
- **Youngest recipient:** Sachin Tendulkar (2014).
- **Non-Indian recipients:** Mother Teresa, Khan Abdul Ghaffar Khan, Nelson Mandela.

Legal Position

- **Supreme Court (Balaji Raghavan v. Union of India, 1996):**
  - National awards **do not violate Article 18**.
  - They are **honours, not hereditary or titular distinctions**.

Medal Design & Production

- **Shape: Peepal leaf** form.
- **Obverse:** Sunburst with **"Bharat Ratna"** in Devanagari.
- **Reverse: "Satyameva Jayate"** below the State Emblem.
- **Materials:**
  - Platinum (emblem, sun, rim)
  - Burnished bronze (inscriptions)
- **Minted at:** Alipore Mint, Kolkata

Jeevan Raksha Padak Awards

Overview

- **Nature:** Civilian **life-saving gallantry award series** for acts involving personal risk to save lives.
- **Established: 1961** (offshoot of the **Ashoka Chakra** gallantry awards).
- **Authority:** Approved by the **President of India** on PM's recommendations.

Categories

- **Sarvottam Jeevan Raksha Padak:** Conspicuous courage under **very great danger**.
- **Uttam Jeevan Raksha Padak:** Courage and promptitude under **great danger**.
- **Jeevan Raksha Padak:** Courage with **grave risk of bodily injury**.

Eligibility

- **Open to all persons**, irrespective of gender or occupation.
- **Posthumous awards** permitted.
- **Acts covered:** Drowning rescues, fires, accidents, electrocution, mine rescues, natural disasters.

Process

- **Nominations:** Invited annually from **States/UTs** and **Union Ministries**.
- **Scrutiny:** Jeevan Raksha Padak Awards Committee (within **two years** of the act).
- **Final approval: Prime Minister** and **President of India**.

Award & Allowance

- **Components: Medallion + Certificate**.
- **One-time monetary allowance:**

  - **Sarvottam:** ₹2 lakh
  - **Uttam:** ₹1.5 lakh
  - **Jeevan Raksha:** ₹1 lakh
- **No service concessions:** No rail/airfare or additional perks.

Significance

- Promotes **civic courage** and **humanitarian values**.
- Recognises **ordinary citizens** for **extraordinary life-saving acts**.

Wings India 2026

Context: Asia's largest civil aviation event scheduled at **Begumpet Airport, Hyderabad**, from **28–31 January 2026**.

Wings India 2026

- **Overview**
  - **Type:** Biennial global civil aviation exhibition and conference
  - **Organised by:** Ministry of Civil Aviation, Government of India
  - **Permanent Venue:** Hyderabad, Telangana
  - **Theme:** *Indian Aviation: Paving the Future – From Design to Deployment, Manufacturing to Maintenance, Inclusivity to Innovation, Safety to Sustainability*
- **History**
  - **Launched as:** *India Aviation* in **2008**
  - **Rebranded:** *Wings India*
  - **Notable milestone:** First edition featured **Airbus A380 landing** at Begumpet Airport
- **Aim**
  - Position India as a **global aviation hub** across connectivity, manufacturing, MRO, cargo, training, and innovation.
  - Facilitate **investment, technology transfer, partnerships, and policy dialogue**.
- **Key Features**
  - **Aircraft displays:** Static and flying exhibitions; **30+ aircraft**.
  - **Business engagements: 500+ B2B and B2G meetings**, CEO roundtables, investor sessions.
  - **Ecosystem coverage:** Airlines, airports, OEMs, MROs, lessors, startups, regulators, training institutes.
  - **Focus areas:** Sustainable Aviation Fuel (SAF), green airports, digital air navigation, advanced air mobility.
- **Significance**
  - Highlights India as a **fast-growing aviation market** with rising passenger demand and large aircraft orders.
  - Showcases national initiatives like **UDAN**, **greenfield airports**, **MRO policy reforms**, and **aerospace manufacturing expansion**.