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CONSTITUTION OF INDIA
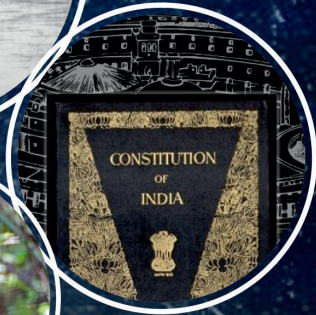
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January-2026

Current Affairs

Contents

Chapter-
1

HISTORY & CULTURE

Mahad Satyagraha

Context: The Mahad Satyagraha has returned to public discourse as scholars revisit its profound role in shaping constitutional morality and human rights ethics in India.

About Mahad Satyagraha:

What it is?

- A historic non-violent movement led by B. R. Ambedkar asserting Dalit rights to access public water and reject caste-based exclusion—one of India's earliest human rights struggles.

  Launched in: March 19–20, 1927 (Mahad 1.0) and December 25–26, 1927 (Mahad 2.0) at Mahad, Bombay Presidency (now Raigad, Maharashtra).

Causes:

- Denial of access to public water sources such as the Chavdar Tank due to caste-based untouchability.
- 1923 Bole Resolution legally allowed Dalits to use public facilities, but local caste elites resisted implementation.
- Rising caste violence in villages like Goregaon and Dasgaon reinforcing the need for collective assertion of rights.

Key Features of Mahad Satyagraha:

- Assertion of Civil Rights: Ambedkar and thousands of followers marched to Chavdar Lake and drank water to affirm equality as a human right.
- Challenge to Brahmanical Hegemony: Upper castes performed "purification rituals," prompting Ambedkar's stronger mobilisation in Mahad 2.0.
- Burning of Manusmriti: On December 25, 1927, Ambedkar symbolically rejected the scriptural basis of caste oppression.
- Birth of Constitutional Morality: Ideas of liberty, equality, fraternity—later embedded in the Constitution—were explicitly articulated at Mahad.
- Participation of Women: Ambedkar addressed women directly, making gender equality central to the anti-caste struggle.
- Non-violent Democratic Protest: Inspired by the French Revolution's ideals, but rooted in Buddhist ethics of dignity and maitri (compassion).

Outcome:

- Legal victory (1937): Courts held no valid custom existed to bar Dalits from public tanks, affirming equal civic rights.
- Strengthened Dalit political consciousness: Mahad became the birthplace of a new rights-based movement.
- Foundation for later struggles: Directly influenced Ambedkar's arguments in Annihilation of Caste and shaped the moral core of India's Constitution.
- December 25 recognised as Indian Women's Liberation Day, reflecting the gendered nature of Ambedkar's

social revolution.

70th Death Anniversary of Dr. B.R. Ambedkar

Context: India observed the 70th death anniversary (Mahaparinirvan Diwas) of Dr. B.R. Ambedkar, commemorating his lasting contributions to constitutional governance, social justice, and economic thought.

About 70th Death Anniversary of Dr. B.R. Ambedkar:

Who He Was?

- B.R. Ambedkar (1891–1956) was a jurist, economist, social reformer, and chief architect of the Indian Constitution. He led pioneering movements against caste discrimination and laid the foundations of India's modern democratic and economic institutions.

Early Life & Education:

- Born on 14 April 1891 in Mhow (MP) into a socially oppressed Mahar family; faced severe caste discrimination since childhood.
- Completed B.A. from Bombay University; supported by a Baroda State scholarship for higher studies abroad.
- Earned PhD from Columbia University, D.Sc. from London School of Economics, Bar-at-Law in London—becoming one of India's most accomplished scholars of his time.
- His early works—Castes in India, Evolution of Provincial Finance, Problem of the Rupee—established him as a global intellectual.

Contributions to India's Freedom Movement & Social Reform:

- Led Mass Movements Against Untouchability: Ambedkar transformed the social reform landscape by leading historic civil rights agitations, most notably the Mahad Satyagraha (1927) where Dalits asserted their right to drink water from a public tank. This marked the first organised anti-caste mass mobilisation challenging notions of purity–pollution.
- Fought for Temple Entry and Religious Equality: He spearheaded the Kalaram Temple Satyagraha (1930) in Nashik to demand Dalit entry into Hindu temples. This campaign directly confronted religious exclusion and became a symbol of the struggle for dignity and the right to worship.
- Represented Depressed Classes at Round Table Conferences: At the Round Table Conferences (1930–32) in London, Ambedkar was the foremost voice for Dalits. He articulated their political grievances, demanded separate electorates for adequate representation, and successfully internationalised the issue of caste discrimination.
- Negotiated the Poona Pact (1932): Ambedkar's negotiations with Mahatma Gandhi led to the Poona Pact, replacing separate electorates with reserved seats for Dalits in legislatures. This became the basis of modern affirmative action in India and ensured political empowerment within a joint electorate.
- Championed Labour Rights and Social Justice During Colonial Rule: As Labour Member in the Viceroy's Executive Council (1942–46), Ambedkar introduced 8-hour workdays, paid leave, maternity benefits, dispute resolution systems, and welfare funds—advancing both workers' rights and social justice during the freedom struggle.
- Contribution to Drafting the Constitution: B.R. Ambedkar ensured the Constitution embodied justice, liberty, equality and fraternity by designing a strong framework of fundamental rights, federalism and an independent judiciary. He introduced safeguards such as abolition of untouchability, reservations, minority protections and social welfare principles.

Contributions to India's Economic Thought:

- Father of Monetary Economics in India: His book The Problem of the Rupee (1923) shaped modern monetary policy and directly influenced the creation of the Reserve Bank of India (RBI) in 1934.

- Fiscal Federalism Pioneer: His 1921 thesis on provincial finance laid the intellectual foundation for India's Finance Commission and fiscal decentralisation.
- Labour Reforms (as Labour Member, 1942–46): Introduced 8-hour workday, maternity benefits, labour welfare funds, and set up Employment Exchanges across India.
- Water & Power Resource Planning: Spearheaded key institutions such as the Central Water Commission, Damodar Valley Project, and promoted multi-purpose river projects for national development.
- Anti-inflation and welfare economics: Emphasised monetary stability and warned that inflation disproportionately harms the poor—echoing principles in today's inflation-targeting framework.

Organisations Associated with Ambedkar:

- Bahishkrit Hitkarini Sabha (1923): Upliftment of oppressed communities.
- Independent Labour Party (1936): Advocated labour rights and social justice.
- Scheduled Castes Federation (1942): Political mobilisation of marginalized groups.
- Republican Party of India (announced 1956): Vision for an egalitarian polity (formed after his death).

Literary Contributions:

- Ambedkar's works span economics, sociology, politics, religion, and law. Key texts include:

  Annihilation of Caste

  The Problem of the Rupee

  Who Were the Shudras?

  Buddha and His Dhamma

  Essays on Untouchables and Untouchability

  Buddha or Karl Marx

  Critical journals: Mooknayak, Bahishkrit Bharat, Janata, Samata

- These writings shaped India's intellectual, social, and constitutional landscape.

Ambedkar's Last Days:

- Declining Health (1954–56): From 1954 onward, Ambedkar suffered from diabetes, weakened eyesight, and deteriorating physical health. Despite this, he continued his academic writing, parliamentary work, and Buddhist studies.
- Completion of The Buddha and His Dhamma: In the final months of his life, he worked intensely to complete his last and most profound book, "The Buddha and His Dhamma", laying the philosophical foundation of Navayana Buddhism. The book was published posthumously in 1957.
- Historic Conversion to Buddhism (14 October 1956): Ambedkar and over 5 lakh followers embraced Buddhism in Nagpur, marking a revolutionary social and spiritual movement. He saw conversion as the final step in rejecting caste oppression and reclaiming dignity.
- Final Writings and Reflections: In his last speeches and writings, Ambedkar expressed concern about rising casteism, economic inequality, and the gap between constitutional ideals and social reality. He warned that "political democracy cannot last unless there lies at the base of it social democracy."
- Mahaparinirvan (6 December 1956): Ambedkar passed away peacefully in his sleep at his residence, 26 Alipur Road, Delhi, at the age of 65. His death anniversary is observed as Mahaparinirvan Diwas.
- Cremation and Memorial at Chaitya Bhoomi: His funeral drew lakhs of followers, and his ashes were enshrined at Chaitya Bhoomi, Mumbai, which has since become an iconic pilgrimage site for Ambedkarites.
- Bharat Ratna (1990): Ambedkar was posthumously awarded India's highest civilian honour, the Bharat Ratna, for his monumental contributions to nation-building, constitutional design, social justice, and economic thought.

Conclusion:

Dr. B.R. Ambedkar's legacy extends far beyond drafting the Constitution—he laid the moral, economic, and institutional foundation of modern India. His life remains a testament to the transformative power of knowledge, courage, and constitutionalism. Seven decades after his passing, Ambedkar's ideas continue to

light the path towards a more just, equitable, and dignified society.

Decline of Indus Valley Civilisation

Context: A new multi-proxy paleoclimate study has claimed that the Indus Valley Civilisation (IVC) declined due to centuries-long recurring droughts, not a single catastrophic event.

About Decline of Indus Valley Civilisation:

What it is?

- The Indus Valley Civilisation (3300–1300 BCE), also called Harappan Civilisation, was one of the world's earliest urban cultures spread across present-day Pakistan and northwest India.

- It originated along the Indus and Ghaggar-Hakra (Sarasvati) river systems, evolving into a sophisticated Bronze Age civilisation known for cities like Harappa, Mohenjo-Daro, Rakhigarhi and Dholavira.

Features of Indus Valley Civilisation:

- Art & Craft:

    Highly developed craftsmanship in bead-making, pottery, terracotta figurines, shell–copper–bronze artefacts, and the iconic "Dancing Girl" and "Priest-King" sculptures.

- Architecture & Urban Planning:

    World-class urban design with grid-pattern streets, multi-storey brick houses, citadels, granaries, and advanced drainage with covered sewerage and soak pits.

- Script & Literature:

    Used a still-undeciphered pictographic script found on seals, tablets and pottery; no surviving textual literature, but inscriptions show a complex symbolic system.

- Economy:

    A diversified economy based on agriculture (wheat, barley, cotton), craft industries, internal trade, and long-distance trade with Mesopotamia, Oman and Iran (evident from seals, weights and boats).

- Society & Governance:

    Urban society with standardised weights, uniform architecture, and planned layouts, implying an efficient civic authority; evidence suggests a largely peaceful, egalitarian society with little social stratification.

Decline of the Indus Valley Civilisation:

New Evidence from 2025 Study:

- Decline was gradual, triggered by four major mega-droughts (2425–1400 BCE):

    The study identifies four prolonged drought phases, each lasting over 85 years, with the most severe one peaking around 1733 BCE for nearly 164 years.

    These droughts did not occur once but in cycles, creating centuries of hydrological instability, which progressively weakened agriculture, trade, and urban functioning.

- Weakening monsoons due to warming of the tropical Pacific:

    Climate records show that the tropical Pacific shifted from a cool, La Niña-like phase (3000–2500 BCE) to a warmer, El Niño-like phase.

    This directly reduced monsoon rainfall by 10–20%, drastically lowering water availability for fields, reservoirs, and rivers.

- Hydrological changes: rivers shrank and soils dried up:

    The study combines lake cores, cave stalagmites, and climate models to show that rivers like the Sutlej-Ghaggar system, Beas, and many tributaries experienced reduced flows.

Soil moisture declined, leading to desiccation, salinity build-up, and reduced crop yields — especially in areas away from the Indus River.

- Impact on agriculture and food systems:

  Crop failures increased, forcing Harappans to shift from water-intensive crops (wheat, barley) to drought-resistant ones like millets.

  Agricultural stress weakened the surplus system that supported large urban centres.

- Breakdown of long-distance trade and economic networks:

  Lower river levels made river navigation difficult, reducing connectivity to Mesopotamia, the primary trade partner.

  Reduced rainfall and shrinking lakes also made overland routes riskier.

  This decline in external trade undermined urban jobs (bead makers, potters, metalworkers), destabilising the economic base.

Other Classical Theories:

- Changes in River Systems (Indus & Ghaggar-Hakra shifts)

  Tectonic movement altered the courses of key rivers.

  The Ghaggar-Hakra (Sarasvati) dried gradually, leading to the abandonment of major settlements like Kalibangan and Banawali.

  The Indus River occasionally flooded massively, depositing silt and destroying fields, while later shifting away from some cities.

- Collapse of Mesopotamian Trade Network:

  Around 2000 BCE, Mesopotamia faced internal political turmoil (Akkadian collapse, Ur III decline).

  As Mesopotamian trade weakened, demand for Harappan goods (beads, cotton textiles, metals) fell sharply.

  Reduced trade cut off a crucial economic pillar of urban Harappan life, contributing to industrial decline.

- Urban Overcrowding and Declining Civic Maintenance:

  Archaeology shows that many cities became densely crowded, with houses built over older streets and structures.

  The once-pristine drainage systems became clogged and poorly maintained, signalling administrative weakening.

  Public buildings like the Great Bath were built over or lost importance.

- No Evidence of Large-Scale Invasion or Warfare:

  Earlier theories proposed "Aryan invasion" based on Rig Veda references, but archaeology contradicts this:

  No mass graves indicating war.

  No burnt cities or weapons of destruction.

  Harappan society overall shows little militarisation.

  Most scholars now agree that invasion did not cause the collapse.

Significance of Indus Valley Civilisation:

- Gave India its first planned cities, sanitation systems and urban governance models.
- Demonstrated advanced hydrology, craft specialisation, maritime trade, and agricultural adaptation.
- Offers lessons for today on water management, climate resilience, and decentralised settlement planning.
- Its peaceful culture and standardised systems highlight early forms of civil administration, trade regulation and environmental adaptation.

Conclusion:

The new scientific findings show that the Indus collapse was not a mystery or a myth but a slow climatic

tragedy worsened by fragile governance and economic stress. Yet the civilisation's adaptability for nearly two millennia underscores its resilience and sophistication. As today's world faces climate extremes, the Indus story serves as a powerful reminder that environmental shifts can reshape even the greatest urban cultures.

Empanel Heritage Conservation Architects

Context: The Ministry of Culture has initiated a process to empanel heritage conservation architects for the upkeep, conservation, and restoration of ASI-protected monuments.

About Empanel Heritage Conservation Architects:

What it is?

- A heritage (conservation) architect is a specialised professional trained in the restoration, conservation, and management of historic structures, ensuring preservation of architectural integrity, materials, and cultural value in line with established conservation norms.

The Initiative:

- The Ministry of Culture has begun empanelling qualified conservation architects to form a national pool approved by the Archaeological Survey of India (ASI).
- This allows donors, corporates, and private entities to directly engage ASI-approved professionals for conservation works funded through the National Cultural Fund (NCF).

Key Features of the Initiative:

- Donor flexibility: Donors can choose architects from the ASI-approved panel for monuments of their choice.
- ASI oversight mandatory: ASI will continue to monitor all projects to ensure compliance with scientific conservation standards.
- Defined responsibilities: Empanelled architects will prepare Detailed Project Reports (DPRs), design conservation methods, provide project management support, and supervise execution.
- Execution mechanism: Actual restoration work will be carried out by agencies selected by donors, subject to ASI approval.
- Eligibility criteria: Architects must have prior experience in conserving or restoring heritage structures over 100 years old.
- Tenure: Empanelment valid for three years, with annual performance review.

Dandami Maria Tribe

Context: The Bison Horn Maria dance of the Dandami Madia (Maria) tribe of Bastar, Chhattisgarh, has drawn attention for its enduring cultural vitality despite modern influences.

About Dandami Maria Tribe:

Who they are?

- The Dandami Maria, also known as Bison Horn Maria or Khalpati Maria, are a tribal community belonging to the broader Gond (Koytorias) ethnic group.
- They are recognised for their distinctive ceremonial dance and headgear resembling bison horns, which has become a cultural marker of their identity.

Origin:

- The Dandami Maria trace their lineage to the ancient Gondwana region, once spread across central India.
- They identify as part of the Gond tribal tradition, one of the oldest indigenous groups of the Deccan plateau.
- Linguistically, they speak Dandami Maria, with many also using Gondi dialects, an oral language of Dravidian origin.

Habitat and Distribution:

- Predominantly inhabit the Bastar region of southern Chhattisgarh, especially in Darbha, Tokapal, Lohandiguda, Dantewada, and surrounding forested tracts.
- Their settlements are closely integrated with dense forests, shaping their subsistence patterns, rituals, and worldview.
- They practice agriculture, supplemented by hunting and fishing.

Key Cultural Characteristics:

- Bison Horn Maria Dance:

  Performed by both men and women during festivals, rituals, and communal gatherings.

  Men wear horn-shaped bamboo headgear decorated with bison or cattle horns, feathers, cowries, and cloth strips, along with bead necklaces and ankle bells.

  Women wear handwoven saris, heavy silver and brass jewellery, coin ornaments, and ceremonial crowns.

- Social and Cultural Life:

  The ghotul (youth dormitory) plays a vital role in socialisation, cultural transmission, and community cohesion.

  Distinct hairstyles, traditional ornaments, and ceremonial objects such as tobacco boxes and combs are culturally significant.

  They permit divorce and widow remarriage, reflecting flexible social norms.

Significance:

- Represents a living tribal heritage that preserves Gond identity and pre-Aryan cultural traditions.
- Embodies a nature-centric worldview, celebrating hunting traditions, seasonal cycles, and forest deities like Budhadev and Danteshwari Mai.

Archaeologists find 2,000-year-old labyrinth revealing India's role in ancient global trade

Context: Archaeologists have uncovered a 2,000-year-old circular stone labyrinth in Maharashtra's Solapur district, the largest of its kind in India.

About Archaeologists find 2,000-year-old labyrinth revealing India's role in ancient global trade:

What it is?

- The find is a massive circular stone labyrinth constructed using carefully laid concentric stone circuits.
- It is dated to nearly 2,000 years ago and linked to the Satavahana dynasty (1st–3rd century CE).

Discovered at:

- Located in the Boramani grasslands, Solapur district, Maharashtra.
- The semi-arid grassland ecosystem limited excavation, aiding long-term preservation of the structure.

Key features:

- Size: Approximately 50 feet × 50 feet, making it the largest circular labyrinth in India.
- Design: Comprises 15 concentric stone circuits, the highest number recorded so far in Indian circular labyrinths.
- Form: Circular layout, distinct from the larger but square labyrinth found at Gedimedu, Tamil Nadu.
- Setting: Situated in open grasslands, not within settlements, temples, or forts.

Connections within India:

- Similar, smaller labyrinths have been found in Sangli, Satara, and Kolhapur, indicating a regional network across western Maharashtra.
- Their alignment suggests links between inland Deccan routes and western coastal ports such as those used in Roman trade.
- Maharashtra's location made it a trade conduit between interior production centres and Arabian Sea ports.

Significance:

- The circular motif resembles labyrinth designs on ancient Roman coins from Crete, many of which have been found in Indian trade hubs.
- Likely served as navigational or symbolic signposts for merchants transporting spices, textiles, and precious stones.
- Reinforces Maharashtra's role as a key crossroads in ancient global commerce.

The Communist Party of India (CPI)

Context: The Communist Party of India (CPI) has completed 100 years since its founding, marking a century of organised Communist politics in India.

About The Communist Party of India (CPI):

What it is?

- The Communist Party of India (CPI) is one of India's oldest political parties, rooted in Marxist ideology, committed to representing the interests of workers, peasants, and marginalised classes through both mass movements and parliamentary politics.

Established in: December 26, 1925, at Kanpur (then Cawnpore)

- Founded through a national conference of Indian Communist groups active within India

Note: An earlier émigré CPI was formed in Tashkent in 1920, a point of historical debate

Aim:

- Liberation of India from British imperialism (pre-1947).
- Socialisation of means of production and distribution.
- Creation of a socially just, egalitarian society free from exploitation.

Evolution:

- 1920s–30s: Influenced by the Russian Revolution (1917); faced repression through conspiracy cases (Kanpur, Meerut).
- 1930s–40s: Participation in trade unionism, peasant struggles, and United Fronts with socialist forces.
- 1940s: Led major agrarian movements like Tebhaga (Bengal) and Telangana.
- Post-Independence: Shifted largely to parliamentary democracy, forming elected governments in Kerala, West Bengal, and Tripura.
- 1964: Major ideological split leading to the formation of CPI (Marxist) amid debates over constitutionalism and the Sino-Soviet split.

Leaders associated:

- M. N. Roy: International Marxist theorist; linked to Comintern and Tashkent phase
- S. A. Dange: Key organiser of Indian Communism; associated with Kanpur foundation
- Muzaffar Ahmad: Pioneer of Communist movement in Bengal
- P. C. Joshi: Early General Secretary; emphasised united front politics
- A. K. Gopalan, E. M. S. Namboodiripad: Post-Independence parliamentary leaders

Key features:

- Marxist ideological foundation: Class struggle, anti-imperialism, and social equality
- Mass-based politics: Strong links with trade unions (AITUC) and peasant movements
- Dual strategy: Combination of extra-parliamentary movements and electoral participation
- Internationalist influence: Inspired by global Communist movements, yet adapted to Indian conditions
- Federal presence: Regional strength varies, with influence concentrated in specific States

Digital Constitutionalism

Context: The government's rapid rollback of its directive mandating the Sanchar Saathi app—after concerns over consent, surveillance and data misuse—has reignited national debate on digital constitutionalism.

About Digital Constitutionalism:

What it is?

- Digital constitutionalism refers to the application and extension of core constitutional principles—liberty, dignity, equality, privacy, due process, proportionality, and rule of law—to digital spaces, technologies, and governance systems.
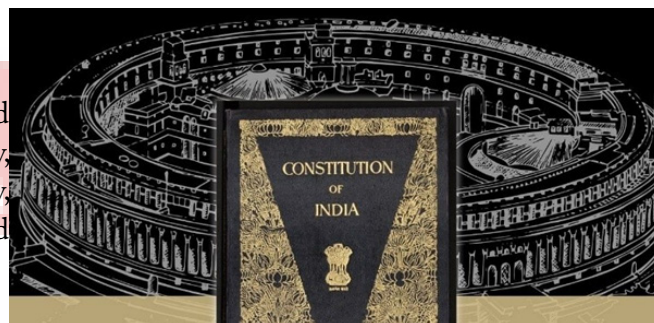
Concept Origin:

- Emerged globally as digital platforms began influencing rights, political participation, and state power.
- Gained prominence after landmark privacy rulings such as the 2017 Puttaswamy judgment in India and the EU's GDPR (2018), which emphasised digital rights, data control, and state accountability.
- Academic discourse traces it to early concerns about unchecked digital surveillance, algorithmic governance, and platform dominance.

Features Of Digital Constitutionalism:

- Rights-based digital governance: Embeds privacy, dignity, autonomy, and equality into digital systems, ensuring technology aligns with constitutional values.
- Limits on surveillance power: Ensures state and corporate monitoring is lawful, necessary, proportionate, and subject to independent oversight.
- Algorithmic transparency: Mandates audits, explainability, and public disclosure of data practices to prevent arbitrary or hidden decision-making.
- Meaningful consent: Requires informed, voluntary, and specific consent mechanisms that give real control over the use of personal data.
- Anti-discrimination safeguards: Ensures AI systems are tested for bias so that digital tools do not reinforce caste, gender, racial or socio-economic inequalities.

Laws Governing Digital Rights In India:

- Article 21 – Privacy as a fundamental right: The Puttaswamy (2017) judgment requires all digital intrusions to meet legality, necessity, and proportionality tests.
- Digital Personal Data Protection Act, 2023: Governs data fiduciaries, consent, and storage but offers broad exemptions to the state, weakening citizen protections.
- IT Act, 2000 & IT Rules 2021/23: Regulate intermediaries, cybersecurity, and platform liability, though they prioritise governance over individual rights.
- Aadhaar Act, 2016: Governs biometric identity and mandate's purpose limitation after Supreme Court scrutiny to prevent mass surveillance misuse.
- No dedicated surveillance law: Current interception relies on outdated Telegraph Act (1885) and IT Act (2000), lacking modern judicial oversight and safeguards.

Challenges Associated With Digital Constitutionalism:

- Unchecked surveillance: Facial recognition, metadata tracking, and biometric monitoring operate without judicial warrants or transparent safeguards.
- Weak consent: Click-through, uninformed consent models erode user autonomy and enable excessive data collection by the state and private actors.
- Government exemptions: Broad powers under DPDP Act reduce accountability and allow disproportionate data access without adequate checks.
- Algorithmic opacity and bias: Black-box AI systems produce discriminatory outcomes, disproportionately affecting women, minorities, and the poor.
- Lack of oversight institutions: India lacks an independent authority to audit algorithms, monitor surveillance practices, or enforce digital rights.

Way Ahead:

- Enact a modern surveillance law: Ensure all monitoring requires judicial warrants, proportionality assessments, and independent audits.
- Establish a Digital Rights Commission: Empowered to review algorithms, oversee data practices, investigate violations, and issue binding directions.
- Strengthen DPDP Act: Narrow state exemptions, enhance user remedies, mandate strict retention limits, and ensure greater transparency.
- Regulate algorithms: Require impact assessments, periodic bias audits, and explainability norms for all high-risk AI systems used in public functions.
- Expand digital literacy: Enable citizens to understand data rights, identify risks, and effectively challenge digital governance abuses.

Conclusion:

As governance becomes increasingly data-driven, constitutional values must anchor digital transformation. Without strong safeguards, surveillance and algorithmic opacity threaten liberty, equality, and democratic accountability. Digital constitutionalism is essential to ensure that technology remains a tool of empowerment rather than a quiet instrument of control.

Directorate General of Civil Aviation (DGCA)

Context: IndiGo's mass flight cancellations forced the DGCA to grant a one-time exemption from the new Flight Duty Time Limitations (FDTL) rules, raising questions about the regulator's authority and decision-making process.

About Directorate General of Civil Aviation (DGCA):

What it is?

- The DGCA is India's statutory civil aviation regulator, responsible for ensuring aviation safety, airworthiness, and compliance with global standards.

Established in:

- Originally created in 1927 (as a government organization)
- Became a statutory body in 2020 under the Aircraft (Amendment) Act.

Ministry:

- Functions under the Ministry of Civil Aviation (MoCA).

  Aim: To promote safe, efficient and reliable air transportation through proactive safety oversight, effective regulation, and alignment with ICAO international standards.

Key Functions of DGCA:

- Safety Oversight & Regulations:

  Frames and enforces Civil Aviation Requirements (CARs).

  Conducts surveillance, audits and spot checks of airlines, airports, MROs and training organisations.

- Aircraft & Airport Certification:

  Registers civil aircraft.

  Issues Certificates of Airworthiness.

  Certifies and inspects aerodromes for safety compliance.

- Licensing:

  Issues licences to pilots, AMEs, ATCOs, cabin crew, flight dispatchers etc.

  Conducts examinations and skill checks.

- Accident & Incident Investigation:

  Investigates incidents and serious incidents (up to 2250 kg AUW).

  Implements safety management and prevention programmes.

- Air Transport Regulation:

  Grants Air Operator Certificates (AOC).

  Regulates domestic and international scheduled and non-scheduled flights.

- ICAO Coordination:

  Ensures Indian aviation rules comply with ICAO standards.

  Participates in USOAP audits and harmonisation of global norms.

- Training Oversight: Approves flying schools, AME schools, simulator centres and aviation training institutes.

- Dangerous Goods & ANS Oversight:

  Certifies operators handling dangerous goods.

  Regulates air navigation services and coordinates civil–military airspace use.

Significance of DGCA:

- Ensures Passenger Safety: Through strict oversight of aircraft, crew rest, maintenance and airport standards.
- Maintains Operational Discipline: Keeps airlines compliant with safety rules, training norms and technical requirements.
- Balances Safety and Capacity: Recent FDTL rollback highlights its role in negotiating between safety norms and operational feasibility.

India's Fire Tragedies: A Governance Failure More Than an Accident

Context: The Goa nightclub fire tragedy, which killed 25 people — most of them migrant workers — has exposed serious gaps in governance, unsafe working conditions, and weak enforcement of licensing and safety norms.

About India's Fire Tragedies: A Governance Failure More Than an Accident

Trends in Fire Tragedies in India:

- High Incidence & Mortality: India records approximately 1.6 lakh fire incidents annually, resulting in over 27,000 deaths (NCRB Accidental Deaths & Suicides in India Report).

- Urban Commercial Shift: While 57% of deaths occur in residential settings, casualties in commercial hubs (hospitals, factories, markets) are rising due to mixed-land use violations.

- Geographic Concentration: Casualties are highest in industrialized, high-density states like Maharashtra, Gujarat, Delhi, and Madhya Pradesh, which account for over 50% of fire-related deaths.
- Nighttime Vulnerability: High-fatality incidents increasingly occur at night/early morning when occupants are asleep and reaction times are slow.

Causes of Fire Tragedies:

- Regulatory Non-compliance: Widespread operation without valid Fire NOCs.

  E.g. The TRP Game Zone fire in Rajkot (2024) occurred in a facility operating without a valid fire NOC or structural stability certificate.

- Structural & Material Hazards: Use of flammable cladding, temporary roofs, and illegal alterations.

  E.g. The Kamla Mills fire (Mumbai, 2017) spread rapidly due to highly combustible bamboo curtains and tarpaulin sheets on the rooftop.

- Electrical Failures: Short circuits remain the leading trigger (approx. 70% of fires) due to overloading and poor wiring.

  E.g. The Mundka fire (Delhi, 2022) was triggered by a generator explosion and electrical faults in a building with a single exit.

- Blocked Egress & Ventilation: Illegal basements and barred windows trap victims.

  E.g. In the Takshashila Arcade fire (Surat, 2019), students were trapped on the top floor because the illegal dome structure blocked the only exit.

- Urban Congestion: Unplanned growth prevents fire tenders from reaching sites.

  E.g. In the Delhi Anaj Mandi fire (2019), narrow lanes forced firemen to use small vehicles, delaying rescue for victims trapped in a "factory-cum-dormitory."

Implications of Recurrent Fire Accidents:

- Disproportionate Impact on Poor: Victims are often low-wage migrant laborers forced to live in unsafe workplaces.

  E.g. A significant portion 43 dead in Anaj Mandi were migrant workers sleeping inside the manufacturing of the unit.

- Governance Deficit: Reveals systemic corruption and lack of coordination between Municipal Corporations, Electricity Boards, and Fire Departments.

- Healthcare Crisis: Fires in hospitals undermine public trust in safety infrastructure.

  E.g. The Bhandara District Hospital fire (Maharashtra, 2021) killed 10 infants, highlighting gaps in safety audits for critical care units.

- Economic Loss: Beyond life, fires destroy capital and disrupt supply chains.

  E.g. FICCI estimates indicate fire-related losses cost the Indian economy over 1,000 crore annually.

Initiatives Taken So Far:

- National Building Code (NBC) 2016 Part 4: detailed provisions for Fire and Life Safety, including mandatory sprinklers, fire lifts, and occupancy restrictions.
- Model Fire and Emergency Services Bill (2019): Proposed to standardize fire services across states, which currently vary as "Fire Services" is a municipal function (12th Schedule).
- Hospital Safety Guidelines (2020): MoHFW mandated "No-Objection Certificates" and quarterly fire audits for all hospitals following the COVID-19 hospital fires.
- Online Compliance Portals: States like Gujarat (Fire Safety COP) and Maharashtra have digitized NOC applications to reduce bribery and track renewal dates.
- Modernization Schemes: The 15th Finance Commission recommended 5,000 crore for strengthening fire services (expansion, modernization, and fleet augmentation).

Way Ahead:

- Mandatory Third-Party Audits: Shift from erratic government inspections to mandatory annual audits by certified independent agencies for all high-rise and commercial buildings.
- GIS & Technology Integration: Map all hydrants and high-risk zones using GIS; deploy drones and firefighting robots for narrow lanes (as seen in Delhi Fire Service trials).
- Unified Command Centre: Create a "One-Nation, One-License" dashboard integrating municipal building plans, electricity load sanctions, and fire NOCs to flag discrepancies automatically.
- Liability Framework: Amend laws to hold municipal officials and electrical inspectors criminally liable for negligence, not just building owners.
- Workplace Safety for Migrants: Strictly enforce the Occupational Safety, Health and Working Conditions Code, 2020, banning the practice of housing workers in factory basements or lofts.

Conclusion:

Fire tragedies in India are not mere accidents but the inevitable result of haphazard urbanization, regulatory apathy, and corruption. Addressing this requires a paradigm shift from reactive compensation to preventive audits, strict officer accountability, and technology-driven enforcement. A fire-safe India is non-negotiable for sustainable urban growth and the protection of its most vulnerable citizens.

Right to Disconnect Bill, 2025: Re-defining Work–Life Boundaries

Context: The Right to Disconnect Bill, 2025, a Private Member's Bill introduced by NCP MP Supriya Sule, has reignited debate on work–life balance and employee well-being in India's digital work culture.

About Right to Disconnect Bill, 2025: Re-defining Work–Life Boundaries:

What it is?

- The Right to Disconnect Bill, 2025 seeks to grant employees a statutory right to disengage from work-related communications outside agreed working hours, protecting personal time in an era of constant digital connectivity and remote work.

Key Features of the Bill

1. Legal right to disconnect: Section 7 guarantees every employee the right to ignore work-related calls, emails, or messages after contractual work hours without fear of disciplinary action.
2. Defined 'out-of-work hours': Clearly defines time beyond agreed work schedules, reducing ambiguity and employer overreach.
3. Employees' Welfare Authority: Establishes a central authority to oversee implementation, protect employee dignity, and promote work–life balance.
4. Negotiation charter: Mandates employer–employee charters specifying out-of-work communication protocols and mutually agreed exceptions.
5. Overtime compensation: Section 11 provides overtime pay at normal wage rates if employees voluntarily respond after hours.
6. Digital well-being measures: Requires awareness programmes, counselling services, and Digital Detox Centres, especially for remote work environments.
7. Penalties for non-compliance: Imposes a financial penalty of 1% of total employee remuneration on violating organisations, acting as a strong deterrent.

Need for Such a Law in India:

- **Always-on work culture:** The spread of smartphones, remote work, and digital platforms has dissolved fixed work hours, making employees perpetually accessible and eroding clear boundaries between professional and personal life.

- **Mental health concerns:** Extended digital availability has led to rising cases of burnout, anxiety, and work-induced stress, particularly among young professionals and gig workers lacking institutional safeguards.

- **Power asymmetry at workplaces:** Employees often hesitate to ignore after-hours communication due to hierarchical pressures, performance appraisals, and job insecurity, resulting in involuntary overtime and silent exploitation.

- **Global legislative precedent:** Countries such as France, Belgium, Ireland, and Australia have legally recognised the right to disconnect, demonstrating its feasibility as a labour-rights protection in modern economies.

- **Productivity over presenteeism:** The law encourages a shift from measuring work by hours logged to outcomes delivered, improving efficiency, innovation, and long-term employee engagement.

Challenges Associated:

- **Diverse work models:** India's economy spans manufacturing, IT, gig work, and global services, making uniform regulation difficult for sectors requiring time-zone coordination or emergency responsiveness.

- **Enforcement difficulties:** Monitoring informal digital communications such as WhatsApp messages or late-night calls poses practical and evidentiary challenges for regulators.

- **SME compliance burden:** Small and medium enterprises may face difficulties in framing charters, maintaining compliance records, and absorbing potential financial penalties.

- **Risk of regulatory rigidity:** Overly strict provisions could limit operational flexibility during peak business cycles, emergencies, or client-driven deadlines.

- **Private Member's Bill limitation:** Without government sponsorship, private member's bills rarely become law, restricting immediate legislative impact despite policy relevance.

Way Ahead:

- **Phased and sector-specific adoption:** Introduce differentiated norms based on sectoral needs, allowing flexibility for global teams while protecting routine employees from digital overreach.

- **Tripartite dialogue mechanism:** Structured consultations among government, employers, and worker representatives can help create balanced, enforceable, and context-sensitive norms.

- **Soft-law approach initially:** Guidelines under existing labour codes can test feasibility and acceptance before formal statutory backing.

- **Behavioural and cultural change:** Awareness campaigns must promote responsible digital communication norms among managers and employees alike.

- **Integration with labour and health policies:** Link the right to disconnect with occupational health, mental well-being, and productivity frameworks for holistic workforce protection.

Conclusion:

The Right to Disconnect Bill, 2025 reflects the evolving realities of India's digital workforce and the growing need to protect mental well-being. While legislative and practical challenges remain, the Bill has sparked a vital conversation on humane, sustainable work cultures. Balancing flexibility with dignity at work will be key to future labour governance in India.

Courts as Guardians, Not Regulators: Preserving Free Speech in India

Context: Recent observations by the Supreme Court in Ranveer Allahbadia vs Union of India (2025), suggesting new regulatory mechanisms for online content, have triggered debate on whether courts should protect free speech or inadvertently regulate it.

About Courts as Guardians, Not Regulators: Preserving Free Speech in India

What is Free Speech?

- Freedom of speech and expression is the right to express opinions, ideas, beliefs, and information through speech, writing, art, or digital platforms without undue interference.
- It is foundational to democracy, enabling dissent, accountability, informed choice, and the free exchange of ideas.

Constitutional Provisions Backing Free Speech:

- Article 19(1)(a): Guarantees the right to freedom of speech and expression to all citizens.
- Article 19(2): Permits reasonable restrictions only on specific grounds—sovereignty and integrity of India, security of the State, public order, decency or morality, defamation, contempt of court, and incitement to an offence.
- The grounds under Article 19(2) are exhaustive, not illustrative.

Role of Courts in Handling Free Speech:

- Constitutional umpire: Courts are tasked with examining whether restrictions on speech are reasonable and constitutionally valid, not with crafting regulatory frameworks or prescribing policy solutions.
- Guardian against prior restraint: Judicial scrutiny must prevent pre-censorship or blanket controls, ensuring speech is restricted only after demonstrable harm and strict constitutional justification.
- Doctrine of separation of powers: Law-making and policy formulation belong to the legislature and executive, while courts must confine themselves to interpretation and review.
- Rights-balancer within Article 19(2): Courts may balance free speech with other rights only within the expressly listed under Article 19(2), avoiding expansion through judicial creativity.

Challenges from Regulation of Free Speech in India:

- Risk of prior restraint: Broad or preventive regulations can silence expression before any actual violation occurs, undermining democratic debate and dissent.
- Vague and subjective standards: Indeterminate terms like "morality" or "offensiveness" enable arbitrary enforcement, leading to inconsistent and biased restrictions.
- Chilling effect on speech: Fear of prosecution, takedowns, or sanctions discourages citizens and media from exercising legitimate criticism or unpopular opinions.
- Judicial overreach: When courts extend cases into policy-making domains, they risk weakening constitutional boundaries and democratic accountability.
- Digital regulation complexity: Online speech involves scale, speed, and technological nuances, requiring expertise beyond traditional judicial capacity.

Key Cases and Judgments:

- Sahara India v. SEBI (2012): The Court held that pre-censorship must be avoided and postponement of publication permitted only as a last resort under strict standards.
- Kaushal Kishor v. State of UP (2023): A Constitution Bench clarified that Article 19(2) grounds are exhaustive, and no new restrictions can be judicially added.
- Common Cause v. Union of India (2008): The Court cautioned against judicial attempts to solve policy problems beyond institutional competence.
- Adarsh Cooperative Housing Society v. Union of India (2018): The Court refused to mandate disclaimers, affirming that content regulation lies with statutory authorities after due process.
- Shreya Singhal v. Union of India (2015): Section 66A of the IT Act was struck down for vagueness and its chilling effect on free expression.

Way Ahead:

- Judicial restraint: Courts must limit themselves to constitutional review, preserving their role as protectors rather than regulators of speech.

- Clear legislative standards: Any restriction must be precise, narrowly tailored, and strictly aligned with Article 19(2).
- Post-facto remedies over pre-censorship: Democracies should prioritise content takedown and penalties after due process rather than preventive bans.
- Comparative democratic practices: India can adopt models from the EU, UK, and Australia that focus on removal mechanisms without surveillance-driven control.
- Robust free speech jurisprudence: Courts must consistently reaffirm that freedom is the rule and restriction the exception.

Conclusion:

Free speech is the lifeblood of democracy, protected by Article 19(1)(a) and constrained only by Article 19(2). Courts must act as guardians, not regulators, ensuring that fear of regulation does not replace freedom. Constitutional fidelity, judicial restraint, and precise law-making are essential to preserve liberty in the digital age.

Supreme Court Guidelines on Dowry-Related Violence

Context: In State of Uttar Pradesh vs Ajmal Beg (2025), the Supreme Court set aside an acquittal in a dowry death case and issued comprehensive guidelines to strengthen enforcement against dowry-related violence and deaths.

About Supreme Court Guidelines on Dowry-Related Violence:

What is the judgment about?

The Supreme Court delivered a landmark ruling addressing the social, constitutional and criminal dimensions of dowry-related violence. It emphasised that dowry, even when disguised as "gifts", violates women's dignity, equality and right to life.
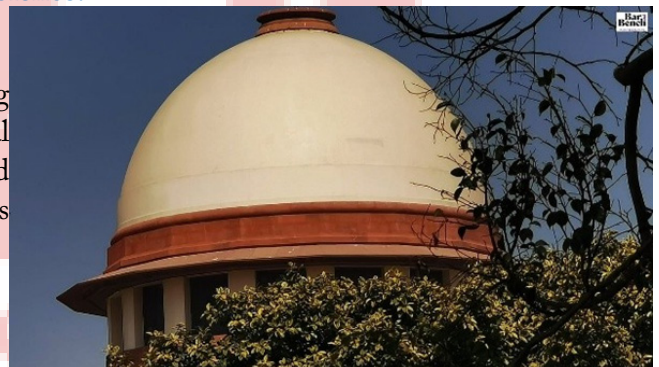
Case name: State of Uttar Pradesh vs Ajmal Beg (2025)

Key judicial findings:

- Restoration of conviction: The Court set aside the Allahabad High Court's acquittal and restored trial court convictions under Sections 304B & 498A IPC, read with Section 113B, Indian Evidence Act.
- Sociological analysis: Dowry has evolved from voluntary gifts to a coercive, institutionalised system linked to hypergamy and patriarchy.
- Across religions: The practice cuts across communities; even Islamic mehr has been diluted by parallel dowry demands.
- Constitutional violation: Dowry violates Articles 14, 15 and 21, making its eradication a constitutional imperative.

Current status and data on dowry in India:

- Scale of the problem: ~7,000 dowry deaths annually (NCRB average).
- Criminal justice gap: Only ~4,500 cases charge-sheeted yearly; 67% investigations pending over 6 months (2022).
- Low convictions: Barely ~100 convictions annually from ~6,500 trial cases.
- Regional concentration: ~80% cases from UP, Bihar, Jharkhand, MP, Odisha, Rajasthan, WB and Haryana.
- Urban distress: Delhi accounts for ~30% of dowry deaths among major cities.

Supreme Court–issued guidelines to curb dowry violence:

1. Value-based education: Governments to integrate constitutional values of equality and dignity in school curricula to address dowry at the social-conditioning stage.

2. Strengthen enforcement machinery: Proper appointment, empowerment and visibility of Dowry Prohibition Officers across States.

3. Capacity-building of institutions: Regular sensitisation training for police and judicial officers on social and psychological aspects of dowry crimes.

4. Fast-track justice: High Courts to review long-pending cases under Sections 304B and 498A IPC and ensure time-bound disposal.

5. Community-level awareness: District administrations and District Legal Services Authorities (DLSAs) to run outreach programmes, especially beyond formal education systems.

6. Monitoring and compliance: Judgment to be circulated to States and High Courts, with continued judicial monitoring.

Challenges to eradication of dowry:

- Social acceptance disguised as 'gifts': Dowry continues under cultural legitimacy, weakening detection and enforcement despite statutory prohibition.

  Eg: State of U.P. v. Ajmal Beg (2025) noted dowry's transformation from voluntary gifts into an institutionalised coercive practice.

- Patriarchal marriage markets: Grooms are monetised based on education, income and status, normalising pre-marriage financial extraction.

  Eg: A 2025 Bengaluru case saw ₹50 lakh and a luxury car demanded just before marriage, triggering FIR after the groom absconded.

- Weak enforcement capacity: Dowry Prohibition Officers remain under-staffed, under-empowered and largely invisible at the district level.

  Eg: In December 2025, the Supreme Court criticised States for failing to operationalise DPOs under the Dowry Prohibition Act.

- Judicial delays and low convictions: Prolonged trials dilute deterrence and erode victims' faith in justice.

  Eg: A 2025 Supreme Court verdict restored conviction in a 2001 dowry death case after two decades of pendency.

- Cross-community diffusion of dowry: Dowry has spread across religions, overriding doctrinal safeguards meant to protect women.

  Eg: The Supreme Court (Dec 2025) observed dowry's diffusion into Muslim marriages, reducing mehr to a nominal formality.

Way ahead:

- Zero-tolerance enforcement: Time-bound investigation and prosecution must replace procedural laxity.

  Eg: Supreme Court (Oct 2025) directed High Courts to fast-track pending cases under IPC 304B and 498A.

- Community-led norm change: Social sanction is essential to delegitimise dowry beyond legal deterrence.

  Eg: The 2025 Model Women-Friendly Gram Panchayats initiative institutionalised Mahila Gram Sabhas nationwide.

- Economic empowerment of women: Financial autonomy reduces vulnerability to dowry-linked coercion and violence.

  Eg: Courts increasingly combine dowry cases with residence and maintenance relief under the Domestic Violence Act.

- Data-driven policing: Evidence-based targeting can improve investigation quality and accountability.

  Eg: In 2025, experts highlighted that only ~4,500 of 7,000 dowry death cases reach charge-sheet stage annually.

- Monitoring judicial compliance: Continuous oversight is needed to translate judicial directions into systemic reform.

Eg: In late 2025, the Supreme Court mandated High Courts to map pendency from the oldest to newest dowry cases.

Conclusion:

The Supreme Court's 2025 judgment reframes dowry eradication as a constitutional duty, not merely a social reform. Legal rigor, institutional capacity and social transformation must move together to end dowry violence. Only sustained enforcement combined with deep cultural change can secure dignity and equality for women.

Quality Council of India

Context: The Quality Council of India (QCI) announced next-generation quality reforms on the eve of Sushasan Divas 2025 to strengthen India's quality ecosystem.

About Quality Council of India (QCI):

What it is?

- The Quality Council of India (QCI) is an autonomous, non-profit national accreditation body that promotes, adopts, and institutionalises quality standards across sectors in India.

- It operates as a public–private partnership (PPP) model, independent of direct government control, while supporting national quality objectives.

Established in:

- 1996, following Cabinet approval, under the Societies Registration Act, 1860.
- Set up on the recommendations of a multi-stakeholder committee coordinated by the then Department of Industrial Policy and Promotion (now DPIIT).

Aim:

- To build a robust national quality infrastructure aligned with international standards.
- To enhance global competitiveness of Indian goods and services, protect consumer interests, and improve quality of life.

Key functions:

- National accreditation programmes: Accredits laboratories, certification bodies, inspection agencies, medical labs, and testing facilities as per global norms.
- Service-sector quality assurance: Develops accreditation frameworks for education, healthcare, governance, environment, infrastructure, and vocational training.
- Trade facilitation: Helps overcome TBT/SPS barriers under WTO by ensuring internationally acceptable conformity assessment.
- Capacity building: Strengthens quality systems in governments, institutions, MSMEs, and enterprises through training and benchmarking.
- International engagement: Maintains linkages with ILAC, IAF, OECD, ISQua, APLAC, PAC, enabling mutual recognition and global acceptance.
- Quality awareness: Leads the National Quality Campaign to empower citizens to demand quality goods and services.

Significance:

- Recent initiatives like Q Mark – Desh ka Haq and Quality Setu shift the system from inspection-heavy regulation to trust-based governance.
- Improves export credibility, especially for MSMEs, by aligning Indian standards with global benchmarks.

Law on Suspension of Sentence

Context: The Supreme Court has stayed the Delhi High Court's order suspending the life sentence of former MLA Kuldeep Singh Sengar in the Unnao rape case, reviving debate on when courts can suspend sentences in heinous crimes.

About Law on Suspension of Sentence:

What is the issue?

- 'Suspension of sentence' refers to the temporary halt on execution of punishment awarded by a trial court during the pendency of an appeal.
- While it preserves the right to appeal, its misuse in serious offences such as rape and life imprisonment cases raises concerns about victim safety, public confidence in justice, and dilution of deterrence.

Situations when suspension of sentence is granted

- Fixed-term or short sentences: Suspension is ordinarily granted because lengthy appellate delays may result in the convict serving the entire sentence, rendering the statutory right to appeal illusory and meaningless.
- Life imprisonment or heinous offences: Suspension is an exception and requires strict judicial scrutiny of the offence's gravity, manner of commission, societal impact, and the appellant's likelihood of securing acquittal.
- Apparent legal or procedural infirmities: Where the trial judgment reveals prima facie perversity, gross legal error, or misapplication of law, suspension may be justified to prevent irreversible miscarriage of justice.
- Humanitarian and medical considerations: Exceptional circumstances such as terminal illness, extreme age, or grave medical conditions may warrant suspension, provided public safety and justice are not compromised.
- Prolonged incarceration with delayed appeal hearing: In rare cases, exceptionally long imprisonment coupled with unlikely early disposal of appeal may be considered, though not as a standalone ground in life sentence cases.

Law governing suspension of sentence:

- Statutory basis under criminal procedure law: Section 389 of the CrPC, 1973 (now Section 430 of BNSS, 2023) empowers appellate courts to suspend execution of sentence during the pendency of appeal.
- Suspension affects punishment, not conviction: The provision merely stays the operation of the sentence; the finding of guilt remains intact unless reversed by the appellate court.
- Discretionary and not a matter of right: Suspension is a judicial discretion guided by reason, proportionality and public interest, rather than an automatic consequence of filing an appeal.
- Higher threshold for serious offences: In life imprisonment or heinous crimes, courts must apply a stricter standard to prevent erosion of deterrence dnd public confidence in justice.

Various court judgement:

1. Bhagwan Rama Shinde Gosai v. State of Gujarat (1999): The Supreme Court held that suspension of sentence is generally justified in short-term convictions, but must be exercised with restraint in serious

offences.

2. Shivani Tyagi v. State of Uttar Pradesh (2024): The Court clarified that in heinous crimes, especially those involving sexual violence, long incarceration alone cannot justify suspension of sentence.

3. Chhotelal Yadav v. State of Jharkhand (2025): The Supreme Court ruled that in life imprisonment cases, suspension is permissible only where a palpable legal error suggests a real likelihood of acquittal on appeal.

Challenges associated:

- Dilution of deterrence: Frequent suspension in grave offences weakens the punitive signal of criminal law and undermines its role in discouraging serious crimes.

- Threats to victim safety: Release of powerful convicts can revive intimidation, retraumatise survivors, and compromise witness protection and trial integrity.

- Inconsistent judicial application: Divergent standards across courts create uncertainty, arbitrariness, and forum-dependent outcomes in suspension jurisprudence.

- Legislative and definitional gaps: Narrow statutory definitions, such as "public servant" under POCSO, may exclude politically influential offenders from aggravated liability.

- Erosion of public trust: Perceived leniency in high-profile cases fuels cynicism and weakens citizens' faith in the fairness of the justice delivery system.

Way ahead:

- Stricter evidentiary threshold: Suspension in life sentence cases should require a clear prima facie indication of likely acquittal or manifest legal error.

- Victim-centric balancing: Courts must weigh power asymmetry, prior intimidation, and survivor vulnerability alongside the rights of the convict.

- Legislative clarification of special laws: Parliament should amend statutes like POCSO to expressly include elected representatives where abuse of authority is evident.

- Time-bound appellate adjudication: Fast-tracking appeals in serious offences can reduce reliance on suspension due to prolonged incarceration.

- Uniform judicial guidelines: The Supreme Court may frame binding norms to harmonise suspension standards in heinous and life-imprisonment cases.

Conclusion:

Suspension of sentence is an important appellate safeguard, but it must remain an exception in grave crimes. In life imprisonment and sexual offence cases, victim safety and societal interest must prevail over routine leniency. Clearer laws, cautious adjudication and faster appeals are essential to prevent dilution of justice.

East African Rift Valley

Context: A new study using resurrected 1960s magnetic data shows clear evidence of active seafloor spreading near the Afar triple junction, confirming that Africa is gradually splitting into two plates.

About East African Rift Valley:

- What it is?

  World's largest active continental rift stretches ~3,500 km from the Red Sea to Mozambique, marked by elongate depressions and steep fault scarps produced by crustal extension.

- Key Features:

  Two distinct branches: the volcanic-rich Eastern Rift (Ethiopia–Kenya) and the seismically active Western Rift (Uganda–Malawi), each showing advanced stages of crustal thinning.
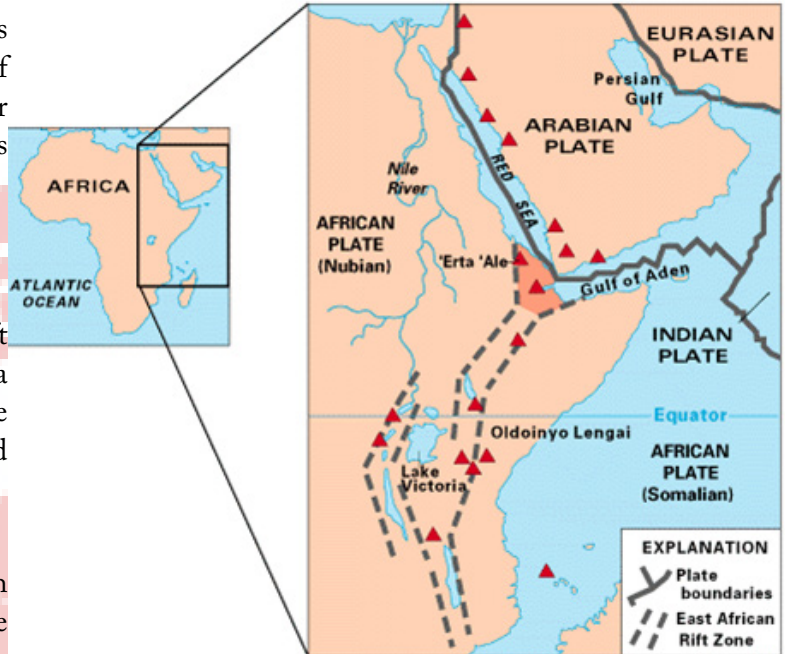
  Tectonic & volcanic zone: characterised by normal faults, fissures, active volcanoes like Erta Ale, and deep lakes such as Tanganyika formed by subsiding crust.

  Afar Triple Junction: a meeting point of the Red Sea, Gulf of Aden and East African rifts, making it one of Earth's most dynamic tectonic regions.

  Divergent plate boundary: separates the Somali and Nubian plates, with measurable spreading of 5–16 mm/year in the north.

Formation of the Rift Valley:

- Mantle plume upwelling increases heat flow and buoyancy, uplifting and thermally weakening the continental lithosphere beneath Ethiopia–Kenya.

- Tensional plate forces stretch the brittle crust, causing extensional stress that produces large, steep normal faults on both sides of the rift.

- Horst–graben structures form as blocks of crust drop down (grabens) while adjacent blocks rise (horsts), creating deep trough-like rift valleys.

- Magmatism & basaltic volcanism accompany crustal thinning, as fissure eruptions and flood basalts fill the widening rift floor over millions of years.

- Progressive divergence may eventually rupture the continental crust entirely, allowing seafloor spreading to create a new ocean basin.

Factors Causing the African Rift:

- Deep mantle superplume beneath East Africa pushes the lithosphere upward, generating uplift, stretching, and widespread magmatic weakening.

- Divergence between Somali & Nubian plates, moving 5–16 mm/year, progressively widens the rift and increases extensional strain on the crust.

- Afar triple-junction dynamics intensify crustal breakup as three spreading centres mechanically pull the region apart in different directions.

- High heat flow & magma intrusions reduce crustal strength, accelerating normal faulting and basin subsidence.
- Stress transfer from Red Sea & Gulf of Aden spreading centres propagates southward, reinforcing rifting from the northeast to Mozambique.

Implications of the Rift:

- Geological Implications:

  Formation of a new ocean basin is likely once continental rupture completes, separating the Somali plate from the African mainland.

  Higher volcanic and seismic activity will persist along Ethiopia, Kenya, and Tanzania as crustal thinning continues and magma pathways open.

  Creation of deep linear lakes & drainage shifts, altering hydrology and forming new basins such as expanded Lake Turkana or Malawi.

  Africa's long-term geographic reconfiguration, producing two continents with newly emergent coastlines and submerged rift floors.

- Socio-Economic Implications:

  Frequent fissuring, fault scarps & earthquakes threaten roads, farms, schools, and settlements across Rift Valley nations.

  Damage to public infrastructure—as seen in Kenya and Ethiopia—will raise disaster-risk, requiring continuous monitoring and adaptation.

  Future coastline emergence may give landlocked nations like Uganda and Zambia potential sea access, reshaping trade patterns.

Conclusion:

The East African Rift Valley represents one of Earth's most active continental breakup zones, gradually reshaping Africa's geography. Though unfolding over millions of years, its seismic and volcanic impacts are already visible today. Understanding this rifting is essential for managing future geological hazards and harnessing new resource opportunities.

Bondi Beach

Context: Australia was shaken by a deadly terror-linked mass shooting at Sydney's Bondi Beach during a Jewish festival, prompting the government to consider tougher gun laws.

About Bondi Beach:

What it is?

- Bondi Beach is a world-famous ocean beach and adjoining suburb in Sydney, known for its surf culture, tourism, and public recreation. It is among the most visited beaches in Australia and a major symbol of the country's coastal lifestyle.

Location:

- Situated 7 km east of Sydney's Central Business District (CBD).
- Lies in the Eastern Suburbs of Sydney within the Waverley Council local government area.
- Neighbouring suburbs include North Bondi, Bondi Junction, Rose Bay, and Bellevue Hill.
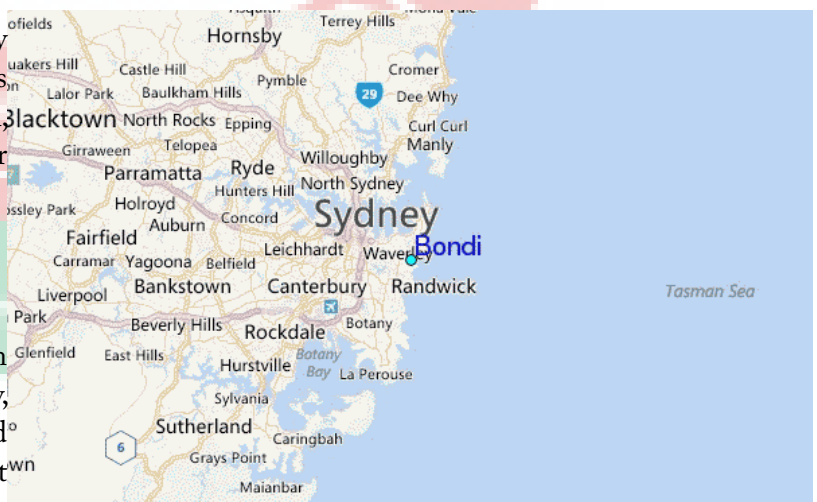
Key features:

- Natural setting: Crescent-shaped sandy beach facing the Tasman Sea, popular for surfing and swimming.
- Cultural prominence: Featured in global TV series such as Bondi Rescue and Bondi Vet.
- Demographics: Historically multicultural, with a strong Jewish community and migrant heritage.
- Indigenous heritage: Traditionally inhabited by Bidjigal, Birrabirragal, and Gadigal Aboriginal peoples.
- Name origin: Derived from the Dharawal word "Bondi", meaning a loud thud, like waves crashing on rocks.

Significance:

- Tourism & economy: A key contributor to Sydney's tourism-driven economy and international image.
- Cultural history: Site of major social movements, including early 20th-century debates on public decency and beach culture.
- Public safety relevance: The recent attack highlights challenges of urban security, counter-terrorism, and public space safety.

Fog

Context: The India Meteorological Department has issued a Red Alert for dense to very dense fog over Uttar Pradesh, with similar conditions forecast across north and eastern India.

About Fog:

What it is?

- Fog is a meteorological phenomenon in which tiny water droplets or ice crystals remain suspended near the Earth's surface, reducing visibility to below 1 km due to scattering of light.

Types of Fog:

- Radiation fog: Forms during clear, calm nights when the Earth rapidly loses heat by radiation, cooling the air near the surface to the dew point. It is common in winter over plains and usually dissipates after sunrise.
- Valley fog: A special type of radiation fog where cold, dense air flows downslope and accumulates in valleys. The trapped air cools further, making valley fog denser and longer-lasting than fog over flat terrain.
- Advection fog: Occurs when warm, moist air moves horizontally over a colder surface such as snow, land, or cold ocean currents. Cooling from below causes condensation, and the fog can persist even during daytime.
- Freezing fog: Composed of supercooled liquid droplets that freeze instantly upon contact with surfaces. It creates a thin ice coating on roads, trees, and power lines, making travel extremely hazardous.
- Evaporation (mixing) fog: Forms when water vapour added by evaporation mixes with cooler, drier air until saturation is reached. Common examples include steam fog over warm water bodies and frontal fog during rainfall.
- Upslope fog: Develops when moist air is forced to rise along hills or mountain slopes. As the air ascends, it cools adiabatically, condenses, and forms fog, often covering large elevated areas.
- Hail fog: A rare fog that forms after heavy hailstorms when melting hail cools the warm, moist air near the ground to its dew point. It is usually shallow, patchy, and short-lived.

How fog is formed?

- Fog forms when air temperature falls to the dew point or when moisture content increases enough for saturation.
- Key mechanisms include radiational cooling, horizontal movement of moist air, evaporation, or orographic uplift.
- Calm winds, high humidity, long winter nights, and temperature inversions favour fog formation.

Impacts on local weather and society:

- Visibility reduction: Near-zero visibility disrupts road, rail, and air transport, increasing accident risk.
- Temperature moderation: Fog can suppress daytime heating, prolonging cold conditions.
- Air quality deterioration: Fog traps pollutants near the surface, worsening smog and respiratory issues.

Chapter-
4

ENVIRONMENT

Barcelona Convention

Context: At COP24 of the Barcelona Convention in Cairo, EU countries and Mediterranean partners adopted strengthened commitments to protect the Mediterranean Sea.

About Barcelona Convention:

- What it is?

  The Barcelona Convention is a legally binding UNEP-led regional environmental agreement for protecting the Mediterranean Sea against pollution and promoting sustainable coastal and marine management.
- Adopted in: 16 February 1976 (Convention for the Protection of the Mediterranean Sea Against Pollution)
- Entered into force: 1978
- Amended & renamed: 1995 as the Convention for the Protection of the Marine Environment and Coastal Region of the Mediterranean
- Aim:

  Prevent, reduce, combat and eliminate pollution from land-based, marine and atmospheric sources.

  Promote sustainable development through coordinated regional action.

  Support Mediterranean states in implementing protocols dealing with dumping, emergencies, land-based sources, protected areas, offshore pollution, hazardous waste, and coastal zone management.

About Mediterranean Sea:

What it is?

- A semi-enclosed, intercontinental sea between Europe, Asia, and Africa, covering ~2.5 million km² and accounting for ~0.7% of global ocean area; a biodiversity hotspot and cradle of ancient civilizations.

Neighbouring Nations:

- The Mediterranean is bordered by:

  Europe: Spain, France, Monaco, Italy, Slovenia, Croatia, Montenegro, Albania, Greece

  Asia: Turkey, Cyprus, Syria, Lebanon, Israel

  Africa: Egypt, Libya, Tunisia, Algeria, Morocco
- Connected to major water bodies via:

  Atlantic Ocean through Strait of Gibraltar

  Black Sea through Dardanelles–Marmara–Bosporus system

Red Sea through Suez Canal

Geological Features:

- Formed by tectonic convergence of the African and Eurasian plates.
- Divided by the Sicily submarine ridge into western and eastern basins.
- Contains major basins: Alborán, Algerian, Tyrrhenian (west); Ionian, Levantine (east).
- Deepest point: Calypso Deep (5,267 m) in the Ionian Sea.
- Hosts major islands including Sicily, Sardinia, Corsica, Crete, Cyprus, Lesbos, and Mallorca.

Senna spectabilis

Context: Tamil Nadu has launched one of India's largest invasive-species eradication drives to completely remove Senna spectabilis from all forest divisions by March 2026.

About Senna spectabilis:

What It Is?

- Senna spectabilis is a fast-growing, yellow-flowering tree belonging to the legume family (Fabaceae), widely planted as an ornamental and shade tree but now recognised as a highly invasive alien species in India, Africa, and parts of Asia.

Origin:

- Native to: South & Central America (Brazil, Argentina, Paraguay, Bolivia, Peru, Venezuela).
- In India, it has aggressively invaded Nilgiris, Mudumalai, Sathyamangalam, Anaikatty and other Western Ghats ecosystems.

Habitat:

- Thrives in dry to moist deciduous forests, disturbed woodland, savannahs, and well-drained soils.
- Prefers full sunlight, adapts to poor soils, and spreads easily through prolific seeds.

Key Characteristics:

- Grows 7–18 m tall, with dense, spreading crown forming thick canopies.
- Bright yellow flowers and long dehiscent pods (15–30 cm) containing numerous hard-coated seeds.
- Leaves exhibit nyctinasty (close at night, open at dawn).
- Used traditionally for fuelwood, ornamental planting, shade, and small implements.

IUCN Status: Classified as Least Concern.

Ecological Implications:

- Suppresses native vegetation by forming dense monocultures, reducing forest biodiversity.
- Limits fodder availability for elephants, deer, and other herbivores, altering wildlife movement patterns.
- Raises forest fire risk due to dry biomass accumulation.
- Delays natural forest regeneration, threatening long-term ecosystem resilience.

Western Tragopan

Context: A captive-breeding programme at Sarahan Pheasantry, Himachal Pradesh, has successfully stabilised the Western Tragopan population, giving conservationists fresh hope.

About Western Tragopan:

- What it is?

  The Western Tragopan (Tragopan melanocephalus) — also called Jujurana or "king of birds" — is one of the world's rarest pheasants and the state bird of Himachal Pradesh. It is a flagship species of the Western Himalayas, known for its striking plumage and ecological sensitivity.

- Habitat:

  Found between 2,400–3,600 m in moist temperate Himalayan forests.

  Prefers dense undergrowth, ringal bamboo, rhododendron thickets, and conifer forests.

  Key strongholds include Great Himalayan National Park (GHNP), Kazinag, Limber (J&K), and pockets in Uttarakhand and northern Pakistan.

- IUCN Status:

  Listed as Vulnerable on the IUCN Red List.

  Only 3,000–9,500 mature individuals remain, all forming a single fragile sub-population.

- Key Characteristics:

  Male: Velvet-black head, crimson breast, white spotting, and colourful blue–orange facial wattles used in elaborate mating displays.

  Female: Brown, camouflaged, smaller; immature males resemble females.

  Ground-dwelling, shy, active at dawn/dusk; feeds on berries, seeds, buds, shoots, and insects.

  Breeds during May–June, laying 3–5 eggs in concealed nests.

- Significance:

  An indicator species of high-altitude forest health.

  Cultural symbol of Himachal Pradesh.

  Captive breeding at Sarahan Pheasantry has produced over 40+ individuals, offering insurance against extinction.

Rhinoceros (Rhino)

Context: A recent international study shows that rhino dehorning has reduced poaching by nearly 75–78% in African reserves, offering a cost-effective conservation tool.

About Rhinoceros (Rhino):

- What it is?

  The rhinoceros is a large, herbivorous mammal belonging to the family Rhinocerotidae.

  It is one of the oldest surviving megafauna, dating back millions of years.

- Habitat:

  Rhinos occupy diverse ecosystems depending on species:

  Grasslands and savannahs

  Tropical and subtropical forests

  Swamps, riverine areas, and shrublands

- Types of rhinos (5 species):

  White rhino (Ceratotherium simum): Africa

  Black rhino (Diceros bicornis): Africa

  Greater one-horned (Indian) rhino (Rhinoceros unicornis): India & Nepal

  Javan rhino (Rhinoceros sondaicus): Indonesia

  Sumatran rhino (Dicerorhinus sumatrensis): Indonesia

- Key characteristics:

  Horn made of keratin, not bone (same protein as hair and nails)

  Herbivorous, feeding on grasses, leaves, shoots, and roots

  Poor eyesight but strong hearing and smell

  Semi-aquatic behaviour in some species (Indian rhino)

  Slow reproduction, making recovery difficult after population loss

- Conservation status:

  Critically Endangered: Javan, Sumatran, Black rhino

  Vulnerable: Greater one-horned rhino

  Near Threatened: White rhino

- Significance:

  Biodiversity value: Rhinos are keystone species, shaping grassland and forest ecosystems through grazing and seed dispersal.

  Ecological balance: Their feeding behaviour maintains habitat heterogeneity, supporting smaller species.

  Cultural and heritage value: The Indian rhino features in Assam's natural heritage, especially Kaziranga

National Park.

Indicator of governance: Rhino conservation reflects state capacity, anti-poaching enforcement, and community participation.

Global conservation symbol: Rhino protection is central to global efforts against illegal wildlife trade, alongside elephants and tigers.

Pollution Control Vessel 'Samudra Pratap'

Context: The Indian Coast Guard (ICG) has inducted its first indigenously designed and built Pollution Control Vessel (PCV), Samudra Pratap, marking a major milestone in maritime environmental protection.

About Pollution Control Vessel 'Samudra Pratap':

What it is?

- Samudra Pratap is a specialised Pollution Control Vessel (PCV) commissioned into the Indian Coast Guard for marine environmental protection, oil-spill response, and firefighting operations.

- It is the largest vessel in the ICG fleet and the first PCV to be indigenously designed and constructed in India.

   Built by: Goa Shipyard Limited (GSL) under the two-ship Pollution Control Vessel project for the Indian Coast Guard.

Key features:

- Size & capacity: 114.5 m length, 16.5 m breadth, displacement of 4,170 tonnes, enabling long endurance and high-seas operations.

- Advanced navigation & control: First ICG ship with Dynamic Positioning (DP-1) capability for precise station-keeping during pollution response.

- Pollution response systems: Equipped with oil fingerprinting machine, oil spill detection systems, viscous oil recovery equipment, and onboard pollution control laboratory.

- Firefighting capability: Holds FiFi-2/FFV-2 notation with a high-capacity external firefighting system for ship and offshore fire emergencies.

- Combat & support systems: Armed with 30 mm CRN-91 gun and two 12.7 mm remote-controlled guns, integrated with modern fire-control systems.

- Indigenous systems: Features Integrated Bridge System, Integrated Platform Management System, and Automated Power Management System.

Significance:

- Enhances India's capability to respond to oil spills, chemical pollution, and maritime accidents within the EEZ and beyond.

- Demonstrates India's ability to design and build complex, mission-specific vessels domestically.

- Strengthens preparedness for maritime ecological disasters and offshore industrial accidents.

Secondary Pollutants

Context: Recent analysis by the Centre for Research on Energy and Clean Air (CREA) shows that secondary pollutants now account for nearly one-third of Delhi's annual PM2.5 load.
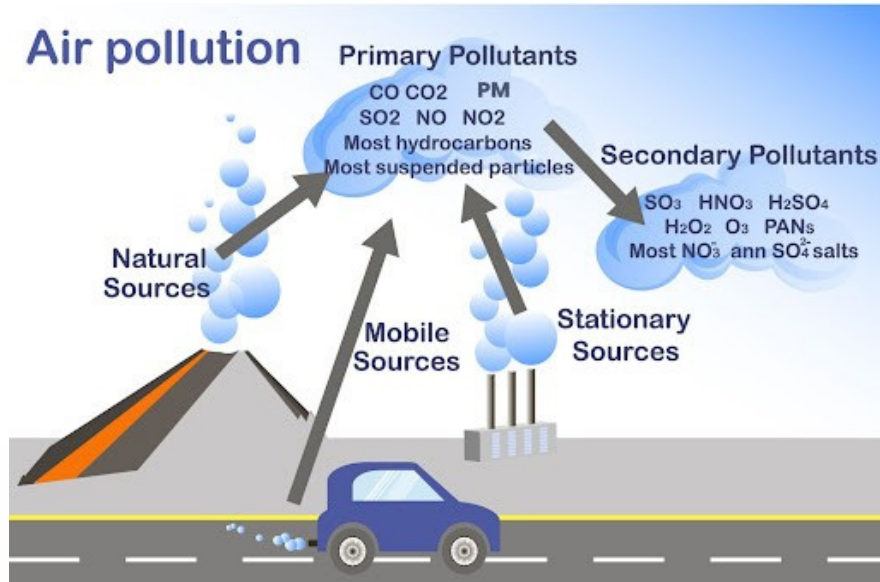
About Secondary Pollutants:

What are secondary pollutants?

- Secondary pollutants are not emitted directly from a source; instead, they are formed in the atmosphere when primary pollutants (gases) undergo chemical reactions influenced by sunlight, humidity, temperature and stagnation.
- Unlike visible local emissions, they often build up downwind and over time, making control more complex.

Major secondary pollutants:

- Secondary particulate matter (PM2.5): Ammonium sulfate, ammonium nitrate.
- Ozone (O_3): Formed from nitrogen oxides (NOx) and volatile organic compounds (VOCs) under sunlight.
- Acids: Sulfuric acid and nitric acid (contributors to acid rain).
- Photochemical smog components: Peroxyacetyl nitrates (PANs), nitrogen dioxide (NO_2).

How are secondary pollutants formed?

- Emission of precursor gases: SO_2 (coal-fired power plants, refineries), NOx (vehicles, power plants), ammonia (fertiliser use, livestock, sewage).
- Atmospheric transformation:
1. SO_2 oxidises to sulfate   reacts with ammonia   ammonium sulfate.
2. NOx oxidises to nitric acid   combines with ammonia   ammonium nitrate.
- Favourable weather conditions: High humidity, fog, low temperatures and low wind speeds accelerate these reactions, especially in winter, allowing particles to form within hours and remain airborne for days.

Implications:

- Regional and transboundary impact: Secondary aerosols can travel hundreds of kilometres, meaning Delhi's air quality is affected by emissions from coal-dominated states beyond NCR.
- Severe winter smog: Moist, stagnant winter conditions sharply increase secondary PM2.5, explaining sudden pollution spikes even when local sources are restricted.
- Policy blind spots: Focus on visible PM10 or local sources alone is insufficient; control of precursor gases (SO_2, NOx, NH_3) is crucial.
- Health risks: Fine secondary particles penetrate deep into lungs, increasing risks of respiratory and cardiovascular diseases.

SCIENCE & TECHNOLOGY

Solar Flares

Context: NASA reported a strong X1.9-class solar flare erupting from the Sun causing a major radio blackout over Australia and raising concerns about further space-weather disturbances.

- The flare coincides with the emergence of a massive sunspot (AR 4294–96) over 10 times the size of Earth.

About Solar Flares:

What it is?

- A solar flare is a sudden, intense explosion of energy on the Sun caused by the rapid release of magnetic energy stored in twisted magnetic field lines near sunspots.
- It emits radiation across the electromagnetic spectrum—from radio waves to X-rays and gamma rays.

How It Forms?

- Twisted magnetic fields: Strong magnetic fields around sunspots become twisted and stressed by solar rotation and plasma flows, building up large amounts of magnetic tension and stored energy.
- Magnetic reconnection: When these stressed magnetic field lines suddenly snap and reconnect, the stored magnetic energy is explosively released, creating an intense flare.
- Heating and particle ejection: This energy release heats solar plasma to several million degrees and accelerates photons and charged particles outward at high speeds.
- Link with CMEs: A flare may erupt alone or alongside a coronal mass ejection (CME), which ejects massive clouds of solar plasma capable of disturbing Earth's magnetic field.

Key Features:

- X-ray classification: Solar flares are ranked from A to X based on peak X-ray brightness, with each letter step representing a tenfold increase in intensity measured by space-based detectors.
- X-class events: X-class flares are the strongest type and can cause global radio blackouts, disrupt navigation systems, and expose satellites to damaging levels of radiation.
- Multi-wavelength radiation: Flares emit radiation across radio, ultraviolet, X-ray and gamma-ray bands, heating solar material almost instantly and affecting space weather conditions.
- Sunspot connection: They commonly arise in large, magnetically complex sunspots where interacting magnetic fields make eruptions more frequent and more powerful.
- Rapid and energetic: Flares unfold within minutes, releasing immense energy unpredictably, which makes forecasting difficult and raises concerns for satellites and communication networks.

Implications:

- Communication disruptions: Affect high-frequency radio signals, aviation communication, maritime navigation, and military systems.
- Satellite and spacecraft risk: Can damage electronics, sensors and expose astronauts to radiation.
- Geomagnetic storms: If accompanied by a CME directed at Earth, can deform Earth's magnetic field and cause power grid failures.

AstroSat

Context: IIA celebrated 10 years of the UltraViolet Imaging Telescope (UVIT) aboard AstroSat, marking a decade of major scientific discoveries.

About AstroSat:

- What it is?

  AstroSat is India's first dedicated astronomy satellite enabling simultaneous observations in UV, optical, soft X-ray and hard X-ray bands.

- Launched in: 2015 by PSLV-C30 into a 650 km orbit.

- Aim: To study cosmic sources across multiple wavelengths, track high-energy processes, and provide global-access astronomical data.

- Key Features:

  Five scientific payloads covering 0.3–100 keV + UV bands.

  Enables simultaneous multi-wavelength imaging, unique among space observatories.

  High pointing stability and long-duration exposure capabilities.

  Data processed and archived by ISSDC, Bylalu; mission operated by ISTRAC, Bengaluru.

  Minimum designed life: 5 years, extended far beyond.

About Ultra-Violet Imaging Telescope (UVIT):

- What it is?

  A twin-telescope UV imager aboard AstroSat capable of near-UV, visible, and far-UV observations.

- Features:

  Spatial resolution better than 1.5 arcseconds (among the world's best in UV imaging).

  Two telescopes: NUV+Visible and FUV channels.

  Developed by a national consortium led by IIA, with ISRO centres.

- Significance:

  India's first UV space telescope, second globally in FUV capability after Hubble.

  Enabled major discoveries: hot companions of Be stars, blue stragglers, UV disks in dwarf galaxies, novae in Andromeda, AGN UV–X-ray correlations.

Niger becomes 1st African country to eliminate onchocerciasis

Context: Niger has officially become the first African country to eliminate onchocerciasis (river blindness), as declared by the government and verified by the World Health Organization (WHO).

RIVER BLINDNESS
18 MILLION INFECTED

Parasitized A fly carrying the disease bites a human.

Infection Larvae grow under the skin, forming nodules and causing painful irritation.

Reproduction Worms mate, producing eggs which develop into microfilariae.

Proliferation Microfilariae are passed on to other flies that bite the infected host.

Transport Microfilariae migrate to the cornea of the eye causing scarring and permanent blindness.

About Niger becomes 1st African country to eliminate onchocerciasis:

- What is Onchocerciasis?

  Onchocerciasis, or river blindness, is a neglected tropical parasitic disease caused by the filarial worm Onchocerca volvulus, transmitted by infected blackflies breeding near fast-flowing rivers.

- Vector: Simulium blackflies found near rapidly flowing rivers and streams.

- Origin:

  Over 99% of global cases occur in sub-Saharan Africa and Yemen.

  Smaller endemic pockets exist on the Brazil–Venezuela border.

  Onchocerciasis is the second leading infectious cause of blindness, after trachoma.

- Key Features:

  Caused by chronic microfilarial infection producing intense inflammation.

  Leads to severe itching, disfiguring skin changes ("leopard skin"), and progressive eye damage.

  Adult worms live 10–15 years, making long-term treatment essential.

  Community-level morbidity includes blindness, reduced productivity, and increased poverty risk.

- Symptoms:

  Skin: severe itching, rashes, skin thickening, depigmentation.

  Eyes: lesions leading to impaired vision and eventual permanent blindness.

  Nodules: firm subcutaneous lumps containing adult worms.

  Early infection in children is linked to epilepsy in certain regions.

- Treatment: The primary treatment is Ivermectin (Mectizan), given once or twice yearly for 10–15 years.

Brain–Computer Interface (BCI)

Context: India is exploring neurotechnology and Brain–Computer Interfaces (BCIs) as strategic tools for healthcare, economic growth, and technological leadership amid global advances led by the U.S., China, and Europe.
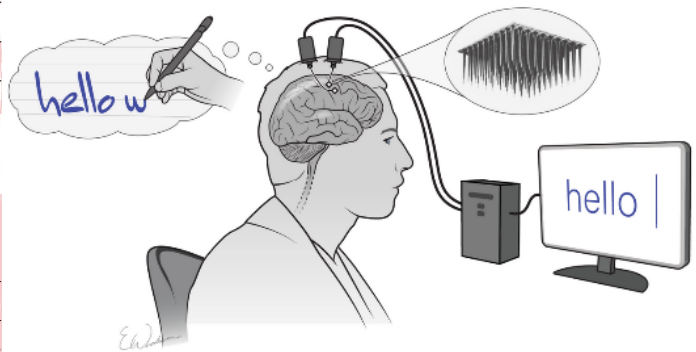
About Brain–Computer Interface (BCI):

What It Is?

- A Brain–Computer Interface (BCI) is a system that interprets brain signals and converts them into digital commands to control external devices such as computers, robotic limbs, or wheelchairs.

- BCIs form a two-way communication channel between the brain and machines, aiding restoration of lost functions or enabling new capabilities.

How It Works?

- Signal Capture: Electrodes (invasive or non-invasive) record electrical activity from neurons.

- Neural Decoding: Machine learning algorithms translate these patterns into intentions (e.g., move arm, select letter).

- Device Control: The decoded signals activate an external device—robotic limbs, speech synthesizers, drones, or smart-home systems.

- Feedback Loop: Continuous decoding improves accuracy and enables real-time brain-machine interaction.

Key Features:

- Direct brain–machine link: Bypasses nerve or muscle pathways, crucial for paralysed patients.

- Invasive & non-invasive options: Implantable electrodes give high precision; wearable EEG devices enable

safer, everyday use.

- Real-time response: AI speeds up decoding, allowing fast, naturalistic control.
- Bidirectional capability (emerging): Some BCIs can stimulate the brain to restore function or treat disorders.

Applications of BCIs:

- Medical Rehabilitation: BCIs restore mobility in paralysed patients through robotic limbs or wheelchairs and enable "locked-in" patients to communicate via neural spellers or gaze-based typing.
- Treatment of Neurological Disorders: Used for stroke, Parkinson's, depression and spinal injuries by stimulating targeted brain regions, reducing long-term reliance on conventional psychiatric or neuro drugs.
- Assistive Technologies: Allow users to operate smartphones, computers and smart-home devices through thought-driven commands, significantly boosting independence for motor-impaired individuals.
- Defence & Security: BCIs can enable soldiers to control drone swarms or communication systems mentally, offering tactical advantages but creating serious ethical, legal and security risks.

Planetary-Defense Exercise on 3I/ATLAS

Context: Europe has launched the world's largest planetary-defence drill, centred on tracking the fast-approaching object 3I/ATLAS.

About Planetary-Defense Exercise on 3I/ATLAS:

- What it is?

  The 3I/ATLAS planetary-defense drill is the largest global simulation ever conducted to test how nations detect, track and respond to near-Earth threats.

- Launched By: Led jointly by ESA, NASA, UN-IAWN (International Asteroid Warning Network).

- Aim:

  To evaluate Earth's readiness for high-velocity objects by testing early-warning systems, tracking networks, emergency coordination and citizen communication.

  Also aims to identify gaps in international cooperation, data-sharing and psychological preparedness.

- How It Works?

  Tracking 3I/ATLAS: Agencies use ground telescopes and space-based sensors to continuously monitor the comet's position, speed and brightness, refining its orbital path in real time.

  Analysing Trajectory Shifts: Scientists test for small deviations caused by gravity or solar forces, updating orbital models to identify any change that could alter its distance from Earth.

  Calculating Impact Probabilities: Thousands of simulations are run with different uncertainty ranges to determine whether the object could intersect Earth's orbit or remain safely distant.

  Running Global Response Scenarios: Teams simulate options such as deflection missions, civil-defence mobilisation or evacuation modelling to test operational readiness under pressure.

  Testing International Coordination: The drill evaluates how quickly NASA, ESA, ISRO, CNSA, JAXA and UN-IAWN exchange data, issue alerts and take joint decisions during high-uncertainty events.

- Key Features:

  Real object (3I/ATLAS) travelling at ~60 km/s provides real-world complexity.

  Involves planetary-defense modelling, orbital prediction drills and anomaly-response protocols.

  Includes public-communication modules, addressing misinformation and psychological preparedness.

  Uses multi-agency coordination, including defense space commands.

  Parallel geopolitical coordination amid ESA's record budget and U.S.–China–India moves in space security.
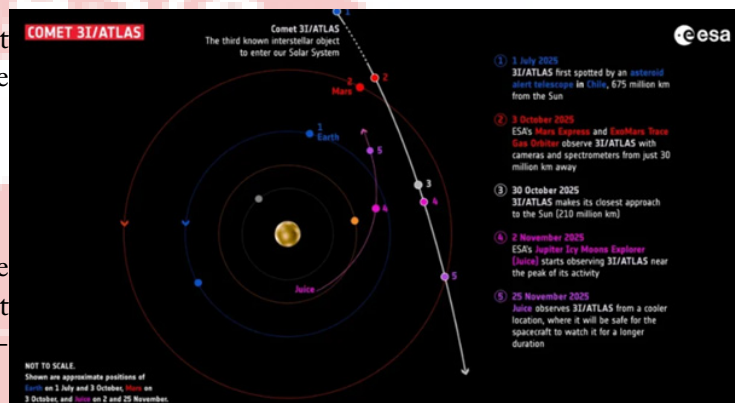
- Significance:

  Strengthens global readiness for future asteroid threats — a rising planetary-security concern.

  Exposes systemic weaknesses like absence of a global public-guidance system during space anomalies.

Q-day

Context: Google's new Quantum Echoes experiment using the 65-qubit Willow processor has sparked global debate on whether it accelerates the arrival of Q-day.
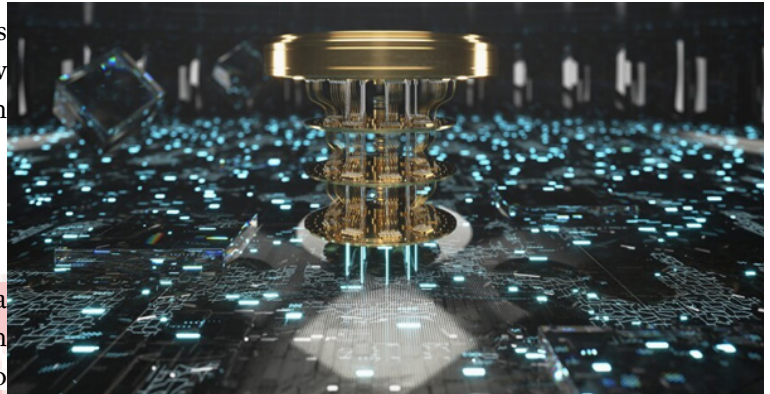
About Q-day:

- What it is?

  Q-day refers to the moment when a cryptographically relevant quantum computer becomes powerful enough to break widely used encryption systems such as RSA-2048, threatening global digital security.

- Background:

  The fear stems from Shor's algorithm (1994), which showed that a sufficiently large quantum computer could factor large numbers exponentially faster, breaking the mathematics behind today's public-key cryptography.

- Key Features of Q-Day Risk:

  Breaks RSA & ECC: Quantum computers could factor keys and compromise global internet security.

  Harvest Now, Decrypt Later: Hackers/governments may store encrypted data today and decrypt it later.

  Requires millions of logical qubits: Current machines have only hundreds of noisy qubits — far from attack capability.

  Triggers Post-Quantum Cryptography (PQC): Push for quantum-safe algorithms like CRYSTALS-Kyber & Dilithium (standardised by NIST).

- Significance:

  Global cybersecurity transition: Banks, governments, military networks and cloud systems must shift to PQC before the end of this decade.

  Strategic & geopolitical implications: Nations see PQC as the next digital infrastructure race.

  Long-term digital safety: Prevents future mass data breaches, identity theft, and compromise of national security communications.

Geminid Meteor

Context: The Geminid meteor shower is set to peak over India between December 13–15, 2025, offering up to 100–120 meteors per hour under dark skies.

About Geminid Meteor:

What it is?

- The Geminids are an annual meteor shower observed every December, known for their high meteor rates, bright fireballs, and slow-moving streaks, making them among the most spectacular celestial events visible from Earth.

Origin:

- Unlike most meteor showers that originate from comets, the Geminids arise from the asteroid 3200 Phaethon, a rocky body with a highly elliptical orbit around the Sun.

- Extreme solar heating causes Phaethon to shed debris, which Earth encounters each year, producing the

meteor shower.

Why it occurs?

- The shower appears to radiate from the constellation Gemini, which rises higher in the sky after midnight, increasing meteor visibility.
- Earth passes through the dense debris stream of 3200 Phaethon between mid-November and late December, with peak activity in mid-December.
- The phenomenon is visible globally, with better rates in the Northern Hemisphere, including India.

Key Characteristics:

- Peak rate: Up to 120 meteors per hour under dark, clear skies
- Colour: Often yellow or white, sometimes producing bright fireballs
- Speed: Moderately fast (~35 km/s), slower than Perseids
- Observation: Best seen from midnight to pre-dawn, without telescopes

Significance:

- Scientific importance: Helps astronomers study asteroid-origin meteoroid streams and near-Earth objects.
- Public engagement: One of the most accessible astronomical events, promoting scientific curiosity and citizen science.
- Planetary defence insight: Understanding Phaethon improves tracking of potentially hazardous asteroids.

AILA (Artificially Intelligent Lab Assistant)

Context: Researchers at IIT Delhi have developed AILA, an AI system capable of autonomously conducting real scientific experiments, a first of its kind in India.

About AILA (Artificially Intelligent Lab Assistant):

What it is?

- AILA is an autonomous AI-powered laboratory assistant that can design, run, and interpret real-world scientific experiments without continuous human intervention.
- Unlike conventional AI tools that only analyse data, AILA directly controls laboratory instruments and adapts decisions in real time.

  Developed by: Indian Institute of Technology (IIT) Delhi, in collaboration with research teams from Denmark and Germany.

Aim:

- To automate complex laboratory experiments, reduce human effort and time, and accelerate discoveries in materials science and experimental physics.
- To enable AI to move beyond analysis into active scientific reasoning and experimentation.

Key features:

- Autonomous experiment execution: Independently operates the Atomic Force Microscope (AFM), a critical tool in nanoscale materials research.
- Real-time decision-making: Adjusts experimental parameters dynamically based on ongoing observations.
- End-to-end workflow: Designs experiments, controls instruments, analyses data, and generates results without manual intervention.
- Time efficiency: Reduces tasks that took an entire day to 7–10 minutes, significantly boosting research productivity.
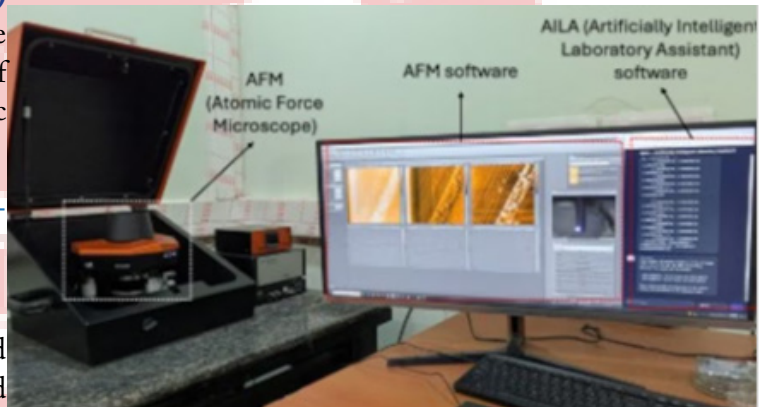
- Adaptive intelligence: Learns from experimental outcomes to refine subsequent actions.

Significance:

- Marks a transition from AI as a support tool to AI as an active scientific agent.
- Enables wider access to advanced instruments by lowering skill and time barriers.
- Aligns with India's AI for Science initiative and ANRF-backed research funding.

Plasser's Quick Relaying System (PQRS)

Context: The Northeast Frontier Railway (NFR) has set a record single-day mechanised track renewal of 1,033 track metres using Plasser's Quick Relaying System (PQRS).

About Plasser's Quick Relaying System (PQRS):

What it is?

- Plasser's Quick Relaying System (PQRS) is a semi-mechanised track renewal technology used by Indian Railways to remove old track panels and replace them with new prefabricated rail panels efficiently within short traffic blocks.

  Developed by: Plasser & Theurer, an Austria-based global leader in railway track maintenance and construction machinery

Aim:

- To speed up track renewal while minimising traffic disruption.
- To enhance track safety, reliability, and maintenance efficiency.
- To reduce manual labour and lifecycle maintenance costs.

How it works?

- PQRS uses self-propelled portal cranes that move on an auxiliary track (3,400 mm gauge) aligned with the existing track.
- Old rail panels (rails + sleepers) are lifted and removed, and new prefabricated panels are placed using Track Laying Equipment (TLE).
- Retrieved old panels are directly transferred to BFRs (Bogie Flat Wagons), eliminating extra freight handling.

Key features:

- Portal cranes: Self-loading, self-unloading cranes capable of lifting complete rail panels.
- High lifting capacity:

  Older models: ~5 tonnes (9 m panels)

  Newer models (PQRS-201): up to 9 tonnes, lifting 13 m PRC sleeper panels

- Integrated gripping system: Sleeper grippers and rail clamps securely hold panels during lifting and placement.
- Turntable mechanism: Enables cranes to be turned and placed on/off BFRs even in mid-sections.
- Compact and modular design: Reduces maintenance cost and improves operational flexibility.

Significance:

- Faster renewals: Allows renewal of longer track lengths in shorter traffic blocks.
- Improved safety: Ensures uniform track geometry and reduces human error.

Anopheles stephensi

Context: India's push to eliminate malaria by 2030 faces a new challenge with the rapid spread of the invasive urban mosquito Anopheles stephensi, especially in cities like Delhi.

About Anopheles stephensi:

What it is?

- Anopheles stephensi is a malaria-transmitting mosquito species capable of spreading both Plasmodium falciparum and Plasmodium vivax, now recognised globally as an invasive vector threatening malaria elimination efforts.

Origin:

- Native to South Asia and the Arabian Peninsula
- Recently detected in multiple African countries, indicating rapid transcontinental spread

Habitat:

- Thrives in urban and peri-urban environments.
- Breeds in artificial water containers such as overhead tanks, tyres, construction sites, and water storage vessels.
- Unlike traditional malaria vectors, it adapts easily to high-density cities.

Key features:

- Urban adaptability: Efficiently survives in man-made habitats.
- Efficient vector: Transmits both major human malaria parasites.
- Container breeder: Similar breeding behaviour to dengue mosquitoes, complicating control strategies.
- Resilient spread: Capable of establishing itself rapidly in new regions.

Implications:

- Threat to malaria elimination goals: Undermines India's target of zero indigenous cases by 2027 and elimination by 2030.
- Urban malaria resurgence: Shifts malaria from rural/tribal zones to metropolitan settings.
- Control challenges: Requires city-specific surveillance, vector control, and inter-sectoral coordination.

PathGennie Software for Fast-Tracking Drug Discovery

Context: The Ministry of Science and Technology has developed PathGennie, a new open-source computational software that significantly accelerates drug discovery by accurately simulating drug–protein unbinding.
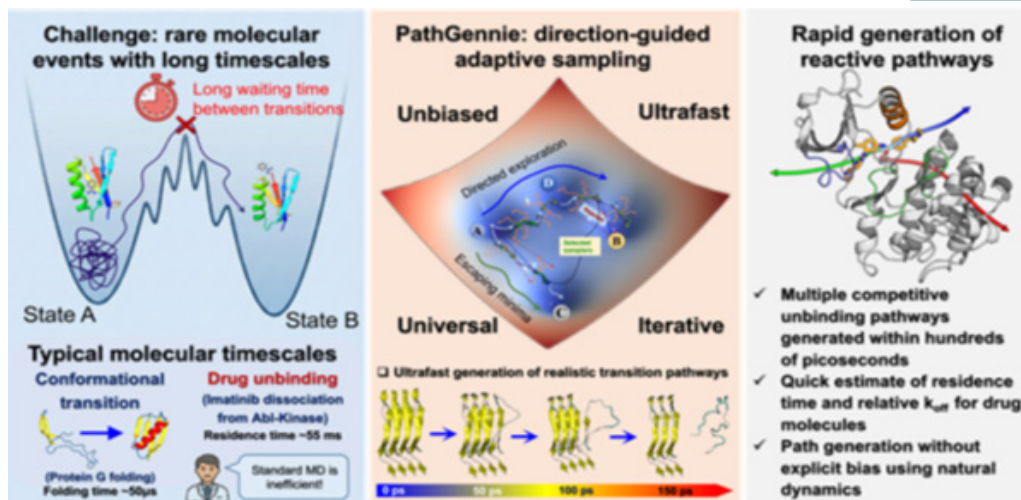
About PathGennie Software for Fast-Tracking Drug Discovery:

What it is?

- PathGennie is an open-source computational framework designed to efficiently simulate rare molecular events, especially drug unbinding from protein targets, without introducing artificial distortions.
- It helps predict drug residence time, a key factor in drug efficacy and safety.

Developed by: Scientists at S. N. Bose National Centre for Basic Sciences, Kolkata

Aim:

- To overcome limitations of traditional molecular dynamics simulations in capturing slow, rare molecular transitions.
- To provide physically accurate pathways for drug–protein interactions while reducing computational cost and time.

How it works?

- Instead of forcing molecules to move, the software lets them move naturally.
- It runs many tiny, short simulations at the same time to see which ones head in the right direction.
- Only the useful paths are continued, while the rest are stopped, saving time and computing power.
- This works like natural selection — the best paths survive without artificial pressure or heat.
- It can handle complex patterns, even those identified using artificial intelligence, making it very adaptable.

Applications:

- Predicts accurate drug unbinding pathways and residence times (e.g., imatinib–Abl kinase).
- Understanding protein–ligand kinetics for better drug design.
- Applicable to chemical reactions, catalysis, phase transitions and self-assembly processes.

Transforming India into a leading Quantum-Powered Economy

Context: NITI Aayog's Frontier Tech Hub has released a comprehensive roadmap titled "Transforming India into a Leading Quantum-Powered Economy."

About Transforming India into a Leading Quantum-Powered Economy:

What It Is?

- It is a national strategic roadmap prepared by NITI Aayog (with IBM as knowledge partner) that lays out India's 2035 vision for quantum computing, communication, sensing and materials, and details actions needed to build a globally competitive quantum ecosystem.

Key Highlights of the Report:

1. Vision for 2035: India Among Top 3 Quantum Economies: India aims to become a global leader with 10+ quantum startups achieving USD 100M+ revenue and capturing over 50% of the global quantum software market.

2. Deployment Across Strategic Sectors: Quantum tech should be deployed at scale across defence, healthcare, finance, mining, energy and national infrastructure by 2035.

3. Full Quantum Supply-Chain Participation: India must achieve "quantum Atmanirbharta" by contributing to quantum hardware, materials, processors, cryogenic systems, and software stacks, while becoming a net exporter.

4. Two-Phase Milestone Plan (2025–30 & 2030–35): Milestones include setting up testbeds, 50+ funded startups, sectoral pilots, PQC deployment, and later global leadership, export corridors and supply-chain dominance.

5. Workforce Expansion & Talent Readiness: The plan calls for a 10× expansion of quantum-skilled professionals within 2–3 years and making India a top-three global destination for quantum talent.

6. Focus on Standards, IP and Global Quantum Diplomacy: India will lead international standard-setting, secure market access through global partnerships, and establish quantum benchmarking consortia.

7. Large-Scale Adoption of Quantum-Resilient Cryptography: Mandatory planning for quantum-safe encryption in government systems, deployment of PQC testbeds, and integration into national cybersecurity architecture.

8. Strong Emphasis on Industry Participation & Innovation-to-Market Pipeline: The roadmap highlights quantum–HPC integration, sectoral pilots, cloud-based quantum services, accelerators and venture funding to build a strong private-sector ecosystem.

Opportunities for India:

- Leapfrog Advantage: Quantum is still nascent globally, giving India a rare chance to lead rather than catch up (greenfield trillion-dollar opportunity).

- High-Value Job Creation: Specialized jobs in algorithms, hardware, cryogenics, sensors, and quantum materials.

- Sectoral Productivity Boost: Logistics, finance, aviation, energy, pharma, and manufacturing can achieve massive optimization and cost savings through quantum advantage.

- Strategic Autonomy: Indigenous quantum communications, PQC and sensing will strengthen defence and national security.

- Export Leadership: Software, PQC libraries, cloud platforms, sensors and components for the Global South market.

Announced government investments in QT, Jan 2023–Apr 2025, $ billion

Legend: Announced in 2023 | Announced in 2024 | Announced in 2025 (Jan–Apr)

Country				Total
Japan		7.4		7.4
UK	3.3	0.1	0.1	3.5
Germany	3.2			3.2
US	1.0	0.6	1.6	3.2
South Korea	2.3			2.3
Australia	0.3	0.6		1.0
Spain	0.9			0.9
India	0.7			0.7
Canada	0.4	0.1		0.4
Denmark	0.1	0.2		0.4
Singapore	0.2			0.2
Netherlands	0.1			0.1
Total (for selected countries)	~11.4	~1.8	~10.0	
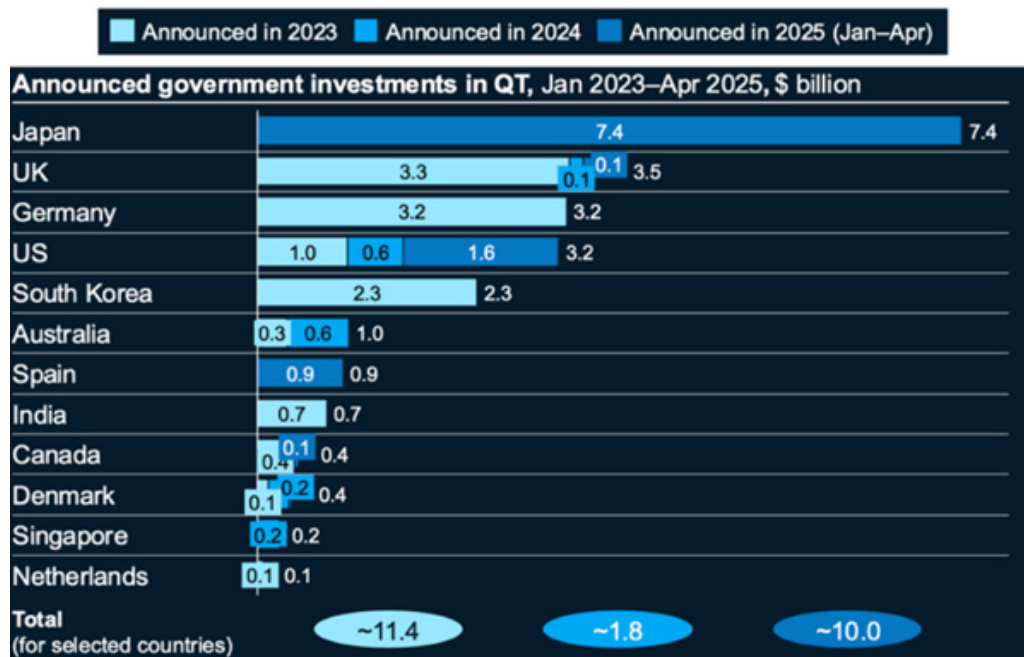
Initiatives Already Taken:

- National Quantum Mission (2023–2031) with 6000+ crore to build quantum hubs, testbeds, and technologies.
- Start-up support via iDEX and NQM, early industry pilots, and India's participation in international collaborations.
- Quantum communication trials, QKD networks, and sensing prototypes in strategic sectors.

Challenges Identified in the Report:

- Hardware Gaps & Import Dependence: India lacks domestic capability in quantum processors, cryogenic systems, quantum materials, and peripherals.
- Weak Basic Science & Low R&D Investment: India invests only ~0.65% of GDP in R&D; research quality and IP ownership remain low.
- Severe Skill Shortages: Shortage of experts in cryogenics, optics, microwave engineering, hardware–software co-design and techno-business skills.
- Risk-Averse Capital & Limited Industry Adoption: Deep-tech capital is scarce; industry awareness is low; procurement and audit processes hinder innovation.
- Global Geopolitical Risks: China's dominance in materials, export controls by advanced economies, and global talent competition.

NITI Aayog Roadmap Recommendations:

- Build domestic quantum hardware & materials ecosystem: manufacturing for cryo-electronics, detectors, photonics, and processors.
- Set up quantum-specific standards, testbeds, and certification systems to ensure global interoperability.
- Massively scale quantum skilling through universities, online platforms, and national quantum education programmes.
- Accelerate industry pilots in logistics, aviation, energy, pharma, finance, and defence.
- Strengthen international quantum diplomacy for market access, supply-chain security and standards leadership.
- Ensure early transition to PQC across government and critical infrastructure.
- Create a national quantum venture fund and innovation-to-market accelerators.

Conclusion:

Quantum technology offers India a once-in-a-century opportunity to shape a frontier industry rather than chase it. With coordinated investment, strong R&D, global partnerships and aggressive industry adoption, India can rise as a top-three quantum economy by 2035. The roadmap provides a blueprint to secure technological leadership, economic competitiveness and national security in the coming quantum era.

Flight Duty Time Limitations Rules

Context: India's aviation sector is facing major disruptions as the newly implemented Flight Duty Time Limitations (FDTL) rules have triggered large-scale flight cancellations and delays, especially at IndiGo, due to crew shortages and tighter fatigue norms.

About Flight Duty Time Limitations Rules:

- What it is?

   FDTL refers to regulatory limits on how long pilots can be on duty, how many hours they may fly, the number of night operations they can perform, and the minimum rest required to prevent fatigue.

- Published by: Issued and enforced by the Directorate General of Civil Aviation (DGCA) under a revised framework notified in January 2024.

- Aim: To reduce fatigue-related safety risks, align Indian aviation with global norms, and ensure safer flight operations by regulating duty hours, night operations, and rest requirements.

- Features:

   48 hours of continuous weekly rest ensures pilots get sufficient uninterrupted recovery time, reducing cumulative fatigue that builds up over busy rosters and frequent night operations.

   Night period extended to 00:00–06:00 increases protected rest hours for early-morning and late-night flights, which are biologically high-fatigue windows, strengthening safety margins.

   Limit of two-night landings and two consecutive night duties reduce exposure to the most fatiguing tasks, preventing performance degradation during critical phases of flight.

   Mandatory roster adjustments and fatigue reporting require airlines to redesign schedules and allow pilots to formally flag fatigue risks, making crew management more transparent and safety-driven.

   Phased implementation by November 1, 2025 pushed airlines to overhaul long-standing scheduling practices and expand crew capacity to comply with the stricter fatigue-control framework.

Significance:

- Enhances flight safety by scientifically addressing circadian fatigue.
- Aligns India with ICAO and international best practices.
- Improves pilot well-being and operational discipline.

Open Market Operation (OMO) Purchase

Context: The RBI announced a 1 trillion OMO purchase along with a $5 billion dollar–rupee swap to inject durable liquidity into the banking system as the rupee weakened past 90/$ amid foreign outflows.

About Open Market Operation (OMO) Purchase:

What is an OMO Purchase?

- An Open Market Operation (OMO) purchase is when the RBI buys government securities from banks and financial institutions to inject durable liquidity into the financial system.

- It increases bank reserves, lowers short-term interest rates, and supports smooth monetary transmission.

Purpose of OMO Purchases:

- Inject durable and long-term liquidity into the banking system.
- Smoothen monetary transmission so lending rates fall in line with policy cuts.
- Stabilise money-market rates such as the Weighted Average Call Rate (WACR).

Types of Open Market Operations:

1. Expansionary OMO (Liquidity Injection):

   RBI buys government securities.

   Increases in bank reserves lead to lower interest rates, which will stimulate lending/investment.

2. Contractionary OMO (Liquidity Absorption):

   RBI sells government securities.

   The reduction in money supply leads to a rise in interest rates, which in turn cools inflation.

3. Special OMOs / Operation Twist:

   RBI buys long-term bonds and sells short-term ones simultaneously.

   Used to shape the yield curve without changing overall liquidity.

How OMO Purchases Work?

- Assessing Liquidity Conditions: RBI monitors currency pressure, capital flows, call money rates, and banking liquidity.
- Announcing OMO Auctions: RBI notifies the quantity (e.g., 1 trillion) and maturity of securities it will purchase.
- Buying Government Securities: Banks sell bonds to the RBI in the auction.
- Settlement: RBI pays banks   their reserves increase   system liquidity expands.
- Market Impact:

   More liquidity lowers overnight rates.

   Bond yields soften.

   Rupee money-markets stabilise even during dollar demand shocks.

   Transmission improves across banks

Significance of OMO Purchases:

- Strengthens Rupee Liquidity During Currency Stress: Foreign outflows reduce rupee liquidity; OMO purchases replenish it.
- Supports Monetary Transmission: Ensures lending rates move in line with repo rate decisions.
- Stabilises Bond Markets: Prevents disorderly spikes in yields that raise government borrowing costs.
- Enhances Banking System Liquidity: Banks get durable funds, enabling more lending to businesses and households.

Dumping

Context: The U.S. is considering new tariffs on Indian rice after American farmers accused India of dumping subsidised rice into the U.S. market, lowering domestic prices.

About Dumping:

What is Dumping?

- Dumping occurs when a firm sells a product in a foreign market at a price lower than its domestic price or below its average cost of production, often to capture market share.
- It is a form of international price discrimination, enabled when goods cannot freely move back from low-price to high-price markets due to tariffs or transport costs.

Criteria to Determine Dumping:

A product is considered dumped if:

- Export price < domestic market price of the exporting country; or
- Domestic price unavailable, then compare export price with:

  Price in a third-country market, or

  Exporter's average production cost.
- If any of these tests confirm under-pricing, the importing country can initiate anti-dumping action.

Implications of Dumping:

- Hurts domestic producers by undercutting prices and eroding market share, leading to losses and job reductions.
- Short-term benefit to consumers through cheaper imports but long-term harm when domestic industry becomes uncompetitive.
- Market distortion occurs when firms rely on subsidies to artificially lower prices, creating trade tensions.

WTO and Dumping Rules:

- The WTO does not ban dumping, but allows countries to act only if they prove:

  Dumping has occurred,

  Domestic industry suffered material injury, and

  Dumping caused this injury.
- Countries may impose anti-dumping duties equal to the margin of dumping (difference between dumped price and normal price).

  WTO's Anti-Dumping Agreement governs procedures, investigations, and review mechanisms.

Measures to Counter Dumping:

- Anti-dumping duties: Additional tariffs matching the price difference (as the U.S. is considering against Indian rice).
- Countervailing duties: Tariffs to offset foreign government subsidies.
- Import quotas: Limits to prevent market flooding.
- Price undertakings: Exporter voluntarily raises prices to avoid penalties.
- Strengthening domestic industry: Support for productivity, tech upgrades, and diversification to withstand imported competition.

The Indian Ocean as the Cradle of a New Blue Economy

Context: The Indian Ocean is emerging as a focal point of global climate, economic and geopolitical shifts, prompting calls for a new Blue Economy framework.

About The Indian Ocean as the Cradle of a New Blue Economy:

India's Historical Leadership in Ocean Governance:

- Championing "Common Heritage of Mankind": India aligned with Small Island Developing States (SIDS) during UNCLOS, advocating that seabed resources beyond national jurisdiction be treated as a global common, strengthening its moral leadership.
- Early Vision of Maritime Centrality: Nehru asserted that India's future prosperity and security are tied to ocean freedom and resources, embedding oceans into India's strategic imagination from the 1950s.
- Environmental Justice at Global Forums: Indira Gandhi's Stockholm (1972) stance on balancing poverty eradication with environmental protection positioned India as a credible advocate of equitable ocean

governance.

- Consistent Support for Multilateral Ocean Regimes: India's engagement in IORA, IONS, and Indian Ocean Commission reflects a long-standing commitment to cooperative maritime governance instead of great-power rivalry.
- Leadership in Sustainable Use Norms: India has consistently supported biodiversity protection, including readiness to ratify the BBNJ Agreement, reinforcing its reputation as a responsible ocean steward.

Emerging Challenges in the Indian Ocean:

- Intensifying Climate Vulnerability: The Indian Ocean is warming faster than the global average, driving thermal expansion, sea-level rise, and more frequent extreme cyclones impacting coastal populations.
- Ocean Acidification & Coral Collapse: Rising CO_2 levels are degrading coral reefs such as the Lakshadweep and Chagos systems, undermining biodiversity, fisheries productivity, and tourism incomes.
- Illegal, Unreported & Unregulated (IUU) Fishing: IUU fleets deplete fish stocks, harm artisanal livelihoods, and fuel regional tensions, particularly near East Africa and the Bay of Bengal.
- Declining Marine Productivity: Overfishing and altered monsoon patterns reduce nutrient upwelling, weakening the marine food chain and posing food-security risks for littoral nations.
- Socio-Economic Instability: Ecosystem decline triggers migration, loss of coastal employment, and community vulnerability, creating a security challenge beyond traditional naval threats.

Rationale for a Blue Ocean Strategy for India:

Stewardship of the Commons:

- Promote Cooperative Ocean Governance: Position the Indian Ocean as a shared space through rules-based management, biodiversity protection, and joint marine scientific research.
- Restore Degraded Ecosystems: Lead regional coral-restoration, mangrove recovery, and sustainable fisheries initiatives to rebuild ecological resilience.
- Strengthen Marine Protected Areas (MPAs): Support expansion of MPAs—including high-seas areas under BBNJ—to safeguard critical habitats and spawning grounds.

Climate and Disaster Resilience:

- Regional Resilience & Innovation Hub: India can host a hub integrating ocean observation, modelling, and technology transfer for SIDS and African nations to strengthen early-warning capacities.
- Enhance Ocean Observation Infrastructure: Scale up INCOIS, MoES, and satellite systems for better cyclone prediction, monsoon modelling, and tsunami risk tracking.
- Build Climate-Ready Coastal Infrastructure: Support nature-based solutions—mangrove belts, dune restoration, artificial reefs—to protect vulnerable coasts from storm surges.

Inclusive Blue Growth:

- Green Shipping Corridors: Develop low-emission maritime routes with major ports, reducing freight emissions and aligning with IMO decarbonisation goals.
- Offshore Renewable Energy Expansion: Leverage India's vast EEZ for offshore wind, wave, and tidal energy projects, enabling clean growth for coastal states.
- Sustainable Aquaculture Systems: Promote mariculture, seaweed farming, and hatchery upgrades to boost rural incomes while reducing pressure on wild stocks.

Global Momentum for Ocean Finance:

1. Rising Global Commitments for Ocean Action: New international pledges indicate a rapid shift in global priorities, with countries and institutions recognising oceans as critical to climate resilience, biodiversity protection, and sustainable development.
2. €25 Billion Existing Ocean Investments + €8.7 Billion New Pledges (BEFF 2025): At the Blue Economy & Finance Forum 2025, governments, development banks, and private investors showcased a €25 billion

pipeline of ongoing ocean projects and announced €8.7 billion fresh commitments, signalling confidence in blue-economy returns.

3. **$20 Billion Ocean Finance Target Under the One Ocean Partnership (COP30, Belém):** COP30 launched the One Ocean Partnership committing to mobilise $20 billion by 2030, integrating oceans into mainstream climate finance and supporting conservation, resilience, and sustainable blue-economy pathways.

Way Ahead:

- **Establish an Indian Ocean Blue Fund:** Create a financing mechanism seeded by India and open to global partners to convert pledges into implementable regional projects.

- **Operationalise "Security Through Sustainability":** Integrate anti-IUU patrols, coral monitoring, and pollution tracking with maritime domain awareness to align ecology with security.

- **Lead Ocean Norm-Setting Platforms:** Use IORA, IOC-UNESCO, and G20 forums to standardise practices on green shipping, blue bonds, and responsible marine resource extraction.

- **Accelerate BBNJ Ratification & Implementation:** Demonstrate leadership in high-seas biodiversity governance by championing MPAs, ABS mechanisms, and marine technology sharing.

- **Promote Science-Diplomacy Networks:** Strengthen collaboration among INCOIS, CSIR-NIO, WHOI, and regional institutes to jointly advance ocean science, modelling, and innovation.

Conclusion:

The Indian Ocean—home to ancient civilizations and modern vulnerabilities—can become the cradle of a new blue economy that blends prosperity with sustainability. By aligning vision with finance and stewardship, India can show that cooperation, not rivalry, must define the future of ocean governance, living up to the principle: "From the Indian Ocean, for the World."

Cabinet Approve 100% FDI In Insurance

Context: The Union Cabinet has approved a proposal to raise the FDI limit in insurance companies from 74% to 100%, to be implemented through the Insurance Laws (Amendment) Bill, 2025.

About Cabinet Approve 100% FDI In Insurance:

What is FDI?

- Foreign Direct Investment (FDI) is when a non-resident investor acquires an equity stake (≥10%) in an Indian company, with a lasting interest and some degree of control/management influence.

How FDI works in India?

- Foreign investor brings capital into an Indian company through:

  Subscription to shares (MoA, preferential allotment, rights/bonus issue, private placement)

  Mergers, demergers, amalgamations

  Share purchase from existing residents

  Conversion of convertible instruments / notes, swap of instruments etc.

- FDI is regulated under FEMA, sectoral caps, pricing guidelines, entry routes and conditions laid down by the Government / RBI.

- In insurance, 100% FDI means a foreign insurer can now hold full ownership (subject to Indian regulatory conditions) in an Indian insurance company.

Two FDI Routes in India:

1. Automatic Route

No prior Government or RBI approval required.

Investment must comply with sectoral caps, FEMA rules, SEBI/RBI norms etc.

Investor only needs to report and file prescribed forms.

2. Government Route

Prior Government approval is mandatory.

Application is made through the Foreign Investment Facilitation Portal (FIFP).

Approval may carry specific conditions (lock-in, reporting, security conditions, etc.).

Prohibited Sectors under FDI:

FDI is not allowed in, among others:

- Lottery business, online lotteries
- Gambling and betting, including casinos
- Chit funds (except some NRI/OCI non-repatriation cases)
- Nidhi companies
- Trading in Transferable Development Rights (TDRs)
- Real estate business and construction of farmhouses
- Manufacturing of cigarettes, cigars, cigarillos of tobacco / substitutes
- Sectors not open to private investment (e.g. atomic energy, certain railway operations)
- Technology collaboration (brand/franchise/management) is also prohibited in lottery and gambling/betting.

Progressive FDI Liberalisation in Insurance:

- 2015 – FDI cap raised from 26% to 49%.
- 2021 – FDI cap raised from 49% to 74%, with safeguards on Indian management and control.
- 2025 (proposed) – FDI cap to be raised to 100%, subject to conditions in the Insurance Laws (Amendment) Bill, 2025 and changes in:

  LIC Act, 1956

  IRDA Act, 1999

  Insurance Act, 1938

India and A Strong Defence Industrial Base

Context: The debate on building a strong defence industrial base has intensified as India targets ₹3 lakh crore defence production and ₹50,000 crore defence exports by 2029, alongside rising geopolitical instability and supply-chain risks.

About India and A Strong Defence Industrial Base:

What it is?

- A defence industrial base is the ecosystem of public + private firms, MSMEs, R&D labs, testing infrastructure, and supply chains that can design, develop, manufacture, maintain, and export defence platforms, spares, and technologies.

Key trends in India:

- Highest-ever defence production: ₹1.54 lakh crore in FY 2024–25.
- Indigenous defence production: ₹1,27,434 crore in FY 2023–24 (up 174% from 2014–15).
- Defence exports: Record ₹23,622 crore in FY 2024–25, to 80+ countries / over 100 nations.
- Ecosystem depth: 16,000 MSMEs, 788 industrial licences to 462 companies.
- Private sector role rising: About 23% share in total production (FY 2024–25).

Necessity of an Indigenous Defence Industrial Base (IDIB):

- Strategic autonomy in crises: An indigenous defence base insulates national security from foreign sanctions, export controls, and geopolitical pressure during conflicts.

  E.g. The BrahMos Missile System, co-developed and manufactured in India, ensures India retains full operational control without the risk of a foreign "push-button veto" in crisis situations.

- Operational readiness: Domestic manufacturing enables faster repairs, upgrades, and contextual modifications essential for sustained military operations.

  E.g. During the Ladakh standoff, indigenous platforms like LCA Tejas and ALH Dhruv were rapidly adapted for high-altitude and extreme weather conditions by HAL, avoiding delays from foreign dependence.

- Economic multiplier: Defence production catalyses high-skill employment and innovation across aerospace, electronics, metallurgy, and advanced materials.

  E.g. The Tamil Nadu and Uttar Pradesh Defence Industrial Corridors have attracted firms like Tata Advanced Systems and L&T, building end-to-end domestic supply chains from components to complex systems.

- Geopolitical leverage: Defence exports deepen strategic partnerships, enhance interoperability, and translate industrial capability into diplomatic influence.

  E.g. India's BrahMos export to the Philippines (2024) marked a shift from importer to security provider in the Indo-Pacific, adding a credible hard-power dimension to India's foreign policy.

Initiatives taken so far:

1. Policy reforms for indigenous procurement: DAP 2020 emphasising Buy (Indian-IDDM) and faster approvals.
2. Ordnance Factory reforms: Corporatisation to improve efficiency and accountability.
3. FDI liberalisation: Up to 74% automatic route, up to 100% via government route (as per your notes).
4. Innovation push: iDEX, Technology Development Fund, and RDI ecosystem linking startups/MSMEs with defence needs.
5. Defence Industrial Corridors: UP and Tamil Nadu corridors as manufacturing clusters and supply-chain hubs.
6. Export facilitation digitisation: Online export authorisations, OGEL, simplified SOPs to ease exports.

Challenges Associated with Defence Indigenisation:

- Regulatory complexity: Multiple approvals for joint ventures, technology transfer, and export licensing slow project execution and reduce private-sector confidence.

  E.g. The Single Engine Fighter Jet project faced years of delay under the Strategic Partnership model, as firms like Tata–Lockheed and Adani awaited clarity on technology ownership and transfer terms.

- Testing and certification bottlenecks: Lengthy trials, limited test infrastructure, and frequently changing GSQRs delay induction of indigenous systems.

  E.g. The ATAGS artillery system underwent nearly six years of multi-terrain trials; while ensuring quality, such timelines slowed induction compared to off-the-shelf imports.

- Financing constraints: Defence MSMEs face high working-capital needs and long order cycles, making access to affordable credit difficult.

  E.g. Drone startups in Bengaluru and Pune often exhaust early-stage funding while waiting for RFPs and long-term MoD contracts required by banks for lending.

- R&D to production gap: Translating successful prototypes into reliable, mass-produced systems remains a key weakness.

  E.g. Despite DRDO's R&D success, the Nishant UAV struggled during scale-up due to production and quality issues, limiting its operational adoption.

- Demand uncertainty: Frequent cancellations and re-tendering discourage private investment in capacity

and specialised infrastructure.

E.g. Repeated halting and revival of the Navy's LPD project created uncertainty for private shipyards like L&T (Kattupalli), affecting long-term planning and investment.

Way ahead for Defence Indigenisation:

- Single-window export facilitation agency: Fragmented approvals across ministries delay exports and weaken credibility; a single-window, professionally run agency can fast-track licensing, coordination, and after-sales support, improving India's reliability as a defence supplier.

- Predictable long-term procurement pipelines: Unclear demand projections discourage private investment in capital-intensive defence manufacturing; 10–15 year procurement roadmaps with assured indigenous orders can reduce risk and enable capacity expansion.

- Re-orient DRDO's role: Combining R&D with production slows induction timelines; limiting DRDO to frontier research while industry handles manufacturing will speed up commercialisation and operational deployment.

- Strengthen the defence finance ecosystem: Long gestation cycles and weak access to credit constrain MSMEs; specialised export finance, credit guarantees, and sovereign lines of credit can de-risk investment and sustain production.

- World-class testing and certification: Limited testing capacity and India-specific standards delay induction and exports; integrated test facilities and alignment with global norms will shorten trials and boost acceptance.

- Ease of doing business for MSMEs and startups: Complex compliance and delayed payments strain cash flows; faster clearances, simplified rules, and time-bound payments will help startups survive procurement delays and scale up.

Conclusion:

A strong defence industrial base is India's shield and springboard—it protects sovereignty while powering innovation-led growth. The recent rise in production and exports shows the direction is right, but reforms must now deepen into finance, testing, demand certainty, and faster clearances. If sustained, defence Atmanirbharta can become a defining pillar of Viksit Bharat 2047 and India's global strategic credibility.

PFRDA (Exits and Withdrawals under the National Pension System) (Amendment) Regulations, 2025

Context: The Pension Fund Regulatory and Development Authority has notified the NPS Exit & Withdrawal (Amendment) Regulations, 2025, increasing lump sum withdrawal to 80% for non-government subscribers and allowing exit deferment up to 85 years, significantly enhancing flexibility and liquidity in NPS.

About PFRDA (Exits and Withdrawals under the National Pension System) (Amendment) Regulations, 2025:

What it is?

- A set of amended regulations governing withdrawal, exit, deferment, annuity requirements, loans, and death-related settlements under the National Pension System (NPS).

Key features:

- Higher lump sum withdrawal:

  Non-government subscribers: Up to 80% lump sum, mandatory annuity reduced to 20% (earlier 40%).

  Government subscribers: Existing 60:40 (lump sum : annuity) continues.

- Enhanced exit deferment:

  Subscribers can defer lump sum withdrawal or annuity purchase up to age 85 (earlier 75).

- Corpus-based flexibility (non-govt):

Accumulated Pension Wealth ≤ 8 lakh: 100% lump sum allowed.

8–12 lakh: Options of 6 lakh lump sum or 80:20 split.

12 lakh: Up to 80% lump sum, 20% annuity mandatory.

- Voluntary exit norms:

Accumulated Pension Wealth ≤ 5 lakh: 100% lump sum permitted; otherwise 20:80 applies.

- Death cases:

100% lump sum or 100% annuity allowed for non-govt subscribers irrespective of corpus.

- Loans against NPS:

Permits loans from regulated institutions up to 25% of own contributions.

- Partial withdrawals clarified:

House construction allowed as one-time withdrawal.

Medical withdrawals broadened to any medical treatment/hospitalisation of self/family.

- No fixed 5-year lock-in:

Exits governed by eligibility and annuity rules, improving liquidity.

- Missing subscriber provision:

20% interim relief to nominees; balance settled after legal presumption of death (as per Bharatiya Sakshya Adhiniyam, 2023).

About National Pension System (NPS):

- What it is?

A market-linked, defined contribution pension scheme aimed at providing retirement income through systematic savings.

- Launched in: 2004 (initially for government employees; later expanded)

- Regulatory authority:

Regulated and administered by Pension Fund Regulatory and Development Authority under the PFRDA Act, 2013.

- Key features:

Voluntary, portable, flexible retirement savings scheme.

Eligible subscribers:

Central & State Government employees (as opted), corporate employees, and all citizens (18–70 years) including NRIs.

Account structure:

Tier I: Mandatory retirement account (restricted withdrawals).

Tier II: Voluntary savings account (free withdrawals; requires active Tier I).

Tax efficiency:

Contributions eligible for tax benefits; Seva Nidhi / withdrawals subject to prevailing tax rules.

Manufacturing in India

Context: India's manufacturing slowdown has resurfaced in public debate following economist Arvind Subramanian's analysis linking weak industrialisation to wage structures, technology stagnation, and the Dutch Disease framework.

About Manufacturing in India:

What it is?

- Manufacturing refers to the transformation of raw materials into finished goods using labour, capital, technology, and energy, forming the backbone of employment-led structural transformation.
- Historically, manufacturing has enabled countries to move from agrarian economies to high-productivity, export-driven growth.

Trends and data:

- Manufacturing contributes ~13% of India's GDP, while services account for about 64%, indicating premature deindustrialisation.
- Between 2011–2023, India's manufacturing GDP share declined by 3.2 percentage points, though less than China (6 pp) and South Korea (4 pp).
- Industrial growth remains uneven, with recent PMI expansion but limited long-term wage and productivity gains.

Successes of India's manufacturing sector:

- Electronics manufacturing boom: Targeted incentives under the PLI scheme reduced cost disadvantages, encouraged scale economies, and integrated India into global electronics value chains.

  E.g. Mobile exports surged from USD 0.18 bn (2014) to USD 15+ bn (2024), reflecting rapid capacity creation.

- Improved FDI inflows: Geopolitical diversification under the China+1 strategy positioned India as a preferred manufacturing destination for global firms.

  E.g. Apple's contract manufacturers crossed 20% domestic value addition in India by FY25.

- Import substitution achieved: Domestic production reduced dependence on critical electronic imports, strengthening trade balance and supply-chain resilience.

  E.g. Mobile phone imports fell from USD 5.7 bn (2014-15) to below USD 1 bn (2023-24).

- Defence and aerospace gains: Strategic indigenisation reduced import reliance and built domestic technological capabilities in high-value manufacturing.

- Renewables manufacturing growth: Policy push aligned manufacturing with climate goals, creating green industrial capacity and export opportunities.

Challenges associated with manufacturing in India:

- Dutch disease-like wage distortion: High public-sector wages raised economy-wide wage expectations without parallel productivity growth in manufacturing.

  E.g. Manufacturing firms struggled to compete with government salaries, discouraging factory employment expansion.

- Low technological upgrading: Easy access to cheap labour reduced incentives for automation, capital deepening, and productivity enhancement.

  E.g. Many apparel units continue manual stitching instead of adopting automated cutting and sewing technologies.

- Weak skill ecosystem: Mismatch between formal education and shop-floor skills constrains industrial efficiency and scale.

  E.g. MSMEs report shortages of CNC machine operators despite high youth unemployment.

- MSME fragility: Limited access to finance, technology, and standards prevents MSMEs from integrating into global value chains.

  E.g. Numerous Indian MSMEs could not meet Apple's supplier quality benchmarks.

- Rising inequality: Capital-intensive growth concentrated gains at the top, weakening wage growth and mass consumption demand.

E.g. IT unicorn valuations soared while entry-level software salaries stagnated for over a decade.

Way ahead:

- Technology-driven industrialisation: Manufacturing must shift from labour dependence to innovation-led productivity growth.

  E.g. Germany's Industry 4.0 demonstrates how automation sustains competitiveness despite high wages.

- Labour-intensive manufacturing push: Sectors with high employment elasticity should anchor India's industrial strategy.

  E.g. Bangladesh's garment exports crossed USD 45 bn, generating large-scale female employment.

- Skill–industry integration: Vocational education must be aligned with real-time industry requirements.

  E.g. Japan's dual training model integrates classroom learning with factory apprenticeships.

- MSME value-chain integration: Cluster-based support, standardisation, and export credit can unlock MSME scale.

  E.g. Vietnam linked MSMEs to global electronics chains, boosting exports and productivity.

- Stable trade and policy regime: Long-term policy certainty is essential to crowd in private manufacturing investment.

  E.g. South Korea's consistent industrial policy produced globally competitive manufacturing champions.

Conclusion:

India's manufacturing lag is rooted not only in policy choices but also in insufficient technological upgrading and labour absorption. Recent gains show promise, yet employment-centric industrialisation remains incomplete. A technology-enabled, MSME-driven, labour-absorbing manufacturing strategy is essential for inclusive growth.

Copper

Context: Copper prices touched a record high of over USD 12,000 per tonne in 2025, driven by US tariff uncertainty, global supply disruptions and surging demand from AI, clean energy and EVs.

About Copper:

What it is?

- Copper (Cu) is a naturally occurring metallic element (Atomic number: 29) known for its excellent electrical and thermal conductivity.

- It is among the oldest metals used by humans and is central to modern industrial, digital and green economies.

Characteristics of Copper:

- Chemical characteristics:

  Symbol: Cu and Atomic weight: 63.546 amu

  High resistance to corrosion and oxidation

  Forms important alloys such as brass (Cu+Zn) and bronze (Cu+Sn)

- Physical characteristics:

  Excellent electrical and thermal conductivity (second only to silver)

  Ductile and malleable, enabling easy wiring and shaping

  Naturally reddish-brown; one of the few coloured metals

- Unique properties:

  100% recyclable without loss of quality

Antimicrobial in nature, useful in healthcare settings

Enhances energy efficiency, reducing CO_2 emissions over product life cycles

Applications of Copper:

- Energy and power sector: Used extensively in power grids, transformers, renewable energy systems, and battery storage.
- Electric vehicles (EVs): EVs use over twice the copper of conventional vehicles due to motors, batteries and wiring.
- Digital and AI infrastructure: Data centres, especially hyperscale AI facilities, require massive copper volumes for cooling and power transmission.
- Construction and manufacturing: Plumbing, roofing, industrial machinery and electronics rely heavily on copper.
- Defence and healthcare: Used in defence electronics, ammunition and antimicrobial medical surfaces.

India and Copper: Current Status

- India is recognised copper as a critical mineral under its resource strategy.
- Over 90% dependence on imported copper concentrate

Major producers across globe: Chile, Peru, DR Congo, China, USA
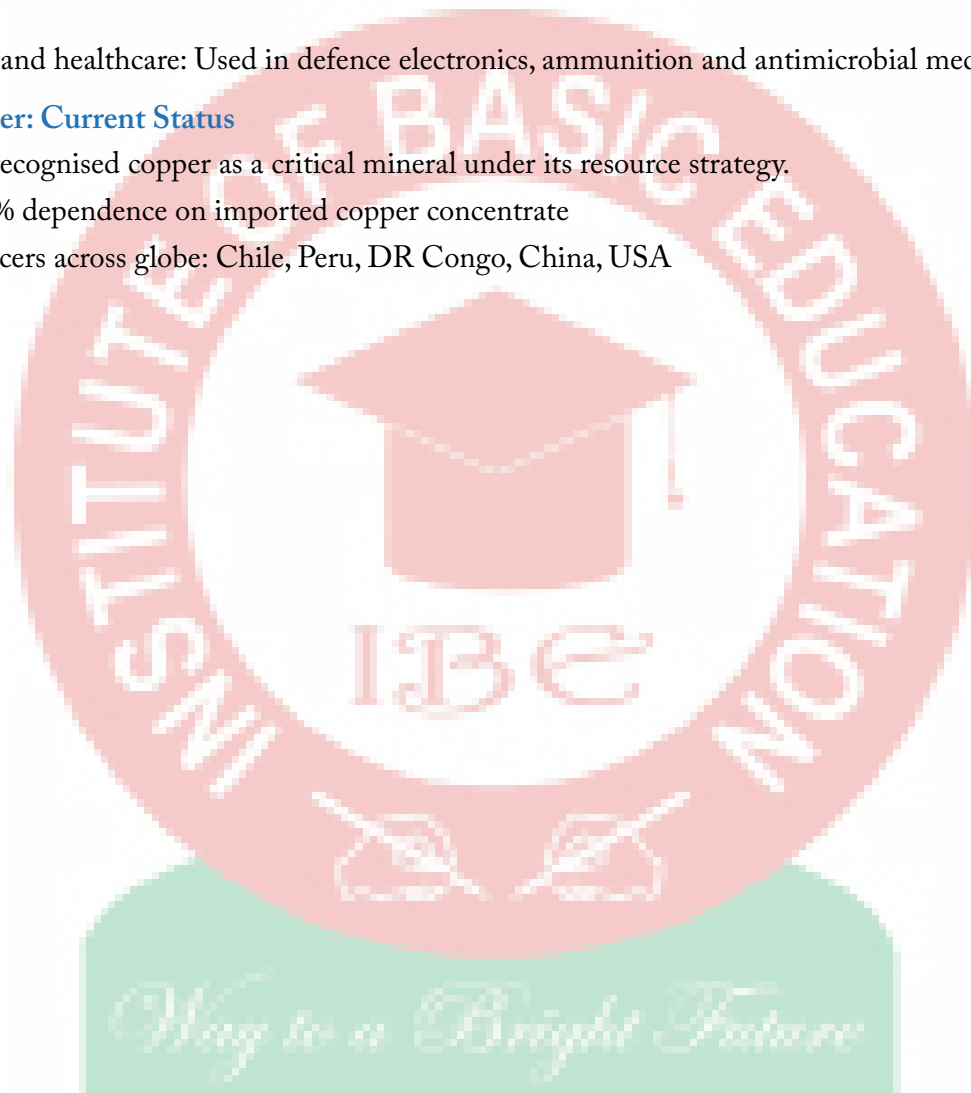
Inclusive Growth and Disability Rights

Context: The International Day of Persons with Disabilities highlighted the WHO's call for inclusive and equitable health financing for persons with disabilities.

About Inclusive Growth and Disability Rights:

What It Means?

- Inclusive growth and disability rights aim to ensure persons with disabilities (PwDs) participate fully in society through accessible infrastructure, livelihoods, education and legal safeguards, eliminating structural barriers to equality and dignity.

Current Status in India:

1. Population size: India has 2.68 crore PwDs (2011 Census) constituting 2.21% of the population, requiring targeted rights-based frameworks for equal participation.
2. Legal identity systems: The UDID programme now enables nationwide disability certification, improving transparency and access to benefits.
3. Expanding disability categories: The RPwD Act 2016 recognises 21 disabilities, expanding coverage beyond the earlier seven categories for more inclusive service delivery.

Need for Inclusive Growth in India:

- Human capital utilisation: PwDs can significantly contribute to the workforce if provided accessible education, skills and mobility, strengthening national productivity.
- Equity and constitutional morality: Inclusive growth fulfils the RPwD Act mandate of non-discrimination, dignity and equal opportunity for all citizens.
- Breaking poverty–disability link: Many disabilities push families into long-term poverty; inclusive systems reduce dependence and enhance economic independence.
- International commitments: As a UNCRPD signatory, India must build an accessible society aligned with rights-based development.

Challenges Faced by Persons with Disabilities (PwDs):

- Accessibility gaps: Public buildings, transport and digital systems often remain inaccessible despite the Accessible India Campaign's goals.
- High financial burden: Assistive devices, therapies and long-term care create major out-of-pocket costs, pushing families into economic stress.
- Low awareness and outreach: Many PwDs — especially women and marginalised castes — remain unaware of schemes, limiting utilisation.
- Skill and employment barriers: Limited training centres, low employer readiness and inadequate workplace adaptations hinder economic inclusion.
- Justice system hurdles: Legal aid remains inaccessible, with procedural delays and lack of disability-sensitive grievance redressal mechanisms.

Key Initiatives Taken:

1. Legal & Policy Measures:

RPwD Act 2016: Recognises 21 disabilities, mandates accessibility, 4% job reservation, inclusive education and strong anti-discrimination protections.

National Trust Act 1999: Supports persons with autism, cerebral palsy, intellectual and multiple disabilities through community-based care systems.

RCI Act 1992: Regulates training of rehabilitation professionals and maintains national registers for quality support services.

2. Major Schemes & Programmes

    Sugamya Bharat Abhiyan: Advances accessibility across built spaces, transport and ICT; revamped app offers grievance reporting and accessibility mapping.

    UDID Project: Creates a unified national database, enabling transparent delivery of benefits, renewals, and scheme integration.

    ADIP Scheme: Provides modern assistive devices, cochlear implants, therapies and post-surgery support to enhance mobility and communication.

Way Ahead:

- Strengthen last-mile delivery: Expand local outreach, ensure multilingual accessibility, and improve district-level awareness for scheme utilisation.

- Scale financing & insurance: Integrate disability coverage in health financing and micro-insurance to prevent catastrophic expenditures.

- Accelerate universal accessibility: Enforce building codes, transport standards and digital accessibility norms across public and private sectors.

- Boost skill-training ecosystem: Expand NAP-SDP courses, industry partnerships, and inclusive workplaces for meaningful employment.

- Enable justice access: Link PM-DAKSH, UDID and legal aid institutions to create disability-friendly grievance and judicial systems.

Conclusion:

India is moving toward an inclusive, rights-based disability framework, combining legislation, digital tools and welfare schemes. Yet bridging awareness gaps, accessibility deficits and financial vulnerabilities remains essential. A coordinated, adequately funded and technology-enabled ecosystem is the path to ensuring dignity, equality and full participation for every person with a disability.

World Summit on Disaster Management (WSDM) 2025

Context: At the World Summit on Disaster Management (WSDM) 2025 in Dehradun, Dr. Jitendra Singh announced major upgrades to Uttarakhand's early-warning systems, including six weather radars, 33 observatories, and 142 AWS stations.
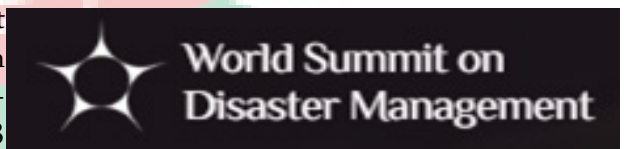
About World Summit on Disaster Management (WSDM) 2025:

- What it is?

  WSDM 2025 is a global platform on disaster resilience, bringing together scientists, policymakers, practitioners, and industry leaders to discuss future-ready strategies for disaster risk reduction in a changing climate.

- Held in: Dehradun, Uttarakhand

- Theme: "Strengthening International Cooperation for Building Resilient Communities."

- Aim:

  To enhance global disaster collaboration, share scientific insights, strengthen early-warning infrastructure, and promote resilient development, especially in fragile ecosystems like the Himalayas.

- Key Features:

Announcement of expanded radar networks, early-warning systems, and Himalayan climate studies.

Focus on hydrometeorological hazards, climate change impacts, glacier monitoring, landslide risk, and forest fire prediction.

Emphasis on "Nowcast" systems providing 3-hour forecasts to vulnerable districts.

Discussions on using agri-startups, CSIR value-addition models, and technological innovation for resilient Himalayan livelihoods.

- Significance:

Reinforces India's emergence as a regional hub for disaster science, forecasting, and climate resilience.

Strengthens Uttarakhand's capacity to manage cloudbursts, GLOFs, landslides, and flash floods.

Helps align India's climate adaptation efforts with global commitments like Net Zero 2070.

Military Exercises in News

Context: Two major military exercises were in focus: Exercise Garuda 25 between India and France concluded in France, while Exercise Garuda Shakti 2025 between India and Indonesia commenced in Himachal Pradesh.

About Military Exercises in News:

About Exercise Garuda 25:

- Host: Air Base 118, Mont-de-Marsan, France
- Nations Involved: India (IAF) and France (French Air & Space Force – FASF)
- Key Features:

IAF deployed Su-30MKI, IL-78 air-to-air refuellers, and C-17 Globemaster III.

Conducted complex missions including strike, escort, air refuelling, and coordinated operations.

Included joint mission planning, tactical execution, and exposure to each other's SOPs.

Ensured high aircraft serviceability through IAF maintenance teams.

Reinforced Indo–French strategic partnership and improved interoperability in high-end air combat.

About Exercise Garuda Shakti 2025:

- Host: Special Forces Training School, Bakloh, Himachal Pradesh

Nations Involved: India (PARA SF) and Indonesia (Indonesian Special Forces)

- Key Features:

Focus on counter-terrorism tactics, unarmed combat, combat shooting, sniping, and heliborne ops.

Training on drone warfare, counter-UAS, and loiter-munition planning in semi-mountainous terrain.

Includes sharing expertise on weapons, equipment, and operational procedures.

Culminates in a validation exercise simulating real-operation scenarios for testing readiness.

India Hosts 20th UNESCO's Inter-Governmental Committee

Context: India is hosting the 20th Session of UNESCO's Intergovernmental Committee for the Safeguarding of Intangible Cultural Heritage at the Red Fort, New Delhi.

About India Hosts 20th UNESCO's Inter-Governmental Committee:

What is this Committee?

- The Intergovernmental Committee for the Safeguarding of Intangible Cultural Heritage (ICH) is a 24-member UNESCO body created under the 2003 ICH Convention to promote, supervise and operationalize safeguarding of intangible heritage globally.

Host Venue: Red Fort (Lal Qila), New Delhi

Structure of the Committee:

Composition:

- 24 Member States, elected by the General Assembly of States Parties.
- Seats allocated by equitable geographical representation across six UNESCO regional groups.
- Each State must nominate experts qualified in ICH fields.

Term:

- Members serve four-year terms: Each elected State Party remains on the Committee for a fixed four-year period to ensure continuity in safeguarding work.
- Every two years, half the members are replaced: A staggered renewal system maintains institutional memory while introducing fresh perspectives regularly.
- No consecutive terms allowed: States cannot be re-elected immediately, preventing monopolisation and promoting broader global participation.

Functions of the Committee:

- Promote the objectives of the 2003 Convention: Ensures global commitment to preserving living heritage and strengthening community-based safeguarding.
- Provide guidance on best safeguarding practices: Offers States technical advice and models to improve preservation of traditions and cultural expressions.
- Prepare operational directives and ICH Fund plans: Drafts rules, procedures and financial guidelines for effective implementation of the Convention.
- Examine nominations for the Representative List: Evaluates cultural elements proposed by States to highlight global diversity and awareness.
- Evaluate elements for the Urgent Safeguarding List: Identifies traditions at risk and determines their eligibility for immediate safeguarding measures.

About Intangible Cultural Heritage (ICH):

What is ICH?

- Intangible Cultural Heritage refers to living traditions, expressions, skills and knowledge transmitted across generations — including performing arts, rituals, festivals, crafts, oral expressions and social practices.

Origin:

- Concept institutionalised in the 2003 UNESCO Convention for Safeguarding of Intangible Cultural Heritage (entered into force in 2008).
- Created global ICH Lists to protect living traditions and encourage community participation.
- Lists include:

  Representative List

  Urgent Safeguarding List

  Register of Good Safeguarding Practices
- India currently has 15 elements on UNESCO's Representative List.

Exercise Harimau Shakti

Context: India and Malaysia have begun the 5th edition of Exercise Harimau Shakti 2025 at Mahajan Field Firing Range, Rajasthan.

About Exercise Harimau Shakti:

- What It Is?

  Exercise Harimau Shakti is a bilateral military training exercise conducted between the Indian Army and the Royal Malaysian Army to strengthen coordination in counter-insurgency and peacekeeping operations.

- Nations Involved:

  India: Represented mainly by troops from the DOGRA Regiment.

  Malaysia: Represented by the 25th Battalion, Royal Malaysian Army.

- Host location: Mahajan Field Firing Range, Rajasthan (India).

- Key Features:

  Focus on Sub-Conventional Operations under UN Chapter VII mandates.

  Joint drills on cordon and search, heliborne operations, search and destroy missions, and securing helipads.

  Practice of casualty evacuation, counter-terrorist tactical responses, and coordinated small-team operations.

  Inclusion of Army Martial Arts Routine (AMAR), combat reflex shooting, and yoga for physical conditioning.

  Exchange of best practices to improve tactical proficiency and operational synergy.

- Significance:

  Enhances interoperability between Indian and Malaysian forces in peacekeeping and counter-terror scenarios.

  Strengthens bilateral defence cooperation and military diplomacy.

  Improves readiness for UN peacekeeping roles, ensuring safer and more coordinated ground operations.

IMF Lists UPI as World's Largest Real-Time Payment System

Context: The IMF has officially recognised India's Unified Payments Interface (UPI) as the world's largest real-time retail payment system by transaction volume.

- UPI accounts for 49% of all global real-time digital payments, far ahead of Brazil, Thailand and China.

UPI's status against other leading international real-time payment platforms

Countries	Transaction Volume (in Billions)	% Share of Global real-time payment platform
India	129.3	49%
Brazil	37.4	14%
Thailand	20.4	8%
China	17.2	6%
South Korea	9.1	3%

About IMF Lists UPI as World's Largest Real-Time Payment System:

What UPI Is?

- UPI (Unified Payments Interface) is India's instant, real-time, interoperable payments system that enables bank-to-bank transfers using a mobile phone.
- It is operated by NPCI (National Payments Corporation of India) and regulated by the Reserve Bank of India (RBI).

Origin of UPI:

- Conceptualised by NPCI to unify fragmented payment systems under one interoperable platform.
- Launched as a pilot in April 2016 by then RBI Governor Raghuram Rajan.

Key Features of UPI:

- Real-time payments: Money transfers in under 5 seconds, 24×7.
- Interoperability: Works across banks, apps, QR codes and merchants.
- Low-cost / Zero MDR: Ensures mass adoption among small businesses and consumers.
- Scalable architecture: Handles billions of transactions per month.
- Versatility: Supports P2P, P2M, autopay, credit line on UPI, RuPay linkage, and international acceptance.

Global Share & IMF Recognition:

- IMF's report "Growing Retail Digital Payments – The Value of Interoperability" lists UPI as the world's largest retail fast-payment system.
- As per ACI Worldwide (Prime Time for Real-Time 2024):
  UPI share: 49% of global real-time transactions
  Volume: 129.3 billion transactions
- UPI outperforms:
  Brazil (14%) – Pix
  Thailand (8%) – PromptPay
  China (6%) – UnionPay/WeChat/Alipay
- This makes India the undisputed global leader in fast payments.

Policy for Auction of Coal Linkage for Seamless, Efficient & Transparent Utilisation (CoalSETU)

Context: The Union Cabinet has approved creation of a new CoalSETU window under the NRS Linkage Policy, enabling long-term coal linkages for any industrial use and exports.

About Policy for Auction of Coal Linkage for Seamless, Efficient & Transparent Utilisation (CoalSETU):

What it is?

- CoalSETU is a new auction-based coal linkage window under the Non-Regulated Sector (NRS) Linkage Policy, allowing any domestic industrial buyer to secure long-term coal linkages for own use or export (up to 50%), except resale within India.

Ministry: Ministry of Coal, Government of India

Aim of the Policy:

- To ensure transparent, seamless and efficient utilisation of domestic coal resources.
- To promote ease of doing business and reduce dependence on coal imports.
- To boost availability of washed coal and support export opportunities.

Key Features:

- New CoalSETU Window in NRS Policy (2016):

  Allows any industrial consumer to participate in coal linkage auctions.

  Existing NRS auctions for cement, sponge iron, steel, aluminium, CPPs will continue.

  These users may also bid in the CoalSETU window.

- No End-Use Restrictions:

  Coal can be used for own consumption, washing, or export (up to 50%).

  Coking coal excluded from this window.

  Traders barred from bidding to prevent speculative hoarding.

- Export Flexibility:

  Companies may export up to 50% of allotted coal.

  Washed coal allowed for export.

  Coal can be shared across group companies as per operational needs.

- Boost to Washery Operators:

  Encourages growth of private washeries.

  Improves domestic supply of washed, cleaner coal.

  May reduce import dependence and improve export viability.

- Alignment with Coal Sector Reforms:

  Complements the 2020 reform allowing commercial mining without end-use restrictions.

  Strengthens fair, market-driven allocation of mineral resources.

Significance of the Policy:

- Promotes Transparent & Competitive Allocation: Auction-based linkages ensure fair market access and remove closed-door allocations.
- Reduces Import Dependence: By expanding domestic access and improving washed coal availability, industries can reduce reliance on costly imports.
- Supports Industrial Growth: Provides long-term assured coal supply to small, medium and new industries previously excluded.

Natyashastra

Context: During the 20th Session of UNESCO's Intergovernmental Committee for Safeguarding Intangible Cultural Heritage (ICH) in New Delhi, IGNCA organised an academic programme on Natyashastra.

About Natyashastra:

What it is?

- The Natyashastra is the foundational Sanskrit treatise on drama (natya), dance (nritya and nritta), music (sangita), aesthetics, and stagecraft in the Indian tradition.
- It is regarded as the Natya Veda (Fifth Veda)—intended to communicate ethical, aesthetic, and social values to all sections of society through performance.

Authored by: Traditionally attributed to Bharata Muni.

Language: Composed in Classical Sanskrit, primarily in śloka (verse) form, with a few prose explanations in later recensions.

History and Composition:

- Broadly dated to c. 200 BCE – 200 CE (scholarly consensus range).
- The text evolved from an oral performance tradition before being codified.
- The most influential classical commentary is Abhinavagupta's Abhinavabharati (c. 10th–11th century CE).

Key features of the text:

- Consists of 36 chapters (some traditions count 37).
- Covers the entire lifecycle of theatrical production.
- Rasa theory (core contribution): Explains aesthetic experience through Rasa–Bhava framework; classical rasas include Shringara, Hasya, Karuna, Raudra, Veera, Bhayanaka, Bibhatsa, Adbhuta (later tradition adds Shanta).
- Four-fold acting tools (Abhinaya): Describes Angika (body), Vachika (speech), Aharya (costume/props), Sattvika (inner emotion) as essential to performance.
- Dramaturgy & stagecraft: Details plot construction, roles, performance styles, theatre space, costumes, make-up, and direction—making it a complete production manual.
- Dance & gesture codification: Elaborates mudras/hastas, body positions, facial/eye movements, and units like karanas, enabling standardised training.
- Integration of arts: Treats performance as a synthesis of music + rhythm + movement + expression, making "theory and praxis" inseparable.

Significance:

- Civilisational foundation: Provides the theoretical base for India's classical performing arts ecosystem—dance, theatre, music pedagogy and aesthetics.

- Cultural continuity: Helps reinterpret classical forms for contemporary theatre and performance training without breaking tradition.

Exercise DESERT CYCLONE–II 2025

Context: An Indian Army contingent has departed for the India–UAE Joint Military Exercise DESERT CYCLONE–II (2025) to be held in Abu Dhabi.

About Exercise DESERT CYCLONE–II 2025:

What it is?

- DESERT CYCLONE–II is the second edition of the bilateral joint military exercise between the Indian Army and the UAE Land Forces, aimed at enhancing operational cooperation.

Host country: United Arab Emirates (Abu Dhabi)

Participating nations:

- India: 45 personnel from a battalion of The Mechanised Infantry Regiment
- UAE: Personnel from 53 Mechanised Infantry Battalion, UAE Land Forces

Aim:

- To train jointly for sub-conventional operations under a UN mandate.
- To prepare forces for peacekeeping, counter-terrorism and stability operations in urban environments.

Key features:

- Training in fighting in built-up areas (FIBUA).
- Heliborne operations and detailed joint mission planning.
- Integration of Unmanned Aerial Systems (UAS) and Counter-UAS techniques.
- Focus on urban warfare scenarios and joint tactical drills.

Significance:

- Strengthens bilateral defence ties and military diplomacy between India and the UAE.
- Enhances mutual understanding of tactics, techniques and procedures (TTPs).

Bureau of Port Security (BoPS)

Context: The Union government has constituted the Bureau of Port Security (BoPS) as a statutory body under the Merchant Shipping Act, 2025 to strengthen port and maritime security.
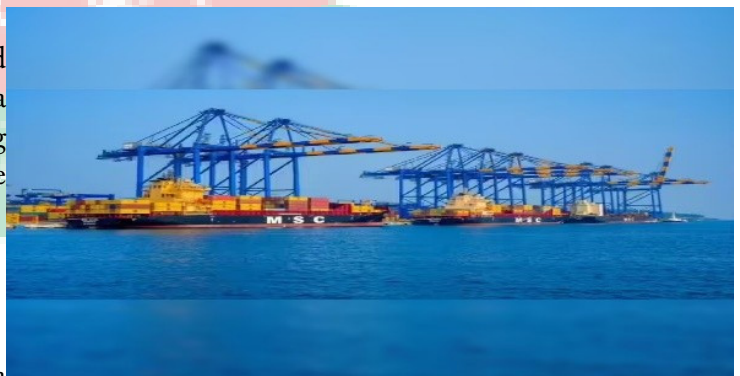
About Bureau of Port Security (BoPS):

What it is?

- The Bureau of Port Security (BoPS) is a statutory regulatory authority responsible for the security oversight of ports, port facilities, and ships in India.
- It is modelled on the Bureau of Civil Aviation Security (BCAS), providing a unified institutional framework for port security.

Established by:

- Constituted under Section 13 of the Merchant Shipping Act, 2025.
- Functions under the Ministry of Ports, Shipping and Waterways (MoPSW).

Aim:

- To create a single, legally empowered authority for port security regulation, coordination, and compliance.
- To ensure safe, secure, and resilient ports in line with Maritime India Vision 2030 and global security standards.

Key functions:

- Regulatory oversight: Enforce compliance with international frameworks such as the International Ship and Port Facility Security (ISPS) Code.
- Coordination role: Act as a nodal body coordinating among Coast Guard, CISF, Navy, State maritime police, and port authorities to avoid security gaps.
- Threat prevention: Address risks like maritime terrorism, arms and drug smuggling, human trafficking, piracy, illegal migration, and poaching.
- Cybersecurity: Establish a dedicated division to protect port IT systems and digital infrastructure, coordinating with national cyber agencies.
- Standardisation & training: Designate CISF as a recognised security organisation to prepare security plans, conduct audits, and train port security personnel.
- Graded security implementation: Ensure risk-based, phased security measures across major and non-major ports.

Significance:

- Reduces fragmentation caused by multiple agencies handling coastal security.
- Enhances security credibility amid rising cargo volumes, port capacity expansion, and inland waterway usage.

National Technology Readiness Assessment Framework (NTRAF)

Context: The Principal Scientific Adviser to the Government of India has unveiled the National Technology Readiness Assessment Framework (NTRAF) to create a uniform, evidence-based system for assessing technology maturity across India's R&D ecosystem.

About National Technology Readiness Assessment Framework (NTRAF):

What it is?

- The National Technology Readiness Assessment Framework (NTRAF) is a standardised, objective framework to assess the maturity of technologies from early laboratory research to full commercial deployment using 9 Technology Readiness Levels (TRLs).

Ministry / Department:

- Office of the Principal Scientific Adviser (OPSA) to the Government of India
- Developed in collaboration with the Confederation of Indian Industry (CII)

Aim:

- Establish a common language between researchers, investors and policymakers
- Enable evidence-based funding decisions under national R&D and mission-mode programmes
- Reduce the "Valley of Death" between TRL 4 and TRL 7 by de-risking promising deep-tech innovations

Key features:

- TRL-based assessment: Covers the full innovation cycle from Proof of Concept (TRL 1–3) to Prototype Development (TRL 4–6) and Operational Deployment (TRL 7–9).
- Objectivity over subjectivity: Uses structured, measurable checklists instead of narrative claims of readiness.
- Global best practices, Indian context: Adapted from international models (e.g., NASA TRLs) and

customised for India's research and industrial ecosystem.

- Sector-specific annexures: Tailored assessment pathways for domains such as Healthcare & Pharmaceuticals and Software, recognising sectoral differences.
- Self-assessment tool: Enables researchers and startups to identify technical gaps before applying for funding.

Significance:

- Improves efficiency of public R&D spending by aligning funding with actual technology maturity.
- Boosts private sector confidence by providing validated, investment-ready readiness benchmarks.
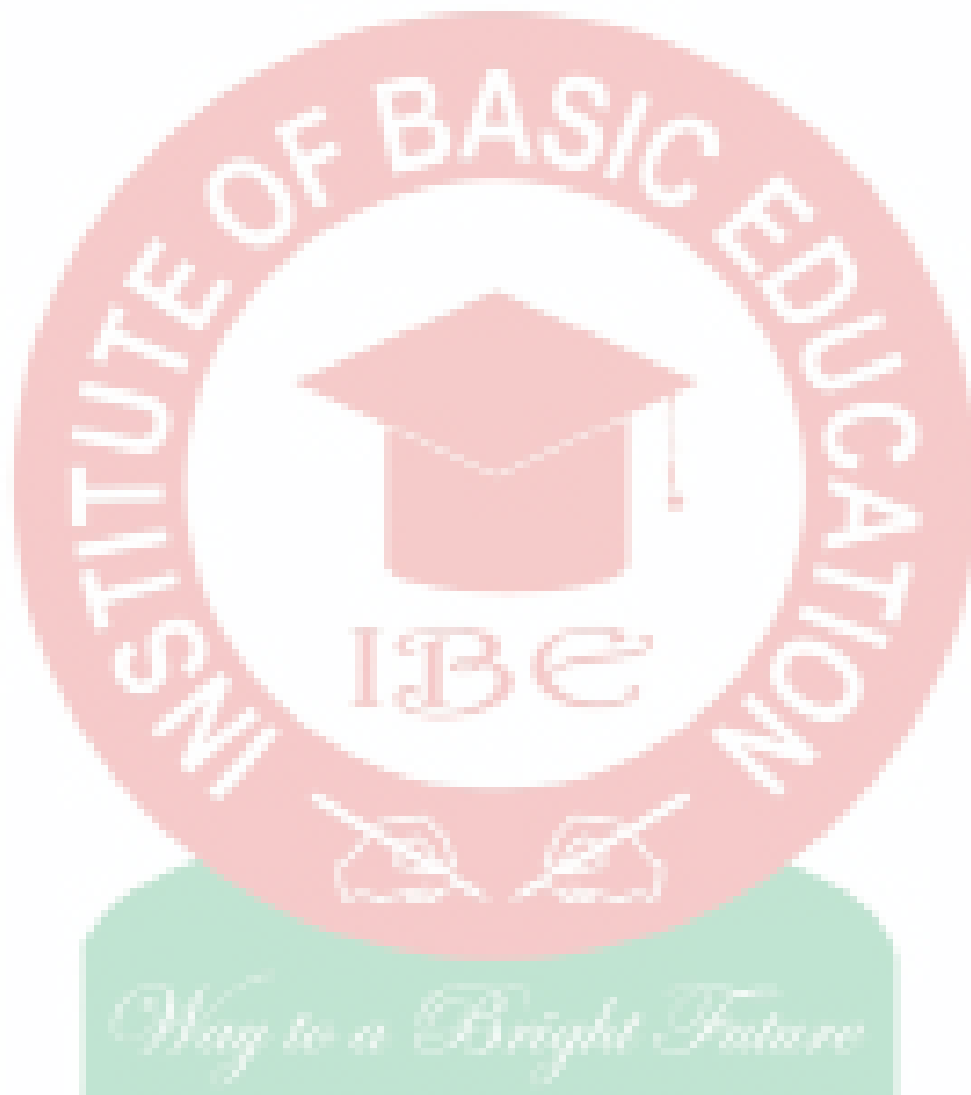
Chapter-
8

INTERNATIONAL RELATION

India–Russia Bilateral Relations

Context: Russian President Vladimir Putin is on a state visit to India for the 23rd India–Russia Annual Summit in New Delhi, where he received a ceremonial welcome at Rashtrapati Bhavan and held talks with Prime Minister of India.

About India–Russia Bilateral Relations:

- Nature of ties: India–Russia enjoys a "Special and Privileged Strategic Partnership" since 2010, upgraded from a Strategic Partnership in 2000, marked by high trust, defence dependence, and political convergence on multipolarity.

- Institutional structure: Relations are anchored in annual summits, the India–Russia Inter-Governmental Commission (IRIGC) with its TEC and M&MTC segments, the 2+2 dialogue, NSA-level talks, parliamentary exchanges and sectoral working groups.

- Strategic convergence: Both countries support a multipolar world, reform of global governance (UNSC expansion including India), and coordination in BRICS, SCO, G20, UN.

Key Areas of Cooperation:

1. Defence & Strategic Security:

   Legacy & current platforms: Russia remains India's major defence partner – Su-30MKI, T-90 tanks, INS Vikramaditya, most submarines, and S-400 air defence system are of Russian origin or co-produced.

   Joint R&D / production: Flagship projects include BrahMos cruise missile, licensed production of Su-30MKI and T-90, AK-203 assault rifles under "Make in India", long-term military-technical cooperation programme 2021–31.

   Exercises & operational cooperation: Regular joint exercises like INDRA (tri-services + naval), participation in large Russian drills (e.g., ZAPAD-2025), and Garuda-type engagements strengthen interoperability and strategic signalling.

   Nuclear & space cooperation: Russia is India's only foreign civil nuclear partner on the ground (e.g., Kudankulam Nuclear Power Plant), and a key collaborator for Gaganyaan astronaut training and space-tech sharing.

2. Energy & Natural Resources:

   Hydrocarbons: Russia is a major supplier of discounted crude oil, gas and coking coal, pivotal during post-Ukraine sanctions turbulence. Indian companies have upstream stakes in Russian projects (e.g., Sakhalin).

   Civil nuclear energy: Ongoing units and plans at Kudankulam underpin long-term baseload power and technology transfer.

   New frontiers: Dialogue on LNG, critical minerals, Arctic energy, hydrogen and nuclear fuel cycle cooperation is expanding.

3. Trade, Connectivity & Economic Ties:

   Trade profile: Bilateral trade reached USD 68.7 billion in FY 2024–25, dominated by India's imports of energy, fertilizers, and defence items; India exports pharmaceuticals, agri-products, chemicals and marine

products.

Trade targets: Leaders have set a goal of USD 100 billion trade by 2030 and USD 50 billion mutual investments (energy, petrochemicals, banking, infrastructure, pharma).

Connectivity corridors: Joint work on International North–South Transport Corridor (INSTC), Chennai–Vladivostok Eastern Maritime Corridor, and interest in the Northern Sea Route to shorten transit times and bypass chokepoints.

4. Science, Technology & Space:

    S&T cooperation: Joint projects in basic sciences, nanotech, materials science, IT, AI, guided by an STI Roadmap (2021) aiming at commercialization and innovation ecosystems.

    Space collaboration: Long-standing partnership including Gaganyaan astronaut training, satellite cooperation and potential joint missions; legacy goes back to early ISRO–Soviet launches.

5. Education, Culture & People-to-People Ties:

    Education: Over 20,000 Indian students study in Russia (especially medicine); multiple MoUs under EEP, RIN, SPARC, GIAN and growing scholarship exchanges (ITEC).

    Cultural links: Indian films, Yoga, classical arts and festivals (e.g., Bharat Utsav, Indian Film Festival) remain popular in Russia, while Russian literature, art and academic exchanges are prominent in India.

Key Challenges in the Bilateral Relationship:

- Geopolitical Pressures & Ukraine War: Western sanctions, US/EU scrutiny and the ongoing Russia–Ukraine conflict complicate India's balancing between Russia and the West, raising reputational and financial risks (payment channels, secondary sanctions).

- Trade Imbalance & Payment Issues: Trade is heavily skewed in Russia's favour (large current account deficit for India); rupee–rouble settlement, frozen funds and banking connectivity remain unresolved.

- Over-Dependence on Russian Defence Supplies: Despite diversification, a significant share of Indian military platforms and spares is Russian; delays, sanctions, and Russia's own wartime needs risk supply disruptions and slow modernization.

- Technological Transitions & Competition: India seeks cutting-edge defence and high-tech from Western/Japanese partners, sometimes beyond what Russia can offer, creating relative decline in Russia's share of India's procurement pipeline.

- Connectivity & Logistics Bottlenecks: INSTC, Chennai–Vladivostok corridor and Northern Sea Route face infrastructure, regulatory and financing constraints, and regional instability in West Asia/Caucasus can affect routes.

Way Ahead:

- Rebalance Economic Ties & Diversify Trade Basket: Push Indian exports in pharma, agri, textiles, machinery, IT services, resolve payment mechanisms, and set up dedicated India–Russia trade facilitation corridors and logistics parks.

- Deepen Co-production & Technology Sharing in Defence: Move from buyer–seller to joint design, IP sharing and export-oriented co-production (next-gen air defence, armour, naval platforms, engines, space and cyber).

- Fast-Track Connectivity Projects: Operationalise INSTC and Chennai–Vladivostok EMC with regular shipping services, digital documentation, customs harmonisation and PPP investments; explore Arctic shipping cooperation carefully.

- Cooperate on New-Age Technologies & Energy Transition: Launch joint missions in nuclear fuel cycle, small modular reactors (SMRs), green hydrogen, critical minerals, AI, quantum and cybersecurity to keep the partnership future-oriented.

- Strengthen People-to-People and Educational Links: Ease student mobility, mutual degree recognition, joint campuses, and expand cultural festivals, tourism, and academic chairs in each other's universities.

- Institutionalise Strategic Dialogue Amid Global Flux: Use Annual Summits, 2+2, NSA dialogue and

track-2 channels to manage differences on Ukraine, China, Indo-Pacific and sanctions while preserving strategic autonomy for both.

Conclusion:

India–Russia relations remain one of New Delhi's most enduring strategic partnerships, built on defence, energy and political trust. The current summit amid global churn is an opportunity to rebalance ties beyond hydrocarbons and Soviet-era defence platforms towards technology, trade and connectivity. Managing external pressures while modernising and diversifying cooperation will decide whether the partnership stays "special and privileged" in substance, not just in name.

23rd India–Russia Annual Summit

Context: The 23rd India–Russia Annual Summit concluded with a joint statement reaffirming the Special & Privileged Strategic Partnership.

About 23rd India–Russia Annual Summit:

What it is?

- The Annual Summit is the highest-level institutional dialogue between India and Russia, where the Prime Minister and the Russian President review bilateral ties and set strategic directions.
- The 2025 Summit marked 25 years of the Strategic Partnership (2000–2025).

Key Outcomes of the Joint Statement:

- Strategic Partnership Reaffirmed: Both leaders reiterated commitment to a time-tested, trust-based partnership, emphasising mutual respect for core interests and a shared vision for a multipolar world.
- Programme 2030 Adopted: A comprehensive roadmap to deepen cooperation in trade, technology, defence, energy, space, nuclear, and connectivity till 2030.
- Boost to Trade & Payments System:

   Push for USD 100 billion bilateral trade by 2030.

   Decision to deepen trade settlement using national currencies, interoperability of payment systems, and central bank digital currencies.

- Defence & Military-Technical Cooperation Upgraded:

   Shift toward joint R&D, co-development and co-production under Make in India.

   Support for spare-part manufacturing in India for Russian-origin equipment.

   Continued momentum in exercises like INDRA-2025 and trilateral training.

- Major Energy Cooperation:

   Strengthening ties in oil, gas, LNG, petrochemicals, coal gasification, and long-term fertilizer supply.

   Agreement to fast-track pending investment issues.

- Connectivity Corridors Advanced:

Commitment to scale up infrastructure for:

   International North-South Transport Corridor (INSTC)

   Chennai–Vladivostok Maritime Corridor

   Northern Sea Route (Arctic)

- Civil Nuclear & Space Cooperation:

   Progress on Kudankulam NPP units and discussions on a second nuclear site.

   Joint collaboration in nuclear fuel cycles, localization, and reactor technology.

   Enhanced cooperation between ISRO–Roscosmos, including human spaceflight, satellite navigation, and rocket engines.

- Skilled Mobility Agreement Signed: Facilitates regulated mobility of Indian skilled workers to Russia.

- Global & Regional Issues:

  Russia reaffirmed support for India's permanent UNSC seat.

  Both sides strengthened cooperation in G20, SCO, BRICS, counter-terrorism, and climate change.

  Strong condemnation of terrorism, referencing Pahalgam attack (India) & Crocus City attack (Russia).

Saudi UNESCO Global Network of Learning Cities (GNLC)

Context: UNESCO has added three more Saudi cities — Riyadh, AlUla, and Riyadh Al-Khabra — to the Global Network of Learning Cities (GNLC) in its 2025 update.

About Saudi UNESCO Global Network of Learning Cities (GNLC):

What is GNLC?

- The GNLC is a UNESCO-led international network that recognises cities promoting lifelong learning across all age groups through inclusive, accessible, and sustainable learning ecosystems.

History:

- Established in 2013, GNLC has grown rapidly and today includes 425 cities from 91 countries, supporting lifelong learning opportunities for nearly 500 million people.
- It forms part of UNESCO's Education 2030 agenda and the SDG-4 mandate.

Key Features of a UNESCO Learning City:

Learning cities must demonstrate:

- Lifelong learning systems: Education integrated across formal, non-formal, workplace, and community settings.
- Digital and AI readiness: Preparing citizens for future labour markets and technological shifts.
- Literacy & skills development: Targeted programmes for youth, adults, and marginalised groups.
- Innovation & entrepreneurship: Platforms for creativity, startup culture, and workforce reskilling.
- Sustainability & inclusion: Learning linked to SDGs, environmental responsibility, and social equity.

Saudi Arabia's Recent Addition:

- UNESCO recognised Riyadh, AlUla, and Riyadh Al-Khabra for meeting rigorous global benchmarks of community-wide learning.

  Saudi's total GNLC membership: 8 cities.

  The expansion aligns with Saudi Vision 2030 and the Human Capability Development Program.

India and the Global Learning Cities Network:

- India has three GNLC cities (2022 cohort):

  Warangal (Telangana)

  Thrissur (Kerala)

  Nilambur (Kerala)

- These cities were recognised for integrating learning in public spaces, literacy programmes, and community participation.

India's BRICS presidency 2026

Context: Brazil has formally handed over the BRICS (18th) presidency to India for 2026, amid global trade frictions and geopolitical tensions.

About India's BRICS presidency 2026:

What it is?

- India will serve as the rotating (pro tempore) Chair of BRICS in 2026. As Chair, India will set priorities, convene meetings, and host the annual summit for the year.

Established in:

- Origins (BRIC): Political dialogue began with the BRIC Foreign Ministers' meeting in 2006 (UNGA sidelines).
- Leaders' summit start: The first summit of heads of state/government took place in 2009 (Yekaterinburg).
- BRICS formed: South Africa joined in 2011, turning BRIC into BRICS.

  Headquarters: No permanent HQ and it works as an informal coordination platform with a rotating presidency.
- The New Development Bank (NDB) is headquartered in Shanghai, China.

  Members: Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Iran, United Arab Emirates, Saudi Arabia, Indonesia.

How is the BRICS Presidency decided?

- Not elected by voting. The BRICS presidency is rotational, not chosen through an election.
- Rotation principle: The chairmanship rotates annually among member countries, traditionally following the alphabetical order of the acronym "BRICS".
- Tenure: Each presidency runs from 1 January to 31 December of the year.
- Role of the President country:

  Sets the annual agenda and priorities

  Chairs meetings at all levels (Sherpas, Ministers, Leaders)

  Hosts the BRICS Summit

  Official language of BRICS: No single official language is prescribed in the BRICS Charter.

Key functions of BRICS:

- Political coordination: Builds common positions on major global issues and pushes for a fairer world order.
- Economic and financial cooperation: Promotes trade, investment coordination, and reform of global financial governance.
- Development finance: Uses institutions like the NDB to fund infrastructure and sustainable development in EMDCs.
- People-to-people pillar: Expands cultural, academic, youth and civil society engagement across members.
- Bridge-building for Global South: Provides a platform where developing countries amplify shared priorities.

Significance of India's BRICS presidency:

- India can steer agendas on development finance, health, and technology equity.

● India can strengthen calls for reform of institutions like UN, IMF, World Bank, WTO.

Global Declaration on Noncommunicable Diseases (NCDs) and Mental Health

Context: World leaders at the 80th United Nations General Assembly (UNGA) adopted a historic global political declaration that jointly addresses noncommunicable diseases (NCDs) and mental health for the first time.

About Global Declaration on Noncommunicable Diseases (NCDs) and Mental Health:

What it is?

● The Global Declaration on NCDs and Mental Health is a political declaration adopted by UN Member States to accelerate prevention, control and care of NCDs and mental health conditions through an integrated approach.

● It represents the first UN declaration to treat NCDs and mental health together, recognising their shared risk factors and societal impact.

Published by:

● United Nations General Assembly (UNGA)

● Adopted during the Fourth UN High-Level Meeting on NCDs and Mental Health (2025)

Targets (to be achieved by 2030):

The declaration introduces first-ever global "fast-track" outcome targets:

1. 150 million fewer tobacco users

2. 150 million more people with hypertension under control

3. 150 million more people with access to mental health care

Key features:

● Integrated health approach: Treats NCDs and mental health as interconnected challenges driven by common risk factors such as unhealthy diets, tobacco, alcohol, physical inactivity and air pollution.

● Expanded scope of NCDs: Covers new areas including oral health, lung health, childhood cancer, kidney and liver diseases, and rare diseases.

● Focus on emerging risks: Addresses environmental determinants (air pollution, clean cooking, lead exposure) and digital harms (excessive screen time, harmful online content, misinformation).

● Stronger regulation: Emphasises regulation of e-cigarettes, novel tobacco products, unhealthy food marketing to children, front-of-pack labelling, and elimination of industrial trans fats.

● System-level national targets: Calls for strong primary healthcare, affordable essential medicines, financial protection, multisectoral national plans, and robust surveillance systems.

● Whole-of-government and whole-of-society approach: Encourages engagement of civil society, youth, persons with disabilities, and people with lived experience.

Significance:

● Addresses the world's leading causes of premature death and disability, affecting people across all countries and income groups.

● Prioritises vulnerable groups such as climate-affected populations, Small Island Developing States (SIDS), and humanitarian settings.

UN Peacekeepers

Context: The UN Security Council has strongly condemned drone

attacks on UN peacekeepers in Sudan's South Kordofan, which killed six Bangladeshi personnel serving with UN Interim Security Force for Abyei.

About UN Peacekeepers:

What it is?

- UN Peacekeeping is a mechanism deployed by the United Nations to help countries transition from conflict to peace by stabilising volatile situations and supporting political processes.

Evolution of UN Peacekeeping:

- 1948: Observer missions UN peacekeeping began with unarmed observer missions like UNTSO, focused on monitoring ceasefires and reporting violations without enforcement powers.
- Cold War era: Geopolitical rivalry between major powers restricted mandates, limiting peacekeeping largely to monitoring roles and consent-based deployments.
- Post-1990s expansion: After civil wars increased, missions became multidimensional, combining military presence with political mediation and humanitarian support.
- Reforms (Brahimi Report, 2000): The report called for clearer mandates, adequate resources, rapid deployment, and prioritising civilian protection.

Functions of UN Peacekeepers:

- Ceasefire monitoring: Peacekeepers observe buffer zones and report violations to prevent renewed hostilities.
- Protection of civilians: They are authorised to use force when necessary to protect civilians facing imminent threats.
- Disarmament, Demobilisation and Reintegration (DDR): They assist ex-combatants in laying down arms and reintegrating into civilian life.
- Support to elections and governance: Peacekeepers help organise elections and strengthen local administrative institutions.
- Human rights and rule of law: They monitor abuses, support judicial reforms, and promote accountability.
- Humanitarian assistance: They facilitate relief delivery and support early recovery in post-conflict areas.

India and UN Peacekeeping:

- Major troop contributor: India remains one of the largest contributors of uniformed personnel to UN peacekeeping operations.
- Scale of participation: Over 2,90,000 Indian peacekeepers have served in more than 50 missions worldwide.
- Current deployments: Around 5,000 Indian personnel are deployed across nine active UN missions.
- Sacrifice and commitment: Nearly 180 Indian peacekeepers have sacrificed their lives in service of global peace.

The Blue Line

Context: A UNIFIL peacekeeper was injured by gunfire near the Blue Line in southern Lebanon, allegedly following fire from Israeli Defence Forces positions.

About The Blue Line:

What it is?

- The Blue Line is a United Nations–identified withdrawal line, not an international border, used to verify Israel's withdrawal from southern Lebanon as mandated by UN Security Council resolutions.

Located in:

- Along southern Lebanon, adjoining northern Israel
- Extends for about 120 kilometres from the Mediterranean coast to the tri-border area near the Golan Heights

Neighbouring nations: Lebanon, Israel, and Israeli-occupied Golan Heights (bordering Syria)

Origin of the Blue Line:

- Established in 2000 by the United Nations
- Created to confirm Israel's compliance with UN Security Council Resolution 425 (1978) after its withdrawal from Lebanon
- Reinforced under UN Security Council Resolution 1701 (2006) following the Israel–Hezbollah conflict

Key features:

- Unofficial boundary: Serves as a line of withdrawal, not a legally recognised international border.
- UN monitoring: Patrolled by the UN Interim Force in Lebanon (UNIFIL) to prevent escalation.
- Weapons-free buffer: Resolution 1701 calls for a zone free of armed groups between the Blue Line and the Litani River (except Lebanese armed forces and UNIFIL).
- Frequent flashpoint: Subject to violations, construction disputes, and cross-border firing, making it one of the most sensitive frontiers in West Asia.

Justice Mission 2025

Context: China conducted large-scale live-fire military drills named "Justice Mission 2025" around Taiwan, including missile launches, fighter jet sorties, and naval deployments.

PLA Justice Mission 2025 military exercises

Date: Dec. 29 to 6 p.m. on Dec. 30

- Justice Mission 2025 exercises (Dec. 29–30, 2025)
- Joint Sword-2024B (Oct. 14, 2024)
- Joint Sword-2024A (May 23–24, 2024)
- Live-fire drills following U.S. House Speaker Nancy Pelosi's visit (Aug. 4–7, 2022)

Median line of the Taiwan Strait

Dongyin

Matsu

China

Wuqiu

Kinmen

Outer limit of Taiwan's contiguous zone

Outer limit of Taiwan's territorial sea

Taiwan

Penghu

Taiwan's Air Defense Identification Zone

About Justice Mission 2025:

What it is?

- Justice Mission 2025 is a high-intensity, two-day PLA (People's Liberation Army) military exercise involving live-fire missile launches, air and naval manoeuvres.
- It is designed to simulate blockade operations and precision strikes against Taiwan's ports and maritime targets.

Location:

- Conducted around Taiwan, including waters to the north and south of the island.
- Missile launches observed from Pingtan Island, the closest Chinese territory to Taiwan.

Nations involved:

- China: People's Liberation Army (ground forces, navy, air force, missile units).
- Taiwan: Target of the drills; responded with heightened military readiness.

Aim:

- To send a deterrent signal against Taiwan's independence assertions.
- To warn the US and its allies against military support and arms sales to Taiwan.
- To demonstrate China's capability to blockade and isolate Taiwan during a conflict.

Key features:

- Live-fire missile launches targeting surrounding waters.
- Naval deployments simulating maritime blockades and anti-submarine warfare.
- Joint operations integrating air, sea, missile, and ground forces.
- One of the largest drills near Taiwan in recent years, indicating escalation.

Implications:

- Heightened regional tension: Raises the risk of miscalculation in the Taiwan Strait.
- US-China rivalry: Reinforces strategic competition over Taiwan's security.
- East Asian security impact: Concerns for Japan, ASEAN, and global trade routes.

Chapter-
9

SOCIAL ISSUES

Child Marriage Hotspot

Context: Child marriages in Madhya Pradesh have risen sharply by 47% since 2020, with Damoh district emerging as the worst hotspot in 2025.

- Parliamentary data shows 538 cases recorded this year, the highest in five years.

About Child Marriage Hotspot:

- What it is?

A persistent cluster of districts reporting disproportionately high child marriages, mainly in Bundelkhand, central MP, Gwalior–Chambal and tribal belts, indicating entrenched socio-economic vulnerabilities.

- Trends:

Steady Statewide Rise: MP saw cases rise from 366 (2020) to 538 (2025) — a 47% increase despite awareness campaigns.

District-Level Surge: Damoh alone accounts for 21% of all child marriages in 2025, jumping from 33 cases in 2024 to 115 in 2025.

Regional Concentration: Bundelkhand, tribal and economically backward districts dominate the list, signalling poverty-linked, region-specific persistence.

- Implications:

Rising child marriages undermine girls' education, health and economic participation, deepening intergenerational poverty.

It increases risks of maternal mortality, early pregnancies and domestic violence.

The trend signals weak enforcement of PCMA 2006, gaps in local governance, and failure of social protection schemes to reach the most vulnerable.

Digital Hub for Reference and Unique Virtual Address (DHRUVA)

Context: The Department of Posts has released a draft amendment to introduce DHRUVA, a UPI-like digital addressing system enabling users to share address "labels" such as name@entity.

## About Digital Hub for Reference and Unique Virtual Address (DHRUVA):

What it is?

- DHRUVA is a national Digital Address Digital Public Infrastructure (DPI) that standardises, digitises and virtualises physical addresses through secure, consent-driven sharing using UPI-like address labels.

- It builds on the DIGIPIN system to offer geocoded precision and interoperability across platforms.

Smart addresses

A draft amendment seeks to enable an interoperable system replacing physical addresses with smart labels like "name@entity" powered by DIGIPIN for precise geolocation

- Labels will be provided by address service providers, while consent architecture will be managed by address information agents

- It will be based on the DIGIPIN system, which is a 10-character alphanumeric expression of latitude and longitude coordinates
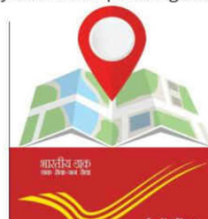
- The technology was developed to provide more precise locations in rural areas or in cases where the textual expression of a physical address does not offer adequate information

- The draft amendment is under consultation; Section 8 entity proposed (like NPCI for UPI)

- The system will be built as part of government's digital public infrastructure initiatives, and will allow private firms to participate

India Post

Launched by: Draft policy introduced by the Department of Posts in 2025 for public consultation.

Aim:

- To create a unified, interoperable, secure, and user-controlled digital address ecosystem.
- To treat address-data management as a core public infrastructure similar to Aadhaar, UPI, and DigiLocker.
- To enable Address-as-a-Service (AaaS) for government, businesses, and citizens.

Key Features:

- UPI-like Address Labels: Users get a virtual address such as "name@entity", which acts as a proxy for their physical address—reducing the need to fill address forms repeatedly.
- Consent-Based Access: Companies can access the user's geocoded or textual address only with time-bound authorisation, ensuring strong privacy protection.
- DIGIPIN Backbone:

  DIGIPIN = a 10-character alphanumeric geocode representing latitude–longitude.

  Maps every 14 sq m patch of Indian territory (~228 billion unique pins).

  Open-sourced and precise, especially for rural and hard-to-map areas.
- Address-as-a-Service (AaaS) Framework: Provides secure APIs for integrating address data across government agencies, logistics firms, fintech, e-commerce, etc.
- Institutional Architecture:

  A Section 8 not-for-profit entity (NPCI-like) will administer the ecosystem.

  Address Service Providers (ASPs) issue labels; Address Information Agents (AIAs) manage consent workflows.
- Interoperability & Private-Sector Participation: The system is voluntary—designed to attract e-commerce, gig platforms, financial services, and logistics companies.

India's STEM Future

Context: A national debate has emerged after concerns were raised about the government's proposal to restrict PhD research topics to "emerging national priorities," highlighting deeper structural issues in India's STEM ecosystem.

About India's STEM Future:

Trends in India's STEM Demography:

- Massive Output: India produces 25–30 lakh STEM graduates annually, ranking second globally after China (AISHE 2021-22).
- The "Leaky Pipeline" for Women: While women comprise 43% of STEM graduates (one of the highest globally), they hold only 14% of research positions due to societal and structural barriers.
- Low Researcher Density: India has just ~260 researchers per million people, significantly lower than China (~1,500), the USA (~4,500), and South Korea (~8,000).
- Sectoral Imbalance: The workforce is heavily skewed toward IT services and software engineering, with a severe shortage of talent in core research areas like biotechnology, material sciences, and physics.

Need for Strengthening STEM Education:

- Strategic Autonomy: Crucial for reducing import dependence in critical sectors like semiconductors, defense (DRDO), and space (ISRO).
- Global Competitiveness: Essential to transition from a "service-based economy" to an "innovation hub," targeting a trillion economy.
- Emerging Technologies: Fundamental for success in national missions on Green Hydrogen, Artificial Intelligence (AI), and Quantum Computing.
- Demographic Dividend: With a median age of 28 years, skilling youth in high-end STEM fields prevents

underemployment and boosts national productivity.

Initiatives Taken in India

- Anusandhan National Research Foundation (ANRF) 2023: Established with a corpus of 50,000 crore (over 5 years) to fund research in universities and colleges, not just elite institutions.
- National Education Policy (NEP) 2020: Introduces multidisciplinary education, allowing STEM students to take humanities courses to foster holistic thinking.
- Targeted National Missions:

  National Quantum Mission: 6,000 crore allocated to scale intermediate-scale quantum computers.

  IndiaAI Mission: 10,372 crore approved to build computing infrastructure and large multimodal models.
- Innovation at School Level: Atal Innovation Mission (AIM) has established over 10,000 Atal Tinkering Labs (ATLs) to foster curiosity in robotics and IoT among school children.
- Fellowships & Scholarships: Programs like PMRF (Prime Minister's Research Fellowship) offer attractive stipends (up to 80,000/month) to retain top talent in Indian PhD programs.

Challenges to STEM Education & Research:

- Low R&D Expenditure: India's Gross Expenditure on R&D (GERD) is stagnant at ~0.64% of GDP, compared to the global average of ~1.8% and China's 2.4%.
- Private Sector Apathy: The private sector contributes less than 40% of India's R&D spend, whereas in advanced economies (USA, Japan), it contributes over 70%.
- Bureaucratic Red Tape: Delays in fellowship disbursals (often 6–8 months) and rigid procurement rules for lab equipment demotivate scholars.
- "Human Capital Flight": Top-tier talent migrates to the US/Europe for better infrastructure; approx. 90% of AI researchers from elite Indian institutes move abroad for work.
- Infrastructure Deficit: 90% of state universities suffer from outdated laboratories and a lack of access to high-end journals.

Way Ahead:

- Boost Funding to 2% GDP: Government must commit to increasing R&D spending to at least 2% of GDP to match global standards.
- Strengthen Industry-Academia Link: Mandate industry funding for university research via CSR norms or tax incentives for R&D investments.
- Ease of Doing Science: Implement a "Single Window Clearance" for research grants and equipment procurement to reduce administrative burden.
- Retain Talent: Create "post-Doc" opportunities with competitive pay and strictly enforce monthly automated fellowship disbursals.
- Democratize Access: Expand the ANRF's reach to fund state universities and rural colleges, breaking the monopoly of IITs/IISc.

Conclusion:

India's STEM potential is massive but constrained by under-funding and bureaucratic inertia. Unlocking this potential requires a shift from "diploma production" to "research creation," supported by robust funding and academic freedom. A self-reliant India (Atmanirbhar Bharat) can only be built on the foundation of a thriving, inclusive, and well-funded STEM ecosystem.

Shilp Didi Programme

Context: The Union Textiles Secretary announced that the Shilp Didi Programme has significantly boosted women artisans' income, with some earning over 5 lakh.

About Shilp Didi Programme:

- What it is?

  A government initiative to economically empower women artisans ("Shilp Didis") by providing training, digital skills, and market access, including e-commerce platforms and physical exhibitions.

- Launched In: 2024 (100-day pilot phase began in June 2024).

- Implemented By: Ministry of Textiles, through the Office of the Development Commissioner (Handicrafts).

- Aim: To make women artisans financially independent, improve design and business skills, and help them leverage modern marketing and entrepreneurship tools.

- Key Features:

  E-training modules (entrepreneurship, regulatory compliance, social media, e-commerce onboarding).

  Marketing opportunities via Dilli Haat, craft fairs, and curated events.

  E-commerce integration for nationwide and global visibility.

  Baseline inclusion of 100 women artisans from 72 districts across 23 states.

  Covers 30 diverse handicrafts (textiles, pottery, metal crafts, embroidery, etc.).

  Capacity-building through National Handicrafts Development Programme (NHDP) clusters.

- Significance:

  Provides sustainable livelihoods and boosts rural/non-farm incomes.

  Strengthens micro-entrepreneurship among women in the handicrafts sector.

  Enhances digital inclusion—artisans use social media & e-commerce to expand markets.

Proposal to rename MNREGA

Context: The Centre is set to amend the MGNREGA Act to rename the flagship rural employment scheme as "Pujya Bapu Gramin Rozgar Yojana" and may raise the guaranteed work limit from 100 to 125 days.

About Proposal to rename MNREGA:

What it is?

- MGNREGA is a demand-driven, rights-based rural wage employment programme guaranteeing unskilled manual work to rural households, aimed at livelihood security and creation of durable assets.

Launched in:

- 2005, brought into force through the MGNREGA Act, 2005
- Came into effect in phases from 2006 across India

Historical Background:

- Recommended by Narsimha Rao's Employment Assurance Scheme (1993) and Food for Work Programme (2004).
- Envisioned as a legal right to work, inspired by Gandhian ideals of self-reliant rural livelihoods.
- Became the largest social security programme in the world.

Aim of MGNREGA:

- Guarantee 100 days of wage employment (now proposed 125 days).
- Enhance livelihood security, reduce distress migration.
- Strengthen Panchayati Raj Institutions through decentralized planning.

Key Features of the Scheme:

- Rights-based entitlement:

  Every adult rural household member can demand unskilled manual work.

  Right to unemployment allowance if work not provided within 15 days.

- Wage & Material Ratio: 60:40 ratio at Gram Panchayat level.
- Women-Centric Approach: At least 1/3rd beneficiaries must be women; actual participation > 58% (2024–25).
- Transparent Payment Systems: Payment via Aadhaar-Based Payment System (ABPS); 99%+ wage payments through e-FMS.
- Strengthening Natural Resource Base: Focus on water conservation, afforestation, land development, and soil moisture restoration.
- Social Audit: Mandatory audits by Gram Sabha to ensure transparency and accountability.

Recent Amendments:

- Renaming and Expansion of Employment (2025 Proposal):

  Rename MGNREGA as "Pujya Bapu Gramin Rozgar Yojana".

  Increase employment from 100 to 125 days.

  Introduce exclusion clauses based on a State's economic indicators.

  Tweaks in funding pattern.

- Priority for Water Conservation (Sept 2025 Amendment)

  MGNREGA's Schedule-I amended to earmark:

  65% funds in Over-exploited & Critical blocks

  40% funds in Semi-critical blocks

  30% funds in Safe blocks

- Project UNNATI (Skill Upgradation):

  Launched in 2019 to skill MGNREGA workers.

  Target 2 lakh workers however 90,894 trained till March 2025.

The Changing Patterns of India's Student Migration

Context: India is witnessing a sharp rise in self-financed student migration, with overseas enrolment projected to reach 13.8 lakh in 2025.

- Recent debates highlight rising debt, underemployment and "brain waste", questioning the developmental gains of this trend.

About The Changing Patterns of India's Student Migration:

What it is?

- Student migration now represents a mass middle-class phenomenon, driven less by elite scholarships and more by self-financed education loans and family savings.

Recent trends:

1. By December 2025, 82 lakh Indian students were studying across 153 countries, with Germany and France emerging as cost-effective alternatives, as Germany alone recorded ~49% growth amid tighter rules in traditional hubs.
2. The Kerala Migration Survey (2023–24) shows student migration doubling from 29 lakh (2018) to 2.5 lakh (2023), now forming 11.3% of all emigrants, while Gulf labour migration has stagnated.
3. In 2023–24, Kerala's outward education remittances touched ₹43,378 crore, nearly 20% of its inward labour remittances, marking a measurable economic strain on households.
4. In 2024–25, stricter norms in Canada, the US, UK and Australia saw Canada's study-visa approval rate fall to ~30%, triggering a 23% YoY drop in education remittances as families deferred overseas plans.

Factors Causing the Change in Migration Patterns:

- Aspirational mobility and PR pathways: Students increasingly choose destinations that offer post-study work and residency options, even at higher costs, viewing education as a migration ladder rather than a learning goal.

  Eg: In 2024–25, Australia and Germany saw higher Indian enrolments due to clearer PR pathways despite rising visa fees.

- Gaps in domestic education–employment linkage: Weak alignment between Indian degrees and labour-market needs pushes graduates to seek foreign credentials for employability.

  Eg: The India Skills Report 2024 found only 51% of Indian graduates employable, fuelling the "degree-plus-visa" strategy.

- Aggressive recruitment networks: Unregulated agents prioritise commissions over student outcomes, steering aspirants to low-quality overseas institutions.

Eg: In 2024, Punjab Police cracked down on hundreds of fake immigration firms after 700 students faced deportation threats from Canada.

- Normalisation of self-financed migration: Middle-class families increasingly accept high debt as a legitimate investment in global mobility.

  Eg: RBI (2024) recorded a sharp rise in LRS remittances under "Education" and "Maintenance of Close Relatives".

Challenges Associated with Student Migration:

- Deskilling and underemployment: Highly educated students often end up in low-skill jobs due to restrictive visa regimes and weak placement support.

  Eg: UK's 2024 limits on skilled-visa switching pushed Indian STEM graduates into gig-economy work.

- Reverse remittances and household debt: Instead of earning abroad, students drain domestic savings and incur long-term family debt.

  Eg: Education loans averaged ₹35–40 lakh in 2024, often mortgaging ancestral land in Punjab and Haryana.

- Exploitation and informal labour: Financial stress forces students into unsafe housing and undocumented work.

  Eg: Canada's 2024 housing crisis led to "hot-bedding" and illegal warehouse jobs among Indian students.

- Mental health and social stress: Isolation, debt pressure and insecurity severely affect student well-being.

  Eg: Indian consulates in the US and Canada reported a surge in distress calls in 2024 after violent incidents.

- Brain waste instead of brain gain: Failure to secure skilled jobs results in debt-burdened returns rather than knowledge transfer.

  Eg: Many returnees face "circular migration failure", coming back with loans instead of advanced skills.

Way Ahead:

- Regulate education recruitment agents: Mandatory registration and penalties can curb fraud and misinformation.

  Eg: Proposed amendments to the Punjab Prevention of Human Smuggling Act target unregistered study-abroad consultants.

- Strengthen pre-departure counselling: Transparent guidance can align expectations with ground realities.

  Eg: MEA's "Surakshit Jaaye, Prashikshit Jaaye" (2024) campaign educates aspirants on risks and rights.

- Bilateral education accountability frameworks: Structured mobility agreements reduce uncertainty and exploitation.

  Eg: India-Australia MATES programme provides regulated visa quotas for young professionals.

- Improve domestic higher education outcomes: Quality global education at home can reduce forced migration.

  Eg: Foreign university campuses at GIFT City, Gujarat, offer international degrees at lower cost.

- Promote return and reintegration pathways: Returning talent must be absorbed into India's innovation ecosystem.

  Eg: VAIBHAV Fellowship links diaspora and returnees with Indian R&D institutions.

Conclusion:

India's student migration reflects rising aspirations but also growing structural vulnerabilities. Without regulation and domestic reform, the promise of global education risks turning into debt-driven underemployment. A balanced approach is needed to convert student mobility into genuine human capital gain rather than brain waste.

Govt. to increase reservation for Agniveers in CAPFs to 50%

Context: The Union Home Ministry has notified an increase in reservation for ex-Agniveers in Group-C posts of Central Armed Police Forces (CAPFs) from 10% to 50%, starting with the Border Security Force (BSF).

About Govt. to increase reservation for Agniveers in CAPFs to 50%:

What it is?

- The Ministry of Home Affairs has amended recruitment rules to reserve 50% of constable (Group-C) vacancies in CAPFs for ex-Agniveers, beginning with the Border Security Force.

Earlier policy:

- In 2022, the government announced 10% reservation for ex-Agniveers in CAPFs.
- Additional relaxations included 5 years age relaxation for the first batch and 3 years for subsequent batches.
- Ex-Agniveers were required to compete through regular recruitment processes.

New proposal / changes:

- 50% reservation for ex-Agniveers in every recruitment year for constable posts.
- Ex-Agniveers are exempted from PST/PET, but must clear the written examination like other candidates.
- Recruitment will be done in two phases:

  Phase-1: Nodal CAPF recruits ex-Agniveers for 50% vacancies.

  Phase-2: SSC recruits remaining candidates (including 10% ex-servicemen).
- Age limit for absorption of BSF Combatised Constable (Tradesmen) relaxed from 30 to 35 years.
- Recruitment rules of other CAPFs (CRPF, CISF, ITBP, SSB, Assam Rifles) to be amended gradually.

About Agnipath Scheme:

What it is?

- A short-term military recruitment scheme under which selected youth are enrolled as Agniveers for a four-year service period in the Armed Forces.

Launched in: June 2022

Key features:

- Tenure: 4 years (including training).
- No pension or gratuity for Agniveers after exit.
- Seva Nidhi package: ~ 10.04 lakh (tax-free) on exit after 4 years.
- Pay: Starts at 30,000/month (Year 1) and rises to 40,000/month (Year 4).

- Regular cadre intake: Up to 25% of each batch may be absorbed into the permanent cadre based on performance.
- Insurance: ₹48 lakh non-contributory life cover during service.
- Skill & education benefits: Skill certificate and Class-12 equivalent certification (for those enrolled after Class 10).

Artificial Intelligence in Education

Context: The Vice President of India, at the National Conclave on AI Evolution (AI Mahakumbh), stressed that Artificial Intelligence must be integrated into school and higher-education curricula to build future-ready skills.

About Artificial Intelligence in Education:

What it is?

- Artificial Intelligence in education refers to the use of machine learning, data analytics, and intelligent systems to support teaching, learning, assessment, research, and educational governance while retaining human oversight.

Trends and data:

- Rapid adoption: Over 80% of higher-education students in premier institutions reportedly use AI tools for learning and research support.
- Policy push: India's AI for Science and NEP-2020 encourage digital and AI-enabled pedagogy.
- Global momentum: UNESCO and OECD identify AI as a key accelerator for achieving SDG-4 (Quality Education).

Why AI is critical for India's education system?

1. Demographic scale challenge: India's education system caters to over 250 million learners, making uniform pedagogy ineffective across socio-economic, linguistic, and cognitive diversity.

   E.g. DIKSHA uses AI-driven recommendation engines to deliver customised learning paths across multiple State Boards.

1. Teacher shortage: Skewed teacher availability, especially in aspirational districts, weakens classroom outcomes and increases dropout risks.

   E.g. Uttar Pradesh's SwiftChat AI supports para-teachers in rural schools with lesson plans and doubt resolution.

1. Skill mismatch: The economy demands analytical, digital, and problem-solving skills, while curricula still over-emphasise rote memorisation.

   E.g. Atal Tinkering Labs integrate AI modules to develop computational thinking among secondary school students.

1. Equity and access: Linguistic, regional, and gender divides restrict access to quality learning resources.

   E.g. IIT Madras's AI4Bharat translates advanced STEM content into Indian languages like Tamil and Marathi.

Key transformations enabled by AI in education:

1. Personalised learning: AI dynamically adjusts content difficulty based on learner performance and pace.

   E.g. Embibe analyses test responses to generate targeted remedial practice for JEE/NEET aspirants.

1. Teacher empowerment: Automation of grading and planning reduces clerical burden, enabling deeper student engagement.

   E.g. CBSE's AI-enabled portals auto-evaluate objective internal assessments at scale.

1. Research acceleration: AI compresses research timelines through rapid literature review and data synthesis.

   E.g. Bhashini enables multilingual academic collaboration, overcoming language barriers in research.

1. Smart governance: Data-driven dashboards improve decision-making across admissions, attendance, and

retention.

E.g. Gujarat's Vidya Samiksha Kendra uses predictive analytics to identify potential school dropouts early.

1. Employability focus: AI aligns curricula with emerging labour-market needs in real time.

    E.g. AICTE's NEAT platform maps student skills to internships in EV and semiconductor sectors.

Core principles emphasised by UNESCO

1. Human-centred AI: AI should assist teachers, not replace pedagogic judgement or moral authority.
2. Equity and inclusion: AI must actively bridge learning gaps for marginalised and differently-abled groups.
3. Ethical use: Transparency and safeguards are essential to prevent misinformation and algorithmic errors.
4. Data privacy: Learner data must be protected through consent-based, secure frameworks.
5. Cultural sensitivity: AI systems should reflect indigenous knowledge and local contexts.

Challenges associated with AI in education:

*   Digital divide: Poor connectivity and device access persist in remote and Tier-3 regions.

    E.g. Himalayan villages remain unable to use bandwidth-intensive AI learning platforms.

*   Over-dependence risk: Excessive reliance on AI outputs can weaken originality and reasoning.

    E.g. Students using ChatGPT for humanities essays without independent analysis.

*   Bias and inaccuracies: Western-trained models often misinterpret Indian accents and contexts.

    E.g. Speech-recognition tools failing with regional linguistic variations.

*   Teacher readiness: Limited digital literacy creates resistance to AI adoption.

    E.g. Pushback against AI-based attendance and assessment in state-run schools.

*   Privacy concerns: Large-scale data collection of minors raises surveillance and misuse risks.

    E.g. Concerns over commercial exploitation of student data by private EdTech firms.

Way ahead:

*   Early curriculum integration: AI literacy must be introduced from foundational schooling.

    E.g. CBSE has introduced AI as a skill subject from Grade 6.

*   Teacher upskilling: Nationwide capacity-building in ethical and pedagogic AI use is essential.

    E.g. NISHTHA modules are being updated to include AI-assisted teaching methods.

*   Blended learning model: Combine AI efficiency with human mentoring and ethical guidance.

    E.g. Phygital classrooms where AI delivers content and teachers guide reflection.

*   Robust regulation: Clear legal oversight is needed for algorithmic transparency and accountability.

    E.g. Proposal for a National AI Regulatory Body for EdTech governance.

*   Indigenous AI development: India must build sovereign, context-aware AI systems.

    E.g. Bhashini-led LLMs trained across all 22 Scheduled Indian languages.

Conclusion:

Artificial Intelligence can transform India's education system from rote-based to learner-centric. When guided by ethics, inclusion, and human oversight, AI becomes a force multiplier for equity and innovation. Responsible adoption of AI is vital for building a future-ready, knowledge-driven Viksit Bharat.

Child Marriages in India

Context: Despite 18 years of the Prohibition of Child Marriage Act, 2006, Andhra Pradesh continues to report a high incidence of child marriage, highlighting gaps between law and social reality.

About Child Marriages in India:

What it is?

- Child marriage refers to the formal or informal union where one or both parties are below 18 years of age, violating children's rights to education, health, protection and choice.
- It disproportionately affects girls, exposing them to early pregnancy, domestic violence, school dropout and long-term economic dependence.

Historical evolution:

- Colonial era: Social reform movements (Raja Ram Mohan Roy, Ishwar Chandra Vidyasagar) highlighted early marriage as a social evil.
- Legislative steps:

  Child Marriage Restraint Act, 1929 (Sarda Act) – minimum age fixed but weak enforcement.

  Prohibition of Child Marriage Act, 2006 – declared child marriage voidable, introduced penalties and Child Marriage Prohibition Officers.
- Recent push: National campaigns like Bal Vivah-Mukt Bharat aim to eliminate child marriage by 2030 in line with SDG-5.

Trends of child marriage in India:

- About 16% of girls aged 15–19 are currently married, though prevalence declined from 47% (2005–06) to ~27% (2015–16).
- India still accounts for ~1.5 million child marriages annually, the highest globally in absolute numbers.
- Higher prevalence persists in economically vulnerable regions such as Bihar, Andhra Pradesh, Rajasthan and parts of Madhya Pradesh.

Reasons for child marriage:

1. Poverty and economic distress: Poor households perceive early marriage as a way to reduce care costs and secure social protection for daughters.

   E.g. NFHS analysis shows child marriage is far higher among the poorest wealth quintile than the richest.
1. Lack of awareness: Limited understanding of the Prohibition of Child Marriage Act and adolescent health risks weakens legal deterrence.

   E.g. Surveys under Bal Vivah Mukt Bharat found low awareness of penalties and the legal marriage age.
1. Entrenched gender norms: Patriarchal beliefs treat girls as paraya dhan, prioritising marriage over education and autonomy.

   E.g. Social studies show norms change slowly even when female education improves.
1. School dropouts: Distance to schools, safety concerns and costs push girls out of secondary education, increasing vulnerability.

   E.g. UNICEF data shows completing secondary education sharply lowers the risk of early marriage.
1. Social pressure and stigma: Fear of elopement and loss of "family honour" drives families to arrange early marriages.

   E.g. Authorities report spikes in secret mass marriages on culturally auspicious days.

Challenges associated:

1. Weak enforcement: Low conviction rates dilute the deterrent effect of the law despite frequent prevention efforts.

   E.g. Judicial observations highlight severe pendency and slow disposal of child marriage cases.
1. Family complicity: Entire families often support early marriage, limiting scope for timely intervention.

   E.g. Courts have noted use of informal betrothals to bypass legal scrutiny.
1. Institutional gaps: Inadequate shelters, counselling services and trained officers weaken rescue and rehabilitation.

E.g. Many Child Marriage Prohibition Officers hold additional charge without specialised capacity.

1. Gendered health impacts: Adolescent motherhood raises risks of anaemia, maternal mortality and low birth-weight infants.

E.g. Nutrition audits link early marriage districts with poor maternal-child health outcomes.

Way ahead:

1. Education-first strategy: Retaining girls in secondary education delays marriage and expands life choices.

E.g. Conditional cash transfers tied to schooling have significantly postponed marriage age.

1. Economic support to families: Cash-plus and skill-based interventions reduce poverty-driven marriage decisions.

E.g. Upgraded Anganwadi centres now provide vocational and life-skills training for adolescents.

1. Community engagement: Shifting norms requires panchayats, faith leaders and youth ownership of prevention.

E.g. Village-level "Child Marriage-Free" declarations have created positive social pressure.

1. Stronger enforcement: Dedicated units, digital reporting and swift FIRs improve accountability.

E.g. Centralised online portals now enable real-time alerts and faster administrative response.

1. Integrated adolescent empowerment: Linking protection with health, nutrition and legal awareness ensures sustained impact.

E.g. Nari Adalats combine community mediation with legal backing to prevent early unions.

Conclusion:

Child marriage is not merely a legal violation but a symptom of poverty, gender inequality and social neglect. While laws and campaigns exist, their success depends on education, economic security and community-level change. Ending child marriage is essential for safeguarding children's rights and breaking intergenerational cycles of deprivation.

Virtual Water Export Crisis

Context: India has emerged as the world's largest rice producer and exporter, accounting for nearly 40% of global rice trade, but this export dominance is intensifying groundwater depletion in water-stressed States like Punjab and Haryana.

● The debate has resurfaced around India's growing "virtual water export crisis", where scarce groundwater is effectively exported through water-intensive crops.

About Virtual Water Export Crisis:

What it is?

● The virtual water export crisis refers to the export of water embedded in agricultural commodities, especially water-intensive crops like rice, from a water-stressed country.

- In India's case, large rice exports mean exporting billions of cubic metres of groundwater, even as domestic aquifers face depletion.

Key trends:

- India exports over 20 million metric tonnes of rice annually, embedding massive quantities of irrigation water.
- Rice production alone accounts for 34–43% of global irrigation water use.
- Around 24,000+ million cubic metres of virtual water is exported annually through rice trade.
- Northern rice belts increasingly rely on groundwater rather than surface irrigation.

Reasons behind the virtual water export crisis:

- Water-intensive rice cultivation model: Rice requires 3,000–4,000 litres of water per kg, far exceeding global averages, making it unsustainable in semi-arid regions.
- Distortionary subsidies: High MSPs for rice and free or cheap electricity incentivise excessive groundwater extraction and discourage crop diversification.
- Policy legacy of food security: Green Revolution-era policies prioritised rice and wheat to ensure food security, but were not recalibrated for water scarcity realities.
- Weak groundwater regulation: Groundwater remains poorly regulated, allowing unrestricted borewell drilling and over-extraction by farmers.
- Global market dependence: India's dominance in global rice trade makes policy shifts politically and economically sensitive due to price and export implications.

Impacts on India:

- Rapid groundwater depletion: In Punjab and Haryana, CGWB data shows most blocks classified as over-exploited, with borewell depths increasing from 30 feet to 80–200 feet, sharply raising irrigation costs.
- Rising farm distress: Small farmers in rice belts report mounting debt to finance deeper pumps and electricity, reflected in rising input costs despite MSP hikes, as highlighted in recent Reuters field surveys (2025).
- Climate vulnerability: Even with good monsoons in 2023–25, excessive extraction prevented aquifer recharge, exposing northern agriculture to severe risk during any future weak monsoon year.
- Ecological imbalance: Falling water tables have degraded wetlands and soil moisture regimes in Punjab–Haryana, reducing biodiversity and long-term land productivity, per PAU studies.
- Inter-generational inequity: India exports over 24,000 million cubic metres of virtual water annually through rice, effectively transferring future water security costs to coming generations.

Challenges associated:

- Political resistance to reform: The rollback of the 2020–21 farm laws after nationwide protests shows the political sensitivity of reducing MSP dependence and procurement guarantees.
- Farmer income insecurity: One-season diversification incentives, such as Haryana's 17,500/ha millet scheme (2024), failed to scale due to lack of income certainty.
- Uneven State capacity: As water is a State subject, groundwater regulation remains weak and fragmented, with enforcement varying widely across Punjab, Haryana and eastern States.
- Short-term policy design: Crop-switch schemes limited to a single season have not offset long-term risk, discouraging farmers from abandoning assured rice procurement.
- Data and enforcement gaps: Despite NAQUIM mapping, absence of real-time extraction monitoring allows unchecked borewell drilling in over-exploited blocks.

Initiatives taken to handle the water crisis:

1. Jal Shakti Abhiyan (JSA): Mission-mode water conservation and recharge campaign since 2019, with focus on over-exploited districts.

2. Atal Bhujal Yojana: Community-led groundwater management in water-stressed districts.

3. Mission Amrit Sarovar: Rejuvenation of local water bodies to enhance groundwater recharge.

4. Per Drop More Crop: Promotion of micro-irrigation to improve farm water-use efficiency.

5. NAQUIM 2.0: Scientific aquifer mapping for informed groundwater management decisions.

Way ahead:

- Reorient MSP and procurement policy: Expanding assured procurement for millets under International Year of Millets momentum can replicate rice-like income security with lower water use.

- Price groundwater realistically: Rationalising free power for agriculture and promoting solar pumps with usage caps can curb wasteful extraction, as piloted in parts of Gujarat.

- Long-term diversification support: Experts recommend 5–7 year income assurance, as short-term schemes have failed to induce durable crop shifts in Punjab–Haryana.

- Promote climate-smart agriculture: Techniques like Direct Seeded Rice (DSR) promoted by Punjab Agriculture Department reduce water use by 15–20% per hectare.

- Integrate trade and water policy: India's export strategy must internalise water footprint costs, shifting exports toward less water-intensive, higher-value crops to reduce virtual water loss.

Conclusion:

India's rice export success masks a silent crisis of groundwater depletion through virtual water exports. Continuing to subsidise water-intensive crops in stressed regions threatens long-term food and water security. Sustainable agriculture now demands aligning farm policy, water governance and trade strategy with ecological limits.

10 / DEFENCE
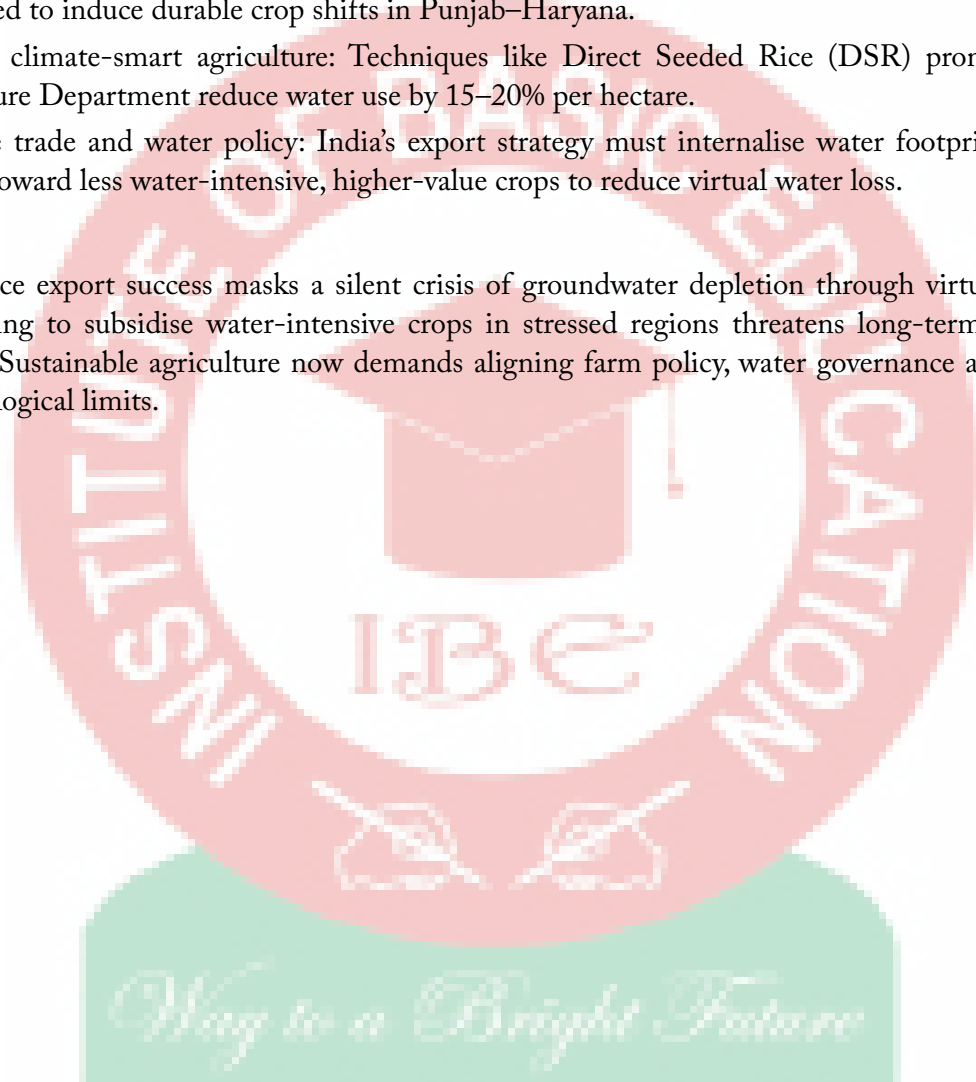
INS Aridaman

Context: India is set to commission INS Aridaman, its third indigenous nuclear-powered ballistic missile submarine (SSBN), with Navy Chief Admiral Dinesh K.

About INS Aridaman:

What it is?

- INS Aridaman is India's third indigenously built SSBN, part of the Arihant-class nuclear submarines under the Strategic Forces Command, designed to provide assured retaliatory capability under India's no-first-use nuclear doctrine.

Built By: Constructed under the Advanced Technology Vessel (ATV) Project, led by:

- Ship Building Centre, Visakhapatnam
- It integrates over 90% indigenous components, including its nuclear reactor.

History of India's Nuclear Submarine Programme:

- Initiated under the ATV programme in the late 1980s to achieve a credible underwater nuclear deterrent.
- INS Arihant (launched 2009, commissioned 2016) made India the 6th nation with operational SSBN capability.
- INS Arighat followed in 2024.
- INS Aridaman will be the third operational SSBN, marking the first time India will have a minimum rotation fleet for continuous at-sea deterrence.

Key Features of INS Aridaman:

- Displacement: ~6,000 tonnes (surface), ~7,000 tonnes (submerged)
- Reactor: 83 MW pressurised water reactor (BARC) enabling near-unlimited endurance
- Armament:
  Four vertical launch tubes
  Up to 24 K-15 Sagarika SLBMs (750 km range) or
  K-4 missiles with 3,500 km range
- Stealth Enhancements: Anechoic tiles, advanced sonar suite (bow, flank, towed array)

Significance:

- Strengthens Nuclear Triad: Provides survivable, assured second-strike capability essential under India's no-first-use posture.
- Enhances Maritime Security: Expands Navy's deterrence reach across the Indo-Pacific amid rising regional tensions.
- Boost to Aatmanirbhar Bharat: High indigenous content reflects mastery over complex nuclear naval propulsion.

INS Taragiri

Context: The Indian Navy has received 'Taragiri', the fourth Nilgiri-class advanced stealth frigate under Project 17A, delivered by Mazagon Dock Shipbuilders Ltd.

About INS Taragiri:

What it is?

- INS Taragiri is a Project 17A Nilgiri-class advanced stealth frigate, designed as a multi-mission combat platform with enhanced stealth, firepower, automation and survivability.

Built By: Mazagon Dock Shipbuilders Ltd (MDL), Mumbai

Full List Ships Under Project 17A:

- INS Nilgiri
- INS Himgiri
- INS Udaygiri
- INS Taragiri
- INS Dunagiri (Upcoming)

Key Features:

- Advanced Stealth Design: Reduced radar, acoustic and infrared signatures.
- Propulsion: Combined Diesel or Gas (CODOG) system with diesel engines + gas turbines; CPP on each shaft.
- Sensors & Weapons:

  BrahMos supersonic cruise missiles

  MF-STAR multifunction radar

  MRSAM air defence missile complex

  76 mm SRGM, 30 mm and 12.7 mm CIWS

  Torpedoes and rockets for anti-submarine warfare
- Integrated Platform Management System (IPMS) for automation and machinery control
- Indigenisation Level: ~75% with contributions from over 200 MSMEs

Significance:

- Strengthens India's naval deterrence with a modern, multi-mission stealth combat platform.
- Demonstrates India's capability to design, construct and deliver sophisticated warships under compressed timelines.
- Supports Aatmanirbhar Bharat through indigenous technologies and large MSME participation.

Cybercrime Cases in India

Context: Cybercrime cases in India have surged sharply, rising from 52,000 in 2021 to over 86,000 in 2023, marking an increase of more than 33,000 cases, according to NCRB's Crime in India 2023 report.

About Cybercrime Cases in India:

- What it is?

Cybercrime refers to offences committed using digital devices and networks, including fraud, identity theft, phishing, ransomware attacks, online harassment, and financial scams targeting citizens.

- Trends:

Cybercrime cases rose dramatically from 52,000 (2021) to 86,000 (2023), indicating a nationwide escalation.

Haryana recorded 751 cases, Himachal Pradesh 127 cases (up from 77), while Punjab saw a decline.

Delhi leads among UTs with 407 cases, followed by J&K with 185 cases.

The Centre has supported 20 states/UTs under the Nirbhaya Fund to improve cyber forensic capacity.

- Implications:

Highlights rising digital vulnerability as internet penetration and online financial transactions expand.

Strains law enforcement capacity due to increasing sophistication of cybercriminals.

Threatens citizen safety, financial systems, national security, and public trust in digital services.

Regional Level Pollution Response Exercise (RPREX-2025)

Context: The Indian Coast Guard (ICG) conducted RPREX-2025, a Regional Level Pollution Response Exercise off the Mumbai coast, to test preparedness against major oil spill incidents.

About Regional Level Pollution Response Exercise (RPREX-2025):

What it is?

- RPREX-2025 is a large-scale maritime pollution response exercise conducted to simulate and manage oil spill emergencies at sea, in accordance with India's National Oil Spill Disaster Contingency Plan (NOSDCP).

Host: Conducted off the Mumbai coast.

Organisations involved: Indian Coast Guard and ONGC.

Aim:

- To ensure a swift, coordinated, and effective response to oil spills at sea.
- To test inter-agency coordination, equipment readiness, and communication.
- To validate the National Oil Spill Disaster Contingency Plan (NOSDCP).

Key features:

- Realistic spill simulation: Scenario involved a tanker–fishing boat collision, causing crude oil spillage in the Arabian Sea.
- Two-phase approach:

  Phase I: Planning conference, technical lectures, tabletop exercise

  Phase II: Full-scale live sea exercise testing ships, skimmers, and containment gear
- Specialised assets deployed: Use of Pollution Control Vessels (PCVs) with skimming and containment equipment.
- Multi-agency participation: Integration of port authorities, oil companies, coastal police, and state agencies.
- Sea-to-shore coordination: Mangrove protection, coastal livelihood security, and port contingency plans tested.

Significance:

- Environmental protection: Prevents oil spills from reaching sensitive coastlines and mangroves.
- Maritime safety: Enhances India's capacity to respond to large-scale marine pollution disasters.
- Economic resilience: Protects fisheries, ports, and coastal livelihoods.

11 / KURUKSHETRA JANUARY 2026

1- Khadi: Innovation, Sustainability and India's Textile Renaissance

Khadi—India's iconic hand-spun and handwoven fabric—symbolizes the convergence of heritage, sustainability, and rural livelihoods.

- From its ancient civilizational origins and central role in the freedom struggle to its contemporary revival as a premium, eco-conscious textile, Khadi reflects India's evolving development narrative.

- In the context of climate change, ethical consumption, and inclusive growth, Khadi has re-emerged as a pillar of sustainable development.

Khadi: Concept and Significance

Khadi (khaddar) is a hand-spun and handwoven fabric made from natural fibres such as cotton, silk, wool, or blends. Originating in eastern and north-eastern regions of the Indian subcontinent, including present-day Bangladesh, Khadi is characterised by:

- Breathability and comfort

- Thermal versatility (cool in summer, warm in winter)

- Extremely low carbon footprint

- Decentralised, village-based production

Beyond being a textile, Khadi generates rural employment, empowers women artisans, and offers a sustainable alternative to resource-intensive fast fashion.

Historical Evolution of Khadi

- Ancient and Medieval Roots- Archaeological findings from Mohenjo-Daro suggest the presence of handwoven textiles resembling Khadi.

- During the Mauryan period, Khadi-like cotton fabrics held economic importance, with Chanakya's Arthashastra referencing organised textile production.

- Depictions in the Ajanta Caves further establish India's long tradition of hand-spun and handwoven garments.

- Khadi and the Freedom Movement- Khadi gained modern political significance in 1918, when Mahatma Gandhi launched the Khadi Movement to address rural poverty and resist colonial economic exploitation.

- The charkha became a symbol of Swadeshi, self-reliance, and national resistance, with Khadi embodying Gandhian values of simplicity, discipline, and dignity of labour.

Role of Khadi & Village Industries in Indian Economy and its Growth:

The Khadi & Village Industries Commission (KVIC), established under the Khadi and Village Industries Commission Act, 1956 (61 of 1956), is a statutory organization engaged in promoting and developing Khadi and Village Industries for providing employment opportunities in rural areas, thereby strengthening the rural economy.

The main objectives of KVIC are:

- The social objective of providing employment in rural areas in general and urban areas through District Industries Center (DIC) particularly.
- The economic objective of producing saleable articles.
- The wider objective of creating self-reliance amongst the people and building up a strong rural community spirit.

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Post-Independence Institutional Support

- Post-Independence, the sector was institutionalised through the Khadi and Village Industries Commission (KVIC), 1957. KVIC's mandate includes:
- Supplying raw materials
- Improving production techniques
- Ensuring quality control
- Marketing and sales promotion
- Generating sustainable rural employment

    Despite this, Khadi gradually lost mainstream appeal and became associated with political attire and outdated fashion, remaining largely outside contemporary fashion until the late 1980s.

Designer-Led Revival

- The late 1980s–1990s marked a revival phase. Designers such as Devika Bhojwani (1989) and Ritu Kumar (1990) introduced:
- Innovative textures and dyeing techniques
- Contemporary patterns and silhouettes
- Fashion-forward interpretations

    Though initial impact was limited, these efforts repositioned Khadi as a premium, artisanal, and sustainable fabric, aligning it with rising demand for authenticity and eco-conscious fashion.

Material and Technological Innovations

Recent resurgence is driven by material and process innovation:

- Blending with linen, bamboo, hemp, Tencel, and silk to improve durability, drape, and functionality
- Use of low-impact dyes and eco-friendly finishing techniques

Key technological interventions include:

- Improved charkhas and ergonomic looms
- Solar-powered dyeing units
- Pre-processing and quality enhancement tools

    These measures reduce drudgery, enhance productivity, and preserve the handmade character while enabling scalability.

Khadi in the Context of Global Fashion and Sustainability

    The global fashion industry is valued at approximately USD 1.3 trillion, employs over 300 million people, and is one of the world's most polluting industries. By 2030, the sector's:

- Water consumption is expected to rise by 50%
- Carbon emissions by 63%
- Waste generation to 148 million tonnes

    India's apparel market, projected at USD 59.3 billion (2022), is the sixth-largest globally, driven by rapid urbanization, rising incomes, digital retail, and demand for affordable aspirational fashion.

In this context, Khadi offers a compelling alternative:

- Minimal electricity usage
- Extremely low carbon footprint
- Natural fibres and dyes
- Artisan-centric supply chain

Growth of the Khadi Market: Key Data

    Khadi and Village Industries achieved a historic milestone in 2024–25 with a turnover of Rs. 1.70 lakh crore.

- Production increased from Rs. 26,109.07 crore (2013–14) to Rs. 1,16,599.75 crore (2024–25) – 347% growth
- Sales rose from Rs. 31,154.19 crore to Rs. 1,70,551.37 crore – 447% growth
- Employment increased by 49.23%, supporting 1.94 crore people
- Khadi garment production rose 366% to Rs. 3,783.36 crore
- Khadi garment sales increased six-fold to Rs. 7,145.61 crore
- Khadi Gramodyog Bhavan, New Delhi achieved Rs. 110.01 crore turnover
- PMEGP facilitated over 10 lakh units, generating employment for 90 lakh individuals

Women Empowerment

- 57.45% of 7.43 lakh trainees were women
- Women constitute 80% of Khadi artisans
- Artisan wages increased by 275% in 11 years

Challenges Facing & the Way Forward for Khadi Sector

Challenges	Way Forward
Competition from cheap, machine-made fabrics	Innovation without loss of authenticity
High production costs and limited scalability	Design modernization with cultural integrity
Inadequate branding, marketing, and infrastructure	Market expansion with artisan welfare at the core
Seasonal demand patterns	Alignment with initiatives such as Make in India, Skill India, and Vocal for Local strengthens Khadi's relevance in India's development discourse.
Rapidly changing fashion preferences	-
Global competition and supply chain limitations	-

Conclusion- Once a symbol of resistance and rural empowerment, Khadi has re-emerged as a pillar of sustainable development, inclusive growth, and cultural identity. Backed by policy support, design innovation, and environmental awareness, it bridges tradition and modernity. With continued reforms and market integration, Khadi can both preserve India's textile heritage and lead the future of ethical and sustainable fashion.

2- Khadi: Strengthening the Rural Economy and India's Journey towards Self-Reliance

Khadi exemplifies India's model of grassroots-led, inclusive development. From a symbol of resistance during the freedom struggle, it has evolved into a modern economic driver under Aatmanirbhar Bharat, integrating self-reliance, sustainability, and cultural identity.

The Khadi and Village Industries Commission Act, 1956 defines Khadi as cloth hand-spun and handwoven from cotton, silk, or wool in India.

- Echoing Mahatma Gandhi's vision, Khadi represents Swaraj, dignity of labour, and freedom from economic dependence. During the freedom movement, household-level Khadi production unified communities and fostered self-reliance.

From Freedom Struggle to Institutional Support

Post-Independence, the Khadi and Village Industries Commission (KVIC) under the Ministry of MSME institutionalised Khadi's promotion through:

- Skill development and technology transfer

- Raw material and credit support
- R&D and marketing
- Rural and semi-urban employment generation

Khadi sustains a broad value chain beyond spinners and weavers, including suppliers, entrepreneurs, marketers, and logistics providers.

Growth and Economic Impact

Between 2013–14 and 2024–25:

- Production rose from Rs. 811 crore to over Rs. 3,700 crore (≈4.5×)
- Sales increased from Rs. 1,081 crore to over Rs. 7,000 crore (≈6.5×)
- Employment: ~5 lakh artisans, 80% women

As per MSME Annual Report 2024–25, Khadi sales (including polyvastra and solarvastra) reached Rs. 5,352 crore (till Dec 2024), generating 4.99 lakh jobs.

In the North-Eastern Region, FY 2024–25 (till Dec) sales touched Rs. 1,247.93 lakh, with production of Rs. 1,313.89 lakh.

Modernization, Global Reach and Artisan Support

KVIC is modernizing Khadi through 24 retail centers, including India's first Khadi Mall at Connaught Place (20,000 sq. ft.), which uses AI-based virtual try-ons and records an annual turnover of over Rs. 100 crore.

- Khadi's global presence has expanded via the 2017 KVIC–Arvind Mills agreement. Patagonia placed orders worth Rs. 1.88 crore, while Khadi trademarks are registered in 15 countries and logos in 31 countries. Exports stood at Rs. 37.88 crore in 2023–24, with markets such as China, Russia and Tanzania, and overseas retail is being explored, including Thailand.
- To strengthen the artisan base, spinning wages increased from Rs. 10 to Rs. 12.50 per hank, weaving wages rose by 7%, and Market Development Assistance offers 35% incentive (cotton, wool, polyvastra) and 30% (silk). Workshed Scheme, ISEC (4% interest) and Rs. 15 lakh support per weak sales centre further improve livelihoods.
- Digital and skill initiatives include eKhadiIndia.com (2021), KIMIS, and the Centre of Excellence for Khadi (CoEK) at NIFT and regional centres, with CoEK 2.0 focusing on design innovation and product diversification.

Protect, Promote and Propel: Three P's of Khadi

The Ministry of MSME supports Khadi through a comprehensive "3P approach" – Protect, Promote and Propel, aimed at modernising production, strengthening infrastructure, diversifying products, and expanding market access to sustain Khadi's relevance in an Aatmanirbhar Bharat. Key schemes supporting Khadi include:

- Khadi Gramodyog Vikas Yojana (KGVY): Umbrella scheme comprising Khadi Vikas Yojana (KVY) and Gramodyog Vikas Yojana (GVY); provides budgetary support for Khadi and village industries.
- Modified Market Development Assistance (MMDA): Deregulates Khadi pricing, enabling market-based competitiveness.
- Interest Subsidy Eligibility Certificate (ISEC): Concessional loans for working capital and capital expenditure.
- Workshed Scheme: Financial support for individual and group work sheds to improve productivity and working conditions.
- Khadi Reform and Development Programme (KRDP): Renovation and modernization of Khadi sales

outlets to increase incomes and employment for spinners and weavers.

- Prime Minister's Employment Generation Programme (PMEGP): Promotes self-employment through micro-enterprises for individuals aged 18+, strengthening the rural MSME ecosystem.
- Entrepreneurship and Skill Development Programmes (ESDPs): Capacity-building for youth and artisans; promotion through exhibitions, trade fairs, fashion shows, dedicated outlets, and digital platforms.
- Digital Outreach: eKhadiIndia.com enhances market access by integrating Khadi producers with e-commerce and wider stakeholders.

Conclusion

In today's Aatmanirbhar Bharat era, Khadi is far more than a fabric—it is a quiet movement of self-respect, self-reliance, sustainability, and inclusive growth. By combining tradition with technology, local livelihoods with global markets, and heritage with innovation, Khadi strengthens India's rural economy while reinforcing national identity. With sustained policy support, market integration, and citizen participation, Khadi can continue to empower artisans, preserve cultural heritage, and contribute meaningfully to India's long-term development vision.

3- Khadi as a Driver of Sustainable Agriculture

Khadi, rooted in Gandhian ideals of Swadeshi and Gram Swaraj, represents far more than hand-spun fabric. It embodies self-reliance, dignity of labor, sustainable livelihoods, and rural resilience.

- In the contemporary context of Aatmanirbhar Bharat, climate action, and inclusive growth, Khadi has re-emerged as a strategic instrument linking agriculture, cottage industries, sustainability, and rural employment.

Gandhian Philosophy and Rural Self-Reliance

Mahatma Gandhi envisioned Khadi as a means to achieve economic Swaraj, enabling villages to become self-sufficient units of production and consumption.

- Spinning and wearing Khadi symbolized resistance to colonial exploitation while ensuring household-level livelihoods, especially during agricultural off-seasons. This philosophy laid the foundation for Khadi's role in strengthening rural economies and reducing dependence on external markets.

Institutionalization and Farm-to-Fabric Linkages

Post-Independence, the establishment of the Khadi and Village Industries Commission (KVIC) in 1957 transformed Khadi into a structured rural development instrument. Khadi's value chain directly links agriculture with cottage industries, sourcing raw materials such as:

- Cotton from farms
- Silk from sericulture
- Wool from sheep rearing
- Jute from agro-based cultivation

This farm-to-fabric ecosystem generates employment for farmers, spinners, weavers, and allied workers, maximizing local resource utilization and preserving traditional skills.

Khadi–Agriculture Symbiosis and Livelihood Security

Khadi provides income diversification for small and marginal farmers, especially during lean agricultural periods. By offering off-season employment, it enhances livelihood security and reduces vulnerability to climatic shocks and crop failures.

- Women benefit significantly through home-based spinning and weaving, promoting economic independence and social empowerment without requiring large capital or migration.

Economic Contribution and Rural Employment

Khadi and Village Industries have emerged as a major rural economic engine:

- Turnover (FY 2024–25): Rs. 1.70 lakh crore
- Employment: ~1.94 crore people (up from 1.30 crore in 2013–14)
- KVIC turnover (FY 2023–24): Rs. 1.55 lakh crore
- Sales growth: 400% and production growth: 315% since 2013–14
- New jobs created (last decade): 10.17 lakh, reflecting 81% employment growth

  By reducing distress migration and strengthening village economies, Khadi contributes to GDP growth, rural industrialization, and the goal of Doubling Farmers' Income.

  Policy Support and Government Initiatives- Khadi's integration with agriculture and rural livelihoods is reinforced through flagship schemes:

- Honey Mission: Beekeeping for supplementary income and improved pollination
- Kumhar Sashaktikaran Yojana: Electric wheels and training for potters
- SFURTI: Cluster-based development for infrastructure, skills, and marketing
- PMEGP: Micro-enterprise promotion for self-employment
- Alignment with Aatmanirbhar Bharat, Make in India, and Vocal for Local

  These initiatives position Khadi as a bridge between traditional livelihoods and modern rural entrepreneurship.

  Sustainability and Green Economy Role- Khadi supports sustainable agriculture and climate action through:

- Use of organic cotton and natural fibres
- Eco-friendly practices such as natural dyes, minimal water use, and low chemical input
- Hand-spinning and hand-weaving, resulting in negligible carbon emissions
- Minimal electricity dependence, supporting low-carbon and circular economy models

  Khadi aligns with India's Net Zero 2070 commitment and demonstrates how traditional industries can advance green development.

  Integration with the Millet Mission (Shree Anna) further strengthens climate-smart livelihoods, as millets require less water, enhance nutrition, and are suitable for dry regions.

Innovation, Digitalization, and Market Expansion- To remain relevant, Khadi has embraced modernization:

- e-Khadi platforms enable direct artisan-to-consumer sales
- Solar Charkha Mission promotes solar-powered spinning
- Design interventions attract youth and urban markets
- Branding through Khadi India and Vocal for Local
- Events such as Khadi Mahotsav and digital outreach enhance visibility

  Globally, Khadi is gaining recognition as a sustainable and ethical textile, aligning with international demand for eco-conscious fashion.

Conclusion

Khadi continues to embody simplicity, dignity of labor, and economic independence, while evolving into a symbol of sustainable living and inclusive growth. Deeply intertwined with agriculture, it strengthens rural resilience through local production, employment generation, and environmental stewardship.

As India moves towards Amrit Kaal and India@2047, Khadi can emerge as a flagship of green, inclusive, and self-reliant development, positioning India as a global leader in ethical and sustainable production.

4- Khadi: Eco-Friendly Textile and Living Cultural Heritage

Khadi occupies a unique space at the intersection of environmental sustainability, cultural heritage, and rural livelihoods. Long before sustainability became a global concern, Khadi exemplified low-energy production,

decentralized craftsmanship, and ethical consumption. Rooted in the freedom movement and Gandhian philosophy, Khadi today stands reimagined as both a climate-smart textile and a living heritage craft, central to India's inclusive and green development pathway.

Eco-Friendly Production and Climate Relevance

Khadi is among the world's most environmentally responsible textiles due to its production process:

- Low energy and low carbon footprint: Manual spinning and weaving eliminate dependence on heavy machinery and electricity, unlike mill-made textiles.
- Natural and biodegradable fibres: Cotton, silk, and wool decompose naturally, avoiding microplastic pollution caused by synthetic fabrics.
- Chemical-free and water-efficient dyeing: Use of natural dyes (indigo, herbal dyes) minimises water pollution and toxic discharge.
- Zero-waste craftsmanship: Fabric scraps are reused for accessories, quilts, and paper, reflecting circular economy principles.

    In contrast to the fast fashion industry—which contributes nearly 10% of global carbon emissions—Khadi offers a climate-conscious, low-impact alternative, aligning with India's Net Zero 2070 commitment.

Sustainable Rural Livelihoods and Social Impact

Khadi's sustainability extends beyond ecology to social and economic dimensions. Its labor-intensive nature generates high employment per unit of investment, especially for rural women, through home-based spinning and weaving. This:

- Reduces distress migration
- Strengthens village economies
- Preserves traditional skills
- Promotes dignified livelihoods

    By linking farming with cloth-making, Khadi integrates agriculture, cottage industries, and rural entrepreneurship, making it a cornerstone of inclusive growth.

Institutional Support and Heritage Governance

Post-Independence, the Khadi and Village Industries Commission (KVIC) was established to institutionalise Khadi as a rural development and heritage instrument. Government support recognises Khadi's dual role—economic and cultural—through schemes such as:

- Khadi Gramodyog Vikas Yojana (KGVY): Support to Khadi institutions, artisan training, and production infrastructure
- SFURTI: Cluster-based regeneration of traditional industries, including Khadi

- Khadi Mark certification: Ensures authenticity and protects heritage value
- State Khadi Boards: Local-level promotion, awareness, and employment generation
- Centre of Excellence for Khadi (CoEK): Design innovation linking heritage craft with contemporary markets

Museums like the National Charkha Museum and branding campaigns further strengthen Khadi's cultural narrative.

Modernization, Innovation, and Global Appeal

To remain relevant, Khadi is integrating tradition with innovation:

- Solar-powered charkhas reduce drudgery and emissions
- Digital platforms (eKhadiIndia) expand market access
- Designer interventions blend rustic aesthetics with modern silhouettes
- Eco-conscious global fashion increasingly values Khadi's traceability and ethical origins

Khadi today features in luxury fashion, home décor, and lifestyle products, appealing to global consumers seeking sustainable and slow fashion.

Challenges & Way Forward in Sustainability and Heritage Preservation

Challenges in Sustainability and Heritage Preservation	Way Forward
Ensuring authenticity and quality control amid machine-made imitations	Strengthen heritage-focused clusters under SFURTI
Competition from cheaper, mass-produced textiles	Enhance Khadi Mark traceability and certification
Skill transmission gaps as youth move away from manual crafts	Expand skill development and youth engagement through apprenticeships
Balancing small-scale heritage production with economic viability	Integrate Khadi craft villages into heritage tourism circuits
Need for stronger branding, tourism linkage, and infrastructure	Promote global outreach via e-commerce, exports, and fashion collaborations
	Highlight Khadi's eco-friendly narrative in climate and sustainability discourse

Conclusion

Khadi represents a rare convergence of ecology, economy, culture, and ethics. It is not merely a fabric but a living heritage, a sustainable livelihood system, and a philosophy of harmony between nature, craft, and community.

As India advances towards Amrit Kaal and India@2047, Khadi can serve as a flagship of green development, cultural preservation, and self-reliant rural transformation, demonstrating that the solutions to modern challenges often lie in time-tested indigenous wisdom.

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