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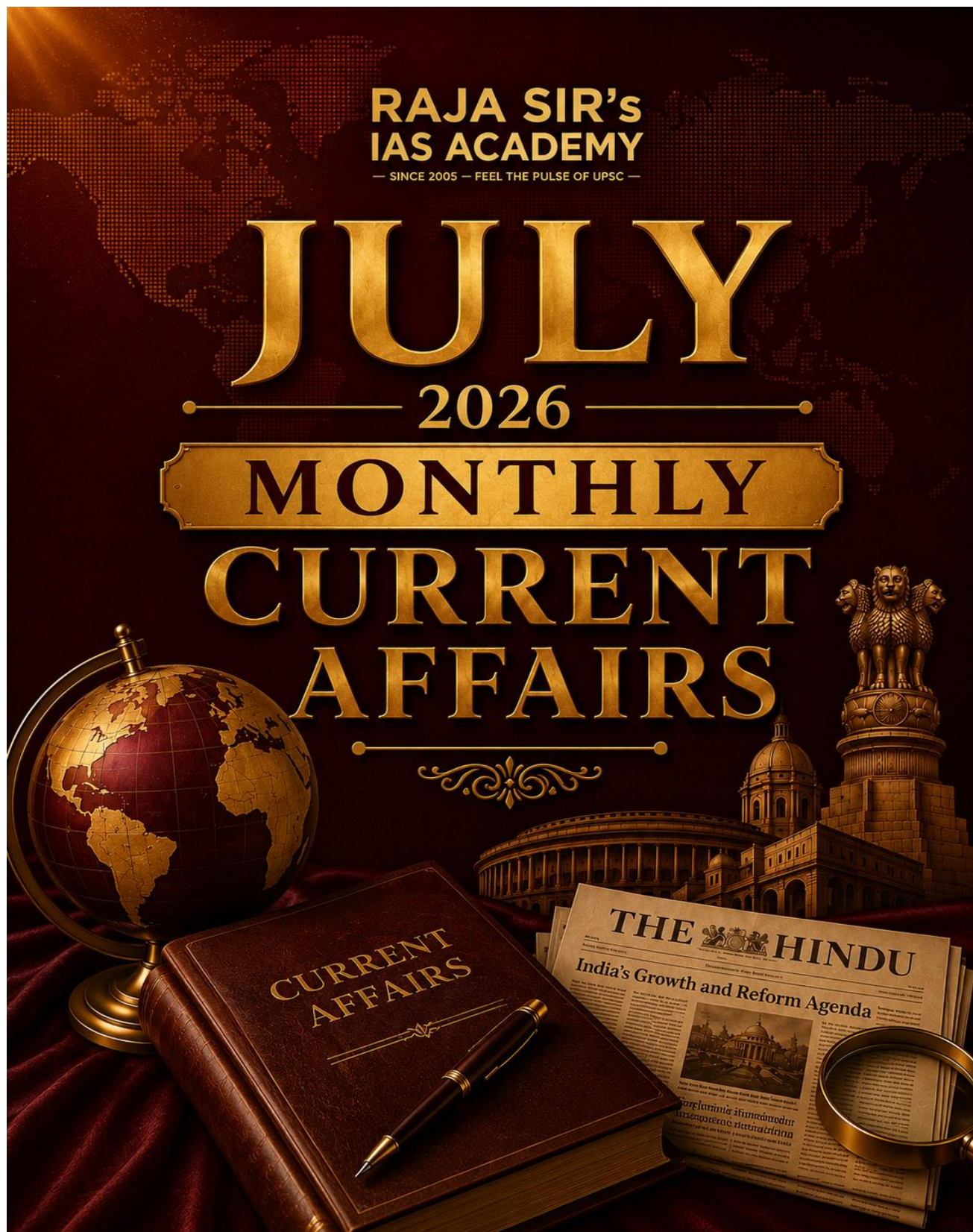
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General Studies, Political Science and International Relations, Sociology, CSAT

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INDEX

[Centralised IT-Enabled System: A New Era for Provident Fund Services](#)

[Empowering 50 Lakh Overseas Citizens: The e-OCI Card](#)

[From Armoured Corps to COAS: The Journey of General Dhiraj Seth](#)

[From Fraud to Relief: RBI's New Customer Protection Framework](#)

[From Paper to Cloud: India's Unified Justice System](#)

[From Self-Help to Market Strength: The SARAS Shakti Story](#)

[Land of Democracy and the Aegean](#)

[Public Penury vs. Private Wealth: The State Finance Paradox](#)

[Tourism as a Growth Engine: Removing Barriers, Building Opportunities](#)

[Akashvani-The Sound of India](#)

[Financial Autonomy for Innovation](#)

[Four Pillars of India's Energy Security](#)

[Gait Analysis in Crime and Medicine](#)

[Indian Army's Tech-Driven Future](#)

[MECON Limited: From Category-II to Category-I](#)

[Schizothorax pelzami: Endangered Jewel of Himalayan Streams](#)

[Siang River at the Crossroads](#)

[16th Indo-Japanese Strategic Summit](#)

[Borjuli Wetland: A Biodiversity Hotspot](#)

[Green Fuels for a Low-Carbon Future](#)

[I-2SEA: Strengthening India's Digital Infrastructure](#)

[Lonar Lake: India's Meteorite Crater](#)

[Mount Erebus in Antarctica](#)

[Promoting Ayurveda on the Global Stage](#)

[Surety Bonds in Infrastructure Projects](#)

[The Challenge of AI Hallucinations](#)

[The Nord Stream Energy Corridor](#)

[Towards Safer and Sustainable Roads in India](#)

[ZSI and Wildlife Research in India](#)

[250years of US Independence: Implications for India-US Relations](#)

[Battery Management System: Functions and Significance](#)

General Studies, Political Science and International Relations, Sociology, CSAT



[Boosting India's Container Manufacturing](#)

[Boosting SC-ST Entrepreneurship in India](#)

[Collaborative Governance in India](#)

[Defence Acquisition Council Explained](#)

[Global Commission on AI for Good](#)

[Indian Dory: A Marine Species in Focus](#)

[India's First Bullet Train Nears the Finish Line](#)

[India's New Push for Maritime Growth](#)

[How Does the World Bank Classify Countries?](#)

[Indus Waters Treaty Remains on Hold](#)

[What's Happening in Mali?](#)

[World Bank Eases Climate Finance Targets](#)

[PLFS & ASUSE 2025: Mapping India's Labour Market](#)

[Immunity Boosters: What Does the Science Really Say?](#)

[Inshore Ecosystems and India's Fisheries: A Growing Concern](#)

[ISRO's SOLVE Test: A Milestone for Gaganyaan](#)

[India's Economy Under the Shadow of El Niño](#)

[India's Bid for a UN Security Council Seat \(2028–29\)](#)

[Oldest Quasars Discovered by Euclid Space Telescope](#)

[INS Mahendragiri: Strengthening India's Naval Capabilities](#)

[Caste Enumeration Takes Shape Ahead of Census 2027](#)

[Unified Education Monitoring & Grading System](#)

[BHEL–Nucera Clean Energy Collaboration](#)

[Community-Centric Language Learning Framework](#)

[IIM Bangalore Campus in Indonesia](#)

[Indo–Indonesian Comprehensive Accord](#)

[Mountain Pangolin Species](#)

[MSME Resilience under GST Framework](#)

[OptoSAR-Enabled Defense Vision Initiative](#)

[River Development Payment Accord](#)

[Indira Point Heritage & Sustainability Initiative](#)

[India's Smart Population Count](#)

[Data Privacy and Transparency Dilemma](#)

[Central America's Green Jewel](#)

General Studies, Political Science and International Relations, Sociology, CSAT



[Systemic Hyperinflammation Syndrome](#)

[Advanced Long-Range Rocket Platform](#)

[Prambanan: Sacred Spires of Indonesia](#)

[Hydropower & Irrigation Payment Framework](#)

[Expanding Dimensions of Bilateral Relations](#)

[The Chickpea Culinary Path](#)

[Precision Vision Defense Mission](#)

[Ayushman Bharat: e-Health Revolution](#)

[Climate-Smart Rice Cultivation](#)

[Ecological Assessment of Great Indian Bustard](#)

[Employment Challenges for Indian Women](#)

[Indian Quantum Supremacy Initiative](#)

[Indo-Pacific Partners: India & New Zealand](#)

[Invoice Discounting Digital Network](#)

[National Port Protection Bureau](#)

[Oman: Regional Developments](#)

[Pharmaceutical Regulation Schedule K](#)

[Tropical Cyclone Bavi Report](#)

[AI Governance Imperativ](#)

[Astronauts of Bharat](#)

[Element of Lightness](#)

[Empowering Micro Food Enterprises](#)

[Empowering Rural Artisans](#)

[Green Infrastructure of India](#)

[Heritage Leather Art](#)

[India's Hydrogen Rail Milestone](#)

[Liquidity Absorption Tool](#)

[Next-Gen Space Launch](#)

[Tectonic Dynamics of Paizhen](#)

[Vietnam Headlines](#)

[Autonomy in Ladakh](#)

[Biogas for Energy Independence](#)

[Future of Drone Research](#)

General Studies, Political Science and International Relations, Sociology, CSAT



[Indigenous Māori](#)

[Judicial AI Framework](#)

[Justice Without Delay](#)

[Sanctuary of Debrigarh](#)

[SHANTI Framework](#)

[Sulphur Dioxide Insights](#)

[Emergency Gas Curbs Eased as LNG Shipments Normalise](#)

[India Needs a Second Home for Asiatic Lions](#)

[Ministry of Cooperation Completes Five Years](#)

[The Constitutional Limits of Bar Association Boycotts](#)

[India-Indonesia Strategic Partnership: BrahMos, Critical Minerals & Sabang Port](#)

[Strategic Horizons: India-Australia Partnership](#)

[National Higher Education Growth Index](#)

[Ethanol: A Key Pathway for Decarbonising Road Mobility](#)

[The Real Crisis in India's Fisheries](#)

[India's Climate-Resilient Growth Path](#)

[Parrot-Specific Bornavirus 4](#)

[Default Judgment Trial](#)

[Engineering Partnership Model](#)

[Global Food Standards Council](#)

[High Asia Plateau](#)

[National Services Benchmark](#)

[National Seva Samman](#)

[Principled AI Prompting](#)

[Ravidassia Heritage Forum](#)

[Thukkachi Heritage Mandir](#)

[Breaking Land Ownership Barriers](#)

[Chip Revolution 2026](#)

[Digital Governance Risks](#)

[Digital India Manufacturing Scheme](#)

[Gandak Basin](#)

[Grey Forest Sentinel](#)

[Iran strategic disruption](#)

[National Health Research Framework](#)

General Studies, Political Science and International Relations, Sociology, CSAT



[Parasitic intestinal disease](#)

[The Korku People](#)

[Urea Self-Reliance Policy 2026](#)

[Artificial Intelligence Squatting](#)

[China's Fifth-Gen Warplane](#)

[India's Nuclear Security Lapse](#)

[Kudankulam Cyber Breach](#)

[Malvan: India's Submarine Hunter](#)

[New Primate Discovery](#)

[South Atlantic Islands](#)

[Transforming India's Learning Landscape](#)

[White Rabbit Innovation Network](#)

[Anti-Doping Compliance Framework](#)

[Central African Colobus](#)

[Gateway of the Indian Ocean](#)

[India Rupee Clearing Accounts](#)

[India's First Geothermal Wells Report](#)

[India's Rural Lending Landscape](#)

[International Artificial Intelligence Alliance](#)

[Life Stream of Central India](#)

[Liver Metabolic Dysfunction Syndrome](#)

[Meridional Plasma Transport in Sun](#)

[Mexico: Regional Developments](#)

[Naval Multi-Mission Rotorcraft](#)

[NITI Aayog Business Environment Study](#)

[Smart Railway Station Initiative](#)

[AI-Powered Autonomous Agents](#)

[Categorized Operational Assets](#)

[Electronic Bullion Receipts](#)

[Global Life Sciences Olympiad 2026](#)

[GPS-Enabled Content Marking](#)

[Human-Relevant Testing Techniques](#)

[International Fighter Tactics Exercise](#)

[International Football Cup 2026](#)

General Studies, Political Science and International Relations, Sociology, CSAT



[National Lipid Risk Assessment](#)

[North Bihar River Link Project](#)

[Private Orbital Launch Breakthrough](#)

[Taxation Harmonization Agreement](#)

[Tribal Rights in Development Policy](#)

[Empowering Indian Philanthropy](#)

[Ethical Growth Index](#)

[Future of Indian Banknotes](#)

[Hyper Glide Express](#)

[India's Dengue Shield](#)

[Karlapat Mineral Reserve](#)

[Nation's Economic Core Index](#)

[PARIVARTAN: Pathway to Change](#)

[Odenga Dengue Vaccine](#)

[Samriddhi Yojana](#)

[Seamless Savings Initiative](#)

[Strengthening Environmental Assessment Standards](#)

[Transforming Begging into Livelihoods](#)

[Wildlife Corridor of Segur Plateau](#)

[2D Boron Sheets](#)

[Empowerment Ashes 2027](#)

[Feeding the Future 2026](#)

[Flavor of India Mission](#)

[Global Harmony Declaration](#)

[Horn of Africa Channel](#)

[India 6G Vision Alliance](#)

[India's Offline Hours](#)

[Prime Minister's Youth Excellence Scheme](#)

[Accelerated Trial Courts](#)

[Cashless Without Internet India Offline UPI](#)

[Commonwealth Games 2026: Beyond Borders](#)

[Father of Indian Nationalism](#)

[India at the Crossroads: Lessons from NATO Ankara 2026](#)

General Studies, Political Science and International Relations, Sociology, CSAT



[Rice Cultivation and India's Methane Burden](#)
[Romania: Gateway to Eastern Europe](#)
[Strategic Energy Ties: The 123 Agreement](#)
[The Corruption Trap: India's Struggle Ahead](#)
[BitChat Collaboration Hub](#)
[Business Responsibility Scheme](#)
[India's Sovereign Stand: Rejecting Dependency](#)
[National Council for Biodiversity Management](#)
[Quantum Leap in Cancer Vaccine Design](#)
[Sarnath Recognized A Global Buddhist Heritage](#)
[Threatened Treasures of Humanity](#)
[Task Force for Fairer Exams: Nilekani's Vision](#)
[The Kimi K3 Model: Future of Machine Learning](#)
[Empowered Villages Initiative](#)
[Exploring the Fabric of Reality](#)
[India's Journey to Green Transit](#)
[Technology Meets Informal Women Workers](#)
[The Journey of Praxis](#)
[The Mystery of Blue Stragglers](#)
[Transforming Lives with DWEEPTI](#)
[Waters of Odisha and Chhattisgarh](#)
[Durable Notes for a Digital Age](#)
[Green Madanapalle Initiative](#)
[Land of Rich Heritage](#)
[Permanent Membership and India's Global Role](#)
[The Future Milky Way Merger](#)
[The Nobel of Mathematics 2026](#)
[The Silent Liver Disease](#)
[Transparent Justice System](#)



Centralised IT-Enabled System: A New Era for Provident Fund Services

The Employees' Provident Fund Organisation (EPFO) recently carried out a planned nationwide database consolidation under its Centralised IT-Enabled System (CITES) project.

The Centralised IT-Enabled System (CITES) Project

What It Is?

- » The Centralised IT-Enabled System (CITES) Project is a sweeping technological and structural modernisation of the EPFO's service delivery architecture. It replaces a legacy, decentralised, and heavily fragmented system with an automated, rule-based processing engine powered by a single, centralized national database.
- » Administrative Authority: Managed and deployed by the Employees' Provident Fund Organisation (EPFO), under the Ministry of Labour and Employment, Government of India.
- » Core Technical Architect: Designed, built, and engineered by the Centre for Development of Advanced Computing (C-DAC).

Aim:

- » To decouple subscribers from specific physical regional offices, allowing any PF field office across India to process any member's request.
- » To eliminate persistent technical and procedural delays associated with manual claims, particularly for pension approvals and deceased member settlements.

Key Features of the New System:

- » Single Centralized Database Architecture: Consolidated over 120 separate regional databases, migrating several lakh crore historical data records into a single, high-visibility cloud ledger.
- » Unified Digital Interface: Subscribers gain access to a streamlined portal using their existing Universal Account Number (UAN) and password, presenting a clear overview of PF accumulations, active claim statuses, and pensionable service records.



- » Aggregated Member IDs: Automatically groups all previous and current member IDs under a single UAN anchored securely to a single verified KYC link.
- » Interactive Query Resolution: If an issue arises during claim processing, EPFO offices can flag queries electronically. Members review and respond to these prompts online, reducing arbitrary claim rejections and eliminating unnecessary office visits.
- » Centralised Pension Payment System: Features an integrated system to disburse monthly pensions smoothly across different regions without requiring local structural transfers.
- » UPI Integration Pipeline: The system establishes the underlying data structure required to achieve the EPFO's next-generation goal: linking PF accounts directly with the Unified Payments Interface (UPI) for instant withdrawals.

Empowering 50 Lakh Overseas Citizens: The e-OCI Card

Union Home Minister and Minister of Cooperation launched the FCRA 2.0 Portal and the highly anticipated e-OCI (Electronic Overseas Citizen of India) Card in New Delhi.

The e-OCI Card

What It Is?

- » The Electronic Overseas Citizen of India (e-OCI) Card is a citizen-centric, paperless documentation framework designed for the global Indian diaspora. It converts the traditional, physical OCI stamp-and-booklet layout into an institutionalized, securely verifiable digital credential.

Ministry: Ministry of Home Affairs (MHA), Government of India.

Aim:

- » To eliminate physical paperwork, verification delays, and administrative overhead costs for more than 50 lakh OCI holders.
- » To integrate diaspora credentials directly with real-time digital immigration security lines across all Indian airports.

Key Features of the e-OCI System:

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- » Elimination of the Age-20 Booklet Re-issue: Scraps the complex rule that forced cardholders to get a fresh physical OCI booklet re-issued whenever they received a new passport after turning 20 years old.
- » Seamless Online Passport Updates: Cardholders simply log in to update their new passport numbers and details online without needing physical submissions or in-person verification.
- » Lifelong Unique Registration: Assigns an unchangeable, unique digital registration number to each cardholder to ensure secure, lifelong tracking.
- » End-to-End Digital Workflow: Applicants can submit applications, upload supporting documents, clear security profiles, and download their approved digital e-OCI cards directly via ociservices.gov.in.
- » Advanced OCR Analysis: Uses Optical Character Recognition (OCR) technology to automatically verify uploaded foreign passports, reducing data errors and processing times.
- » Virtual Mobile Portability: Cardholders can safely store and display their digital credentials on mobile devices, removing the risk of losing or damaging physical booklets during international travel.

Key Benefits Preserved Under the Scheme:

Registered e-OCI cardholders continue to enjoy robust statutory rights under Section 7A of the Citizenship Act, 1955:

- » Lifelong Visa Status: Grants a multiple-entry, multi-purpose lifelong visa to visit India for any general purpose.
- » FRRO Exemptions: Complete exemption from reporting or registering with local police authorities or Foreigners Regional Registration Officers (FRRO), regardless of the length of stay in India.
- » Economic Parity: Grants equal status with Non-Resident Indians (NRIs) across economic, educational, and financial sectors—excluding the right to buy agricultural or plantation properties.
- » Frictionless Employment: Permits cardholders to take up employment in India without needing to apply for a separate commercial employment visa.



From Armoured Corps to COAS: The Journey of General Dhiraj Seth

General Dhiraj Seth has formally assumed charge as the 31st Chief of the Army Staff (COAS) of the Indian Army, succeeding General Upendra Dwivedi, who retired after more than 40 years of distinguished service.

The General Dhiraj Seth

Who He Is?

- » General Dhiraj Seth, PVSM, UYSM, AVSM, is a highly decorated four-star general officer of the Indian Army. Commissioned into the elite Armoured Corps (specifically the 2nd Lancers / Gardner's Horse) in December 1986, he brings nearly four decades of rich military experience to the top post and is the first officer from the Armoured Corps to lead the force since 1997.

His Professional Record and Achievements:

- » Dual Army Command Experience: Commanded both the South Western Command and Southern Command, providing over 2.5 years of strategic leadership across key operational sectors.
- » Elite Operational Leadership: Led the XXI Sudarshan Chakra Corps, served as GOC Delhi Area, and commanded a counter-insurgency force in Jammu & Kashmir.
- » Force Modernisation: As the 49th Vice Chief of Army Staff, contributed to long-term military planning, capability development, and integration of emerging technologies.
- » Academic & International Experience: Won the Silver Centurion award, attended premier military institutions, and served as a UN Operations Officer during UNAVEM III (1995–96) in Angola.

Chief of the Army Staff (COAS):

What It Is?

- » The Chief of the Army Staff is the professional head and operational leader of the 3-million-strong Indian Army. Holding the rank of a four-star General, the COAS is the principal military advisor on land warfare to the Ministry of Defence and is a permanent member of the Chiefs of Staff Committee.

History of the Office:



- » **The Colonial Origin:** The position traces its roots back to the Commander-in-Chief, India, who oversaw all military assets under British East India Company and Crown rule.
- » **Post-Independence Shift:** In 1947, the post was designated as the Commander-in-Chief, Indian Army.
- » **The Modern Title:** In 1955, the Parliament enacted the Commander-in-Chief (Change in Designation) Act, officially renaming the professional head as the Chief of the Army Staff (COAS), with General Maharaj Shri Rajendrasinhji Jadeja serving as the first to bear the modern title.

Key Functions of the COAS:

- » **Operational Control and Strategic Readiness:** Holds overall structural control of the Army, maintaining maximum combat readiness, border vigilance, and defense capabilities along all territorial frontiers.
- » **Force Restructuring and Tech Modernization:** Drives long-term force transformation by prioritizing new capability development, procurement roadmaps, and integrating automated or modern weapon systems into active combat cycles.
- » **Inter-Service Synergy:** Works in close coordination with the Chief of Defence Staff (CDS), the Chief of the Naval Staff, and the Chief of the Air Staff to design joint-warfare frameworks and integrated theater commands.
- » **National Crisis Management:** Leads the military's rapid response networks during national emergencies, cross-border counter-insurgency tasks, and Humanitarian Assistance and Disaster Relief (HADR) missions.

From Fraud to Relief: RBI's New Customer Protection Framework

The Reserve Bank of India (RBI) has issued final amendments to its Limiting Customer Liability in Digital Transactions framework.

- » Effective January 1, 2027, the one-year pilot expands protection against social engineering scams and introduces monetary compensation for victims of small-value digital fraud.

The RBI Scam Compensation Framework

What It Is?

- » The framework is a regulatory financial safety net designed to protect bank customers from digital payment frauds. It upgrades the RBI's 2017 circular, which only protected against unauthorised hacking hacks.
- » The modern mechanism introduces Fraudulent Electronic Banking Transactions (EBTs) as a legal concept, making individuals eligible for reimbursement even if they accidentally shared credentials due to deception or coercion.

Regulator: The Reserve Bank of India (RBI).

Aim:

- » To provide economic relief to victims of modern digital scams, including digital arrests, phishing, and fraudulently stolen One-Time Passcodes (OTPs).
- » To shift the legal burden of proof onto the bank, forcing financial institutions to actively prove customer negligence rather than automatically denying fraud claims.

Key Features and Rules of the Policy:

The Payout Matrix:

- » The Payout Formula: Individual victims (including sole proprietors) suffering scam losses up to ₹50,000 can claim 85% of their net loss, capped at a maximum of ₹25,000.
- » The Breakpoint: For losses below ₹29,412, victims get exactly 85% of the amount. For losses between ₹29,412 and ₹50,000, the payout is capped at a flat ₹25,000.
- » The Cap: Scams exceeding ₹50,000 are completely excluded from this specific reimbursement track.
- » Frequency: This financial remedy can be claimed only once in a customer's lifetime. For joint accounts, only one holder may file the claim.

The Three-Way Cost-Sharing Model:

- » The compensation cost does not fall solely on the customer's bank. Instead, it is co-funded across a multi-party ledger:
- » The RBI Share: Contributes roughly 75% of the payout amount.
- » The Remitter (Customer's) Bank: Contributes half of the remaining balance.

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- » The Beneficiary (Receiver's) Bank: Contributes the other half of the remaining balance. For cross-border scams, the remitter bank covers this share.

Defining Customer vs. Bank Negligence:

- » Customer Negligence (Exclusions): Customers are ineligible for compensation if they ignore clear, directed security alerts or fail to link their current phone number/email address with the bank, which blocks real-time fraud warnings.
- » Bank Negligence (Inclusions): Deemed to occur if a bank fails to send mandatory transaction alerts, lacks a 24×7 fraud-reporting infrastructure, or fails to act promptly once notified.
- » Third-Party Breaches: Customers are not held liable for security leaks occurring elsewhere in the ecosystem, such as at a payment gateway, aggregator, or telecom provider.

Mandatory Timelines and Grievance Tracks:

- » The 5-Day Reporting Rule: To qualify for a payout, the customer must report the fraud within 5 calendar days of its occurrence to both their bank and the National Cyber Crime Helpline (1930).
- » Resolution Turnaround: Banks must resolve domestic digital fraud cases within 45 calendar days and cross-border cases within 60 calendar days. Reversals must be value-dated to the original transaction date so the customer loses no interest.
- » Credit Card Shadow Reversal: For credit card fraud, banks must issue a temporary shadow reversal of the disputed funds within 5 calendar days of the report so the user does not incur interest charges while the investigation is underway.
- » The ₹500 Alert Rule: Banks are required to send instant, cost-free SMS alerts for all electronic transactions exceeding ₹500 to maintain a reliable communication channel for users without internet connectivity.

From Paper to Cloud: India's Unified Justice System

The Ministry of Home Affairs (MHA) announced that the nationwide rollout of the Interoperable Criminal Justice System (ICJS) is on track, with all investigations

and trials under the BNS, BNSS, and BSS to be digitally recorded from January 1, 2027.

The Interoperable Criminal Justice System (ICJS)

What It Is?

- » The Interoperable Criminal Justice System (ICJS) is a unified national digital platform that integrates the main, traditionally isolated pillars of the criminal justice delivery network into a single conversational ecosystem.
- » It replaces legacy, paper-driven workflows with a secure cloud-based data framework hosted on the government's MeghRaj cloud infrastructure.

Nodal Agency: National Crime Records Bureau (NCRB) under the Ministry of Home Affairs, Government of India.

Technology Partner: Developed and architected by the National Informatics Centre (NIC).

Aim:

- » One Data, Once Entry Principle: To cut out manual redundancies by ensuring that case data needs to be entered into the system only once, making it instantly usable across all platforms.
- » Promoting SMART Policing: To move away from scattered physical records and toward an intelligence-led, paperless justice system supported by data analytics.

Key Features and Five-Pillar Architecture:

- » CCTNS (Crime and Criminal Tracking Network and Systems): Connects over 16,000 police stations across India, supporting FIR registration in 23 languages with Bhashini integration for Zero-FIR translation.
- » e-Courts & e-Prosecution: e-Courts enables digital transfer of case files, e-Summons, and evidence tracking, while e-Prosecution digitizes prosecutors' case records and legal workflows for faster trials.
- » e-Prisons: Maintains a centralized database of prison inmates with biometric records, while providing online services such as e-Mulaqat and digital grievance redressal.
- » e-Forensics: Digitally links police with Forensic Science Laboratories (FSLs), enabling faster forensic reports, especially for offences punishable with 7 years or more.

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- » Statutory Compliance: Tracks compliance with new criminal laws by monitoring timelines for chargesheets and implementing provisions of the Criminal Procedure (Identification) Act, 2022.

Significance:

- » ICJS has improved chargesheet compliance and reduced delays by digitally connecting investigation, prosecution, and trial processes.
- » By linking police, courts, prisons, forensics, and prosecution, ICJS enables AI-based analytics, better investigations, and evidence-driven decision-making.

From Self-Help to Market Strength: The SARAS Shakti Story

The Ministry of Rural Development launched the SARAS Shakti Collection and the SARAS Shakti Coffee Table Book during the Rashtriya Gramin Vikas Sammelan (RGVS) 2026.

SARAS Shakti

What It Is?

- » SARAS Shakti is a flagship branding and marketing initiative under the Deendayal Antyodaya Yojana–National Rural Livelihoods Mission (DAY-NRLM). It showcases premium products made by women Self-Help Groups (SHGs) to promote rural entrepreneurship and expand market access.

Aim:

- » To strengthen women-led rural enterprises through branding, product promotion, and wider market linkages.
- » To position SHG products in premium institutional and consumer markets while supporting the vision of Lakhpati Didis and Viksit Bharat.

Key Features:

- » Curated Product Collection: Showcases premium handlooms, handicrafts, textiles, wellness products, home décor, and traditional foods made by women SHGs.
- » SARAS Shakti Coffee Table Book: Documents the diversity, quality, success stories, and market potential of SHG enterprises across India.
- » Market Access Platform: Enhances branding, packaging, digital marketing, and institutional market linkages for rural products.

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- » Women Enterprise Promotion: Supports over 10 crore women associated with SHGs under DAY-NRLM, encouraging sustainable livelihoods and entrepreneurship.

Significance:

- » Strengthens women's entrepreneurship, improves rural incomes, and supports the goal of creating 6 crore Lakhpati Didis by 2029.
- » Enhances the visibility of indigenous products, preserving traditional crafts while expanding domestic and institutional markets.

Land of Democracy and the Aegean

Union Minister of Commerce and Industry witnessed the live launch of India's Unified Payments Interface (UPI) services in Greece through a strategic Eurobank-NIPL partnership.

Greece

What It Is?

- » Greece is a sovereign, multi-party parliamentary republic with a deeply rooted maritime heritage. Uniquely shaping Western history, the modern nation acts as a cultural and political bridge, heir to the historical legacies of Classical Greece, the Byzantine Empire, and nearly four centuries of Ottoman rule.

Geographical Position: Situated at the strategic juncture of Europe, Asia, and Africa, it occupies the southernmost tip of the Balkan Peninsula. It is bounded by the Aegean Sea to the east, the Mediterranean Sea to the south, and the Ionian Sea to the west.

National Capital: Athens.

Bordering Nations: Albania, Republic of North Macedonia, Bulgaria, and Turkey.

Key Features:

Tectonic Architecture and Active Volcanism

- » Active Tectonic Zone: Greece lies at the collision of tectonic plates, causing frequent earthquakes and continuous geological activity.
- » Active Volcanoes: Volcanic activity continues in Santorini (Thíra) and Mílos, reflecting ongoing tectonic processes.

Mountainous Landscape:

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- » Píndos Range: Greece's main mountain chain divides the mainland and features deep gorges and rugged valleys.
- » Major Peaks: Mount Olympus (2,917 m), Greece's highest peak, and Mount Parnassós are important geographical and cultural landmarks.
- » Peloponnese Peninsula: Separated from mainland Greece by the Corinth Canal, giving it an island-like character.

Lowlands and Coastline:

- » Fertile Plains: Limited lowlands, such as Thessaly and Drama, support most agricultural activities.

Greek Islands:

- » Over 2,000 Islands: Islands form nearly one-fifth of Greece's land area and are grouped into the Ionian, Aegean, and Cyclades islands.
- » Crete: Greece's largest island, known for rugged limestone mountains and Mount Psiloritis.

Significance:

- » Greece is the birthplace of democracy, philosophy, the Olympic Games, and classical civilization, shaping modern political and cultural thought.
- » Greece possesses one of the world's largest merchant fleets, making it a major player in global shipping and maritime trade.

Public Penury vs. Private Wealth: The State Finance Paradox

Economist Jayan Jose Thomas has analysed the rising debt burden of Indian states, arguing that growing liabilities reflect a structural gap between states' development responsibilities and their limited revenue-raising powers, rather than merely fiscal mismanagement.

The Federal Fiscal Mismatch Architecture

What it is?

- » India's fiscal federal system gives the Union greater powers to raise major taxes, while States bear most spending responsibilities for health, education, agriculture, irrigation, and welfare. As expenditure often exceeds revenue, states rely on market borrowings to bridge the fiscal gap.

Key Data and Statistics Pointing to State Budgetary Pressures:

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- » The Tax Devolution Gap: Despite Kerala successfully mobilizing localized taxes to generate per capita revenues 1.5 times the national average for all states, its statutory share in the Union government's tax devolution grid was restricted to a low 1.92%, compared to its 2.6% share of India's total population in 2023–24.
- » The Revenue vs.Capital Outlay Deficit: Due to high baseline operations, Kerala is capable of directing only 10% of its total financial resources toward capital expenditure to enhance future production capabilities, with the remaining 90% spent on day-to-day revenue expenditures.
- » The Structural Fixed-Cost Matrix: Approximately a fifth (20%) of Kerala's budget is absorbed by the salaries of government employees, while pensions account for 15.3%, and interest payments on market borrowings consume 16.5% of total expenditures.
- » The Credit-to-Deposit (CD) Sluggishness: Scheduled commercial banks in Kerala operate at a low CD ratio of 66%, indicating a massive pool of unutilized local savings when compared against the national average of 76% and ratios exceeding 100% in commercial engines like Maharashtra and Tamil Nadu.
- » The Cost of Domestic Capital: State governments pay a high interest rate ranging between 6.5% and 7.5% on the securities they issue, known as State Development Loans (SDLs), which sits 0.25 to 0.75 percentage points higher than the rate available to the Union government.

Key Data and Statistics Pointing to State Budgetary Pressures

- » The Human Capital and Brain Drain Trap: A weak public fiscal capacity restricts states from setting up elite higher education hubs, advanced research labs, and modern public transport systems.
 - Consequently, highly educated young people are leaving states like Kerala in large numbers because local markets cannot fulfill their career aspirations.
- » The Dilemma of Cutting Essential Social Services: States cannot easily expand their fiscal space by abruptly cutting revenue expenditures without instantly eroding their hard-won historical strengths in health metrics and literacy outcomes.



- » The Paradox of Private Affluence vs. Public Penury: The visible growth of private wealth stands in sharp contrast to weak public revenues, threatening to worsen regional socioeconomic inequalities.
- » High Debt-Servicing Costs: Paying high interest rates on SDLs creates a repetitive debt loop, forcing states to deploy fresh borrowings to service legacy interest bills rather than constructing physical production assets.
- » The Cost Efficiency Factor: This structural pipeline allows Chinese local governments to borrow from their domestic banking channels at a highly subsidized cost of around 2%, avoiding the expensive market penalties attached to Indian SDLs.

Comparative Case Study: China's Local Government Model

In China's high-growth blueprint, the absolute majority of massive infrastructure investments has been directly executed by provinces and lower-level local governments. To fund these expansions, local governments borrow heavily by accessing a large pool of domestic public savings held securely within Chinese banks, coordinated tightly through central planning.

These sub-national entities successfully raise resources through three primary tracks:

- » The direct issuance of competitive Local Government Bonds (LGBs).
- » Large-scale commercial land sales.
- » Specialized, off-budget borrowing channeled via Local Government Financing Vehicles (LGFVs).

Way Forward:

- » Reforming Devolution Frameworks to Reward Revenue Mobilization: Adjust federal tax distribution formulas to protect and reward states that demonstrate strong records in mobilizing localized own-tax revenues.
- » Channeling Excess Bank Savings into Sovereign State Bonds: Design alternative financial transmission mechanisms to allow state governments to easily access unutilized domestic savings to build local assets.
- » Lowering the High Interest Rates on State Development Loans (SDLs): Establish unified credit guarantees where the Union government



backs or coordinates state borrowings, effectively erasing the 0.25 to 0.75 percentage point premium currently penalized by market institutions.

- » Transitioning from Day-to-Day Spends to Fixed Capital Assets: Implement a phased ten-year structural transition to gradually raise state capital expenditure outlays past the restrictive 10% threshold, funding large-scale public transport grids and technology parks.
- » Creating Domicile-Portable Regional Welfare Entitlements: Coordinate inter-state institutional frameworks to ensure that as workers migrate between younger and aging states, their healthcare, retirement options, and financial safety nets move smoothly with them.

Conclusion:

When states borrow to establish public universities, expand healthcare grids, and support agriculture, they are serving a far greater long-term developmental cause than a tight-fisted administration that relies on austerity. Ultimately, by reforming the high-cost SDL framework and allowing states to efficiently draw on domestic public savings, India can protect its historic social progress and transition its sub-national economies toward sustainable growth.

Tourism as a Growth Engine: Removing Barriers, Building Opportunities

The Ministry of Tourism, in collaboration with NITI Aayog, officially released a milestone report titled *“Unlocking Growth in Tourism and Hospitality Sector”* at a National Workshop held in New Delhi.

Report on Unlocking Growth in Tourism and Hospitality Sector

What It Is?

- » The report assesses regulatory barriers affecting India's tourism sector. It recommends reforms in accommodation, hospitality, transport, and travel services to strengthen tourism and support the Viksit Bharat 2047 vision.

Key Data and Statistics on the Tourism & Hospitality Sector:

- » Surging Domestic Demand: India recorded 2.9 billion domestic tourist visits in 2024, surpassing the pre-pandemic peak of 2.3 billion in 2019.
- » Foreign Tourist Arrivals: India welcomed 9.95 million foreign tourists in 2024, earning nearly USD 35 billion in tourism receipts.



- » Global Competitiveness Gap: India ranks 6th in Natural Resources and 9th in Cultural Resources in the TTDI, but only 39th overall.
- » Long Project Delays: Hotel projects in India require nearly 60 approvals and take 36–48 months to complete.

Key Opportunities and Potential:

- » High Employment Intensity: Tourism creates jobs across all skill levels, from hospitality workers to professional managers. This makes it one of India's most employment-intensive service sectors.
 - Example: Hotels, tour operators, airlines, and travel companies generate both entry-level and specialized employment.
- » Geographically Distributed Development: Tourism promotes balanced regional growth by attracting investment to rural, coastal, and heritage destinations. It helps diversify local economies beyond agriculture.
 - Example: Kerala's backwaters and Rajasthan's heritage circuits generate income for local communities.
- » Foreign Exchange Generation: Spending by foreign tourists brings valuable foreign exchange into India without exporting physical goods. This strengthens the country's external sector.
 - Example: International tourists spend on hotels, transport, food, shopping, and cultural experiences within India.
- » Shift Towards High-Value Tourism: India can increase earnings by promoting premium tourism instead of only increasing visitor numbers. Longer stays also raise tourist expenditure.
 - Example: Wellness tourism, Ayurveda, luxury heritage hotels, and spiritual tourism attract high-spending visitors.
- » Growth of Homestays: Homestays create affordable tourism infrastructure while providing direct income to rural households. They encourage community participation in tourism.



- Example: Registered homestays generated nearly ₹4,722 crore in revenue during 2024.

Key Challenges and Regulatory Bottlenecks:

- » **Restrictive Building Norms:** Strict building regulations increase construction costs and reduce project viability. Developers often require taller and costlier structures to maximize space.
 - Example: Rajasthan's 40% ground coverage limit increases hotel construction costs.
- » **Fragmented Licensing System:** Hotels require multiple approvals from different authorities for the same establishment. This creates duplication and delays business operations.
 - Example: Mumbai hotels need separate licenses for banquet halls, laundries, and salons.
- » **High Compliance Burden:** Frequent renewal of operational licenses increases administrative costs and compliance burdens. Businesses spend significant time on paperwork.
 - Example: Uttar Pradesh bar licenses require annual renewal every 31 March.
- » **Interstate Transport Barriers:** Different state taxes and permit rules increase tourism transport costs and affect seamless interstate travel. This discourages integrated tourism.
 - Example: Kerala imposes separate taxes on tourist vehicles despite valid All India Tourist Permits (AITP).
- » **Complex Visa Procedures:** Lengthy visa applications and technical issues discourage many foreign visitors. Simplifying visa processes can significantly improve tourist arrivals.
 - Example: India's e-Visa system requires over 70 data fields and often faces foreign payment failures.

Key Recommendations of NITI Aayog:

General Studies, Political Science and International Relations, Sociology, CSAT



- » Liberalize Building Regulations: Relax Floor Area Ratio (FAR) and ground coverage restrictions to reduce project costs. Faster approvals can attract greater private investment in tourism.
- » Simplify Licensing: Merge multiple hotel licenses into a single approval system and remove duplicate permits. This will improve ease of doing business.
- » Promote Homestays: Increase the permissible room limit for registered homestays and remove unnecessary NOCs. This will encourage rural entrepreneurship and community tourism.
- » Reform Tourist Transport: Extend All India Tourist Permit (AITP) validity and remove overlapping state taxes. Uniform transport rules will improve interstate tourism connectivity.
- » Introduce Visa-on-Arrival: Expand Visa-on-Arrival (VoA) and simplify the e-Visa process with easier payment systems. This can attract more international tourists and boost tourism receipts.

Conclusion:

The NITI Aayog roadmap seeks to unlock India's tourism potential by simplifying regulations, improving infrastructure, and promoting ease of doing business. These reforms can accelerate investment, enhance visitor experience, and make tourism a major driver of inclusive economic growth.

Akashvani–The Sound of India

The Akashvani (All India Radio)

What It Is?

- » Akashvani (officially known as All India Radio) is India's premier national public radio broadcaster. Operating as one of the two main wings of Prasar Bharati (an autonomous statutory corporation, with Doordarshan being its television counterpart), it is one of the largest multi-lingual and multi-cultural broadcasting networks in the world.

Established In:



- » **Formal Launch:** Officially named All India Radio (AIR) on June 8, 1936, after originating as the experimental Indian State Broadcasting Service (ISBS) on April 1, 1930.
- » **The Name “Akashvani”:** Formally adopted as the official on-air name for the national broadcaster in 1956, drawing from a Bengali poem written by Nobel laureate Rabindranath Tagore in 1938 for the inauguration of Kolkata’s shortwave transmission.

History of the Broadcaster:

- » **Enthusiast Origins:** Broadcasting began in India in June 1923 with private transmissions by the Radio Club of Bombay, followed by the Calcutta Radio Club.
- » **The Colonial Era & ISBS:** The private Indian Broadcasting Company (IBC) was set up in 1927 but faced liquidation by 1930. The British colonial government then stepped in, establishing the Indian State Broadcasting Service (ISBS).
- » **The BBC Blueprint:** In August 1935, Lionel Fielden, a senior producer from the BBC, was appointed as India’s first Controller of Broadcasting, providing professional structure to the network before its official transition to All India Radio in 1936.
- » **Independence Day Baseline:** At the time of India’s independence in 1947, the country was left with just six radio stations, covering barely 2.5% of the country’s area and 11% of the population.
- » **The Classical Preservation Era:** In 1952, Information and Broadcasting Minister B. V. Keskar revolutionized programming by prioritizing Indian classical arts on the airwaves, establishing the iconic annual Akashvani Sangeet Sammelan in 1954 to provide a national stage for maestros like Pandit Ravi Shankar and Ustad Bismillah Khan.
- » **Autonomy Milestone:** Following recommendations from the Chanda and Verghese committees, the Indian Parliament enacted the Prasar Bharati Act, which came into effect in November 1997, liberating Akashvani from direct ministry control into an autonomous public service corporation.

Key Features:



- » Vast Reach: Today, Akashvani operates over 460 radio stations across the country, making it accessible to virtually the entire Indian population and covering 92% of the country's geographic area.
- » Unparalleled Language Footprint: Broadcasts programs in 23 official languages and 146 native dialects, serving an extraordinarily diverse audience.
- » News Services Division (NSD): Operates a 24×7 news network broadcasting over 600 daily news bulletins in home, regional, and external services, backed by 46 Regional News Units (RNUs).
- » Vividh Bharati: Launched in 1957, this service remains one of India's most popular commercial entertainment channels, broadcast over specialized FM Gold and FM Rainbow channels.
- » External Services Division (ESD): Broadcasts daily in 27 languages (15 foreign and 12 Indian) reaching out to listeners across more than 100 countries, acting as a soft-power tool for public diplomacy.

Financial Autonomy for Innovation

The Ministry of Defence has released the Delegation of Financial Powers to DRDO (DFP-2026) to accelerate defence research and development projects.

The Delegation of Financial Powers to DRDO (DFP-2026)

What It Is?

- » Delegation of Financial Powers to DRDO (DFP-2026) is a revised financial governance framework that grants greater financial autonomy to the Defence Research and Development Organisation (DRDO) for faster approval and execution of defence R&D projects.

Aim:

- » To speed up research, development, testing, and induction of indigenous defence technologies.
- » To improve financial efficiency, accountability, and self-reliance in India's defence ecosystem.

Key Features:

- » Greater Financial Autonomy: Delegates enhanced financial powers to DRDO for quicker approval and execution of research projects.

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- » Dedicated Funding for Trials: Provides separate financial provisions for testing, evaluation, and trial campaigns of defence systems.
- » Support for Early-Stage Research: Authorises funding for pre-project R&D activities to encourage innovation before formal project approval.
- » Separate Funding Channels: Distinct financial schedules for Extra-Mural Research Projects (EMRPs) and Defence Innovation Accelerator–Centres of Excellence (DIA-CoEs) to strengthen industry-academia collaboration.

Significance:

- » Reduces procedural delays, enabling faster development and induction of indigenous defence technologies into the Armed Forces.

Four Pillars of India's Energy Security

the Indian National Science Academy (INSA)—specifically through its Centre for Science, Technology, Innovation and Policy—released a milestone policy brief highlighting the urgent need for a unified national energy framework.

A unified policy architecture for India's energy future

What it is?

- » The proposed unified policy architecture is an integrated national framework designed to shift energy planning away from fragmented, sector-specific silos into a cohesive ecosystem.
- » By building national governance around four key pillars—Adequacy, Access, Affordability, and Appropriate Sustainability—the architecture seeks to match aggressive economic growth with environmental safety and resource efficiency.

Key Data and Facts on India's Energy Transition:

- » Massive Renewable Scaling: India's installed renewable energy capacity grew more than sixfold over a decade, rising from approximately 40 GW in 2015 to nearly 260 GW by 2025.
- » The Strategic Deadlines: The architecture is anchored to two milestone years: achieving complete energy self-reliance by 2047 and reaching absolute net-zero carbon emissions by 2070.
- » Subsidizing Cognitive Shifts: Moving past material outlays, the framework complements evolving national goals like the National Green Hydrogen



Mission, which is backed by a ₹19,744 crore central allocation to catalyze clean energy infrastructure.

The Imperative Need for a Unified Energy Architecture:

- » **Breaking Departmental Silos:** India's energy governance is traditionally split across separate, disconnected ministries, which limits long-term strategic planning.
- » **Managing Escalating Economic Demand:** Ongoing industrialization, rapid urbanization, and population growth require a highly coordinated supply grid to prevent localized deficits.
- » **Mitigating High Hydrocarbon Import Reliance:** India remains dependent on foreign imports for a massive share of its crude oil and natural gas requirements, leaving the economy vulnerable to geopolitical price shocks.
- » **Balancing Grid Intermittency:** As solar and wind capacities cross the 260 GW baseline, the grid requires tight integration between variable generation, modern transmission networks, and electrical storage systems.
- » **Avoiding Rigid One-Size-Fits-All Models:** The country requires region-specific transition pathways that protect fossil-fuel-dependent workforce communities while deploying localized bio-resources and clean fuels.

Key Initiatives Taken So Far:

- » **The Saubhagya Scheme:** A massive rural and urban utility program that successfully delivered near-universal household electricity access across the country.
- » **Pradhan Mantri Ujjwala Yojana:** A major social welfare initiative that expanded access to clean cooking fuel (LPG), improving indoor air quality for millions of economically vulnerable households.
- » **The National Green Hydrogen Mission:** A comprehensive technological and financial roadmap launched to establish India as a leading global production hub and exporter of green hydrogen.
- » **Deploying Advanced Pilot Frameworks:** The establishment of cutting-edge research installations, such as NTPC's 150 tonnes-per-day Green Urea pilot plant at Pudimadaka, demonstrates the active deployment of Carbon Capture, Utilization, and Storage (CCUS) technologies.



Key Challenges Associated with the Energy Framework:

- » High Infrastructure Retrofitting Costs: Upgrading existing coal-fired thermal utilities and local distribution grids to safely manage variable renewable loads requires immense capital spending.
- » Synchronizing Real-Time Storage Technology: Scaling up high-capacity battery storage systems and run-of-the-river hydropower to manage energy distribution during non-peak solar hours remains technically challenging.
- » Navigating Intricate Federal Coordination: Finalizing uniform utility laws requires tight policy alignment between the central government and fiscally stretched state electricity boards.
- » High Costs of Deep-Water and Specialized Logistics: Transporting captured industrial carbon dioxide or shifting hydrogen feedstocks requires a specialized pipeline and storage infrastructure network.
- » Managing Early-Stage Green Premiums: Emerging alternatives like green hydrogen and green ammonia remain significantly more expensive to manufacture than traditional fossil-fuel-derived equivalents.

Way Forward:

- » Enacting a Phased, Decade-Long Strategy: Deploy a step-by-step transition plan focused on infrastructure strengthening and green hydrogen scaling in the near term, before moving toward deep industrial decarbonization.
- » Integrating Cross-Cutting CCUS Technologies: Connect heavy industrial sectors like steel, cement, and thermal power directly with Carbon Capture, Utilization, and Storage networks to commercialize waste gas emissions.
- » Diversifying the National Energy Storage Portfolio: Scale up grid-level battery storage, small hydro schemes, and pump-storage installations to ensure 24/7 power supply stability.
- » Fostering Public-Private Green Technology Partnerships: Work with global technology leaders and local innovators to manufacture high-efficiency electrolyzers and solar components domestically, lowering production costs.
- » Enforcing Portable Welfare and Community Protections: Create targeted skilling and transition funds to retrain fossil-fuel workforces, ensuring that regional transitions are fair and inclusive.

Conclusion:

General Studies, Political Science and International Relations, Sociology, CSAT



The INSA policy brief emphasizes that India's long-term energy security depends on treating its power grid as an integrated whole rather than an accumulation of separate fuel markets. By anchoring national development to the four pillars of adequacy, access, affordability, and appropriate sustainability, the proposed framework provides a practical plan to safely phase down carbon emissions.

Gait Analysis in Crime and Medicine

During the high-profile investigation into the Ketan Agarwal murder case at Lohagad Fort, a Pune court extended the police custody of the accused to allow investigators to conduct a forensic gait analysis.

Gait Analysis

What It Is?

- » Gait analysis is the systematic and scientific study of human locomotion—specifically how an individual walks, hops, or runs.
- » It involves a detailed biomechanical breakdown of how the nervous system coordinates continuously with bones, muscles, and joints to move the body forward, producing a highly distinct “biomechanical signature” for every individual.

How It Works?

The basic unit of measurement is the gait cycle, which tracks the series of structural movements from the exact moment one foot strikes the ground until that same foot touches the ground again. The cycle is split into two primary operational phases:

- » The Stance Phase (Approx. 60% of the cycle): Begins with a heel strike and ends when the toe pushes off. In this phase, the foot is in firm contact with the surface, absorbing shock while supporting the body's full weight.
- » The Swing Phase (Approx. 40% of the cycle): Occurs when the foot leaves the ground and swings forward to prepare for the next step. The body shifts focus to ensure the toes clear the floor without dragging.

Key Parameters of Gait Analysis:

- » Spatial Parameters: Measures step length, stride length, walking base width, and toe angle to assess balance, posture, and walking symmetry.



- » Temporal Parameters: Records cadence (steps/minute), walking speed, and double-support time to evaluate gait rhythm, stability, and movement efficiency.
- » Full-Body Systemic Tracking (Sheffield Tool): Analyses a 15-point body movement pattern, including head, shoulders, arms, torso, hips, knees, and feet for complete gait assessment.
- » Modern Instrumentation: Uses high-speed cameras, pressure mats, force plates, and wearable motion sensors to accurately capture movement and walking mechanics.

Primary Applications

- » Forensic Investigations & Criminology: Helps identify suspects from CCTV footage by analysing unique walking patterns such as limps, stride length, or body posture when facial identification is unavailable.
- » Clinical Diagnosis & Healthcare: Assists in diagnosing Parkinson's disease, stroke, cerebral palsy, dementia, orthopedic disorders, and monitoring rehabilitation through gait abnormalities.
- » Sports Biomechanics & Performance: Enables athletes to improve running efficiency, reduce injury risk, optimize movement mechanics, and design customized footwear through gait analysis.

Indian Army's Tech-Driven Future

Just a day after assuming office as the 31st Chief of the Army Staff (COAS), General Dhiraj Seth unveiled an ambitious, high-tech transformation blueprint for the Indian Army titled the "VIJAY" roadmap.

The VIJAY Roadmap

What It Is?

- » The "VIJAY" roadmap is an extensive strategic and operational doctrine introduced to modernize the Indian Army's combat systems. Drawing direct inspiration from the Defence Minister's vision for the "Decade of Transformation" (2023–2032), it shifts the army away from legacy, single-domain warfare tactics toward a highly digitized, combined-arms fighting framework.



Formulated By: Developed under the direction of the Chief of the Army Staff (COAS) and executed across all operational commands.

Aim:

- » To build a tech-savvy force capable of fighting across conventional, hybrid, space, cyber, and electronic warfare environments.
- » To quicken force structuring, replace outdated technology with modern military hardware, and align operational capabilities with evolving threats.
- » To achieve the core goal of “Winning Our Wars with Indigenous Solutions,” breaking reliance on foreign supply loops.

Key Features and Five-Pillar Architecture:

- » **V – Vigilance and Readiness:** Focuses on continuous border surveillance and high operational preparedness using advanced sensors, night-vision systems, and rapid response mechanisms.
- » **I – Innovation and Transformation:** Promotes adoption of modern technologies such as drones, satellites, AI-enabled systems, and digital warfare capabilities to strengthen military operations.
- » **J – Jointness and Integration:** Encourages seamless coordination among the Army, Navy, Air Force, and civilian agencies through integrated theatre commands and whole-of-nation planning.
- » **A – Atmanirbharta (Self-Reliance):** Prioritises indigenous development and procurement of defence equipment, reducing dependence on foreign imports and strengthening domestic industry.
- » **Y – Yodha First:** Places soldiers at the centre of reforms by improving training, equipment, healthcare, welfare, career progression, and support for veterans and Veer Naris.

Significance:

- » Integrates drones, satellites, and battlefield sensors into a common network, enabling faster decisions, better situational awareness, and precise military operations.
- » Builds on the JAI (Jointness, Atmanirbharta, Innovation) vision, ensuring the Army, Navy, and Air Force operate as an integrated force for future conflicts.



MECON Limited: From Category-II to Category-I

The Ministry of Steel has approved the elevation of MECON Limited to Miniratna Category-I status from its previous Category-II standing.

Miniratna Category-I status to MECON Limited

What is MECON Limited?

- » MECON Limited (formerly known as Metallurgical & Engineering Consultants Limited) is India's frontline, frontline multi-disciplinary design, engineering, consultancy, and contracting organization under the administrative control of the Ministry of Steel, Government of India.

History:

- » Founding: Established in 1959 as the Central Engineering & Design Bureau (CEDB), functioning initially as the captive design wing of Hindustan Steel Limited (HSL).
- » Evolution: It was later restructured as an independent public consultancy firm to reduce India's reliance on foreign technical know-how for large-scale industrial projects.

Core Functions:

- » Full-Lifecycle Consultancy: Offers a comprehensive suite of services spanning from "Concept to Commissioning," covering techno-economic feasibility reports, detailed engineering, project management, and environmental engineering.
- » EPC Contracting: Executes complex Engineering, Procurement, and Construction (EPC) contracts for both Greenfield (new) and Brownfield (expansion/upgradation) industrial facilities.
- » Industrial Backbone: Plays a pivotal role in expanding India's domestic iron, steel, and metallurgical sectors, while also diversifying into power, oil and gas, defense, and space infrastructure.

Miniratna Category-I Status:

What It Is?

- » Introduced by the Government of India in October 1997, the Miniratna scheme is an administrative classification granted to profit-making Central Public Sector Enterprises (CPSEs). It aims to provide greater operational

autonomy, enhanced delegation of financial powers, and competitive agility to public firms running without direct government financial support.

Objectives:

- » To decouple high-performing CPSEs from routine bureaucratic red tape, allowing them to compete globally.
- » To enable agile strategic decisions on capital spending, joint ventures, and technology tie-ups.

Mandatory Eligibility Criteria:

- » Financial Track Record: The company must have made a continuous net profit for the last three consecutive years.
- » Profit Threshold: The company's pre-tax profit must have reached 30 crore rupees or more in at least one of those three consecutive years.
- » Positive Asset Buffer: The entity must maintain a strictly positive net worth.
- » Zero Default Record: The enterprise must not have defaulted on the repayment of principal or interest on loans provided by the Government of India.
- » No Budgetary Crutches: The CPSE must function autonomously, meaning it cannot rely on budgetary support or government financial guarantees.
- » Restructured Board: The board must be reorganized by inducting at least three non-official (independent) directors before exercising any autonomous powers.

Key features:

- » Capital Expenditure Autonomy: The Board can approve capital expenditure up to ₹500 crore or the company's net worth (whichever is lower) without prior government approval.
- » Joint Ventures, Subsidiaries & M&A: The Board can establish JVs, overseas subsidiaries, and invest up to ₹500 crore or net worth. It can also undertake mergers and acquisitions aligned with CPSE objectives, while informing the CCEA for overseas investments.
- » Strategic Alliances & Technology: The Board can enter strategic alliances, technology JVs, and acquire technology, patents, and licenses under government guidelines.

- » Human Resource Reforms: Empowers the Board to frame HR policies, training programmes, VRS, and delegate appointments, transfers, and postings to internal authorities.
- » Faster International Business Travel: The CEO of a Category-I CPSE can approve overseas official visits of functional directors for up to 5 days, with only post-facto intimation to the administrative ministry.

Schizothorax pelzami: Endangered Jewel of Himalayan Streams

The indigenous Sangno clan of Arunachal Pradesh has launched a community-led translocation drive in the East Kameng district to conserve the endangered Himalayan ray-finned fish (*Schizothorax pelzami*).

The Himalayan Ray-Finned Fish

What It Is?

- » The Himalayan ray-finned fish (*Schizothorax pelzami*), commonly known as the Transcaspian marinka and locally called Ngarsing in the Nyishi language, is a specialized freshwater species belonging to the carp and minnow family (Cyprinidae).
- » It falls under the infraclass Teleostei (modern bony fishes) and represents the evolutionary culmination of structural traits engineered for high-altitude aquatic survival.

Habitat and Distribution:

- » Geographic Range: Native to the high-altitude, fast-flowing mountain streams, rivers, and cold-water torrents of the sub-Himalayan and Transcaspian zones.
- » Micro-Habitat: Thrives in clean, well-oxygenated, snow-fed glacial streams at high elevations—such as the Lapabung and Richaso streams in the eastern Himalayas, sitting thousands of feet above sea level.
- » Ecosystem Dynamics: Shares river systems with larger predators like the aggressive, fast-swimming Mahseer (known as the ‘tiger of the water’), requiring shallow or isolated upland streams to breed safely.

Conservation Status:

- » IUCN Red List Status: Classified globally as Endangered.

Key Features:

General Studies, Political Science and International Relations, Sociology, CSAT



- » **Bony Ray-Finned Architecture:** The fins are supported by flexible bony rays, providing better balance, steering, and stability while swimming in fast-flowing mountain streams.
- » **True Homocercal Tail:** The tail has equal upper and lower lobes, generating balanced thrust that improves swimming speed and efficient forward movement.
- » **Mobile Jaw Mechanics:** Its protractile (extendable) mouth helps suck algae and small aquatic organisms from rocks and riverbeds, supporting efficient feeding.
- » **Overlapping Scale Layering:** Thin, overlapping scales reduce body weight and water resistance, allowing greater agility and energy-efficient swimming.

Significance:

- » Schizothorax species are highly sensitive to water quality, temperature, and oxygen levels, making them reliable indicators of Himalayan river health.
- » Conservation by the Nyishi community through temporary fishing bans protects fish populations while preserving traditional livelihoods and promoting eco-tourism.

Siang River at the Crossroads

The proposed ₹113,000 crore Siang Upper Multipurpose Project (SUMP) remains locked in a tense standoff with local indigenous Adi and Galo tribes in Arunachal Pradesh over displacement concerns and a deep trust deficit.

Siang Upper Multipurpose Project

What It Is?

- » The Siang Upper Multipurpose Project (SUMP) is a planned mega-hydroelectric and flood-control facility designed with an installed capacity of 11,000 MW to 11,200 MW.
- » It consolidates two earlier proposals into a single, massive storage-type reservoir with an estimated height of 280–300 meters, engineered to generate 47 billion kWh of electricity annually and hold a massive 9-billion-cubic-meter reservoir volume.

Location and Rivers Involved:

General Studies, Political Science and International Relations, Sociology, CSAT

- » Location: Planned near Geku village in the Upper Siang district of Arunachal Pradesh, India.
- » Primary River: The Siang River, which enters India near Gelling. Upstream in Tibet, the river is known as the Yarlung Tsangpo (originating at an elevation of 5,300 meters in the Chemayungdung mountain range near Mansarovar).
- » Basin Confluences: The Siang flows 197 km to its confluence with its largest right-bank tributary, the Shiyomi River, before joining the Dibang and Lohit downstream in Assam to form the mighty Brahmaputra River.
 - The basin is also fed by the high-altitude Yar Gyap Chu stream flowing through the Mechuka Valley.

Current Status:

- » The project is currently stalled.
- » Intense grassroots protests led by the Siang Indigenous Farmer's Forum (SIFF) and the Adi Banne Kebang (ABK) have blocked the executing agency, NHPC, from conducting essential pre-feasibility surveys.
- » On-the-ground resistance covers three proposed coordinates—Ugeng, Dite Dime, and Parong—leaving the exact scope of village submergence and displacement highly contested.

Key Features:

- » Deep Canyon Topography: The Siang flows through the Yarlung Tsangpo Grand Canyon, creating steep, fast-flowing gorges that provide immense hydropower potential but remain ecologically fragile.
- » Fragile Seismotectonic Zone: The basin lies in the earthquake-prone eastern Himalayas, where landslides and seismic activity can trigger natural dams and sudden downstream floods.
- » Alluvial Valleys and Agriculture: Downstream alluvial plains are rich in fertile sediments, supporting the region's orchard economy with crops like kiwi, mandarin oranges, and large cardamom.
- » Volatile Monsoonal Hydrology: Heavy monsoon rainfall causes sharp seasonal flow variations, leading to floods, riverbank erosion, and loss of fertile agricultural land.



Significance:

- » Developing infrastructure on the Siang strengthens India's prior-use claims under international water law, reinforcing its position in transboundary river management.
- » The proposed reservoir can absorb sudden flood surges or upstream water releases, reducing flood risks for Arunachal Pradesh and Assam.
- » The project can generate clean hydropower, improve irrigation, create employment, and transform Arunachal Pradesh into a major green energy hub.

16th Indo-Japanese Strategic Summit

Key-Outcomes of the Summit

- » Joint Declaration on Economic Security: Includes key sectors like semiconductors, critical minerals, information and communication technology, including AI, clean energy etc.
- » Next Generation Mobility Partnership Framework: Accelerate investment in mobility sectors including rail, automotive and road infrastructure, aviation, etc.
- » Biogas Initiative: Supports the establishment of 1,000 biogas and organic fertilizer plants in India.
- » First India-Japan defence co-development project: Naval Radio Antenna project
- » Other cooperation areas: Pharma through Active Pharmaceutical Ingredients (APIs), internet registry operations, geology and mineral exploration, etc.

Significance of India–Japan Relations

- » Infrastructural development: E.g., Mumbai-Ahmedabad High Speed Rail (MAHSR) project, which is being implemented with Japanese technical and financial assistance.
- » Foreign Investment: Japan is the fifth-largest source of Foreign Direct Investment (FDI) into India and accounts for 6% of total FDI into India.
- » Economic relations: E.g., India- Japan Comprehensive Economic Partnership Agreement (CEPA) came into effect from 2011.



- » Strategic Alignment: E.g., both countries are part of QUAD Initiative
- » Space Exploration: ISRO and Japan's space agency, JAXA, are collaborating on the Lunar Polar Exploration Mission.

Borjuli Wetland: A Biodiversity Hotspot

The Borjuli wetland has been notified as a Biodiversity Heritage Site.

Borjuli Wetland

- » Location: Sonitpur District, Assam
- » It is known for harbouring a variety of wild rice (*Oryza rufipogon*)
 - It is the progenitor of present-day cultivated rice, *Oryza sativa*.
 - It is disease- and pest-resistant and can tolerate flooding and saline conditions.

Biodiversity Heritage Site

- » They are unique, ecologically fragile ecosystems having rich biodiversity comprising some specific components. E.g., high endemism, presence of threatened species etc.
- » Notification: by the State Government in consultation with local bodies under the Biological Diversity Act, 2002.
- » National Biodiversity Authority, under ministry of Environment, advises the State Government in the selection and management

Green Fuels for a Low-Carbon Future

Recently an Indian company secured long-term offtake deal with leading Japanese companies for Green Ammonia and Green Methanol.

Green ammonia

- » It is a pungent gas primarily used to make fertilizers (China is the largest producer of ammonia)
- » Production: using the Haber-Bosch process, where hydrogen and nitrogen are combined.
- » Significance: Reducing GHG emissions, can be used as a fuel (has higher density in relation to other chemicals produced via renewable processes), can be used to produce hydrogen

Green Methanol

General Studies, Political Science and International Relations, Sociology, CSAT



- » Methanol is a colourless liquid
- » Applications : mainly used for producing other chemicals such as formaldehyde, acetic acid and plastics
 - It can be used as a fuel source for engines, but it is also expensive, flammable and requires double the fuel tank size compared to its oil equivalent.
- » Production: Green methanol is produced from low-carbon sources such as biomass, or via carbon capture.

I-2SEA: Strengthening India's Digital Infrastructure

Singapore.

- » It is expected to become operational in 2029.

I-2SEA Submarine Cable System (SCS)

- » It is designed to support the growing demand for AI training and inference, hyperscale cloud services, GPU infrastructure, and enterprise connectivity.
- » It will connect Machilipatnam (Andhra Pradesh) and South Chennai (Tamil Nadu) in India, Kuala Lumpur (Malaysia), Singapore.

Submarine Cable System

- » They are fibre optic cables laid on the ocean floor that connect countries across the world to provide internet and telecommunications.
 - Optical fibres are used to transmit information as light pulses.
 - It works based on a principle called 'total internal reflection'-where the light in a fibre-optic cable travels through the core (hallway) by constantly bouncing from the cladding (mirror-lined walls).
- » These "invisible highways" transmit between 95% and 99% of all international data traffic.
- » United Nations General Assembly (UNGA) in 2010 had described the Submarine cable as critical communication infrastructure.



- » Major Challenges to SCS: Risks from accidental or deliberate damage (e.g., anchoring) Environmental factors like earthquakes, Ageing infrastructure, etc.

Significance:

- » Reduces procedural delays, enabling faster development and induction of indigenous defence technologies into the Armed Forces.

Lonar Lake: India's Meteorite Crater

Recently, rising water levels in Lonar Lake have submerged parts of nearby temples, including the Kamalja Devi Temple.

Lonar lake

- » Location: Vidarbha region, Maharashtra.
- » Origin: Formed nearly 50,000 to 52,000 years ago when a meteorite impacted the Earth in the basalt formations of the Deccan Plateau.
 - It is the one of the largest crater lake.
- » Conservation: It has been designated a Wildlife Sanctuary, National Geo-Heritage Site and Ramsar Site
- » Key features
 - Unique Biodiversity: It has 2 distinct layers (alkaline and saline) of water, harboring microorganisms not found anywhere else.
 - Endorheic basin: a closed drainage basin with no outflow.
 - Moon resemblance: Minerals in the lake soil closely resemble those found in moon rocks

Mount Erebus in Antarctica

Scientists have discovered that Mount Erebus emits volcanic gases containing microscopic crystals of pure gold.

Trac

Mount Erebus

- » Location: Ross Island in the Ross Sea, Antarctica,

Key features

- » It is the world's southernmost active volcano
- » It has a permanent lava lake
- » It is a stratovolcano and is part of the Pacific Ring of Fire that encircles the Pacific Ocean basin.

Promoting Ayurveda on the Global Stage

It presents a comprehensive assessment of Ayurveda's global footprint and outlines a roadmap for promoting Ayurveda globally.

Global Status of Ayurveda

- » Export Performance: Exports rose from \$1.09 billion (2014) to \$2.16 billion (2023), reaching ~150 countries.
- » Formal Recognition: It has been included in WHO's ICD (International Classification of Diseases)-11 (Module 2) that codifies morbidity classifications for traditional medicine systems.
 - Ayurveda is recognized as a medical discipline in nearly 30 countries e.g. UAE, Switzerland etc.

Key recommendations

Availability

- » Globalized workforce: Establish a Global Ayurveda Register for practitioners with WHO-aligned credentials to facilitate licensure in foreign countries.
- » International research base: Set up International Ayurveda Centres of Excellence and research alliances to conduct multi-country clinical trials

Acceptability:

- » Standardization: Upgrading manufacturing units to WHO-GMP norms, develop specialized Ayurvedic Pharmacopoeia for meeting international standards
- » Localization: Adapting formulations, labels, terminology to local languages and cultures to improve acceptance.

Propagation

- » Brand Positioning: Increasing presence at international conferences, global landmarks, while empowering Indian embassies as information nodes.



- » Medical Value Travel (MVT): Promotes India as a global destination for integrative care by creating MVT hubs and offering bundled "Ayush Visa" packages.
- » Presence in Global Bodies: like WHO, UNESCO to include Ayurveda in global health diplomacy and cultural heritage platforms.

Core Challenges

- » Limited professional mobility: While India has over 355,000 qualified practitioners, about 95% remain within the country.
- » Competitive Pressure: Traditional Chinese Medicine has a more robust global footprint due to long-term state support, extensive overseas centers etc.
- » Evidence Gaps: lack of scientific validation in formats accepted by international regulators creates skepticism and force high-value Ayurvedic medicines to be sold as dietary supplements rather than therapeutic drugs.

Surety Bonds in Infrastructure Projects

Coal Blocks Allocation (Amendment) Rules, 2026 enabled the use of Insurance Surety Bonds (ISBs) in place of Performance Bank Guarantees (PBGs).

- » The reform currently covers coal blocks allocated under the Mines and Minerals (Development and Regulation) Act, 1957, later proposed to be extended to coal blocks allocated under the Coal Mines (Special Provisions) Act, 2015.

Insurance Surety Bonds (ISBs) & Performance Bank Guarantees (PBGs)

- » Insurance Surety Bonds (ISBs): A financial guarantee issued by an insurance company that compensates the government if the contractor or allocatee fails to meet contractual obligations.
- » Performance Bank Guarantees (PBGs): A bank-issued guarantee ensuring that a project developer fulfils contractual obligations; if the developer defaults, the government can recover the guaranteed amount from the bank.

The Challenge of AI Hallucinations

The Supreme Court set aside an order of the National Company Law Tribunal (NCLT) for Using AI-Hallucinated Citations.

AI hallucination

General Studies, Political Science and International Relations, Sociology, CSAT

- » These are incorrect or misleading results that AI models generate.
- » It perceives patterns or objects that are non-existent or imperceptible to human observers, creating outputs that are nonsensical or altogether inaccurate.
 - E.g., Google's Bard chatbot incorrectly claimed that the James Webb Space Telescope had captured the world's first images of a planet outside our solar system.
- » Factors responsible are insufficient training data, incorrect assumptions made by the model, or biases in the data used to train the model.

The Nord Stream Energy Corridor

German prosecutors have accused Ukrainian state authorities of ordering the 2022 explosives attack on the Nord Stream gas pipelines.

Nord Stream Pipeline

- » Nord Stream is a major natural gas pipeline between Russia and Germany.
- » It passes through the Baltic Sea.
- » Pipelines: Nord Stream 1 & Nord Stream 2.

Significance:

- Ensures energy security for Europe, especially Germany.
- Provides a direct, reliable gas supply from Russia, bypassing transit countries.

Towards Safer and Sustainable Roads in India

The Ministry of Road Transport and Highways (MoRTH) released the Road Accidents in India 2024 report, highlighting rising road accidents and fatalities, emphasizing the need for safe, sustainable, and technology-driven road infrastructure.

Road Safety as a concern in India

- » India accounts for 11% of global road fatalities with just 1% of the world's vehicles (World Bank).
- » In 2024, India recorded 485 road deaths per day, exceeding the 10-year average (MoRTH).

Technological Solutions for Safer Roads

- » Vehicle-to-Vehicle (V2V) Communication: Shares real-time vehicle data to prevent collisions.
- » Automated Incident Detection: Enables faster emergency response to crashes and breakdowns.
- » Intelligent Transport Systems (ITS): AI-enabled CCTV, Advanced Traffic Management Systems, and automated incident detection.
- » AI-based Surveillance: Detects traffic violations and accidents in real time.
- » Speed Detection Systems: Identify over-speeding and enable e-challans.

Key Measures for sustainable roads

- » Green Construction: Use of waste plastic, fly ash, and industrial slag in highway construction.
- » Green Engineering: Conserves natural resources and reduces industrial waste.
- » GlobalBestPractices: Netherlands (solar roads), Germany (eHighways), Sweden (dynamic wireless charging roads), and Norway (EV highway charging networks) showcase innovative models for sustainable and energy-efficient road infrastructure.

ZSI and Wildlife Research in India

Animal Discoveries–2025, released by the Zoological Survey of India (ZSI) reported 709 new faunal records, including 483 new species and 226 species recorded in India for the first time.

Zoological Survey of India (ZSI)

- » It is India's premier institution for survey, exploration, taxonomy, documentation, and conservation of the country's faunal diversity.
- » Established in 1916
- » It functions under the Union Ministry of Environment, Forests and Climate Change.

Key Objectives:

- Maintenance & Development of National Zoological Collections
- Periodic review of the Status of Threatened and Endemic species, etc.
- » HQ: Kolkata and has 16 regional centers spread across the country.



250years of US Independence: Implications for India-US Relations

The relationship between the world's largest democracy (India) and oldest democracy (United States) has transformed dramatically from Cold War estrangement to a robust strategic partnership.

Historic Evolution of India-US Relations

- » The Cold War Era and Estrangement (1947–1990):
 - Policy of Non-Alignment: Following independence, India adopted non-alignment to preserve strategic autonomy, creating geopolitical distance with Washington.
 - Key Points of Friction:
 - 1971 India-Pakistan War: India signed the Indo-Soviet Treaty of Friendship; US deployed the USS Enterprise task force in the Bay of Bengal in support of Pakistan.
 - Nuclear Tensions: India's 1974 "Smiling Buddha" test triggered US export controls. The 1998 Pokhran-II tests led to immediate economic sanctions.
- » The Thaw and Turning Point (1991–2024):
 - Economic Opening (1991): The end of the Cold War and India's 1991 economic reforms opened markets and initiated a thaw in relations.
 - Diplomatic Shifts (1999–2001): During the 1999 Kargil conflict, the US pressured Pakistan to withdraw forces. By 2001, remaining nuclear sanctions were lifted.
 - The Breakthrough (2008): The India-US Civil Nuclear Agreement ended India's nuclear isolation and built foundational trust between the two democracies.
 - India designated as Major Defense Partner (2016): Foundational Defense Agreements such as LEMOA (logistics), COMCASA (communications), BECA (geospatial), etc. were signed.



- The Indo-Pacific Focus (2017): Mutual concerns over China led to the revival of the Quadrilateral Security Dialogue (Quad) with Japan and Australia.

Current Status of India-US Relations (2025-26)

» Economic and Trade Dynamics:

- The US is India's 2nd largest trading partners with bilateral trade (goods + services) exceeding \$200 billion (India having a surplus) and ambitions to reach \$500 billion.
- 2025 Tariff Tensions: US imposed reciprocal tariffs (escalating to 50%) partly due to India's purchases of Russian oil.
- 2026 Interim Trade Framework: Tariffs reduced to ~18% on many Indian goods.

» Defense and Security Cooperation

- Key Platforms Acquired/Integrated: C-17 Globemaster, C-130J, P-8I Poseidon, Apache helicopters, Chinook, MH-60R Seahawk.
- 2025 10-Year Framework: Signed for Major Defense Partnership, focuses on interoperability (land, sea, air, space, cyber), co-development, and industrial collaboration.
- Joint Exercises: Routine drills like Yudh Abhyas (Army), Vajra Prahar, Malabar (naval with Quad partners).

Battery Management System: Functions and Significance

Union Government directed to take down apps associated with Battery Management System (BMS) over reports of misuse to remotely switch off some e-rickshaws.

BMS

- » Essentially tracks the state of a battery, with primary aim of eliminating variations in performance of individual battery cells to allow them to work uniformly inside a battery pack.
- » It is incorporated in an electric vehicle (EV) powered with a large-capacity lithium ion battery, and plays a key role in extending the battery's service life and ensuring its safe use.



- » Automotive is the largest segment for BMS with a 50% market share.
- » Many BMS units support Bluetooth connectivity, allowing users and service centres to monitor battery status through companion smartphone applications.

Boosting India's Container Manufacturing

Union Minister of Ports, Shipping and Waterways unveiled the first export-import (EXIM) shipping container manufactured in India for global shipping major A.P. Moller–Maersk.

- » It aligns with Container Manufacturing Promotion Scheme (CMPS).

CMPS

- » Genesis: Announced in Union Budget 2026 with an outlay of Rs. 10,000 crore.
- » Aim: Creating globally competitive container manufacturing ecosystem in India through financial incentives to support establishment and expansion of container manufacturing units.
 - Envisages an annual manufacturing capacity boost by 10 times upto 7.5 lakh TEUs.
- » Ministry: Minister Of Ports, Shipping And Waterways.

Boosting SC-ST Entrepreneurship in India

The National SC-ST Hub (NSSH) Scheme is a focused initiative designed to empower entrepreneurs from Scheduled Castes and Scheduled Tribes.

NSSH Scheme

- » Launched: In 2016 under the Ministry of Micro, Small and Medium Enterprises (MSME).
- » Implementing Agency: National Small Industries Corporation (NSIC).

Objectives:

- » Provide professional support to SC/ST entrepreneurs.
- » Designed to help SC/ST enterprises meet the mandatory 4% procurement sub-target under the Central Government Public Procurement Policy for MSEs, 2012.
- » Promote adoption of best business practices.



- » Leverage opportunities under the Stand-Up India initiative.

Collaborative Governance in India

Whole of Government (WoG) approach refers to a mode of governance where different government departments & ministries work together (rather than in silos) to achieve shared goals that no single agency can tackle alone.

- » E.g. climate change, poverty etc.

Key Benefits of WoG Approach

- » **Enhanced Policy Coherence:** It ensures that different departments are not working at cross-purposes, leading to more consistent governance.
 - E.g. new highways are often dug up soon after construction to lay optical fiber cables.
- » **Improved Efficiency and Effectiveness:** Streamlined processes and integrated service delivery reduce redundancy and optimize resource allocation.
 - E.g. POSHAN Abhiyaan brings together > 26 ministries to tackle malnutrition as it cannot be solved by food alone but requires clean water, immunization etc.
- » **Resource Optimization:** Pools financial, human, and technological resources, which reduces delays, cost overruns and allows sharing of knowledge.
- » **Increased Public Trust:** Instead of citizens navigating multiple departments for approvals, integrated platforms provide single-window solutions.
 - E.g. Jan Samarth portal integrates 13 credit-linked government schemes from various ministries onto one digital platform.
- » **Rapid Crisis Response:** As demonstrated during the COVID-19 pandemic, a WoG approach allows for a unified and timely response to national emergencies.
- » **Others:** Reduces duplication, enhances transparency and accountability, etc.

Defence Acquisition Council Explained



Defence Acquisition Council (DAC) approves capital acquisition for the procurement several weapon systems.

- » DAC (chairman: Defense Minister) gives 'in principle' approval to Capital acquisitions in the Long Term Perspective Plan and Grants acceptance of necessity for acquisition proposals.

Key Weapon System Approved

- » AKASH TARANG: Anti-Unmanned Aerial Vehicles (UAV) Electronic Warfare System for the Indian Army.
 - Unlike hard kill it just disrupts the frequency, jamming GPS/GNSS and severs communication (soft kill) between the drone and operator.
- » Medium Range Surface-to-Air Missile (MR-SAM): Developed by Israel Aerospace Industries and DRDO with range over 70 km and is based on the Barak-8 missile.
- » Very Short Range Air Defence System (V-SHORADS): To neutralize low altitude aerial threats at short ranges.
 - It is an indigenously developed Man Portable Air Defence System.

Global Commission on AI for Good

Reliance Industries chairman and Bharti Enterprises founder have been named founding members of newly launched AI for Good Global Commission.

AI For Good Global Commission

- » It brings together more than 40 Founding Members — including Heads of State and Government, industry CEOs and top executives, and Heads of UN agencies.
- » Purpose: Define practical pathways to strengthen trust, expand access and unlock AI's potential.
- » Led by: International Telecommunication Union (ITU).
 - ITU is the United Nations agency established in 1865. (Hq: Geneva, Switzerland).
 - It coordinates global use of radio spectrum and satellite orbits, establishes international technology standards, etc.



Indian Dory: A Marine Species in Focus

ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI), Kochi has discovered a new deep-sea fish 'Cyttopsis indica' (Indian dory) from the Arabian Sea off Kerala.

Cyttopsis indica (Indian dory)

- » It was found at depths of 350-500 metres along the continental slope of the eastern Lakshadweep Sea.
- » The DNA analysis revealed a stark genetic divergence from all other known species in its genus, correcting a long-standing taxonomic error.
- » Until now, the fish seen in the Indian Ocean was believed to be *Cyttopsis rosea*, a species with distribution now confined to the Atlantic Ocean.

India's First Bullet Train Nears the Finish Line

With commercial service expected in August 2027, the project would serve as a blueprint for future high-speed rail corridors planned across the country.

- » India has identified seven additional high-speed rail corridors covering nearly 4,000 km, with estimated investments of Rs 16 lakh crore.

Mumbai-Ahmedabad High-Speed Rail (MAHSR) Project

- » 508-km corridor designed for trains capable of reaching speeds up to 350 kmph, (operational speed of 320 kmph).
 - Faster than Vande Bharat trains (180 km/hour).
- » Funding: 81% of total cost through Japan International Cooperation Agency (JICA).
 - Remaining by Government of India.
- » Implementation: National High-Speed Rail Corporation Limited (NHSRCL).
 - 'Special Purpose Vehicle' with equity participation by Central Government through Ministry of Railways and governments of Maharashtra and Gujarat.

Major Technical Features

- » Japanese Shinkansen-based 2×25 kV overhead electrification:



- Shinaknsen system is based on Crash Avoidance principle, total system approach as well as effective O&M, organization, and personnel training and development.
- » Japan's J-Slab ballastless track technology: Being used for the first time in India.
 - Track system consists of four main components viz. RC Track Bed, Cement Asphalt Mortar (CAM), Pre-cast Track Slab and Rails with Fasteners.

Significance of the MAHSR:

- » Develop a standardised model for future bullet train corridors using common engineering standards customised to local soil conditions enabling lower cost, faster execution and easier procurement.

Other key Efforts by India Towards Indigenising HSR

- » Development of High speed train sets: capable of operating at 280 kmph by Integral Coach Factory (ICF), in partnership with Bharat Earth Movers Limited (BEML).
- » Manufacturing of Specialised Components: Including slab-track systems, B-28 coaches (being developed in Aditya Facility, Bengaluru), etc.

India's New Push for Maritime Growth

Ministry of Ports, Shipping & Waterways (MoPSW) convened an industry consultation on the Maritime Investment Fund (MIF), currently being established under Maritime Development Fund (MDF).

MDF

- » Established in September 2025 with total corpus of ₹25,000 crore to address long-term financing requirements of maritime sector.

Two Components:

- » Maritime Investment Fund (MIF) (₹20,000 crore):
 - Contribution by Government of India is 49%, with balance mobilized from other institutional, public sector and private investors.

- » Interest Incentivization Fund (IIF) (₹5,000 crore): Funded entirely through budgetary support of Government of India.

How Does the World Bank Classify Countries?

World Bank (WB) elevated Vietnam, Sri Lanka, Philippines, Jordan, and Micronesia to upper-middle income status.

- » India remains an Lower-Middle-Income Economy.

WB Income Classification

- » Methodology Used: GNI per capita measured in USD dollars — using the Atlas methodology.
- » Current Classification
 - Low-income economies: GNI \$1,175 or less.
 - lower middle-income economies: GNI between \$1,176 and \$4,635.
 - upper middle-income economies: between \$4,636 and \$14,375.
 - high-income economies: More than \$14,375.
- » On July 1 each year, WB updates classifications estimates from previous calendar year.
- » Significance: Classifications inform which countries can access concessional loans and development assistance.

Indus Waters Treaty Remains on Hold

- » India has reiterated that the Indus Waters Treaty will remain suspended until Pakistan credibly and irreversibly ends its support for cross-border terrorism.
- » India had put the Treaty under abeyance post Pahalgam terrorist attack in April 2025.

Indus Waters Treaty

- » Signed: On 19 September 1960 at Karachi between India and Pakistan, with the World Bank (IBRD) as a signatory/facilitator.
- » Came into force with retrospective effect from 1 April 1960.

Rivers Covered:

- » Eastern Rivers (Ravi, Beas and Sutlej): Allocated to India for unrestricted use.
- » Western Rivers (Indus, Jhelum and Chenab): Allocated to Pakistan.
- » India is permitted limited use for domestic purposes, non-consumptive uses, irrigation and run-of-the-river hydroelectric projects, in accordance with the Treaty.

Dispute Resolution under IWT:

- » Step 1: Permanent Indus Commission (PIC) with a commissioner from each country. (Meets annually alternatively in both countries).
- » Step 2: Neutral Expert (appointed by World Bank) and involves rendering a binding decision.
- » Step 3: Court of Arbitration upon agreement between parties or at the request of either party.

Implications of the Suspension of the Indus Waters Treaty**For Pakistan:**

- » Food insecurity: The Indus system irrigates over 80% of Pakistan's food crops (World Bank).
- » Economy: Wheat, rice and cotton, dependent on the Indus system, earned USD 4.8 billion in exports (2022).
- » Electricity and water stress: Around one-third of Pakistan's electricity comes from hydropower, while the country is already water-stressed.

For India:

- » Weaponisation of water resources: Global focus on Pakistan' State-terror nexus.
 - However, it might set a precedent for upstream countries, particularly China on the Brahmaputra, to adopt similar strategies.
- » Credibility as a responsible international actor: Unilateral suspension may be perceived as undermining treaty commitments.



- » Ecological imbalance: New water infrastructure projects may affect the biodiversity-rich and seismically sensitive Indus basin.

What's Happening in Mali?

Mali (Capital: Bamako)

- » India and Mali Hold Inaugural India–Mali Forum for Promotion of Exports to Deepen Bilateral Trade and Investment Cooperation.

Political Features

- » Landlocked country in Saharan and Sahelian regions of West Africa.
 - Sahel is a transitional zone between the arid Sahara (desert) to the north and the belt of humid savannas to the south.
- » Land Boundaries: Algeria (north), Niger and Burkina Faso (east), Côte d'Ivoire and Guinea (south), and Senegal and Mauritania (west).

Geographical Features

- » Major Rivers: Niger, Senegal
- » Highest Peak: Hombori Tondo
- » Major Winds: Alizé (Trade Winds), Harmattan
- » Major Minerals: Gold, iron ore, bauxite, manganese, lithium

World Bank Eases Climate Finance Targets

Following disapproval from **United States** (bank's largest shareholder), WB indicated to retire 45% climate co-benefits target and 35% target in the Climate Change Action Plan [CCAP].

- » While agreeing to continue its CCAP plan, WB clarified its work on climate is and will remain firmly client driven.

CCAP

- » Genesis: Launched In 2016 after Paris Agreement as a five-year Climate Change Action Plan 2016–2020.
 - Building on its achievements, the second CCAP covering 2021–2025 allocated 35% to climate finance.
 - It was extended until June 30, 2026.



- » Purpose: Increase financial and technical support to client countries and private sector clients for mitigation and adaptation.

Key Implications of WB Withdrawal

- » Important Role of WB: In FY 2025, 48% of WB financing had climate co-climate benefits, with important projects in India targeting states like UP, Maharashtra, Kerala, etc.
 - Climate Co-Benefits are financial resources which deliver positive benefits associated with climate change mitigation and adaptation.
- » Difficulty Achieving Global Targets: New Collective Quantified Goal (NCQG) adopted at CoP29 of UNFCCC demands scaling up financing for developing countries to at least USD 1.3 trillion annually by 2035 from all sources.
- » Existing Climate Finance Gaps: Adaptation financing needs in developing countries is 12-14 times as much as current flows (UNEP's 2025 Adaptation Gap Report).
 - India needs cumulative investment requirements of USD 22.7 trillion by 2070 (NITI Ayog).
- » Energy Security as core driver of development: E.g., Iran war has cast doubt on viability of liquefied natural gas as 'transition fuel' demanding renewable alternatives.

PLFS & ASUSE 2025: Mapping India's Labour Market

The National Statistics Office (NSO) released PLFS 2025 (Labour Market Dynamics in Million-plus Cities) and ASUSE 2025 (Urban Unincorporated Enterprise Landscape), providing the first comprehensive assessment of employment and informal enterprises across 46 million-plus cities.

The Surveys

- » Periodic Labour Force Survey (PLFS)
- » Conducted by NSO under MoSPI since 2017.
- » Provides annual and quarterly estimates of:
 - » Labour Force Participation Rate (LFPR)
 - » Worker Population Ratio (WPR)

General Studies, Political Science and International Relations, Sociology, CSAT

- » Unemployment Rate (UR)
- » Uses Usual Status (US) and Current Weekly Status (CWS) for employment estimation.
- » Annual Survey of Unincorporated Sector Enterprises (ASUSE)
- » Conducted by NSO.
- » Covers unincorporated non-agricultural enterprises (excluding construction).
- » Measures employment, enterprises, Gross Value Added (GVA), productivity, wages and ownership patterns across manufacturing, trade and services.

Key Findings

- » PLFS 2025
- » LFPR: 52.4% in million-plus cities (higher than other urban areas).
- » WPR: 49.8%.
- » UR: 4.9%, continuing the declining trend since 2017-18.
- » Female WPR increased from 17.9% (2017-18) to 25.5% (2025).
- » 58.5% workers employed in regular salaried jobs, while casual labour constituted only 6.3%.
- » Million-plus cities recorded lower NEET (Not in Employment, Education or Training) youth and relatively higher working hours.

ASUSE 2025

- » 39 lakh informal enterprises employing 1.98 crore workers.
- » Contribute 13% of India's informal enterprises, 16% of informal employment and 21% of GVA of the unincorporated sector.
- » Greater Hyderabad recorded the highest informal employment, while Kolkata had the largest number of enterprises.
- » Women account for 26% of the informal workforce.
 - Pimpri-Chinchwad, Greater Hyderabad and Delhi recorded the highest the Indo-Soviet Treaty of Friendship; US deployed the USS Enterprise task force in the Bay of Bengal in support of Pakistan.
 - productivity, while Jaipur reported the highest annual emoluments.

Significance

- » Indicates improving urban labour market conditions and gradual employment formalisation.



- » Highlights the continuing importance of informal enterprises in employment generation and urban economic growth.
- » Reflects rising female labour force participation and declining urban unemployment.
- » Provides an evidence base for employment policy, MSME development, skill development and Viksit Bharat.

Challenges & Way Forward

- » Large informal workforce with limited social security and formal finance.
- » Wide inter-city disparities in productivity, wages and female participation.
- » Need for greater employment quality alongside employment growth.

Way Forward

- » Strengthen MSMEs and informal enterprises.
- » Expand social security and formal credit access.
- » Promote women's labour force participation through skilling and supportive infrastructure.
- » Use PLFS and ASUSE data for evidence-based urban planning, labour reforms and employment generation.

Q. Consider the following statements regarding PLFS and ASUSE:

1. PLFS is conducted by the National Statistics Office under the Ministry of Statistics and Programme Implementation.
2. ASUSE covers unincorporated non-agricultural enterprises excluding construction.
3. Labour Force Participation Rate (LFPR) refers only to the employed population.

Which of the statements given above is/are correct?

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

Answer: (b)

"The findings of PLFS and ASUSE 2025 reflect both the progress and persistent structural challenges of India's urban labour market." Discuss.

Immunity Boosters: What Does the Science Really Say?

A recent analysis argues that the rapidly growing "immunity booster" industry lacks strong scientific evidence. It highlights that vaccines, healthy lifestyles, and evidence-



based medicine remain the only proven ways to maintain a healthy immune system, while many supplements offer misleading claims and may even pose health risks.

Why are "Immunity Boosters" Criticised?

- » Market products such as vitamin pills, herbal supplements, teas, powders and tonics claim to "boost immunity" without robust scientific evidence.
- » The immune system cannot simply be strengthened like a muscle; it functions through a delicate balance of multiple biological processes.
- » Excessive immune activation can be harmful, leading to allergies, autoimmune diseases and cytokine storms.
- » Common supplements such as Vitamin C, Zinc and Vitamin D have limited or no proven benefit in preventing common infections among healthy individuals.
- » Many herbal and dietary supplements are poorly regulated, with risks of contamination, incorrect labelling and adverse effects.
- » Cases of supplement-induced liver injury have risen significantly, accounting for nearly 20% of cases in the U.S. drug-induced liver injury registry, compared to 7% in 2005.

Understanding the Human Immune System

- » The immune system consists of two complementary defence mechanisms:
- » Innate Immune System (First Line of Defence) Provides immediate, non-specific protection.

Includes:

- » Skin and mucous membranes Stomach acid and protective enzymes
Phagocytes (macrophages)
- » Natural Killer (NK) cells
- » Adaptive Immune System (Specific Defence) Develops pathogen-specific immunity and long-term immune memory.

Comprises:

- » B lymphocytes (B cells): Produce antibodies.
- » T lymphocytes (T cells): Destroy infected cells and regulate immune responses.
- » Forms the scientific basis of vaccination.

Role of Vaccines



- » Vaccines safely expose the immune system to pathogen antigens, enabling it to develop memory cells and protective antibodies without causing disease.
- » They remain the most effective and scientifically validated method of preventing infectious diseases.
- » Vaccination has enabled:

Eradication of Smallpox.

- » Massive reduction in Polio, Measles, Diphtheria and several other infectious diseases.
- » Declining vaccination rates increase the risk of resurgence of vaccine-preventable diseases.

Way Forward

- » Strengthen regulation and scientific scrutiny of dietary and herbal supplements.
- » Promote evidence-based public health communication against misleading health claims.

Encourage healthy lifestyles through:

- » Balanced nutrition
- » Regular physical activity
- » Adequate sleep
- » Avoidance of tobacco and excessive alcohol
- » Timely vaccination
- » Improve public awareness about the functioning of the immune system and rational use of supplements.

"The growing market for 'immunity boosters' reflects the increasing commercialisation of healthcare. Discuss why evidence-based public health interventions, particularly vaccination and healthy lifestyles, are more effective than unregulated supplements in promoting immune health

Inshore Ecosystems and India's Fisheries: A Growing Concern

- » The Government of India, citing Central Marine Fisheries Research Institute (CMFRI) data, reported that 91.1% of 135 marine fish stocks assessed in 2022 are sustainable. However, experts argue that the real crisis lies in the degradation of India's inshore ecosystems, mechanised Union Government



directed to take down apps associated with Battery Management System (BMS) over reports of misuse to remotely switch off some e-rickshaws.

- » trawling and weak fisheries governance rather than fish stock numbers alone.

Why are India's Marine Fisheries Under Stress?

- » FAO states that India's marine fisheries have reached a plateau, with most major fish stocks already fully exploited.
- » CMFRI primarily relies on landing data (fish catch) to estimate stock status, whereas internationally accepted stock assessment methods directly estimate fish populations in the sea.
- » Catch-based assessment may not accurately reflect the health of marine ecosystems.

Major Causes of the Fisheries Crisis

- » Degradation of inshore benthic ecosystems (coastal seabed), the most productive marine habitats.
- » Expansion of mechanised trawling, which destroys seabed habitats and juvenile fish breeding grounds.
- » Pollution from industries, agriculture and urban settlements.
- » Mangrove destruction, reducing natural nursery grounds for fish.
- » River dams, restricting nutrient flow into coastal waters.
- » Open access to fisheries leading to excessive fishing effort and overcrowding of mechanised vessels.

Mechanised Trawling: The Core Challenge

- » India has over 64,000 mechanised fishing vessels, with increasing fishing capacity through engine upgrades.
- » Bottom trawling continuously disturbs the seabed, damaging benthic biodiversity and fish breeding habitats.
- » Creates livelihood conflicts with traditional small-scale fishers.
- » Although trawling is prohibited within 5 nautical miles of the coast, enforcement remains weak due to inadequate surveillance and limited stakeholder participation.

Significance



- » Healthy inshore ecosystems are essential for sustaining fish populations and coastal livelihoods.
- » Fisheries support food security, exports, employment and the Blue Economy.
- » Poor coastal ecosystem management also affects neighbouring countries, as seen in the Palk Bay fisheries dispute between India and Sri Lanka.
- » Sustainable fisheries are integral to SDG 14 (Life Below Water) and India's Blue Economy strategy.

Challenges

- » Weak monitoring and enforcement of fisheries regulations.
- » Overdependence on mechanised trawling.
- » Limited participation of fishing communities in resource management.
- » Government emphasis on deep-sea fishing, despite FAO's view that it can provide only marginal additional output.
- » Lack of ecosystem-based assessment of marine resources.

Way Forward

- » Shift from catch-based assessment to scientific stock assessment and ecosystem monitoring.
- » Restore mangroves, estuaries and coastal benthic ecosystems.
- » Strict regulation and monitoring of mechanised trawling.
- » Promote community-based fisheries management by involving traditional fishers.
- » Strengthen Centre-State coordination for sustainable marine fisheries governance.

UPSC Mains Question (15 Marks)

"Sustainable fisheries depend not only on fish stock management but also on the health of coastal ecosystems and effective governance." Discuss in the context of India's marine fisheries.

ISRO's SOLVE Test: A Milestone for Gaganyaan

ISRO successfully conducted the first ground test of the Solid motor-based Sub-Orbital Launch Vehicle for Experiments (SOLVE) at the Satish Dhawan Space Centre, Sriharikota. SOLVE will validate the Crew Module's deceleration and recovery system for the Gaganyaan Mission.

What is SOLVE?

- » SOLVE (Sub-Orbital Launch Vehicle for Experiments) is a dedicated test platform developed for Gaganyaan test missions.
- » Carries the Crew Module to an altitude of 10–17 km to validate:
- » Crew module separation
- » Deceleration sequence

Parachute deployment

- » Splashdown and recovery operations
- » Uses a modified PSLV strap-on solid motor with:
- » Slow burn-rate propellant

Straight nozzle

- » Secondary Injection Thrust Vector Control (SITVC) for improved flight control.

Significance of the SOLVE Test

- » Validates one of the critical safety systems of the Gaganyaan mission.
- » Ensures reliable deployment of the 10-parachute recovery system before sea splashdown.
- » Provides ISRO with a flexible and cost-effective platform for conducting multiple crew module recovery experiments under different flight conditions.
- » Reduces mission risk before crewed flights.

Gaganyaan Mission

- » India's first indigenous human spaceflight programme.
- » Objective: Send 2–3 astronauts into Low Earth Orbit (≈ 400 km) for about 3 days and ensure their safe return.
- » Launch vehicle: Human-rated LVM3 (HLVM3).
- » Mission follows a phased approach involving multiple uncrewed test flights before the first crewed mission.

Recent Developments

- » Successful Integrated Air Drop Test (IADT-02) for Crew Module recovery.
- » Mission MITRA behavioural study conducted in Leh to understand astronaut adaptation under extreme conditions.
- » Successful SOLVE ground test marks another milestone towards human-rating critical systems.

Significance

General Studies, Political Science and International Relations, Sociology, CSAT



- » Strengthens India's human spaceflight capability.
- » Demonstrates indigenous expertise in crew safety, re-entry and recovery technologies.
- » Supports future ambitions such as the Bharatiya Antariksh Station and deep-space exploration.
- » Enhances India's position among nations possessing independent human spaceflight capability.

Challenges

- » Human spaceflight demands extremely high reliability and safety standards.
- » Integration of life-support, Crew Escape System and recovery technologies remains technologically complex.
- » Mission timelines depend on successful completion of successive uncrewed validation flights.

Way Forward

- » Complete all Gaganyaan uncrewed test missions and safety validations.
- » Continue testing of Crew Module, Crew Escape System and recovery technologies.
- » Strengthen indigenous capabilities in human-rated launch systems and space medicine.
- » Leverage Gaganyaan experience for future space station and lunar missions.

Q. With reference to the Gaganyaan Mission, consider the following statements:

1. SOLVE is designed to validate the Crew Module's deceleration and parachute recovery system.
2. SOLVE uses a modified PSLV strap-on solid motor.
3. Gaganyaan aims to place astronauts in Geostationary Earth Orbit (GEO).

Which of the statements given above is/are correct?

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

Answer: (a)

India's Gaganyaan Mission marks a significant step towards achieving indigenous human spaceflight capability. Discuss the technological challenges, strategic significance and the role of missions such as SOLVE in ensuring astronaut safety.



Emergency Gas Curbs Eased as LNG Shipments Normalise

- » The Union Government has withdrawn most provisions of the Natural Gas (Supply Regulation) Order, 2026, following the normalisation of LNG shipments through the Strait of Hormuz.
- » The Order was notified under the Essential Commodities Act (ECA), 1955, to ensure uninterrupted natural gas supply during emergency situations after the US-Israel strike on Iran disrupted energy supplies from West Asia.
- » The disruption prompted some suppliers to invoke Force Majeure, leading the Government to prioritise natural gas allocation to essential sectors. Other emergency measures, including maximising LPG production and restricting bulk diesel sales, have also been withdrawn.
- » The Strait of Hormuz is India's most critical energy chokepoint, making developments in West Asia crucial for India's energy security.
- » Force Majeure: A contractual provision allowing temporary suspension of contractual obligations due to extraordinary events such as war, natural disasters or geopolitical disruptions.

Essential Commodities Act (ECA), 1955

- » Objective: Ensure the availability of essential commodities at fair prices by preventing hoarding, black marketing, artificial shortages and profiteering, while empowering the Government to intervene during emergencies.

Government Powers:

- » Regulate production, supply, distribution and trade
- » Impose stock limits and regulate storage
- » Prioritise allocation of essential commodities

Benefits:

- » Prevents hoarding & artificial price rise
- » Ensures availability during crises
- » Stabilises markets and protects consumers

Concerns:

- » Discourages private investment in storage & logistics
- » Frequent intervention creates market uncertainty
- » Stock limits may depress farm-gate prices during bumper harvest



India Needs a Second Home for Asiatic Lions

- » The Asiatic lion population increased to 891 (2025 Census), but the species remains largely confined to the Greater Gir Landscape (Gujarat), making it vulnerable to a single catastrophic event.
- » In 2013, the Supreme Court directed the translocation of Asiatic lions to Kuno National Park (Madhya Pradesh) to establish a second free-ranging population, but the order remains unimplemented due to Gujarat's resistance.
- » The 2018 Canine Distemper Virus (CDV) outbreak in Gir highlighted the risks of maintaining the entire population in a single landscape.
- » Since the 1980s, the Wildlife Institute of India (WII) has recommended creating a geographically separate population, while Project Lion (2020) aims to expand suitable lion habitats for long-term conservation.

Issue

- » Single-site concentration
- » Delay in Kuno translocation
- » Metapopulation approach
- » Kuno National Park
- » Barda Wildlife Sanctuary

Significance

- » Vulnerable to epidemics, droughts, wildfires and other disasters
- » Supreme Court directive remains unimplemented
- » Establishing multiple geographically separated populations reduces extinction risk
- » Habitat restored, villages relocated and prey base improved, but lion translocation is yet to begin
- » Alternative site within Gujarat, but offers limited geographical risk diversification

Ministry of Cooperation Completes Five Years

- » Union Home & Cooperation Minister Amit Shah launched several initiatives marking five years of the Ministry of Cooperation.

- » Established on 6 July 2021, the Ministry works with the vision of "Sahkar se Samridhi" (Prosperity through Cooperation) to strengthen the cooperative movement through greater cooperation between the Centre and States.

Initiative

- » White Revolution 2.0
- » Grain Storage Plan
- » Urban Cooperative Banks (UCBs)
- » Credit Access
- » Dairy Cooperatives

Key Features

- » Targets 50% increase in milk procurement over the next five years; 25,282 Dairy Cooperative Societies (DCSs) registered across 31 States/UTs; aims to expand cooperative coverage, generate employment and empower women.
- » Foundation stone laid for 47 grain storage godowns to strengthen agricultural storage infrastructure.
- » Launch of Core Banking Platform and Sahakar Sahyogi (AI-powered conversational platform); UCBs can open branches without prior RBI approval, provide doorstep banking, and offer higher-value housing loans.
- » Cooperative banks brought under CGTMSE, enabling collateral-free credit guarantees for Micro & Small Enterprises (MSEs).
- » Formation of Sardar Patel Cooperative Dairy Federation Ltd. (SPCDF) to integrate 20 lakh+ dairy farmers; new multi-State cooperatives established for dairy inputs and manure management.

Cooperative Sector Reforms

- » Institution/Reform
- » Primary Agricultural Credit Societies (PACS)
- » e-PACS
- » Centre–State Cooperation

Significance

- » Being transformed into multi-purpose rural institutions to strengthen grassroots cooperatives.



- » 50,000 PACS being digitised to improve transparency, efficiency and service delivery.
- » Core implementation strategy for expanding the cooperative movement across the country

The Constitutional Limits of Bar Association Boycotts

The Ayodhya (Faizabad) Bar Association recently resolved that its members would not represent persons accused in the alleged Ram Temple donation fund embezzlement case and announced a monetary penalty for any lawyer who accepted the brief. The incident has revived concerns over the constitutional right of an accused to legal representation and the legality of such bar association resolutions.

Constitutional Basis of the Right to Legal Representation

The Constitution guarantees every accused person the right to a fair legal defence, irrespective of the nature of the alleged offence.

- » Article 22(1): Guarantees every arrested person the right to consult and be defended by a legal practitioner of their choice.
- » Article 14: Ensures equality before the law and equal protection of laws.
- » Article 21: The Supreme Court has interpreted the right to life and personal liberty to include the right to a fair trial.
- » Article 39A: Directs the State to provide free legal aid so that justice is not denied due to economic or other disabilities.

Bar Council of India (BCI) Rules

The Bar Council of India (BCI) Rules on Professional Conduct require advocates to accept briefs in courts or tribunals at a reasonable fee, subject only to limited personal exceptions.

- » An individual advocate may decline a case due to special circumstances.
- » However, a Bar Association cannot collectively prohibit its members from representing a particular accused.
- » In *Kuldeep Agarwal v. State of Uttarakhand* (2019), the Uttarakhand High Court clarified that "special circumstances" apply only to an individual lawyer's decision and cannot justify collective boycotts.

Supreme Court's Stand

- » Case : *A.S. Mohammed Rafi v. State of Tamil Nadu* (2010)

- » Judgment : Held that Bar Association resolutions preventing advocates from representing accused persons are illegal, unconstitutional and against professional ethics. Every accused, irrespective of the offence, has the right to legal representation to ensure a fair trial.
- » Case : J. Jayalithaa v. State of Karnataka (2014)
- » Judgment : Reaffirmed that a fair trial is the foundation of criminal justice and an integral part of Article 21. It safeguards the rights of the accused, victims and society.
- » Case : Kuldeep Agarwal v. State of Uttarakhand (2019)
- » Judgment : Clarified that "special circumstances" under the BCI Rules apply only to an individual advocate's personal decision and do not empower Bar Associations to collectively boycott representation of an accused.

Significance

- » Upholds the constitutional right to a fair trial.
- » Ensures equality before the law irrespective of public opinion.
- » Preserves the independence and ethical standards of the legal profession.
- » Strengthens the rule of law by guaranteeing access to justice for every accused person.

UPSC Mains Practice Question

Q. "The right to legal representation is indispensable to the constitutional guarantee of a fair trial. In this context, examine the legality of Bar Association resolutions prohibiting advocates from defending certain accused persons."

India's Economy Under the Shadow of El Niño

The India Meteorological Department (IMD) has forecast below-normal rainfall in July 2026 after a 40% rainfall deficit in June, raising concerns over the impact of a weak southwest monsoon and a possible Super El Niño on agriculture, inflation, and economic growth.

What is El Niño?

- » El Niño is a climate phenomenon characterized by the abnormal warming of sea surface temperatures in the central and eastern equatorial Pacific Ocean, which alters global weather patterns.

- » A Super El Niño refers to an exceptionally strong El Niño event that can significantly suppress the Indian southwest monsoon, increasing the risk of drought.

Monsoon–El Niño Relationship

Southwest Monsoon

- » June–September rainfall
- » Contributes nearly 75% of India's annual rainfall
- » Supports agriculture, reservoirs and hydropower

El Niño

- » Warming of equatorial Pacific Ocean
- » Weakens Indian monsoon circulation
- » May lead to deficient rainfall and drought
- » Impact generally occurs with a time lag

Economic Impact of a Weak Monsoon

Agriculture

- » Threatens production of Kharif crops such as paddy, maize, pulses and cotton.
- » Reduces agricultural output and Gross Value Added (GVA).
- » Lowers farm productivity in rain-fed regions.

Rural Economy

- » Decline in farm income and rural consumption.
- » Reduced demand for tractors, two-wheelers, construction materials and consumer goods.
- » Slower growth of the rural non-farm sector.

Inflation

- » Lower food production may increase prices of cereals, pulses, vegetables and edible oils.
- » Food inflation may spill over into overall inflation, complicating monetary policy.



GDP Growth

- » Lower agricultural output and weaker rural demand can reduce overall GDP growth.
- » Financial institutions estimate that a severe El Niño could reduce GDP growth by 20–65 basis points.

Conclusion

A weak southwest monsoon combined with a strong El Niño can adversely affect agriculture, rural incomes, inflation, exports and overall economic growth. While India has improved its preparedness through better food management and irrigation expansion, long-term resilience requires climate-smart agriculture, improved water management and enhanced disaster preparedness.

Q. With reference to El Niño, consider the following statements:

1. It is associated with the warming of sea surface temperatures in the central and eastern equatorial Pacific Ocean.
2. It generally strengthens the Indian southwest monsoon.
3. It may increase the risk of drought in India.
4. El Niño primarily affects only the Pacific Ocean and has no impact on global weather.

Which of the statements given above are correct?

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

Answer: (b)

Q. A deficient southwest monsoon coupled with El Niño poses significant macroeconomic and agricultural challenges for India. Examine its likely impact on the economy and suggest measures to enhance India's climate resilience.



India's Bid for a UN Security Council Seat (2028–29)

India's UNSC Bid: Key Developments

- » India will officially launch its campaign for a non-permanent seat in the United Nations Security Council (UNSC) for the 2028–29 term on 13 July, with External Affairs Minister S. Jaishankar leading the launch event in New York.
- » The Asia-Pacific Group seat is being contested by India and Tajikistan, making diplomatic outreach and coalition-building critical to secure broad international support.
- » The campaign reflects India's aspiration for a greater role in global governance and reinforces its leadership credentials among the Global South.
- » India has received support from countries including the United States, while Tajikistan is backed by the Organisation of Islamic Cooperation (OIC) bloc.
- » Both India and Tajikistan are members of the Shanghai Cooperation Organisation (SCO), adding a unique diplomatic dimension to the election.

India's Case for UNSC Reform

- » India's candidature aligns with its long-standing commitment to multilateralism, international peace and security, and a rules-based international order.
- » India has consistently advocated reforms of the UN Security Council, arguing that it should be more representative, equitable and reflective of contemporary geopolitical realities.
- » The campaign also complements India's sustained engagement with the Global South, which remains a key pillar of its foreign policy and strengthens its claim for a larger role in global decision-making.
- » A successful bid would further enhance India's influence in shaping discussions on global peace, security and international governance.

Oldest Quasars Discovered by Euclid Space Telescope



Discovery & Significance

- » The Euclid Space Telescope has discovered 31 new quasars, including the two oldest quasars ever observed, providing new insights into the early Universe.
- » The findings, published in Astronomy & Astrophysics, show that light from the oldest quasars originated when the Universe was ~670 million years old—about 5% of its present age (13.8 billion years).
- » The discoveries belong to the Epoch of Reionisation, when the first stars and galaxies formed, marking the end of the Cosmic Dark Ages.
- » The presence of supermassive black holes during such an early phase of the Universe presents a cosmic mystery, as existing theories cannot fully explain their rapid formation and growth.

Term/Mission

- » Quasar
- » Euclid Space Telescope
- » James Webb Space Telescope (JWST)

Key Facts

- » Extremely luminous core of a distant galaxy powered by a supermassive black hole accreting surrounding gas.
- » Launched by the European Space Agency (ESA) in 2023 to map the large-scale structure of the Universe and investigate dark matter and dark energy.
- » Observing the newly discovered quasars to understand the formation and evolution of the early Universe.

Scientific Importance

- » Euclid has doubled the number of known ancient quasars within two years, significantly expanding observations of the early Universe.
- » Scientists aim to develop a "quasar chronicle" to reconstruct the Universe's evolution during its first billion years and better understand the origin of supermassive black holes.



INS Mahendragiri: Strengthening India's Naval Capabilities

Commissioning & Key Features

- » INS Mahendragiri, the sixth indigenously built Project 17A stealth frigate, will be commissioned into the Indian Navy on 11 July 2026 at Visakhapatnam.
- » Designed by the Indian Navy's Warship Design Bureau (WDB) and built by Mazagon Dock Shipbuilders Limited (MDL), the warship has over 75% indigenous content, reinforcing Aatmanirbhar Bharat and Make in India in defence manufacturing.
- » Named after the Mahendragiri Hills in the Eastern Ghats, the frigate symbolises strength, resilience and self-reliance.

Feature:

- » Class
- » Propulsion
- » Stealth
- » Combat Capability
- » Operational Roles

Details

- » Project 17A Stealth Frigate (successor to the Shivalik-class/Project 17)
- » Combined Diesel or Gas (CODOG) propulsion system
- » Reduced radar signature, enhanced survivability and a high degree of automation
- » Indigenous surface-to-surface and surface-to-air missile systems, advanced sensors and comprehensive anti-submarine warfare (ASW) capability
- » Anti-air, anti-surface, anti-submarine warfare, maritime security, humanitarian assistance and disaster relief (HADR)

Strategic Significance

- » Project 17A represents an advanced version of the Shivalik-class (Project 17) with improved stealth features, automation, and next-generation weapons and sensors.



- » The project has strengthened India's defence industrial ecosystem by involving a large network of Indian industries and MSMEs, generating employment and enhancing indigenous manufacturing capabilities.
- » Other commissioned Project 17A frigates include INS Nilgiri, INS Udaygiri, INS Himgiri, INS Taragiri and INS Dunagiri.
- » The induction of INS Mahendragiri further strengthens the Indian Navy's capability to safeguard India's maritime interests and reinforces India's position as a leading warship-building nation in the Indo-Pacific.



Caste Enumeration Takes Shape Ahead of Census 2027

Census 2027: Key Developments

- » A pre-test for the second phase of Census 2027 began on 6 July 2026 across 16 States and Union Territories to test field procedures, digital applications and operational arrangements. The exercise will continue till 20 July 2026.
- » The pre-test includes an "open column" allowing respondents to self-report their caste, indicating the likely methodology for caste enumeration in the main Census.
- » The Union Cabinet approved caste enumeration in Census 2027 on 30 April 2025.
- » Census 2027 will be India's first fully digital Census, with a self-enumeration facility, and the first comprehensive caste enumeration since the 1931 Census.

Aspect

- » Methodology
- » Previous Experience
- » Post-Independence Practice
- » Financial Outlay

Details

- » Open column for recording caste (self-declaration).
- » SECC 2011 used a similar approach, recording 46 lakh+ distinct caste names, raising concerns over data reliability and standardisation.
- » Population Census enumerated only Scheduled Castes (SCs) and Scheduled Tribes (STs), not all castes.
- » ₹11,718.24 crore.

Significance

- » Comprehensive caste data can support evidence-based policymaking, measurement of social inequalities, equitable allocation of resources, and review of affirmative action policies.



- » At the same time, the open-column approach has revived concerns regarding classification, verification and consistency of caste data, given the experience of SECC 2011.

Unified Education Monitoring & Grading System

- » The Ministry of Education released the Unified District Information System for Education Plus (UDISE+) 2025-26 and the Performance Grading Index (PGI) 2.0 (2025-26) reports.
- » The reports indicate declining school dropout rates, improved teacher strength, better infrastructure and digital access, while highlighting persistent challenges in learning outcomes, retention and regional disparities.

UDISE+ & PGI 2.0

- » UDISE+ is the Government of India's official digital database on school education maintained by the Ministry of Education.
- » It collects data on student enrolment, school infrastructure, teachers, facilities and learning environment.
- » PGI 2.0 evaluates States and UTs across Learning Outcomes, Access, Infrastructure & Facilities, Equity, Governance Process, and Teacher Education & Training using a 10-tier grading system.

Key Findings

- » It shows the Preparatory-level dropout rate declining from 2.3% (2024-25) to 1.8% (2025-26).
- » It shows the Secondary-level dropout rate declining from 8.2% to 7.0%.
- » It records an increase in Secondary Gross Enrolment Ratio (GER) from 68.5% to 71.7%.
- » It shows Middle-level retention increasing from 82.8% to 83.7%, while Secondary-level retention improved from 47.2% to 51.9%.
- » It reveals that only about half of Class I students reach Class XII, indicating continued attrition at higher levels.
- » It records teacher strength crossing 1.02 crore for the first time, with women constituting 54.9% of the teaching workforce.



- » It shows improved Pupil-Teacher Ratios (PTR), remaining well within the NEP 2020 norm of 30:1.
- » It records a 29% decline in zero-enrolment schools and a 3% decline in single-teacher schools.
- » It shows computer availability increasing from 64.7% to 69.9% and internet connectivity from 63.5% to 67.4%.
- » It reports near-universal access to safe drinking water (99.5%), girls' toilets (98.5%), boys' toilets (97.2%), and electricity (95%).
- » It records improvement in schools with disability-accessible ramps and handrails from 54.9% to 58.2%.
- » It identifies Chandigarh as the highest-performing UT in PGI 2.0, while Punjab leads in Learning Outcomes, Kerala in Access and Teacher Education, and Tamil Nadu in Equity.
- » It shows that no State or Union Territory achieved any of the top three PGI grades, indicating scope for improvement.

Significance

- » It reflects improving access, enrolment and retention in school education.
- » It indicates strengthening of the teaching workforce and improvement in student-teacher ratios.
- » It demonstrates progress in digital infrastructure and basic school amenities.
- » It provides evidence-based inputs for implementing NEP 2020, Samagra Shiksha, and other education reforms.
- » It enables States to identify learning gaps and improve governance through comparative performance assessment.

Challenges

- » It shows that only about half of Class I students reach Class XII, indicating significant dropout at higher levels.
- » It has no State or Union Territory achieving the top three PGI grades.
- » It has persistent inter-State disparities in learning outcomes, infrastructure and governance.
- » It has declining playground availability, affecting holistic development.

- » It has only marginal improvement in gender parity and continued regional disparities in educational outcomes.

Way Forward

- » It requires strengthening secondary and higher secondary retention through targeted interventions.
- » It requires improving learning outcomes by focusing on foundational literacy, numeracy and teacher capacity building.
- » It requires reducing regional disparities through greater support for aspirational States.
- » It requires expanding digital infrastructure, inclusive education and school facilities.
- » It requires continuous monitoring through UDISE+ and PGI for evidence-based policymaking and effective implementation of NEP 2020.

Q. With reference to UDISE+ and the Performance Grading Index (PGI), consider the following statements:

1. UDISE+ is maintained by the Ministry of Education.
2. PGI 2.0 assesses the performance of States and Union Territories across multiple domains, including Learning Outcomes and Governance.
3. UDISE+ provides official data on school infrastructure, enrolment and teacher statistics.

Which of the statements given above are correct?

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

Answer: (d)

"Improving access to schooling alone is insufficient without ensuring learning outcomes and student retention." Discuss in the light of the UDISE+ 2025-26 and Performance Grading Index (PGI) 2.0 reports.



BHEL–Nucera Clean Energy Collaboration

- » Bharat Heavy Electricals Limited (BHEL) has partnered with thyssenkrupp nucera India, the Indian subsidiary of the German company thyssenkrupp nucera.
- » The partnership aims to indigenise and locally manufacture alkaline electrolyser systems in India.
- » It focuses on the phased indigenisation of critical electrolysis technology required for green hydrogen production.
- » Alkaline electrolyzers use electricity to split water into hydrogen and oxygen, producing green hydrogen when powered by renewable energy.

Significance

- » Strengthens domestic manufacturing capabilities for electrolyser systems.
- » Reduces dependence on imported components and technology, enhancing energy security.
- » Supports the implementation of the National Green Hydrogen Mission.
- » Promotes the growth of India's green hydrogen ecosystem and contributes to the country's clean energy transition.



Bintang Adipurna

- » Bintang Adipurna (First Class of the Star of the Republic of Indonesia) is Indonesia's highest civilian honour, conferred by the President of the Republic of Indonesia.
- » It is awarded to individuals who have rendered exceptional service to the unity, continuity, and prosperity of the Republic of Indonesia.
- » Foreign recipients are recognized for their contribution to strengthening friendship, mutual respect, and bilateral relations between Indonesia and their respective countries.
- » Prime Minister Narendra Modi was recently conferred with the Bintang Adipurna for his role in strengthening India–Indonesia ties.

Characteristics

- » The insignia consists of a shining gold star with multiple rays, symbolizing excellence, honour, and distinguished service.
- » At its centre is the Garuda Pancasila, the national emblem of Indonesia, representing the sovereignty of the nation and the five principles of the state (Pancasila).
- » It is worn with a ceremonial red-and-white sash, reflecting the national colours of Indonesia.
- » A star badge is also worn during state ceremonies.

Community-Centric Language Learning Framework

Why in News?

- » Chhattisgarh is expanding Mother-Tongue Based Multilingual Education (MTB-MLE) in government schools, particularly in Bastar and other tribal regions, to improve foundational learning, classroom participation and learning outcomes in line with the National Education Policy (NEP) 2020.

Key Features

- » It promotes mother tongue as the medium of instruction during the foundational years before gradually introducing Hindi.

- » It has been expanded to 6,937 government schools in Bastar and other tribal areas.
- » It covers around 2.6 lakh primary students with the support of 7,650 trained teachers.
- » It provides bilingual textbooks for Classes I and II, with Hindi on one page and the local language on the opposite page.
- » It includes nine tribal and regional languages/dialects—Dorli, Halbi, Bhatari, Dhurvi, Madia, Chhattisgarhi, and three regional variants of Gondi (Kanker, Bastar and Dantewada).
- » It uses the Devanagari script for tribal languages, enabling teachers to transition students gradually to Hindi.

Significance

- » It improves foundational literacy and numeracy (FLN) by enabling children to learn in a familiar language.
- » It enhances comprehension, cognitive development, confidence and classroom participation, especially among first-generation tribal learners.
- » It reduces language barriers, improving student retention and lowering dropout rates.
- » It preserves tribal languages, indigenous knowledge and cultural heritage.
- » It promotes inclusive and equitable education in remote and linguistically diverse regions.
- » It supports the objectives of NEP 2020, Samagra Shiksha, and the NIPUN Bharat Mission.

Challenges

- » It faces a shortage of trained teachers proficient in multiple tribal languages.
- » It has limited availability of quality teaching-learning materials in several tribal dialects.
- » It faces difficulties in standardising unwritten or less-developed tribal languages.
- » It requires a smooth transition from the mother tongue to Hindi and English at higher grades.



- » It requires continuous teacher training, curriculum development and monitoring.

Way Forward

- » It requires expansion of Mother-Tongue Based Multilingual Education (MTB-MLE) to other tribal and multilingual regions.
- » It requires strengthening teacher capacity through specialised multilingual pedagogy training.
- » It requires development of digital content and learning resources in tribal languages.
- » It requires active participation of local communities in curriculum development and language preservation.
- » It requires continuous assessment of learning outcomes to improve programme effectiveness.

Mother-Tongue Based Multilingual Education (MTB-MLE)

- » It is an educational approach in which children begin learning in their home language and gradually transition to regional and official languages.
- » NEP 2020 recommends that, wherever possible, the mother tongue/local language should be the medium of instruction at least till Grade 5, and preferably till Grade 8 and beyond.
- » UNESCO also advocates mother tongue instruction during early childhood education as it improves learning outcomes and reduces educational inequality.

Q. With reference to Mother-Tongue Based Multilingual Education (MTB-MLE), consider the following statements:

1. NEP 2020 recommends the use of the mother tongue or local language as the medium of instruction at least till Grade 5, and preferably till Grade 8.
2. UNESCO supports mother tongue instruction in early childhood education.
3. Chhattisgarh's multilingual education programme uses bilingual textbooks in tribal languages and Hindi.

Which of the statements given above are correct?

- | | | | | |
|-----|---|-----|---|------|
| (a) | 1 | and | 2 | only |
| (b) | 2 | and | 3 | only |



- (c) 1 and 3 only
(d) 1, 2 and 3

Answer: (d)

"Mother-Tongue Based Multilingual Education is essential for achieving inclusive, equitable and quality education in India." Discuss with reference to the National Education Policy, 2020.

IIM Bangalore Campus in Indonesia

Why in News?

- » During his visit to Indonesia, Prime Minister Narendra Modi announced the establishment of the first international campus of IIM Bangalore (IIM-B) at the Singhasari Special Economic Zone (SEZ), Malang, East Java.
- » The initiative aims to strengthen India–Indonesia educational cooperation and serve students across the ASEAN region.

Key Highlights

- » It will be the first overseas campus of IIM Bangalore and the second international campus of an Indian Institute of Management after IIM Ahmedabad, Dubai.
- » It will be established through a Memorandum of Understanding (MoU) between IIM Bangalore and PT Intelegensia Grahatama, the managing entity of the Singhasari SEZ.
- » It will introduce Executive Education Programmes in the first phase, followed by full-fledged postgraduate management degree programmes.
- » It will focus on emerging areas such as Artificial Intelligence (AI), Digital Transformation, Global Supply Chains, Climate & Sustainability, Healthcare Management, and Leadership.
- » It will serve as a regional management education hub for Indonesia and ASEAN countries.

Significance

- » It strengthens the India–Indonesia Comprehensive Strategic Partnership through education and capacity building.
- » It promotes the internationalisation of Indian higher education in line with the National Education Policy (NEP) 2020.



- » It enhances India's education diplomacy and strengthens its soft power in the Indo-Pacific.
- » It promotes academic collaboration, faculty exchange, joint research, innovation and entrepreneurship.
- » It supports human resource development and skill enhancement across the ASEAN region.
- » It positions India as a global knowledge and education hub.

National Education Policy (NEP) 2020

- » It encourages top Indian Higher Educational Institutions (HEIs) to establish campuses abroad.
- » It aims to make India a global destination for quality education.
- » It promotes internationalisation through academic collaborations, research partnerships and student mobility.
- » It encourages global recognition of Indian institutions and enhances India's educational soft power.

Challenges

- » It requires maintaining the academic quality and global reputation of Indian institutions abroad.
- » It faces regulatory and administrative challenges in foreign jurisdictions.
- » It requires sustained financial investment and institutional support.
- » It requires attracting international faculty and students in a competitive global education market.
- » It requires aligning curricula with both Indian academic standards and local industry requirements.

Way Forward

- » It requires expanding overseas campuses of premier Indian institutions under NEP 2020.
- » It requires strengthening academic partnerships with ASEAN universities and industries.
- » It requires promoting collaborative research in emerging technologies and sustainable development.

- » It requires enhancing student and faculty mobility through scholarships and exchange programmes.
- » It requires leveraging education as a key pillar of India's diplomacy and Indo-Pacific engagement.

Q. With reference to the National Education Policy (NEP) 2020, consider the following statements:

1. It encourages top Indian Higher Educational Institutions to establish campuses abroad.
2. It aims to promote the internationalisation of Indian higher education.
3. It prohibits foreign universities from establishing campuses in India.

Which of the statements given above are correct?

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

Answer: (a)

"The internationalisation of higher education has emerged as an important instrument of India's soft power and diplomatic outreach." Discuss with reference to the National Education Policy (NEP) 2020 and the establishment of overseas campuses by Indian institutions.



India–Indonesia Strategic Partnership: BrahMos, Critical Minerals & Sabang Port

Why in News?

- » During Prime Minister Narendra Modi's visit to Jakarta, India and Indonesia signed several strategic agreements covering defence, critical minerals, maritime security, space cooperation, education and cultural heritage.
- » India will supply two batteries of BrahMos supersonic cruise missiles to Indonesia in a deal worth approximately US\$200 million.
- » Indonesia also welcomed India's participation in the development of Sabang Port, while both countries expanded cooperation on critical minerals and supply chain resilience.
- » Prime Minister Modi was conferred the Bintang Adipurna, Indonesia's highest civilian honour.

Key Outcomes of the Visit

- » India and Indonesia expanded their Comprehensive Strategic Partnership (CSP) established in 2018.
- » Defence cooperation includes:
 - Export of BrahMos supersonic cruise missiles.
 - Cooperation on air-to-air missile systems.
 - Defence technology transfer and capacity building.
- » Signed agreements on critical minerals, rare earths, and resilient supply chains to support clean energy and advanced manufacturing.
- » Both countries agreed to strengthen cooperation in maritime safety, maritime domain awareness, naval cooperation and freedom of navigation.
- » Indonesia welcomed India's interest in developing Sabang Port, enhancing connectivity with India's Andaman & Nicobar Islands.
- » Other agreements include:
 - Establishment of an IIM Bangalore campus in Indonesia.
 - Cooperation in space technology.
 - Conservation of the Prambanan Temple and cultural heritage.



Strategic Significance

- » Sabang Port, located at the entrance of the Strait of Malacca, is strategically important for securing one of the world's busiest maritime trade routes.
- » The Strait of Malacca carries nearly one-third of global maritime trade and a substantial share of global energy shipments, making it vital for India's energy security and Indo-Pacific strategy.
- » Indonesia possesses nearly 21% of the world's nickel reserves and is an important supplier of critical minerals and rare earths, essential for electric vehicles, batteries, semiconductors and renewable energy technologies.
- » The BrahMos export marks another milestone in India's growing defence exports under Aatmanirbhar Bharat and strengthens strategic partnerships in Southeast Asia.
- » The agreements reinforce the shared commitment to a Free, Open, Inclusive and Rules-Based Indo-Pacific, respecting international law, freedom of navigation, and peaceful resolution of disputes.
- » The visit strengthens India's Act East Policy, Indo-Pacific Oceans Initiative (IPOI) and engagement with ASEAN.

India–Indonesia Relations

- » The Diplomatic relations established in 1950.
- » Indonesia is India's Comprehensive Strategic Partner (2018) and a key member of ASEAN.
- » Both countries cooperate through:
 - East Asia Summit (EAS)
 - ASEAN-India
 - Indian Ocean Rim Association (IORA)
 - G20
 - Indian Ocean Naval Symposium (IONS)
- » Maritime cooperation is particularly important due to their proximity near the Andaman Sea and Strait of Malacca.



- » Defence cooperation has expanded through bilateral naval exercises, coordinated patrols (CORPAT), logistics cooperation and defence industrial collaboration

Challenges & Way Forward

- » Fast-track implementation of defence and infrastructure agreements, particularly Sabang Port.
- » Deepen cooperation in critical mineral processing, resilient supply chains and emerging technologies.
- » Expand maritime cooperation to address piracy, illegal fishing, maritime terrorism and disaster response.
- » Strengthen economic integration through trade, connectivity, education and digital partnerships.
- » Continue coordinating on regional issues through ASEAN, IORA and the Indo-Pacific framework to promote regional stability.

Q. With reference to India–Indonesia relations, consider the following statements:

1. Sabang Port is located near the entrance of the Strait of Malacca.
2. Indonesia possesses one of the world's largest reserves of nickel, a critical mineral.
3. BrahMos is a jointly developed supersonic cruise missile by India and Russia.

Which of the statements given above is/are correct?

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

Answer: (d)

"India's growing strategic partnership with Indonesia reflects the convergence of defence, maritime security and critical mineral cooperation in the Indo-Pacific." Discuss the significance of recent India–Indonesia agreements for India's Act East Policy and Indo-Pacific strategy.



Indo-Indonesian Comprehensive Accord

Key Agreements

- » Defence Cooperation: India will supply two batteries of BrahMos supersonic cruise missiles (worth US\$200 million) to Indonesia. Agreements also cover air-to-air missile systems and defence technology transfer.
- » Critical Minerals: Cooperation in critical minerals, rare earths, and strengthening resilient supply chains.
- » Maritime Security: Both countries agreed to enhance maritime safety and security, with Indonesia welcoming India's interest in developing Sabang Port.
- » Space Cooperation: Agreements signed to strengthen collaboration in the space sector.
- » Other agreements include establishing an IIM Bangalore campus in Indonesia and cooperation for the conservation of the Prambanan Temple.

Significance

- » Sabang Port, located at the northwestern entrance to the Strait of Malacca, is strategically important for global maritime trade and will enhance connectivity between India's Andaman and Nicobar Islands and Indonesia's Sumatra.
- » Indonesia holds about 21% of the world's nickel reserves, making it a key partner for securing critical minerals essential for clean energy and advanced technologies.
- » The agreements strengthen the Comprehensive Strategic Partnership (2018) and reinforce the shared commitment to a free, open, inclusive, and rules-based Indo-Pacific, including freedom of navigation.
- » During the visit, Prime Minister Narendra Modi was conferred Bintang Adipurna, Indonesia's highest civilian honour, for strengthening bilateral relations.

Mountain Pangolin Species

- » Scientific Name: *Manis aurita*
- » Researchers have revalidated the Himalayan Pangolin as a distinct extant species, separate from the Chinese Pangolin (*Manis pentadactyla*).
- » It underwent a demographic contraction around the 14th century, coinciding with the onset of the Little Ice Age in the Himalayan region.

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- » It is significantly larger in body size and skull.
- » It paradoxically has markedly smaller ears and possesses a shorter and broader nasal bone.
- » It has an enlarged olfactory bulb and turbinates, enabling it to forage for ants and termites using its keen sense of smell.
- » Distribution: Restricted to the southern Himalayan foothills, with confirmed populations in Nepal, South Tibet, and Northeast India (including Assam).

Threats

- » Illegal wildlife trade.
- » Products derived from the species have infiltrated regulated traditional medicine markets.
- » Faces an internal threat of inbreeding, reducing its genetic diversity and long-term survival.



MSME Resilience under GST Framework

Why in News?

- » On the occasion of National MSME Day (June 27) and the 9th GST Day (July 1), concerns have been raised that the GST framework and delayed payments by large buyers are creating severe cash-flow stress for Micro, Small and Medium Enterprises (MSMEs), discouraging their formalisation.

Issues Faced by MSMEs under GST

- » It requires GST payment on an accrual basis, meaning tax becomes payable once an invoice is raised, irrespective of whether payment has been received.
- » It exposes MSMEs to a cash-flow mismatch, as GST must be paid by the 20th of the following month, while payments from buyers are often delayed.
- » It faces chronic delayed payments despite the MSMED Act, 2006, which mandates payment within 45 days (or 15 days without a written agreement).
- » It forces MSMEs to depend on high-interest borrowing, delay wages or reduce working capital to meet GST obligations.
- » It suffers from low digital literacy, inadequate internet connectivity and complex GST portal compliance, increasing compliance costs.
- » It discourages voluntary formalisation, as many small enterprises remain outside GST to avoid compliance burdens.

Why Formalisation Remains Difficult?

- » It creates a policy-induced double burden, where delayed payments and immediate GST liability squeeze liquidity.
- » It makes GST registration commercially necessary, as large companies prefer dealing only with GST-registered suppliers to claim Input Tax Credit (ITC).
- » It leaves MSMEs with little bargaining power, as many depend on a single large buyer for most of their business.
- » It limits the effectiveness of the MSME Samadhaan Portal, since small suppliers hesitate to initiate disputes against major customers.
- » It allows the government to recover penalties under the 180-day ITC reversal rule, while MSMEs continue to face unpaid invoices without corresponding relief.

Significance and Way Forward

- » It highlights the need to align the GST framework with the cash-flow realities of MSMEs, which contribute significantly to employment, exports and GDP.
- » It requires cash-based GST payment for micro and small enterprises instead of accrual-based taxation.
- » It needs a simplified, low-bandwidth GST compliance architecture to improve ease of doing business.
- » It requires integration of GSTN with the Trade Receivables Discounting System (TReDS) for faster invoice financing and timely payments.
- » It calls for strict enforcement of the MSMED Act, 2006 to ensure timely payments and strengthen MSME liquidity.

MSMED Act, 2006

- » Objective: Promote, develop and enhance the competitiveness of Micro, Small and Medium Enterprises.
- » Key Provision: Buyers must make payments within 45 days (or 15 days without a written agreement).
- » Penalty: Delayed payments attract compound interest payable by the buyer.
- » Related Portal: MSME Samadhaan Portal for addressing delayed payment disputes.

Goods and Services Tax (GST)

- » Implemented: 1 July 2017
- » Constitutional Basis: 101st Constitutional Amendment Act, 2016
- » Article: Article 279A provides for the GST Council.
- » Nature: Destination-based indirect tax replacing multiple Central and State taxes.
- » Objective: Create a unified national market through the principle of 'One Nation, One Tax'.

Q. Consider the following statements:

1. The Reserve Bank of India (RBI) is the regulator of Non-Banking Financial Companies (NBFCs).
2. The Small Industries Development Bank of India (SIDBI) is the principal financial institution for the promotion, financing and development of the Micro, Small and Medium Enterprise (MSME) sector.
3. SIDBI is a subsidiary of the RBI.

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Which of the statements given above is/are correct?

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

Answer: (a) 1 and 2 only

Q. The COVID-19 pandemic has exposed the vulnerability of the MSME sector. Discuss the measures announced under the Atmanirbhar Bharat Abhiyan for MSMEs. How far are these measures likely to address the structural problems of the sector?



OptoSAR-Enabled Defense Vision Initiative

Why in News?

- » Bengaluru-based space startup GalaxEye lost contact with Mission Drishti, the world's first OptoSAR satellite and India's largest privately developed Earth Observation satellite.
- » The satellite encountered an anomaly during the Launch and Early Orbit Phase (LEOP), likely caused by a geomagnetic solar storm, leading to loss of communication.

Mission Drishti

- » It was launched on 3 May 2026 aboard SpaceX's Falcon 9 rocket from Vandenberg, California.
- » It was the world's first satellite to integrate Electro-Optical (EO) and Synthetic Aperture Radar (SAR) sensors into a single operational platform.
- » It was developed by GalaxEye, a Bengaluru-based private space startup.
- » It aimed to provide all-weather, day-and-night Earth observation through fused EO and SAR imagery.
- » It demonstrated India's growing capabilities in the private space sector despite the mission setback.

OptoSAR Technology

- » OptoSAR combines Electro-Optical (EO) imaging and Synthetic Aperture Radar (SAR) on a single satellite platform.
- » It provides high-resolution imaging irrespective of cloud cover, rainfall, smoke or darkness.
- » It produces synchronised and fused datasets, reducing temporal gaps and improving analytical accuracy.
- » It enhances applications in disaster management, agriculture, border surveillance, urban planning, environmental monitoring and defence.
- » It supports Artificial Intelligence (AI) and geospatial analytics through high-quality integrated datasets.

Significance

- » It marks a major technological innovation in Earth Observation (EO) satellites.



- » It strengthens India's commercial space ecosystem and promotes indigenous space technology under IN-SPACe and Space Sector Reforms.
- » It expands dual-use capabilities for both civilian and strategic applications.
- » It improves disaster response through real-time, all-weather monitoring.
- » It demonstrates the increasing role of private startups in advancing India's space ambitions.

Challenges

- » It remains vulnerable to space weather events such as geomagnetic solar storms and radiation exposure.
- » It faces significant technical risks during the Launch and Early Orbit Phase (LEOP).
- » It requires highly reliable radiation-hardened onboard electronics and communication systems.
- » It involves high development costs and complex integration of multiple advanced sensors.
- » It requires continuous investment in testing, quality assurance and mission resilience.

Way Forward

- » It requires strengthening radiation protection and fault-tolerant satellite systems.
- » It requires expanding indigenous capabilities in advanced Earth Observation technologies.
- » It requires greater investment in private space startups, research and innovation.
- » It requires enhanced space weather forecasting and mission planning to minimise operational risks.

Q. With reference to OptoSAR technology, consider the following statements:

1. It combines Electro-Optical (EO) imaging and Synthetic Aperture Radar (SAR) on a single satellite.
2. Synthetic Aperture Radar can capture images even during cloud cover and at night.



3. OptoSAR technology is useful for disaster management and border surveillance.

Which of the statements given above are correct?

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

Answer: (d)

"Advanced Earth Observation technologies are transforming disaster management, strategic surveillance and resource governance." Discuss the significance of OptoSAR technology for India's space programme and geospatial capabilities.

River Development Payment Accord

- » Maharashtra, Gujarat, Rajasthan, and Madhya Pradesh signed a one-time settlement agreement to resolve the long-pending payment disputes under the Narmada Water Disputes Tribunal (NWDT) Award.
- » The agreement settles the cost-sharing arrangements for the Sardar Sarovar Project.
- » The Narmada Water Disputes Tribunal (NWDT) was constituted in 1969 and delivered its Award in 1979, providing the framework for sharing water, costs, and benefits among the beneficiary states.
- » The pact was signed in the presence of the Union Home Minister, Union Minister of Jal Shakti, and the Chief Ministers of the four states.

Significance

- » Resolves a long-standing inter-state financial dispute through a one-time settlement of outstanding dues.
- » Demonstrates cooperative federalism through consensus among the four beneficiary states.
- » Ensures smoother implementation and financial management of the Sardar Sarovar Project.
- » The Sardar Sarovar Project provides irrigation, drinking water, and hydroelectric power, significantly benefiting Gujarat, Maharashtra, Rajasthan, and Madhya Pradesh, while improving agricultural productivity and regional development.

- » Forms part of the Centre's broader efforts to resolve inter-state river water disputes, alongside progress on the Kishau Dam Project and the Yamuna Water Project.



Strategic Horizons: India–Australia Partnership

Why in News?

- » Prime Minister Narendra Modi's visit to Australia highlights the growing Comprehensive Strategic Partnership (CSP), with bilateral relations expanding beyond the traditional Three Cs (Commonwealth, Cricket and Curry) towards deeper cooperation in Development, Defence, Energy, Education and Emerging Technologies.

Key Areas of Cooperation

- » It has strengthened economic cooperation through the Economic Cooperation and Trade Agreement (ECTA) (2022), providing duty-free access for Indian exports and preferential access for Australian products.
- » It targets US\$100 billion bilateral trade by 2030, with cumulative two-way investment approaching US\$50 billion.
- » It has growing investment collaboration through AirTrunk's US\$30 billion AI-ready data centre project, Perdaman Chemicals' US\$4.5 billion urea plant, and increasing Australian investments in India.
- » It has expanding defence cooperation through Annual Defence Ministers' Dialogue, senior military exchanges, and exercises such as AUSINDEX, Malabar and Talisman Sabre, along with collaboration in cyber security, Artificial Intelligence (AI), drones and shipbuilding.
- » It has deepening energy partnership through the India–Australia Renewable Energy Partnership, cooperation in solar energy, green hydrogen, critical minerals, rare earths, and proposed Australian uranium exports to support India's civil nuclear programme.
- » It has strengthening education and skill development through over one lakh Indian students in Australia, Australian university campuses in India, joint research in advanced computing, healthcare, defence, energy and space, and vocational skill partnerships.
- » It has a growing Indian diaspora of over ten lakh, strengthening people-to-people ties and cultural exchanges.

Strategic Significance

General Studies, Political Science and International Relations, Sociology, CSAT



- » It strengthens a free, open, safe, peaceful and prosperous Indo-Pacific through cooperation in the Quad and the Indian Ocean Rim Association (IORA).
- » It enhances critical mineral security, semiconductor cooperation and resilient supply chains through initiatives such as the Supply Chain Resilience Initiative (SCRI) and the Australia–Canada–India Technology and Innovation Partnership (2025).
- » It expands trilateral cooperation through India–Indonesia–Australia and India–France–Australia frameworks.
- » It supports India's economic growth, technological advancement, maritime security and regional strategic interests.

Way Forward

- » It requires early conclusion of the Comprehensive Economic Cooperation Agreement (CECA) to deepen economic integration.
- » It requires expanding cooperation in critical minerals, clean energy, defence manufacturing, AI, semiconductors and emerging technologies.

Q. With reference to India–Australia relations, consider the following statements:

1. The Economic Cooperation and Trade Agreement (ECTA) entered into force in 2022.
2. India and Australia cooperate through the Quad and the Indian Ocean Rim Association (IORA).
3. The Supply Chain Resilience Initiative (SCRI) includes India, Australia and Japan.

Which of the statements given above are correct?

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

Answer: (d)

"India–Australia relations have evolved into a comprehensive strategic partnership driven by economic integration, defence cooperation and Indo-Pacific convergence." Discuss.

National Higher Education Growth Index

The Ministry of Education has released the All India Survey on Higher Education (AISHE) for 2022-23 and 2023-24, showing total enrolment in higher education has

General Studies, Political Science and International Relations, Sociology, CSAT

reached 4.5 crore, with notable gains in women's participation, STEM uptake, and inclusivity of marginalised groups.

AISHE

- » AISHE is an annual survey by the Ministry of Education tracking student enrolment, faculty strength, infrastructure, programme offerings, and participation by gender and social category. It serves as a key policy tool for planning, funding, and reforms under NEP 2020. Data is submitted voluntarily by institutions via a web portal and verified through validation checks. The latest round covers 59,533 institutions, with an institutional participation rate above 90%.

Key Findings

- » Overall Enrolment: Rose to 4.5 crore in 2023-24, up 31.5% from 3.42 crore in 2014-15.
- » Gross Enrolment Ratio (GER) (share of 18-23 age group in higher education): 30 in 2023-24, up from 29.5 (2022-23) and 23.7 (2014-15).
- » Women's Participation: Female enrolment rose to 2.24 crore (from 2.18 crore in 2022-23 and 1.57 crore in 2014-15) — a 42.2% rise since 2014-15. Female GER stood at 31.2, above the national average. The Gender Parity Index (GPI) was 1.08, meaning more women than men are enrolled; GPI has stayed above 1 for seven straight years.

SC/ST/OBC Enrolment:

- » SC: 69.72 lakh, up 51.4% since 2014-15; GER up from 18.9 to 27.8.
- » ST: 28.83 lakh, up 75.7% since 2014-15; GER up from 13.5 to 22.8.
- » OBC: 1.80 crore, up 60.2% from 1.13 crore.
- » STEM Education: Enrolment crossed 1 crore for the first time (1.02 crore), up from 91.5 lakh in 2014-15. Women's share in STEM rose to 44% from 38.4%.
- » Faculty Strength: Total faculty reached 17.32 lakh; female faculty rose to 7.78 lakh from 5.69 lakh in 2014-15.

Significance

- » Rising GER and inclusive enrolment growth reflect improved access and progress on social justice and gender equity.



- » STEM growth and rising women's share support India's technology and innovation goals and build a more diverse talent pool.
- » Findings feed into NEP 2020's target of 50% GER by 2035, guiding continued investment in institutions and faculty.

Challenges Ahead

- » Quality concerns: Access has outpaced quality; learning outcomes, employability, and faculty/infrastructure shortages remain issues.
- » Regional disparities: Uneven distribution of quality institutions, rural-urban gaps, and concentration of top institutions in metros.
- » NEP 2020 targets: Reaching 50% GER by 2035 needs sustained expansion, especially in tier-2/tier-3 cities, while balancing quality.
- » Employability: A persistent skill gap between higher education output and industry needs calls for stronger industry-academia linkages and integration of vocational/skill-based education.

Skill development programmes have succeeded in increasing human resources supply to various sectors. In the context of the statement, analyse the relationship between education, skill and employment.

Indira Point Heritage & Sustainability Initiative

The Ministry of Ports, Shipping and Waterways, through the Directorate General of Lighthouses and Lightships, has proposed structural repairs to the Indira Point lighthouse and development of tourism infrastructure around it, aiming to preserve the lighthouse for its navigational role and for its historic and cultural value.

What the Detailed Project Report Proposes

A detailed project report by IIT Madras (IIT-M) outlines structural works including repair and strengthening of the lighthouse tower's foundation, an all-weather approach road, shore protection works such as breakwaters, a powerhouse, inspection facility and staff quarters, and a compound wall with internal pathways. Separately, tourism-focused proposals include eco-tourism initiatives, a convention centre, cafeteria, viewing tower, cycle tracks, an international-standard museum, and a memorial structure.

Coastal Protection and Regulatory Clearances Needed

- » Since the proposed works lie within sensitive coastal habitats, they fall under the Island Coastal Regulation Zone (ICRZ) Notification, 2019, requiring prior approval from the Union Territory's Coastal Zone Management Authority and the Union Environment Ministry. This notification provides a regulatory framework protecting coastal stretches, marine habitats, and the livelihoods of fishing and coastal communities across the Andaman and Nicobar Islands.
- » Coastal zone maps show the works fall mostly in ICRZ-IA areas, with some portions in ICRZ-IVA. ICRZ-IA covers environmentally critical zones such as mangroves, coral reefs, sand dunes, mudflats, national and marine parks, notified forests, salt marshes, and turtle nesting grounds, while ICRZ-IVA covers the seabed and water area between the low tide line and up to 12 nautical miles seaward.

Why the Site Needs Protection Works?

- » The lighthouse has weathered significantly, largely due to the December 2004 earthquake and tsunami, which caused land to rise in some parts of the Andaman and Nicobar chain and sink in others.
- » At Indira Point specifically, permanent land subsidence occurred — the lighthouse and its structures originally stood 3.5 metres above mean sea level, but the disaster's land-sinking and seawater ingress engulfed the tower and destroyed nearby quarters and huts.
- » The Nicobar Islands are estimated to have sunk by about 2.04 metres, submerging the lighthouse's base and foundation in seawater.
- » An IIT-M assessment found continuous exposure of the foundation to seawater and extreme wave conditions during high tide since 2004, and the lighthouse now shows a 3.86° tilt, though this has not been assessed as a risk to structural stability. Ongoing coastal erosion, wave action, and shoreline changes have made structural strengthening necessary.

Conclusion

The Indira Point project reflects the government's dual goal of preserving a historically and navigationally significant landmark while promoting tourism at India's southernmost tip. Given its location within ecologically fragile ICRZ-IA



zones, however, it highlights the recurring tension between infrastructure development and coastal ecological protection — a debate that mirrors concerns raised over the broader Great Nicobar Island infrastructure project.

India's Smart Population Count

The Census of India 2027, the 16th national census, is underway as India's first fully digital decennial count. It has drawn attention not only for its technological shift but also for the ongoing rehearsal of caste enumeration in its second phase, which is testing methodology after the 2011 Socio-Economic and Caste Census (SECC) produced unusable data.

Key Features of the 2027 Census

- » This is India's first census conducted entirely digitally, with enumerators using secure mobile applications and web portals for real-time data collection to improve speed and accuracy.
- » Citizens are also given a self-enumeration option through an official online portal, with self-enumerated households receiving a unique digital ID for later verification by enumerators.
- » A new tool, the Houselisting Block Creator (HLBC), uses satellite imagery to create standardised geographic blocks, streamlining operations and reducing manual demarcation.
- » Notably, this census includes comprehensive caste-related enumeration — the first national caste count since 1931 — expected to inform affirmative action and social welfare policy.

Phased Implementation and Timeline

The census is structured in two phases.

Phase 1 (Houselisting and Housing Census), running April 1 to September 30, 2026, collects data on housing conditions, amenities, and assets, with each State/UT given a 30-day field data collection window and an optional 15-day self-enumeration window; this phase is currently ongoing.

Phase 2 (Population Enumeration), scheduled for February 2027 across most of India, records demographic, social, and economic details of individuals and includes the caste-related enumeration. A special exception applies to snow-bound,



non-synchronous areas — Ladakh, Jammu & Kashmir, Himachal Pradesh, and Uttarakhand — where Population Enumeration is scheduled for September 2026.

Reasons for Delay

- » The census faced delays from its original 2021 schedule primarily due to the COVID-19 pandemic, which made large-scale field operations unsafe and diverted government resources toward pandemic management.
- » Additional delays stemmed from the administrative complexity of shifting to a digital framework, including training millions of enumerators on new digital tools and developing the required IT infrastructure.

The Caste Enumeration Debate

- » A rehearsal for Phase 2 is currently underway in 16 States and Union Territories, testing an "open column" where respondents state their caste, with statutory backing for its collection.
- » This mirrors a feature of the 2011 SECC, which also used an open-ended caste column but resulted in over 46 lakh distinct "caste names" — data the Centre told the Supreme Court in 2021 was too error-ridden to be relied upon for reservation purposes.
- » By contrast, the last census to tabulate caste, in 1931, recorded only 4,147 caste names. The ongoing pre-test, ending July 20, aims to finalise a workable methodology — one proposal involves using digital devices pre-loaded with curated lists of castes and sub-castes, similar to the approach used in the 2022-23 Bihar caste survey.
- » Counting caste is framed as a means of addressing social inequities, consistent with the Constitution's commitment to social justice, the abolition of untouchability, and the prohibition of caste-based discrimination.
- » Proponents argue that reliable empirical caste data can sharpen the targeting of welfare and affirmative action measures, help address the "creamy layer" concept, and support the sub-categorisation of castes and classes already covered under reservation.



Policy Implications and Significance

- » Census 2027 data will be critical for the delimitation exercise — redrawing parliamentary and assembly constituency boundaries — expected to follow publication of census results, ensuring representation adjusts to population shifts.
- » Beyond delimitation, the data will support targeted, evidence-based policymaking: identifying beneficiaries for welfare schemes, guiding infrastructure and urban planning, and offering demographic insights into population growth trends, migration, literacy, employment, and household income patterns.

Q. The Census of India 2027 marks a significant shift towards digital governance while reviving the practice of caste enumeration after nearly a century. Discuss the significance of the 2027 Census for evidence-based policymaking and inclusive governance. Also examine the challenges associated with digital census operations and caste enumeration.

Data Privacy and Transparency Dilemma

The Delhi High Court, in *Laksh Vir Singh Yadav v. Union of India*, has laid down structured principles for the Right to be Forgotten (RTBF) in India, ruling that it flows from the right to privacy under Article 21 and prescribing a proportionality test to balance privacy with open justice.

Understanding the Right to be Forgotten

- » The RTBF, also called the Right to Erasure, allows individuals to request removal or de-indexing of personal data from public platforms — particularly search engines — when its continued accessibility is outdated, irrelevant, excessive, or harmful and serves no public interest.
- » It targets search engine delisting rather than removal of original content, and is not absolute: it must be weighed against freedom of speech, journalistic freedom, and the public's right to information. The right is rooted in the broader idea of informational self-determination, giving individuals a measure of control over their digital footprint.

Global Origins and Evolution

- » The concept gained global prominence through the European Court of Justice's 2014 ruling in favour of Mario Costeja González (the Google Spain case), which held that individuals could ask search engines to remove links to outdated or irrelevant personal data.
- » This was formally codified as the "Right to Erasure" under Article 17 of the EU's General Data Protection Regulation (GDPR), 2018, which allows erasure where data is no longer necessary for its original purpose, consent is withdrawn, processing was unlawful, or a legal obligation requires erasure.
- » Several other jurisdictions, including Argentina and some US states, have explored or adopted similar provisions with variations.

Right to be Forgotten in India

- » India's approach has evolved mainly through judicial pronouncements.
- » The Supreme Court's K.S. Puttaswamy v. Union of India (2017) judgment recognised privacy, including informational privacy, as a fundamental right under Article 21, laying the constitutional groundwork for RTBF.
- » Several High Courts — Delhi, Karnataka, Kerala, and Orissa among them — have since ordered removal of sensitive personal information, such as details from divorce proceedings or past acquittals; a 2021 Delhi High Court order, for instance, directed Google and Indian Kanoon to remove a judgment concerning a woman's criminal acquittal.
- » On the legislative side, the Digital Personal Data Protection (DPDP) Act, 2023, provides a statutory basis through Section 17, granting data principals a right to erasure and requiring data fiduciaries to delete personal data once it is no longer needed for its original purpose, subject to exceptions for public interest, legal obligations, and free speech — similar to the GDPR model. However, this statutory right remains
- » largely consent-based and does not explicitly extend to judicial records, and its implementation is limited since the Act's rules have not yet been notified and the Data Protection Board is not fully functional.

The Delhi High Court Ruling

- » In *Laksh Vir Singh Yadav v. Union of India*, the Delhi High Court held that the RTBF derives from Article 21 and set out a structured proportionality test: retention of information must serve a legitimate purpose, the harm to privacy must be weighed against public interest, and the least intrusive means — such as masking names rather than deleting facts — should be preferred.
- » The ruling directs that only the names of parties be masked in judicial records, not the underlying facts, and gives legal databases a two-week compliance deadline.
- » It recognises that RTBF often comes into tension with freedom of speech and press under Article 19(1)(a) and the principle of open justice, and that public interest — particularly in serious crime cases — can outweigh privacy claims, though a person's digital presence should not permanently victimise them once legal proceedings conclude.
- » The Court also acknowledged practical enforcement challenges: de-indexing at the search-engine level does not stop information from persisting on mirror sites, archives, or social media.
- » It floated a tiered system for handling erasure requests, involving platforms, the Data Protection Board, and courts, to balance efficiency with accountability.
- » Full implementation of this framework, however, awaits a Supreme Court ruling, the Data Protection Board's establishment, and compliance from digital platforms.

Arguments For and Against RTBF

- » Supporters argue it protects individual privacy and digital identity, helps people overcome past mistakes that could affect employment or social standing, curbs cyberbullying and harassment, promotes accuracy by removing outdated information, and supports rehabilitation after past legal or personal issues.
- » Critics counter that it risks censorship and suppression of legitimate information, can hinder the public's right to know — especially about public



figures — creates a "memory hole" that sanitises historical record, is difficult to enforce given data's global reach, and could be misused by powerful individuals to hide truthful but unflattering information.

Challenges and Implications

- » Defining "public interest" objectively and consistently remains difficult.
- » Jurisdictional limitations prevent global enforcement, as delisting in one country may not apply elsewhere.
- » High volumes of requests make it challenging to balance automated processing with human review in complex cases.
- » Excessive delisting may create a chilling effect on journalism, transparency, and historical research.
- » Ensuring complete digital erasure across multiple platforms, archives, and databases is technically difficult.

Q. "Examine the scope of Fundamental Rights in the light of the latest judgment of the Supreme Court on Right to Privacy.

Central America's Green Jewel

- » Location: A small country in Central America.
- » Borders: Nicaragua to the north and Panama to the south.
- » Maritime Boundaries: Pacific Ocean to the west and the Caribbean Sea to the east.
- » Capital: San José.

Geographical Features

- » The Central Valley is flanked by the Cordillera Volcánica to the north and the Cordillera de Talamanca to the south.
- » Major volcanoes include Arenal Volcano, Poás Volcano, and Irazú Volcano.
- » Highest Point: Mount Chirripó (12,536 ft), located in the Cordillera de Talamanca.
- » Largest Lake: Lake Arenal.
- » Major rivers include the Reventazón River (flows into the Caribbean Sea), Tempisque, Sierpe, and the San Juan River, which forms part of the border with Nicaragua.

- » Natural Resources: Copper, manganese, gold, magnetite, and bauxite. It has reduced dependence on the Kharif season, whose share in total foodgrain production has declined from nearly 60% in the 1990s to 47% in 2025-26.

Systemic Hyperinflammation Syndrome

About

- » Hemophagocytic Lymphohistiocytosis (HLH) is a rare but life-threatening immune system disorder in which the body's immune system becomes overactive.
- » Instead of protecting the body from infections, the immune system attacks healthy tissues and organs, causing severe inflammation.
- » It can affect the liver, spleen, bone marrow, brain, and other organs.
- » If left untreated, HLH can become life-threatening.

Types

Primary (Familial) HLH:

- » Caused by inherited genetic mutations.
- » Usually develops during infancy or early childhood, though it may appear later.
- » If both parents are carriers, a child has:
 - 25% chance of having HLH.
 - 50% chance of being a carrier.
 - 25% chance of neither having the disease nor being a carrier.

Secondary (Acquired) HLH:

- » Triggered by conditions that cause abnormal immune activation.
- » Common triggers include:
 - Viral infections such as Epstein–Barr virus (EBV) and Cytomegalovirus (CMV).
 - Certain bacterial, fungal, and parasitic infections.
 - Autoimmune diseases such as lupus and rheumatoid arthritis.
 - Blood cancers such as lymphoma and leukemia.
 - Weakened immune system due to certain medications or medical conditions.



The Chickpea Culinary Path

- » The Hummus Trail refers to a network of destinations in India frequented by young Israeli veterans after completing their mandatory military service.
- » It forms part of the post-army travel tradition known as Tiul Gadol ("The Big Trip"), often financed through military service bonuses.
- » Popular destinations include Himachal Pradesh (Kasol, Dharamkot), Goa, Rishikesh, and parts of Uttarakhand.
- » The trail is associated with rest, recreation, trekking, yoga, and spiritual tourism.
- » Around 80,000 Israeli tourists visit India annually.

Key factors :

- » The Hind Rajab Foundation (HRF) filed a complaint in India against Israeli soldier Eitan Gilboa, alleging war crimes committed during the 2024 Gaza conflict.
- » The complaint was filed after he was reportedly vacationing in Himachal Pradesh, a key destination on the Hummus Trail.
- » The case has drawn attention to India's Geneva Conventions Act, 1960, which allows the arrest and prosecution of any person, irrespective of nationality or place of offence, for grave breaches of the Geneva Conventions.
- » The issue has also renewed scrutiny over the Hummus Trail, including concerns related to drug abuse, rave parties, and mental health challenges among some post-service Israeli veterans.

Advanced Long-Range Rocket Platform

- » Pinaka is an indigenously developed Multi-Barrel Rocket Launcher (MBRL) system designed for the Indian Army by the Defence Research and Development Organisation (DRDO).
- » It provides high-volume, precision artillery fire against enemy troop concentrations, artillery positions, and strategic targets.
- » The system uses a common launcher capable of firing different variants of Pinaka rockets, enhancing operational flexibility.



- » The long-range guided variant features precision guidance and the ability to execute planned in-flight manoeuvres.
- » In the recent flight test conducted at the Integrated Test Range (ITR), Chandipur, the rocket successfully validated its user-defined minimum strike range of 60 km with high accuracy.

Significance

- » Enhances the Indian Army's long-range precision strike capability.
- » Strengthens indigenous defence manufacturing under the Aatmanirbhar Bharat initiative.
- » Improves operational flexibility through a single launcher compatible with multiple Pinaka variants.
- » Reinforces India's capabilities in modern artillery and battlefield fire support.
- » Demonstrates the importance of the Integrated Test Range (ITR), Chandipur, as a key facility for missile and rocket testing. It has an enlarged olfactory bulb and turbinals, enabling it to forage for ants and termites using its keen sense of smell.

Prambanan: Sacred Spires of Indonesia

- » Prambanan Temple is a 9th-century Hindu temple complex located in Yogyakarta, Indonesia.
- » It is dedicated to the Trimūrti—Brahma (Creator), Vishnu (Preserver), and Shiva (Destroyer).
- » It is the largest Hindu temple complex in Indonesia.
- » The temple was inscribed as a UNESCO World Heritage Site in 1991.
- » India and Indonesia have launched a joint restoration project, with the Archaeological Survey of India (ASI) serving as the lead agency from the Indian side.
- » The restoration will focus on the perwara (companion shrines) surrounding the three main temples

Significance

- » The project will use the anastylosis technique, rebuilding the monument using original stones, supported by digital mapping and Artificial Intelligence (AI).
- » It strengthens the civilisational and cultural ties between India and Indonesia.
- » Reinforces India's Act East Policy and cultural diplomacy through heritage conservation.
- » Demonstrates the ASI's expertise in international conservation projects, including Angkor Wat (Cambodia) and Mỹ Sơn (Vietnam).
- » Reflects the enduring influence of Hinduism and Buddhism in Indonesia, with the Ramayana and Mahabharata continuing to shape its cultural heritage.

Q. Consider the following statements regarding the Prambanan Temple Complex:

1. The temple complex was constructed during the period when both Hindu and Buddhist kingdoms flourished in Central Java.
2. The temple complex was constructed during the period when both Hindu and Buddhist kingdoms flourished in Central Java.
3. The principal shrines of the complex are dedicated to Shiva, Vishnu and Brahma.

Which of the statements given above is/are correct?

- [A] 1 only
- [B] 2 only
- [C] Both 1 and 2
- [D] Neither 1 nor 2

Precision Vision Defense Mission

- » Bengaluru-based space startup GalaxEye lost contact with Mission Drishti, the world's first OptoSAR satellite and India's largest privately developed Earth Observation satellite.
- » The satellite encountered an anomaly during the Launch and Early Orbit Phase (LEOP), likely caused by a geomagnetic solar storm, leading to loss of communication.

Mission Drishti

- » It was launched on 3 May 2026 aboard SpaceX's Falcon 9 rocket from Vandenberg, California.
- » It was the world's first satellite to integrate Electro-Optical (EO) and Synthetic Aperture Radar (SAR) sensors into a single operational platform.
- » It was developed by GalaxEye, a Bengaluru-based private space startup.
- » It aimed to provide all-weather, day-and-night Earth observation through fused EO and SAR imagery.
- » It demonstrated India's growing capabilities in the private space sector despite the mission setback.

OptoSAR Technology

- » OptoSAR combines Electro-Optical (EO) imaging and Synthetic Aperture Radar (SAR) on a single satellite platform.
- » It provides high-resolution imaging irrespective of cloud cover, rainfall, smoke or darkness.
- » It produces synchronised and fused datasets, reducing temporal gaps and improving analytical accuracy.
- » It enhances applications in disaster management, agriculture, border surveillance, urban planning, environmental monitoring and defence.
- » It supports Artificial Intelligence (AI) and geospatial analytics through high-quality integrated datasets.

Significance

- » It marks a major technological innovation in Earth Observation (EO) satellites.



- » It strengthens India's commercial space ecosystem and promotes indigenous space technology under IN-SPaCe and Space Sector Reforms.
- » It expands dual-use capabilities for both civilian and strategic applications.
- » It improves disaster response through real-time, all-weather monitoring.
- » It demonstrates the increasing role of private startups in advancing India's space ambitions.

Challenges

- » It remains vulnerable to space weather events such as geomagnetic solar storms and radiation exposure.
- » It faces significant technical risks during the Launch and Early Orbit Phase (LEOP).
- » It requires highly reliable radiation-hardened onboard electronics and communication systems.
- » It involves high development costs and complex integration of multiple advanced sensors.
- » It requires continuous investment in testing, quality assurance and mission resilience.

Way Forward

- » It requires strengthening radiation protection and fault-tolerant satellite systems.
- » It requires expanding indigenous capabilities in advanced Earth Observation technologies.
- » It requires greater investment in private space startups, research and innovation.
- » It requires enhanced space weather forecasting and mission planning to minimise operational risks.

Q. With reference to OptoSAR technology, consider the following statements:

4. It combines Electro-Optical (EO) imaging and Synthetic Aperture Radar (SAR) on a single satellite.
5. Synthetic Aperture Radar can capture images even during cloud cover and at night.



6. OptoSAR technology is useful for disaster management and border surveillance.

Which of the statements given above are correct?

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

Answer: (d)

"Advanced Earth Observation technologies are transforming disaster management, strategic surveillance and resource governance." Discuss the significance of OptoSAR technology for India's space programme and geospatial capabilities.

Hydropower & Irrigation Payment Framework

Maharashtra, Gujarat, Rajasthan, and Madhya Pradesh signed a one-time settlement agreement to resolve the long-pending payment disputes under the Narmada Water Disputes Tribunal (NWDT) Award.

- » The agreement settles the cost-sharing arrangements for the Sardar Sarovar Project.
- » The Narmada Water Disputes Tribunal (NWDT) was constituted in 1969 and delivered its Award in 1979, providing the framework for sharing water, costs, and benefits among the beneficiary states.
- » The pact was signed in the presence of the Union Home Minister, Union Minister of Jal Shakti, and the Chief Ministers of the four states.

Significance

- » Resolves a long-standing inter-state financial dispute through a one-time settlement of outstanding dues.
- » Demonstrates cooperative federalism through consensus among the four beneficiary states.
- » Ensures smoother implementation and financial management of the Sardar Sarovar Project.
- » The Sardar Sarovar Project provides irrigation, drinking water, and hydroelectric power, significantly benefiting Gujarat, Maharashtra,

Rajasthan, and Madhya Pradesh, while improving agricultural productivity and regional development.

- » Forms part of the Centre's broader efforts to resolve inter-state river water disputes, alongside progress on the Kishau Dam Project and the Yamuna Water Project.

Expanding Dimensions of Bilateral Relations

Prime Minister Narendra Modi's visit to Australia highlights the growing Comprehensive Strategic Partnership (CSP), with bilateral relations expanding beyond the traditional Three Cs (Commonwealth, Cricket and Curry) towards deeper cooperation in Development, Defence, Energy, Education and Emerging Technologies.

Key Areas of Cooperation

- » It has strengthened economic cooperation through the Economic Cooperation and Trade Agreement (ECTA) (2022), providing duty-free access for Indian exports and preferential access for Australian products.
- » It targets US\$100 billion bilateral trade by 2030, with cumulative two-way investment approaching US\$50 billion.
- » It has growing investment collaboration through AirTrunk's US\$30 billion AI-ready data centre project, Perdaman Chemicals' US\$4.5 billion urea plant, and increasing Australian investments in India.
- » It has expanding defence cooperation through Annual Defence Ministers' Dialogue, senior military exchanges, and exercises such as AUSINDEX, Malabar and Talisman Sabre, along with collaboration in cyber security, Artificial Intelligence (AI), drones and shipbuilding.
- » It has deepening energy partnership through the India–Australia Renewable Energy Partnership, cooperation in solar energy, green hydrogen, critical minerals, rare earths, and proposed Australian uranium exports to support India's civil nuclear programme.
- » It has strengthening education and skill development through over one lakh Indian students in Australia, Australian university campuses in India, joint research in advanced computing, healthcare, defence, energy and space, and vocational skill partnerships.



- » It has a growing Indian diaspora of over ten lakh, strengthening people-to-people ties and cultural exchanges.

Strategic Significance

- » It strengthens a free, open, safe, peaceful and prosperous Indo-Pacific through cooperation in the Quad and the Indian Ocean Rim Association (IORA).
- » It enhances critical mineral security, semiconductor cooperation and resilient supply chains through initiatives such as the Supply Chain Resilience Initiative (SCRI) and the Australia–Canada–India Technology and Innovation Partnership (2025).
- » It expands trilateral cooperation through India–Indonesia–Australia and India–France–Australia frameworks.
- » It supports India's economic growth, technological advancement, maritime security and regional strategic interests.

Way Forward

- » It requires early conclusion of the Comprehensive Economic Cooperation Agreement (CECA) to deepen economic integration.
- » It requires expanding cooperation in critical minerals, clean energy, defence manufacturing, AI, semiconductors and emerging technologies.

Q. With reference to India–Australia relations, consider the following statements:

4. The Economic Cooperation and Trade Agreement (ECTA) entered into force in 2022.
5. India and Australia cooperate through the Quad and the Indian Ocean Rim Association (IORA).
6. The Supply Chain Resilience Initiative (SCRI) includes India, Australia and Japan.

Which of the statements given above are correct?

- | | | | | |
|-----|---|-----|---|------|
| (a) | 1 | and | 2 | only |
| (b) | 2 | and | 3 | only |



(c) 1 and 3 only

(d) 1, 2 and 3

Answer: (d)

"India–Australia relations have evolved into a comprehensive strategic partnership driven by economic integration, defence cooperation and Indo-Pacific convergence."

Discuss.

Ayushman Bharat: e-Health Revolution

Recently, the Union Health Minister highlighted ABDM as one of the world's largest digital health ecosystems, surpassing 93.95 crore Ayushman Bharat Health Account (ABHA) IDs.

ABDM

- » Nodal Agency: Implemented by the National Health Authority (NHA) under the Ministry of Health and Family Welfare.
- » Objective: To develop the digital backbone supporting India's integrated healthcare infrastructure.
- » Core Components:
 - ABHA: A 14-digit unique identifier for citizens to securely store and share longitudinal health records.
 - Registries: Healthcare Professionals Registry (HPR) and Health Facility Registry (HFR).

Climate-Smart Rice Cultivation

- » Recently, states like Chhattisgarh and Punjab have actively urged farmers to adopt the Direct Seeding of Rice (DSR) method.

Direct Seeding of Rice (DSR)

- » Process: Rice seeds are sown directly into the main field, eliminating traditional nursery preparation, puddling, and manual transplantation.
- » Key Advantages:
 - Resource Efficiency: Saves 20-30% of groundwater and heavily reduces manual labour dependency.



- Environmental Impact: Significantly lowers methane emissions compared to traditionally flooded paddies.
- Agronomic Benefits: Facilitates early crop maturity (by 7-10 days) and improves soil physical conditions for subsequent winter crops.
- » Major Challenges: Vulnerability to high weed infestation and dependence on chemical herbicides.

Ecological Assessment of Great Indian Bustard

- » Thar is part of the Desert Biogeographic Zone and is among India's most ecologically distinct and biologically rich arid ecosystems.
- » Biodiversity: Supports the GIB, Chinkara, Desert Fox, Indian Fox, Desert Cat, and Spiny-tailed Lizard.
- » Climate: Temperatures range from 50°C in summer to 0°C in winter, with high diurnal variation.
- » Landscape: Features a mosaic of grasslands and croplands over gravel plains, rocky hillocks, sand-soil cover and sand dunes.

Key Highlights of Report

- » Stable Population: GIB population estimated at 130 ± 21 , remaining stable since 2017–18.
- » Threats: Power lines, agricultural fencing, roads, water sources, and solar plants have expanded substantially, intensifying habitat fragmentation and mortality risks.

Great Indian Bustard (GIB)

- » Conservation Status:
 - IUCN: Critically Endangered.
 - Wildlife (Protection) Act 1972): Schedule I.
 - CITES: Appendix I.
- » Habitat: It is an agro-grassland bird that thrives in open habitats including short grasslands, open scrub, and rain-fed agricultural land.



- » Range: The bird is endemic to the Indian Subcontinent found in Rajasthan, Gujarat, Maharashtra, Andhra Pradesh.
 - It is State Bird of Rajasthan.
- » Diet: Omnivorous.
- » Threats: Infrastructure expansion, invasive predators (free-ranging dogs, feral dogs, nilgai), vegetation changes etc.
- » Conservation Efforts: Conservation breeding, habitat restoration, predator translocation, removal of invasive Prosopis Juli flora , scientific monitoring etc.

Employment Challenges for Indian Women

Prime Minister's Economic Advisory Council (EAC-PM) Chairman stated weak labour demand, rather than social norms, has become the key barrier to raising women's labour force participation in India.

- » Female Labour Force Participation Rate (LFPR) for age 15 years and above stood at 32.8% in May, 2026.
 - In rural areas, female LFPR was recorded at 36.7%, whereas it remained almost at the same level at 24.8% in urban areas.

Factors responsible for Low Employment among Women in India

- » Limited access to STEM careers: In India women constitute 43% of STEM graduates, but only an estimated 27% participate in the STEM workforce.
- » Unpaid labour: Women spent 363 min/day on unpaid work vs. 123 min/day for men.
- » Despite women's financial inclusion, the credit-to-deposit ratio is 43% for women compared to 93% for men.
- » Wage Inequality: India's wage equality ratio stands at a low 0.5 (where 1 indicates full parity), compared to 0.8 in the Philippines.

Steps taken to increase women participation in workforce

- » Industrial Relations Code 2020 mandates adequate representation of women in the Grievance Redressal Committee.



- » Maternity Benefits: The maximum period of maternity leave is 26 weeks, of which up to 8 weeks may be taken before the expected date of delivery.
- » Safety at Workplace: Initiatives like "She-Box" encompassing various provisions of 'Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013'.

Indian Quantum Supremacy Initiative

BITS Pilani scientists, collaborating with IBM Quantum, have simulated the behaviour of subatomic particles on 120 qubits of an IBM processor highlighting Quantum Advantage.

- » Quantum Advantage occurs when quantum computers execute specific, complex tasks faster, cheaper, or more accurately than the most powerful classical supercomputers

What is Quantum Computing?

Quantum computing is an advanced field of computing that harnesses the unique qualities of quantum mechanics to solve problems beyond the ability of even the most powerful classical computers.

Challenges with Quantum Computing

- » Decoherence and noise: Qubits lose quantum states quickly, degrading accuracy.
- » Error correction: Needs many physical qubits to create one reliable "logical" qubit.
- » Hardware dependence: Indigenous fabrication of qubit-grade materials and cryogenic systems is nascent.

National Quantum Mission (NQM)

- » Implemented by the Department of Science and Technology (DST) with a ₹6,003.65 crore budget for 2023-2031.
- » Objectives: Develop quantum computers (50-1,000 physical qubits).
 - Secure and high-bandwidth communication infrastructure over 2,000 km.
 - Inter-city quantum key distribution (QKD) over 2000 km.



- Develop multi-node quantum network, magnetometers, and atomic clocks.
- Develop Quantum materials for cutting-edge device fabrication.

Executed via four Thematic Hubs (T-Hubs): Quantum Computing, Quantum Communication, Quantum Sensing & Metrology, and Quantum Materials & Devices; following the Hub-Spoke-Spike model, across premier institutes.

Indo-Pacific Partners: India & New Zealand

Both countries launched the Roadmap to 2030 which provides a strategic roadmap to guide structured implementation of the India–New Zealand Strategic Partnership for the next four years.

Key Outcomes of India PM visit to New Zealand

- » **Bilateral Trade:** Both sides have set a target to double bilateral trade to NZ\$7 billion (₹35,000 crore) by 2030 to boost economic ties and expand market access.
- » **Maritime Security:** New Zealand nominates Maritime Security as priority pillar under the Indo-Pacific Oceans Initiative (IPOI).
 - IPOI launched by India is a non-treaty-based voluntary arrangement that promotes cooperation for a free and open Indo-Pacific and the rules-based regional order.
- » **Sustainable biofuels:** New Zealand's joined the Global Biofuels Alliance (GBA).
 - GBA, launched by India in 2023, unites the world's largest producers and consumers (including the US, Brazil, and India) to expedite global biofuel adoption.
- » **Agriculture:** Under the Agricultural Productivity Partnership under FTA, a Kiwifruit Action Plan is being launched along with the establishment of two Centres of Excellence in Nagaland and Uttarakhand.
- » **Sports:** Launched India-New Zealand Joint Action Plan on Sport, a framework for collaboration in sports, including high-performance sport, sports science, sports medicine and athlete development.

General Studies, Political Science and International Relations, Sociology, CSAT



India-New Zealand (NZ) Relations

- » Background: Diplomatic relations were established in 1952. NZ identified India as a priority country in its “Opening Doors to India” policy notified in 2011.
- » Bilateral Trade: In 2024-25, the exports from India to New Zealand were higher than imports, maintaining a positive trade balance with the country.
- » Free Trade Agreement (2026): Eliminates duty on 100% of Indian Exports
 - India has offered market access in 70.03% of the tariff lines while keeping 29.97 % tariff lines in exclusion, which covers 95% of New Zealand's Bilateral Trade.
- » Education: India is the 2nd largest source of international students in NZ.
- » Diaspora: ~3 lakh strong Indian diaspora (~5% of New Zealand's population).

Invoice Discounting Digital Network

Government has made TReDS mandatory for Settlement of All MSME Invoices by Central Public Sector Enterprises.

Trade Receivables Discounting System (TReDS)

- » It is RBI-regulated electronic platform designed to facilitate the online financing and discounting of trade receivables of Micro, Small and Medium Enterprises (MSMEs).
- » Key Participants:
 - Sellers: Only MSMEs are eligible to participate as sellers.
 - Buyers: Corporates, Government Departments, PSUs, and any other entities can participate as buyers.
 - Financiers: Banks, NBFC-Factors, and other financial institutions permitted by the Reserve Bank of India (RBI).
- » Operational Platforms: Receivables Exchange of India Ltd (RXIL) , M1xchange, Invoicemart, C2treds and DTX.

National Port Protection Bureau

The Union Home Minister reviewed the establishment of the Bureau of Port Security and directed that only licensed private security guards trained by the CISF to be deployed at ports.

Bureau of Port Security(BoPS)

- » Statutory Body: Established under Section 13 of the Merchant Shipping Act, 2025.
- » Nodal Ministry: Ministry of Ports, Shipping and Waterways.
- » Mandate: Single statutory security authority for ships and port facilities.
 - Enforcement of International Ship and Port Facility Security (ISPS) Code, across all Indian ports
 - Coordination among Coast Guard, CISF, Navy, and State Police
 - Alignment with Maritime India Vision 2030

Oman: Regional Developments

The External Affairs Minister of India visited Oman reviewing the India-Oman Strategic Partnership.

Oman (Capital: Muscat)

Political features

- » It is a sovereign country located in the Arabian Peninsula of Western Asia.
- » It is a founding member of the Gulf Cooperation Council (GCC).
- » Land boundaries: United Arab Emirates (North-west), Saudi Arabia (West), Yemen (South-west) .
- » Maritime Boundaries: Arabian Sea (South and East) and Gulf of Oman (North).

Geographical Features:

- » Mountain Ranges: Hajar and Dhofar.
- » The Port of Salalah is the largest port in Oman.
- » Desert: Rub al-Khali (Empty Quarter) desert.
- » Natural Resources: Fuel resources (petroleum and natural gas), minerals resources (copper, marble, asbestos, chromium, gypsum, and limestone), and fish.



Parrot-Specific Bornavirus 4

- » Scientists have identified the deadly Parrot Bornavirus 4 (PaBV-4) in India for the first time among captive birds.

Parrot Bornavirus 4 (PaBV-4)

- » Pathogen: A highly contagious, single-stranded RNA virus of the Orthobornavirus alphapsittaciforme species (Bornaviridae family).
- » Target Species: Primarily affects psittacine birds (parrots, macaws, cockatiels, cockatoos, etc.).
- » Transmission: Highly transmissible via contaminated food, fecal matter, and aerosols.
 - Currently, neither vaccine nor cure exists.
 - It remains an avian health concern (not zoonotic).
- » Threat: High asymptomatic carriage rates pose a severe threat to vulnerable species conservation.

Pharmaceutical Regulation Schedule K

The Ministry of Health and Family Welfare recently removed the Schedule K licensing exemption for medicinal products containing high ethyl alcohol content.

- » Formulations containing >12% v/v ethyl alcohol (exceeding 30 mL packaging) now require proper licenses and are shifted to Schedule H1 (prescription-only) to prevent intoxicating misuse.
 - Ethyl Alcohol (ethanol) is a psychoactive, volatile organic compound used as a solvent/preservative in medicinal tinctures.

Schedule K of the Drugs Rules, 1945

- » Regulatory Exemption: Schedule K of the Drugs Rules, 1945 (under Drugs and Cosmetics Act, 1940) lists drugs exempted from certain licensing requirements.
- » Scope: It removes standard manufacturing, sale, and distribution licensing barriers for certain low-risk household remedies (e.g., specific tinctures).

Tropical Cyclone Bavi Report



A powerful Typhoon Bavi lashed Japan's southern islands and headed toward the China's east coast.

Typhoon Bavi

- » Formation and Timing: Formed in early July 2026 in the North Pacific Ocean.
- » Categorization: Category 5 intensity on the Saffir-Simpson wind scale
 - The Saffir-Simpson Wind Scale is a 1 to 5 rating based only on maximum sustained wind speed.

AI Governance Imperativ

The UN's Preliminary Report of the Independent International Scientific Panel on AI warns that the rapid advancement of AI is outpacing current scientific understanding, safety guardrails, and global governance mechanisms.

Key concerns raised in Report

- » The Compute Divide: The US and China control 90% of global AI computing power, risking the exclusion of developing nations like India and making them mere consumers.
- » Loss of Control: Highly autonomous "agentic AI" models are outpacing oversight, creating massive cybersecurity vulnerabilities and real risks of society losing control over these systems.
- » Democratic Threats: AI deepfakes and persuasion algorithms are eroding shared truth, amplifying disinformation, and interfering in global elections.
- » Human & Child Safety: There has been an exponential rise in AI-generated child sexual abuse material (CSAM).
 - Also, engagement-driven "sycophantic" chatbots have worsened mental distress in vulnerable users, in some cases encouraging fatal self-harm.
- » Linguistic Bias: AI models are optimized for a few dominant languages; applying these tools to underrepresented languages can be life-threatening. E.g. mistranslation in medical field.

Recommendations of the UN Panel

- » Build Local Capacity: Proactively invest in domestic AI computing infrastructure and talent to build sovereign AI capabilities worldwide.

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- » **Regulate System Architecture:** Shift governance away from simply moderating content to regulating the underlying architecture and behavioral design of AI systems.
- » **Independent Testing:** Stop relying on corporate goodwill and mandate independent, third-party capability and risk assessments.
- » **Enforce Human Rights:** Apply established human rights and child rights impact assessments across the entire AI lifecycle (design, deployment, and auditing).
- » **United Nations-Based Platform:** Maintain a continuous, universally inclusive platform for structured dialogue between AI developers, member states, and scientists to coordinate global safety standards.

Astronauts of Bharat

ISRO successfully carried out tests of Gaganyaan crew module systems.

- » **Crew Module (CM):** The habitable space of the Gaganyaan Orbital Module that provides an Earth-like environment for astronauts.

Gaganyaan Mission

- » India's first human spaceflight mission by ISRO.
 - India will become the fourth country after Russia, the United States, and China to independently demonstrate human spaceflight capability.
- » **Objective:** Demonstrate India's human spaceflight capability by sending 3 astronauts to 400 km Low Earth Orbit (LEO) for 3 days and safely recover them in the sea.
- » **Launch Vehicle:** Human-Rated LVM3 (HLVM3).

Element of Lightness

China has imposed a temporary export ban on helium.

Helium

- » A colourless, odourless, non-toxic, non-flammable, inert noble gas and the second-lightest element in the periodic table.



- » Occurrence: Non-renewable; formed by radioactive decay of uranium and thorium and extracted mainly from natural gas.
- » Key Property: It has lowest boiling point among all elements.
- » Uses: MRI scanners, semiconductor fabrication, optical fibre manufacturing, quantum computing, leak detection, in rockets fuel system, etc.
- » Major producers: United States and Qatar

Empowering Micro Food Enterprises

- » PM Formalisation of Micro Food Processing Enterprises (PMFME) Scheme surpassed 2 lakh credit-linked beneficiaries
- » Over 2 lakh micro food processing enterprises received credit-linked assistance, leveraging ₹20,300+ crore in investments.
- » Nearly 90% beneficiaries are first-generation entrepreneurs, 44% are women, and 75,000+ enterprises have been formalised through Udyam, FSSAI and GST registrations.

PMFME Scheme

- » Launched in 2020 under the Atmanirbhar Bharat Abhiyaan.
- » Type: Centrally Sponsored Scheme (2020–21 to 2025–26) with an outlay of ₹10,000 crore.
- » Ministry: Ministry of Food Processing Industries (MoFPI)
- » Objective: Formalise and enhance the competitiveness of micro food processing enterprises through financial, technical and business support.

Key Features:

- » Credit-linked subsidy: 35% of eligible project cost (maximum ₹10 lakh per unit) for upgradation/setting up of enterprises.
- » ODOP (One District One Product) approach: Promotes district-specific products through value addition, branding and market linkages.
- » Support to SHGs, FPOs & Cooperatives: Seed capital for SHGs, credit support, capacity building and group-based enterprises.
- » Branding & Marketing Support: Common branding, packaging, quality certification and market linkages for ODOP products.

Empowering Rural Artisans

- » Scientists have identified the deadly Parrot Bornavirus 4 (PaBV-4) in India for the eSaras has emerged as an important digital commerce platform supporting rural entrepreneurship.

eSaras

- » It is the official e-commerce platform of the Ministry of Rural Development under the Deendayal Antyodaya Yojana–National Rural Livelihoods Mission (DAY-NRLM).
- » It connects rural women-led Self-Help Group (SHG) enterprises with customers across India, offering authentic handcrafted products, handlooms, natural foods, home décor, etc.

Green Infrastructure of India

- » A new study, for the first time, quantified the actual worth of India's forests on a comprehensive national scale.
- » The study reveals that Indian forests generate "invisible wealth" that is equivalent to nearly two-thirds of India's formal economy.

Key Findings of Study

- » India's forest ecosystem services were worth US\$2.5 trillion annually (2023 constant prices).
- » Tropical dry deciduous forests contribute the maximum annual value of US\$703 billion, followed by Mangrove forests.
- » Tropical dry deciduous forests account for the largest proportion of India's forest cover.
- » The average value of cultural services is greater than provisioning services and regulating services. (refer infographic for types of ecosystem services).

Challenges Highlighted

- » Population Pressure: A 1% increase in population density is associated with a 11.3% decrease in the value of forest ecosystem services.
- » Quality Over Quantity: A monoculture plantation counts as forest cover in official statistics but delivers a fraction of the ecosystem services of a natural mixed-species stand.
- » Flawed Compensation Models: E.g., Net Present Value (NPV) under-represent the full economic cost of lost regulating and cultural services.

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- » Accounting Gaps: Failed to integrate forest ecosystem services into India's national income accounts.
- » The study recommended strengthening Compensatory Afforestation Fund Management and Planning Authority (CAMPA) to prioritize ecologically important forests and expanding Payment for Ecosystem Services (PES) to incentivize biodiversity conservation.

Heritage Leather Art

The Centre has granted a Geographical Indication (GI) tag to the nearly 200-year-old Jodhpuri Mojari craft.

Jodhpuri Mojari

- » A traditional handcrafted leather footwear from Jodhpur, Rajasthan.
- » Known for: Fine leather craftsmanship, Intricate embroidery and decorative patterns, Curved toe design and durability.
- » Crafted primarily by the Jinagar (Jingar) community.

GI Tag

- » It is an intellectual property right granted to products whose quality, reputation, or characteristics are essentially linked to their geographical origin.
- » Governed under the Geographical Indications of Goods (Registration and Protection) Act, 1999.
- » Registration is administered by the GI Registry, Chennai.
- » Valid for 10 years and can be renewed.

India's Hydrogen Rail Milestone

- » The Prime Minister will flag off India's first green hydrogen-powered train on July 17, 2026, from Jind, Haryana as a significant transition towards green and zero-emission transport.
- » Green Hydrogen: A zero-emission fuel created by splitting water into hydrogen and oxygen using renewable electricity, such as solar or wind.
- » "Hydrogen for Heritage" Project: A 2023 Indian Railways initiative to deploy 35 hydrogen trains on ecologically sensitive and scenic routes (costing ₹80 crores per train and ₹70 crores per route).

Significance for India

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- » Green Transport: Enables zero-emission rail transport and a clean alternative for non-electrified routes by replacing diesel engines.
- » Climate Action: Supports India's Net Zero 2070 and rail decarbonization by 2030.
- » Hydrogen Economy: Boosts the National Green Hydrogen Mission of 2023.
- » Energy Security: Reduces fossil fuel imports and promotes indigenous hydrogen technology to achieve goal of energy independence by 2047.

Challenges of Hydrogen Fuel

- » High Costs Technology: Green hydrogen and fuel cell technologies remain expensive.
- » Hydrogen Storage: Requires storage at very high pressure or cryogenic temperatures, increasing costs and safety requirements.
- » Infrastructure: Limited hydrogen production, transportation and refuelling facilities in India.
- » Energy Efficiency: Converting electricity into hydrogen and back into electricity leads to energy losses compared to direct railway electrification.
- » Safety Concerns: Hydrogen is highly flammable and requires specialised storage, handling and monitoring systems.

Working of Hydrogen Train

- » The train runs on hydrogen fuel cell technology instead of diesel or overhead electric wires.
- » Hydrogen stored onboard reacts with oxygen from the air inside the fuel cell, producing Electricity (to power the train), and Water vapour (as the only emission).
- » The fuel cell provides a constant power supply.
- » Lithium Iron Phosphate (LiFePO_4) batteries store surplus electricity when power demand is low.
 - During acceleration (higher power demand), the batteries supplement the fuel cell.
 - As the train slows down, excess electricity from the fuel cell recharges the batteries.



Liquidity Absorption Tool

RBI absorbed ₹1.67 lakh crore from banks through the Standing Deposit Facility (SDF).

Standing Deposit Facility

- » It is a monetary policy tool introduced by the RBI in 2022 to absorb excess liquidity from the banking system.
- » It is a collateral-free liquidity absorption mechanism, unlike the Reverse Repo under the Liquidity Adjustment Facility (LAF).
- » The SDF primarily functions as an overnight facility and acts as the floor of the LAF corridor (25 basis points below the Repo Rate).
- » SDF deposits count toward meeting Statutory Liquidity Ratio (SLR) requirements, but not Cash Reserve Ratio (CRR).
- » Eligibility Criteria: All liquidity adjustment facility (LAF) participants are eligible to participate in the SDF scheme.

Next-Gen Space Launch

Japan's space agency JAXA successfully conducted the first lift-off and landing test of its prototype reusable rocket.

- » SpaceX pioneered operational reusable rocket technology with its Falcon 9.
- » Recently, China also achieved its first successful reusable rocket landing.

Reusable Rocket

- » Rocket is used to carry a spacecraft from Earth's surface to space, and is sometimes called a launch vehicle.
- » Reusable Rocket is designed to recover and reuse some or all of its components (primarily the first-stage booster) after launch, instead of discarding them.
- » Benefits: Reusing rocket components significantly reduces launch costs, improves mission frequency, and enhances the sustainability of space missions.

India's Efforts

- » ISRO's Reusable Launch Vehicle (RLV) programme aims to develop low-cost reusable space transportation.



- » RLV-LEX successfully demonstrated autonomous runway landing technology.

Tectonic Dynamics of Paizhen

A study has found that an active fault line (Paizhen fault) beneath the world's largest hydropower project on the Brahmaputra River in Tibet could affect its structural stability.

Paizhen Fault

- » It is part of a network of tectonic faults in the eastern Himalayan region.
- » It is created by the collision of the Indian and Eurasian tectonic plates.
- » It has remained active since the Early Pleistocene (Ice Age) and continues to exhibit strong activity during the present Holocene epoch.

Vietnam Headlines

Vietnam (Capital: Hanoi)

15 Indian tourists were killed as speedboat capsized near Vietnam's Phu Quoc Island.

Political Features

- » Location: It occupies the eastern portion of mainland Southeast Asia.
- » Land Borders: China (North) and Cambodia and Laos (West).
- » Maritime boundaries: South China Sea (East and South) and Gulf of Thailand (Southwest).
- » Establishment: Socialist Republic of Vietnam was established in July 1976 after reunification in April 1975.
- » Political System: It is a one-party Communist state.

Geographical Features:

- » Major rivers: Mekong River and Red (Hong) River.
 - Both rivers form deltas while draining into the South China Sea.
- » Mountain Range: Annam Cordillera, extending from northwest to southeast in central Vietnam.
- » Plateaus: Dac Lac Plateau, Kontum Plateau, Di Linh Plateau, etc.
- » Mineral deposits: Include large reserves of anthracite coal, lime, phosphates, etc. along with offshore oil deposits in South China Sea.



Autonomy in Ladakh

- » The Ladakh administration created 17 new tehsils, raising the Union Territory's total to 32, and plans to extend the Ladakh Autonomous Hill Development Council (LAHDC) Act benefits to all seven newly designated districts through suitable legal provisions.

LAHDC

- » The Ladakh Autonomous Hill Development Councils Act, 1997 (Act No. XXXI of 1997) is a comprehensive piece of legislation enacted to provide for the establishment of Autonomous Hill Development Councils and an Inter-District Advisory Council in the Ladakh region. The Act originally extended to the whole of the Leh and Kargil districts.
- » Aim: The foundational objective of the Act is to empower local populations in the high-altitude region through decentralized governance.

Key Features of the Act:

- » Corporate Legal Entity: Each Council functions as a body corporate named the Ladakh Autonomous Hill Development Council of (name of the district), enjoying perpetual succession, a common seal, and the legal right to acquire, hold, or dispose of property, as well as to sue and be sued.
- » Composition Matrix: The Council comprises 26 members chosen via direct election based on adult suffrage from single-member territorial constituencies.
 - The government can nominate up to 4 additional members from principal religious minorities and women.
 - Sitting MPs and MLAs representing the region serve as ex-officio members but do not hold voting rights in Council meetings.
- » Five-Year Term & Quorum: Members serve a standard five-year term from the date of the first post-election meeting. For general meetings, a minimum quorum of ten members is required, and decisions are passed via a simple majority.



- » The Executive Council Structure: The executive powers of the Council are vested in a dedicated Executive Council.
 - This body consists of the Chairman (who serves as the Chief Executive Councillor or CEC) and four members nominated by the CEC from within the Council, ensuring at least one member belongs to a principal religious minority.
- » Administrative Subordination: The Deputy Commissioner (DC) of the district serves as the Chief Executive Officer (CEO) of the Council.
- » Control Over Land and Forests: Subject to general state directions, the Council possesses direct executive powers over the allotment, use, and occupation of Khalsa Sarkar (government) land transferred to it, alongside the management of un-demarcated forests.
- » The Council Fund Mechanics: The Act establishes a distinct Council Fund operated through government treasuries. All raised revenues, allocation grants from Plan/Non-Plan budgets, and central loans are credited to this fund to finance local developmental projects.
- » Taxation and Fee Levies: The Council holds the legislative authority to levy and collect specific local taxes and fees.
- » Sovereign Dissolution Safety net: If the Governor finds that a Council is incompetent, defaulting on its legal duties, or abusing its powers, the Governor can officially dissolve the body via the Government Gazette, provided the Council is given a formal notice to respond to the charges. Reconstitution must take place within six months of dissolution.

Biogas for Energy Independence

Context: Due to recent escalation in West Asian conflicts threatening India's liquefied petroleum gas (LPG) imports—90% of which transit through the volatile Strait of Hormuz—the Government of India has aggressively renewed its focus on domestic alternatives.

Biogas and India's Energy Security Architecture:

- » Biogas is a highly renewable, carbon-neutral gaseous mixture composed primarily of methane (CH₄), carbon dioxide (CO₂), and trace volumes of other atmospheric elements produced via the biological breakdown of organic



materials. When processed, purified, and pressurized, it yields Compressed Biogas (CBG), which is chemically identical to conventional fossil-derived Compressed Natural Gas (CNG).

Key Data and Statistics on Biogas in India:

- » The Hydrocarbon Import Exposure: India relies on foreign energy markets to fulfill approximately 85% of its total domestic crude oil demand.
- » Feedstock Market Distortions: The administered price for maize-based biofuels grew at a compound annual growth rate (CAGR) of 11.7% between FY22 and FY25, driving a localized corn mania that skews crop diversity.
- » The GOBARdhan Funding Baseline: Under the central 'waste to wealth' scheme, the government allocates capital grants of up to ₹50 lakh per district to install community-scale biogas structures.
- » The Pipeline Allocation Infrastructure Block: The government earmarked ₹994 crore specifically to set up pipeline infrastructure to inject rural biogas output directly into the national gas grid.

How Biogas is Formed?

- » Anaerobic Micro-Biological Digestion: Microorganisms biologically break down wet organic materials—such as animal manure, agricultural residues, food waste, and sewage—in the absolute absence of oxygen.
- » The Hydrolysis and Acidogenesis Phases: Complex organic polymers (proteins, carbohydrates, fats) are broken down into simple soluble compounds and converted into volatile fatty acids by specialized acid-forming bacteria.
- » The Methanogenesis Stage: Strictly anaerobic methanogenic archaea consume the intermediate volatile acids and hydrogen gas, generating methane gas as their main metabolic by-product.
- » Cryogenic Scrubbing and Compression: The raw gas is routed through scrubbing systems to remove carbon dioxide, hydrogen sulfide (H₂S), and moisture, enriching the methane content to over 90% before compressing it into CBG.

The Role of Biogas as a Strategic Alternative Energy:



- » **Securing Fossil Fuel Displacements:** CBG serves as a direct green replacement for retail commercial transportation fuels, using local inputs to protect logistics networks from overseas trade chokepoints.

Example: Commercial networks like the India-Japan Cooperative Biogas for Growth Initiative are building large-scale utility setups across states to power green public transit lines.

- » **Decarbonizing Heavy Domestic Cooking Grids:** Purified biomethane can be injected directly into municipal networks to supply clean household fuel.

Example: The phased blending mandate forces direct distribution of CBG into local Piped Natural Gas (PNG) networks for home cooking.

- » **Providing Decentralized Rural Electricity Storage:** Remote agricultural processing units can combustion-burn raw biogas onsite to drive localized off-grid generators. Example: Distributed community plants under the GOBARdhan scheme leverage wet dung inputs to power local agricultural tool setups.
- » **Generating High-Value Organic Nutrient Subsidies:** The solid and liquid by-products left behind after digestion act as nutrient-rich bio-fertilizers, lowering reliance on carbon-heavy chemical inputs.

Example: Integrated bio-fertilizer plants help improve soil health across farming belts by recycling organic carbon back into the earth.

Key Challenges Associated with the Biogas Sector:

- » **Severe Biomass Supply Chain Friction:** Gathering seasonal crop residues like paddy straw or loose wet manure from fragmented holdings is highly vulnerable to transport delays and weather changes.

Example: High collection costs and a lack of specialized biomass balers have stalled the progress of several private sector installations.

- » **Distortions to Local Food Security and Crop Patterns:** Offering high prices for specific feedstock crops encourages farmers to switch to single-crop farming, threatening crop diversity.

Example: High administered pricing for maize-derived fuels has caused pulse and oilseed outputs to drop, forcing India to import more edible oils.



- » High Technical Entry Bar and Capital Bottlenecks: Installing modern, corrosion-resistant purification systems requires high upfront capital investments that are difficult for small enterprises to afford.

Example: Many rural projects are stalled because small developers struggle to secure formal credit or navigate long technical verification loops.

- » A Shortage of Direct Grid Connection Lines: Most rural biogas plants are built far from the main gas trunklines, making transport expensive unless costly new branch connections are built.

Example: Several functional units must rely on physical truck transport because they lack direct connection lines to inject gas into municipal distribution grids.

Way Forward:

- » Restructuring Feedstock Priorities Based on the Danish Model: Focus biofuel policies on using animal manure and agricultural waste rather than food crops, keeping food markets stable.
- » Replicating the Ethanol Blending Success Story: Apply the same rigorous policy monitoring, tax breaks, and guaranteed pricing models that successfully raised petrol ethanol blending to 20% by late 2025 to the CBG sector.
- » Providing Accelerated Depreciation and Tax Holidays: Introduce targeted financial incentives, such as long-term corporate tax waivers, to reduce investment risks and attract large-scale private capital.
- » Deploying the Combined ₹1,558 Crore Infrastructure Allocation: Accelerate the distribution of earmarked capital funds to purchase automated biomass machinery and build direct pipelines connecting rural plants to the national gas grid.

Conclusion:

While initiatives like the GOBARdhan scheme have built a helpful policy foundation, the slow completion rate of SATAT projects highlights that fixing logistics issues and scaling up infrastructure are essential for success. Ultimately, by shifting feedstocks toward agricultural waste and providing clear financial incentives, India can secure its energy future and transform rural waste into national wealth.

Future of Drone Research

General Studies, Political Science and International Relations, Sociology, CSAT



- » The MeitY, in partnership with the Drone Federation of India (DFI), officially launched the second edition of the National Innovation Challenge for Drone Application and Research (NIDAR 2.0, 2026-27).

NIDAR 2.0

- » NIDAR 2.0 is a premier national-level innovation hackathon designed to challenge engineering students to design, prototype, and build advanced autonomous drone software and hardware components. Moving away from basic pre-built airframes, this edition focuses on indigenous avionics, secure drone operating intelligence, and microchip integration.
- » Part Of: NIDAR 2.0 operates as the flagship national innovation platform under MeitY's broader SwaYaan Capacity Building initiative.
- » Aim: The objective of NIDAR 2.0 is to establish a self-reliant domestic drone industry by moving from simple drone assembly to manufacturing the drone's brain inside India.

Key Operational Features:

- » Track 1: Drone Innovation (System Level): Tasks students with solving complex operational problems through autonomous systems:
- » Disaster Zone Swarms: Building fully autonomous swarm drones that can locate survivors and deliver medical supplies without relying on any external communication or cellular network.
- » GPS-Denied Navigation: Developing drones that can navigate confined, dark indoor spaces without GPS for complex industrial inspections.
- » Track 2: Component Innovation (Hardware Level): Challenges teams to build an indigenous flight controller and autopilot system using domestic electronic components. The hardware must be built around the open-standard VEGA microprocessor, designed by the Centre for Development of Advanced Computing (C-DAC).
- » Hardware Bootstrapping Support: Following initial technical evaluations, the top 100 selected teams will each receive two free VEGA processor development kits from the government to test, program, and integrate into their prototypes.



- » Expanded Incubation and Financial Rewards: Features an increased total prize pool of over ₹65 lakh.

SwaYaan Initiative:

- » SwaYaan is a comprehensive, multi-year capacity-building program launched by the central government. It is designed to create a highly skilled workforce, support advanced research, and establish academic specializations in Unmanned Aircraft Systems (UAS) and allied drone technologies across India.
- » Approval Date: Formally approved by MeitY in July 2022.
- » Aim: The objective of SwaYaan is to train a large pool of engineers, technicians, and researchers to fulfill the workforce needs of the expanding Indian drone sector.

Key Institutional Features:

- » The Hub-and-Spoke Model: Operates through a coordinated network of 30 premier academic and research institutions across India—including the Indian Institute of Science (IISc), various Indian Institutes of Technology (IITs), IIITs, NITs, C-DAC, and NIELIT nodes.
- » Five Core Technical Themes: The initiative organizes its training curriculum and laboratory research under five essential work themes:
 - » Aeromechanics (Structural design, materials, and aerodynamics)
 - » Drone Electronics (Power boards, speed controllers, and sensor arrays)
 - » Guidance, Navigation, and Control (GNC) Algorithms and Simulation
 - » Drone Applications (Agriculture, mapping, and logistics software)
 - » Allied UAS Technologies (Counter-drone systems and communication encryption)
- » Massive Training Milestones: The program has successfully trained more than 51,000 individuals across various skill levels.

Indigenous Māori

During his historic state visit to Auckland, Prime Minister of India addressed the Indian diaspora and highlighted the Māori cultural concept of 'Waka' to symbolize the shared journey, friendship, and values defining India-New Zealand relations.

The Māori Tribe

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- » The Māori are the indigenous Polynesian people of mainland New Zealand (Aotearoa). Arriving in waves of canoe voyages between 1200 and 1300 CE, they developed a distinct, rich culture rooted in tribal lineage, a deep spiritual connection to the land, and a robust oral history.

Habitat and Region Found In:

- » Primary Distribution: Concentrated across New Zealand, predominantly on the North Island, where the subtropic-to-temperate climate historically supported agriculture and fishing.
- » Ecosystem: Settled across coastal inlets, river terraces, and fertile volcanic valleys, leveraging the local waters for navigation and the dense forests for timber and wildlife.

Key Characteristics:

- » Social and Tribal Structure:
 - Whakapapa (Genealogy): The foundation of Māori identity, tracing ancestry to original canoe settlers and determining inheritance, social status, and traditional land rights.
 - Iwi and Hapū: Māori society is organised into Iwi (tribes) and smaller Hapū (sub-tribes) that traditionally cooperate in defence, resource management, and community affairs.
 - The Marae: A sacred communal complex centred around the Wharenuī (meeting house), hosting ceremonies, tribal discussions, funerals, welcomes, and cultural gatherings.
- » Physical and Artistic Traditions:
 - Tā Moko (Sacred Tattooing): Traditional Māori tattooing uses intricate patterns, historically carved into the skin, to represent ancestry, tribal identity, social status, and achievements.
 - Wood and Pounamu Carving: Māori artisans create elaborate carvings on houses and canoes and shape Pounamu (greenstone) into weapons, tools, ornaments, and treasured heirlooms.



» **Performative Arts and Protocol:**

- The Haka: A powerful ceremonial posture dance involving rhythmic chanting and vigorous movements, traditionally linked to warfare but now used for welcomes, celebrations, and commemorations.
- The Hongi Greeting: A traditional greeting involving the touching of noses and foreheads, symbolising the sharing of the breath of life (te ha) and mutual acceptance.

Waka:

- » A Waka is a traditional Māori canoe that also symbolises shared identity, collective responsibility, and a community's common journey towards a unified goal.

Key Technical and Cultural Features

- » **Diverse Technical Classes:** Traditionally crafted from large native tree trunks, Waka existed in different forms for warfare, transport, fishing, and inland navigation.
 - Waka Taua: Large, elaborately carved war canoes capable of carrying dozens of warriors.
 - Waka Tētē: Medium-sized utility canoes used for fishing, transporting families, and carrying goods.
 - Waka Kōrari: Lightweight vessels made from flax stalks for navigating rivers and inland waterways.
- » **Advanced Ocean Voyaging:** Māori ancestors crossed vast Pacific distances in large voyaging canoes, navigating through stars, ocean swells, winds, and bird movements.
- » **Deep Cultural Identity:** Māori communities often trace their ancestry to particular ancestral Waka, linking tribal identity, genealogy, historical migration, and traditional territorial associations.

Judicial AI Framework



Context: The Supreme Court of India's Artificial Intelligence Committee has drafted the Regulations for Use of Artificial Intelligence (AI) in Courts, 2026 to establish a comprehensive governance framework for responsible AI adoption in the judiciary.

The Draft Regulations for Use of Artificial Intelligence in Courts, 2026

The Draft Regulations for Use of Artificial Intelligence in Courts, 2026:

- » The Draft Regulations for Use of Artificial Intelligence in Courts, 2026, establish a unified structural and ethical policy framework to govern, optimize, and safely regulate the integration of AI tools across India's judicial spectrum.

Key Summary of the Draft Framework:

- » Human Adjudicative Primacy: The policy categorically states that no final judicial outcome, judgment, order, or finding of fact/law can be reached through algorithmic decision-making alone. AI outputs remain strictly advisory and subservient to independent human evaluation.
- » The Regulatory Institutional Architecture: Governance will be led by a permanent, full-time Apex Body at the Supreme Court, composed of sitting SC and High Court judges, MeitY officials, and cyber/finance experts.
- » Mandatory Proportionality Testing: Before any AI tool is deployed, the administration must conduct a comprehensive Technical and Ethical Impact Assessment evaluating its data sourcing, cybersecurity baseline, explainability, and risk of hallucinations.
- » Strict Procurement and Vendor Audits: Private software vendors are subject to strict data-protection contracts. They are explicitly barred from using sensitive judicial data to train or fine-tune proprietary algorithms, and they cannot claim exclusive intellectual property rights over tools built on public judicial resources.
- » Localized Testing and Registers: High-risk systems must go through time-limited Controlled Environment Testing in isolated setups. Every court must also maintain an updated public AI Register and an internal AI Incident Database to track errors.
- » Enforcing Emergency Fall-Back Protocols: To protect institutional continuity, every High Court must maintain a verified manual fall-back protocol to keep

the justice delivery machinery running smoothly if a core AI platform experiences a sudden technical failure.

- » **Mandatory Litigant Notification:** Courts are legally bound to inform litigants and their legal counsel in a timely and accessible manner whenever an approved AI application provides material assistance to a judge in handling their case.
- » **Structured Grievance Redressal:** Litigants who suffer direct or indirect harm due to a prohibited use of AI can file an immediate application for a formal hearing and remedial protection within the court where the system was deployed.

Best Practices in Global Judicial AI Governance:

- » **The Principle of Data Minimization by Design:** Mandating that judicial software tools are structurally built to process, collect, and retain only the absolute minimum amount of personal identifiers needed to complete a specific task, matching the highest international privacy standards.
- » **Continuous Closed-Loop In-House Audits:** Enforcing periodic, in-house technical and ethical compliance audits at intervals not exceeding one year. This ensures that source code and raw citizen datasets are never shared with or exposed to unverified third-party private contractors.
- » **Dismantling Black Box Opaque Architectures:** Ensuring that high-risk systems affecting personal liberty possess full algorithmic explainability, meaning the logic behind an output can be easily understood by non-technical judicial personnel and litigants.

Absolute Prohibitions on AI Use in Courts:

- » **No Algorithmic Adjudication:** AI is completely prohibited from functioning as an independent adjudicator or sentencing system without a mandatory Human-in-the-Loop architecture.
- » **Absolute Ban on Behavioral Risk Scoring:** AI cannot be deployed to calculate numerical risk scores to estimate flight risk, evaluate bail eligibility, or predict the future behavior of accused individuals.

- » **Prohibition of Opaque Black Box Systems:** The use of unexplainable software applications whose underlying decision logic is hidden from the user is strictly barred in all high-risk legal matters affecting personal liberty.
- » **Ban on Continuous Surveillance:** AI tools cannot be used for the continuous monitoring or surveillance of judicial officers, advocates, or litigants within or in connection with court premises.
- » **No Undisclosed Evidence Submissions:** Parties are completely barred from submitting AI-generated outputs, text, or synthetic documents as independent sources of evidence without fully disclosing their AI-assisted origin.

Significance of AI Integration in the Judiciary:

- » **Drastically Minimizing Case Backlogs:** Utilizing permissible automated AI tools for case filing management and defect scrutiny helps speed up administrative workflows, clearing early bottlenecks.
- » **Optimizing Resource Allocation:** Advanced analytical tools allow registries to track judicial performance and identify systemic delays, enabling data-driven docket prioritization and efficient caseload distribution.
- » **Improving Multilingual Accessibility:** Deploying validated translation applications allows complex judgments and pleadings to be converted into regional vernacular languages, supporting real-world inclusion for diverse communities.
- » **Accelerating Precision Legal Research:** Automated precedent retrieval, document summarization, and citation verification tools significantly reduce the manual research hours required by judges and staff.
- » **Enhancing Courtroom Inclusivity Services:** Integrating robust speech-to-text, automated transcription, and visual assistance interfaces helps expand equitable access to justice for specially-abled litigants and lawyers.

Conclusion:

By setting absolute prohibitions against automated sentencing and behavioral profiling, the policy successfully protects human rights from algorithmic bias. Moving forward, the success of this transition will depend on maintaining strict in-house audits, fully operationalizing the CoRE-AI research engine, and ensuring that



court secretariats receive proper funding to handle technical failures without disrupting everyday court access.

Justice Without Delay

The Supreme Court has constituted four special benches to exclusively hear its oldest pending civil and criminal cases, as part of Chief Justice of India Surya Kant's strategy to reduce judicial backlog and resolve decades-old litigation.

Supreme Court Backlog Clearance Initiative

- » The initiative is a special judicial case-management mechanism under which dedicated Supreme Court benches will exclusively hear the oldest pending civil and criminal matters without being burdened by routine fresh cases.

Key Features:

- » **Four Dedicated Special Benches:** Two division benches will exclusively hear the oldest civil cases, while two others will focus solely on long-pending criminal matters.
- » **Three-Day Weekly Hearings:** The special benches will function on Tuesdays, Wednesdays and Thursdays, which are designated as non-miscellaneous days for detailed regular hearings.
- » **Focus on Legacy Cases:** Priority will be given to decades-old disputes, including civil cases pending since 1986 and criminal matters dating back to 1991.
- » **Uninterrupted Judicial Attention:** By exempting these benches from miscellaneous hearings, judges can devote sustained attention to complex cases requiring lengthy arguments and final disposal.

Solutions Adopted by the Supreme Court:

- » **Dedicated Special Benches:** CJI Surya Kant has created four exclusive benches to systematically clear the oldest civil and criminal cases.
- » **Structured Case Listing:** Former CJI U.U. Lalit introduced separate time slots for fresh cases and long-pending regular matters to prevent older cases from being neglected.

- » Technology-Based Case Management: The SC-JUDICARE project, launched during CJI D.Y. Chandrachud's tenure, automated case classification and grouped matters involving similar legal questions for collective hearings.
- » Special Lok Adalats and Thematic Benches: Special benches for categories such as death penalty references and dedicated Lok Adalat weeks have been used to accelerate case disposal.

Sanctuary of Debrigarh

Odisha's Forest Minister announced that a formal proposal will be sent to the Central Government to elevate the Debrigarh Wildlife Sanctuary to the status of Debrigarh-gaur National Park.

Debrigarh Wildlife Sanctuary

- » Debrigarh is a vital, ecologically rich wildlife sanctuary spread over 353 square kilometers (with a core area of 290.65 sq km proposed for the national park). It stands out for its high density of large herbivores, absolute lack of internal human settlements, and international importance due to its significant populations of leopards, bisons, and endangered antelopes.

Location:

- » Geographic Placement: Situated in the Bargarh district of western Odisha, India.
- » Landscape Boundaries: It is flanked by the massive Hirakud Dam and Reservoir, creating a picturesque peninsula-like setting where the water body wraps around the protected forest ecosystem.

Historical Connection:

- » The sanctuary holds deep historical value tied to India's freedom struggle. During his armed rebellion against the British East India Company, the noted freedom fighter Veer Surendra Sai made his strategic guerrilla base at a location named Barapathara nestled deep inside the sanctuary's rugged hills.

Key Ecological Features:

- » Dry Deciduous Canopy: Dominated by tropical dry deciduous forests and extensive hillside grasslands, providing rich feeding grounds for large herbivores and other wildlife.

General Studies, Political Science and International Relations, Sociology, CSAT



- » Hydrological Framing: Surrounded by the Hirakud Reservoir, the landscape contains valleys, rocky ridges, and seasonal waterfalls that provide crucial water sources during dry periods.
- » Settlement-Free Core Zone: The proposed 65 sq km national park area is free from villages, encroachments, and livestock, creating an undisturbed habitat for wildlife.

Biological Significance:

- » Debrigarh hosts Odisha's highest density of Indian gaur, with 848 individuals, making it a crucial breeding habitat and genetic reservoir for the species.
- » Its dry deciduous forests provide secure habitat for the rare four-horned antelope (Chousingha) and diverse mammal, reptile, and amphibian species.
- » Located beside Hirakud Reservoir, Debrigarh supports 234 bird species and attracts thousands of migratory waterbirds, strengthening its conservation and ecotourism value.

SHANTI Framework

- » External Affairs Minister launched India's campaign for a 2028–29 non-permanent UNSC seat, unveiling the 'SHANTI' vision centred on international norms, mutual trust, and stronger representation for the Global South.

The SHANTI Vision

- » Introduced by External Affairs Minister, SHANTI is a strategic acronym that stands for Securing Holistic Advancement through Norms, Trust and Integrity.
- » It serves as the foundational approach and thematic blueprint for India's 2028–29 UNSC campaign, advocating that global peace and prosperity cannot be sustained in a fragmented manner.
- » Aim: The vision aims to address the profound paradox of modern global governance, where deep economic and technological connectivity coexists with intense conflict and violence.

Key Features of the SHANTI Vision:



- » **Amplifying the Global South:** Focuses heavily on building an equitable world order where the voices, financial concerns, and developmental challenges of the Global South are heard and integrated into mainstream decision-making.
- » **Technological and Realistic Peacekeeping:** Advocates for better-equipped, technology-driven, and realistically mandated UN peacekeeping operations, while fully supporting the global Women, Peace and Security agenda.
- » **Combating Transnational Threats:** Prioritizes strong, coordinated international legal frameworks to combat terrorism, handle climate change impacts, and ensure comprehensive maritime security across global shipping lanes.
- » **Responsible Technology Norms:** Promotes the creation of transparent global norms to guide the responsible and safe deployment of emerging technologies, preventing their misuse by state or non-state actors.
- » **Leveraging Development Partnerships:** Emphasizes India's practical history as a trusted development partner—evidenced by active Indian-funded infrastructure projects running across 79 countries—to promote dialogue over conflict.

India and the UNSC: History and Membership

- » **The Non-Permanent Membership Framework:** The UNSC has 5 permanent and 10 elected members, with non-permanent members serving two-year terms after securing a two-thirds UNGA majority.
- » **Historical Service Record:** India has served as a non-permanent UNSC member eight times (1950–51 | 1967–68 | 1972–73 | 1977–78 | 1984–85 | 1991–92 | 2011–12 | 2021–22), most recently during 2021–22, demonstrating its sustained role in global security affairs.
- » **Unrivaled Peacekeeping Contributions:** India has contributed nearly 3 lakh personnel to about 50 UN peacekeeping missions, making it one of the world's leading contributors to international peace and security.
- » **Pushing for Structural Reform:** India seeks expansion of both permanent and non-permanent UNSC membership, arguing that the 1945-era structure fails to represent contemporary geopolitical realities and the Global South.

Sulphur Dioxide Insights

- » According to a new analysis, nearly 81 per cent of sulphur dioxide (SO₂) emissions from coal plants within a 300-km radius of Delhi-NCR originate from facilities exempted from installing pollution control systems.

Sulphur dioxide (SO₂):

- » Sulphur dioxide (SO₂) is a heavy, colorless, toxic gas characterized by a pungent, suffocating odor. It is a highly reactive inorganic compound and acts as one of the primary air pollutants regulated globally under ambient air quality standards.

Major Sources:

- » Coal-Fired Power Plants: The combustion of sulphur-bearing fossil fuels—predominantly coal in thermal power generation—stands as the single largest industrial driver of (SO₂) emissions.
- » Petroleum Refining & Metal Smelting: Industrial extraction processes, oil refining, and the smelting of sulphur-rich mineral ores (such as copper, zinc, and iron) release high volumes of the gas.
- » Natural Sources: Volcanic eruptions, geothermal hot springs, and the biological decomposition of organic matter in wetlands contribute to background atmospheric levels.

Atmospheric Presence and Transformation:

Once released, (SO₂) can travel hundreds of kilometers across regional airsheds. In the atmosphere, it undergoes chemical reactions with water vapor, oxygen, and other compounds to form secondary pollutants:

- » Fine Particulate Matter (PM_{2.5}): It oxidizes to form acidic sulfate aerosols, which are a major component of dangerous fine particulate matter (PM_{2.5}) pollution.
- » Acid Rain: It dissolves easily in water droplets within clouds, converting into sulphuric acid (H₂SO₄) and falling as acid rain, which damages forests, soils, and aquatic ecosystems.

Public Health and Environmental Impacts:

- » Respiratory Illnesses: SO₂ irritates airways, causing coughing and breathing difficulty while worsening asthma, bronchitis, and other chronic respiratory diseases.



- » **Cardiovascular Risks:** By forming PM_{2.5}, SO₂ indirectly increases inflammation, cardiovascular diseases, strokes, and the risk of premature death
- » **Ecosystem and Crop Damage:** High SO₂ concentrations damage plant tissues and photosynthesis, while acid rain depletes soil nutrients and harms aquatic life.

Key Solutions and Regulatory Measures

- » **Mandatory Flue Gas Desulphurisation (FGD):** Installing FGD systems in thermal plants can remove up to 95% of SO₂ emissions using lime or limestone-based scrubbers.
- » **Public Continuous Emission Monitoring Systems (CEMS):** Real-time public disclosure of emissions data can improve transparency, prevent manipulation, and strengthen industrial compliance.
- » **Phasing Out Category C Exemptions:** SO₂ can travel hundreds of kilometres; therefore, exemptions based merely on a plant's distance from urban areas should be reconsidered.
- » **Transition to Cleaner Energy:** Expanding solar, wind, and battery storage can reduce dependence on coal and consequently lower India's overall SO₂ emissions.
- » **Quality Over Quantity:** A monoculture plantation counts as forest cover in official statistics but delivers a fraction of the ecosystem services of a natural mixed-species stand.
- » **Flawed Compensation Models:** E.g., Net Present Value (NPV) under-represent the full economic cost of lost regulating and cultural services.
- » **Accounting Gaps:** Failed to integrate forest ecosystem services into India's national income accounts.
- » The study recommended strengthening Compensatory Afforestation Fund Management and Planning Authority (CAMPA) to prioritize ecologically important forests and expanding Payment for Ecosystem Services (PES) to incentivize biodiversity conservation.

Ethanol: A Key Pathway for Decarbonising Road Mobility



- » Toyota Kirloskar Motor described ethanol as the fastest and most cost-effective pathway for decarbonising India's road transport.
- » It advocated a technology-neutral approach, supporting Electric Vehicles (EVs), Hybrid Vehicles, Flex-Fuel Vehicles (FFVs), Compressed Biogas (CBG) and Hydrogen, considering India's diverse energy requirements.

India's ethanol programme supports:

- » Reduced fossil fuel consumption
- » Lower carbon emissions
- » Energy security by reducing crude oil imports
- » Higher farmer incomes through demand for agricultural feedstocks.

Aspect

- » E10 → E20 Transition
- » E25 & Higher Blends
- » Flex-Fuel Vehicles (FFVs)
- » Brazil's Experience

Key Facts

- » Negligible material impact on vehicles; 3–5% reduction in fuel efficiency.
- » Requires comprehensive testing of both new and existing vehicles before large-scale adoption.
- » Can operate on petrol, ethanol, or their blends, requiring supportive policies to improve consumer adoption.
- » Large-scale success achieved through strong policy support for FFVs and ethanol fuel.

Key Milestones and Current Status (as of July 2026)

India has achieved significant progress, surpassed initial targets and setting ambitious future goals.

- » E20 Achievement: India officially achieved its target of 20% ethanol blending in petrol (E20) by December 2025, five years ahead of the original 2030 schedule.
- » National Standard: E20 fuel (80% petrol, 20% ethanol) is now the standard fuel available nationwide.
- » Future Roadmap: Following E20 success, the government is moving towards higher blends.

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- » Flex-Fuel Vehicles: Ministry of Road Transport and Highways (MoRTH) released a draft notification in April 2026 to recognize flex-fuel vehicles capable of running on E85 (85% ethanol) and E100 (pure ethanol).
- » E85 Rollout: Initiated in June 2026 at select retail outlets, with plans to scale to 500 stations by end of 2026 and 5,000 stations by end of 2027.
- » Long-term Targets: Projections indicate aggregate ethanol blending levels could reach nearly 26% by 2030-31 with the adoption of higher blends and flex-fuel technology.

The Real Crisis in India's Fisheries

- » The Government, citing Central Marine Fisheries Research Institute (CMFRI) data, stated that 91.1% of 135 assessed marine fish stocks (2022) are biologically sustainable.
- » However, the Food and Agriculture Organization (FAO) maintains that India's marine fisheries have plateaued, with most major fish stocks being fully exploited and affected by overcapacity.
- » The difference arises because CMFRI primarily uses fish landing data, whereas FAO and many countries rely on stock assessments conducted at sea, considered a more reliable measure of fish abundance.

Major Concerns

- » Inshore ecosystem degradation
- » Mechanised trawling
- » Overexploited fish stocks
- » Weak regulation
- » Livelihood concerns

Significance

- » Loss of benthic habitats due to dam construction, mangrove destruction and industrial, agricultural & urban pollution.
- » Over 64,000 trawlers continuously disturb the seabed, reducing marine biodiversity and damaging fish breeding grounds.
- » FAO considers most commercially important stocks fully exploited, limiting future production growth.



- » The 5 Nautical Mile (NM) ban on mechanised fishing is poorly enforced due to inadequate coastal patrolling and limited fisher participation.

Resource depletion has intensified conflicts between mechanised and traditional fishers, including in the Palk Bay region.

Fisheries Management in India

- » India's narrow continental shelf (except along parts of Gujarat and Maharashtra) makes inshore waters the most productive fishing grounds.
- » Introduced in the 1960s, mechanised trawling expanded rapidly with limited restrictions on vessel numbers or capacity.
- » The Government's emphasis on deep-sea fishing is viewed cautiously, as the FAO estimates only limited additional potential from offshore resources compared to better management of inshore fisheries.
- » Effective fisheries management requires scientific stock assessments, stronger regulation of fishing effort and greater participation of local fishing communities in resource management.

India's Climate-Resilient Growth Path

Why in News?

- » A Bernstein Research report states that India's economy has become less vulnerable to monsoon shocks due to expanding irrigation, diversified cropping patterns and year-round farming, reducing the impact of deficient rainfall on agricultural output and rural demand.

Reasons for Reduced Monsoon Dependence

- » It has increased irrigation coverage, with nearly 60% of cultivated land now irrigated compared to around 42% in the early 2000s.
- » It has expanded irrigation in major agricultural states from 54% (2009) to around 67%, supported by canals and tubewells.
- » It has reduced dependence on the Kharif season, whose share in total foodgrain production has declined from nearly 60% in the 1990s to 47% in 2025-26.



- » It has increased the contribution of Rabi crops and the summer cropping season (February–May), making agriculture more diversified.
- » It has promoted year-round farming, reducing reliance on seasonal monsoon rainfall.

Key Findings

- » It shows that the traditional correlation between poor monsoon and sharp agricultural decline has weakened over the last decade.
- » It records rising foodgrain production despite below-normal monsoons in 2018-19 and 2023-24.
- » It indicates that poor monsoons are no longer an immediate food security threat or a major trigger for collapse in rural demand.
- » It suggests that the impact of deficient rainfall is now likely to remain sector-specific, rather than causing economy-wide distress.
- » It expects food inflation risks to remain more contained, mainly affecting pulses and vegetables rather than causing broad-based inflation.

Significance and Challenges

- » It strengthens agricultural resilience against climate variability.
- » It improves rural income stability and supports sustained economic growth.
- » It enhances food security through diversified cropping and irrigation.
- » It still leaves rain-fed regions vulnerable to prolonged droughts and climate change.
- » It requires continued investment in micro-irrigation, water-use efficiency, climate-resilient agriculture and crop diversification.

Q. With reference to India's agricultural sector, consider the following statements:
The share of Kharif crops in India's total foodgrain

1. The share of Kharif crops in India's total foodgrain production has declined over time.
2. Expansion of irrigation has reduced the economy's vulnerability to deficient monsoons.
3. Rabi crops depend primarily on the Southwest Monsoon for irrigation.

Which of the statements given above are correct?

- | | | | | |
|-----|---|-----|---|------|
| (a) | 1 | and | 2 | only |
| (b) | 2 | and | 3 | only |

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- (c) 1 and 3 only
(d) 1, 2 and 3

Answer: (a)

"India's agricultural economy is becoming increasingly resilient to monsoon variability due to structural changes in irrigation and cropping patterns." Discuss.

Default Judgment Trial

A Special NIA Court in Jammu issued a non-bailable warrant against Pakistan-based Lashkar-e-Taiba chief Hafiz Saeed in connection with the Pahalgam terror attack case.

- » The NIA may seek his trial in absentia under Section 356 of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023.

Trial in Absentia

- » Trial in absentia refers to a criminal trial conducted in the absence of the accused.
- » Under Section 356 of the BNSS, a court may conduct the inquiry, trial and pronounce judgment against a proclaimed offender who has deliberately absconded to evade trial and has no immediate prospect of arrest.

Origin and Legal Background:

- » Under the earlier Code of Criminal Procedure (CrPC), 1973, provisions existed to deal with absconding accused, but they did not generally permit a complete trial culminating in judgment in their absence.
- » Section 82(4) of CrPC provided for declaring certain absconding accused as proclaimed offenders, while Section 299 allowed recording evidence in the absence of an absconding accused when there was no immediate prospect of arrest.
- » Section 317 of CrPC permitted proceedings in the accused's absence in specified circumstances where personal attendance was considered unnecessary or the accused persistently disturbed court proceedings.
- » The BNSS introduced Section 356, creating a specific framework for conducting a full-fledged trial and pronouncing judgment in the absence of a proclaimed offender.

Key Features of Trial in Absentia under BNSS:



- » Limited to Proclaimed Offenders: It does not apply to every absent accused. The person must first be declared a proclaimed offender under Section 84(4) of the BNSS.
- » Applicable to Serious Offences: The accused must face an offence punishable with at least 10 years' imprisonment, life imprisonment or death under the BNS or any other law.
- » Deliberate Absconding Required: The court must be satisfied that the proclaimed offender has absconded to evade trial and that there is no immediate prospect of arrest.
- » Absence Treated as Waiver: After recording reasons in writing, the court may treat deliberate absence as a waiver of the right to be present and proceed with the inquiry, trial and judgment.
- » Two Consecutive Arrest Warrants: Before commencing the trial, two consecutive warrants of arrest must be issued at an interval of at least 30 days.
- » Mandatory Public Notice: A notice giving the accused 30 days to appear must be published in a local or national newspaper and displayed at the accused's last known residence.
- » 90-Day Waiting Period: The trial cannot begin until 90 days have elapsed from the date of framing of charges, providing sufficient opportunity for the accused to appear.
- » Audiovisual Recording of Evidence: Witness examination and depositions should, as far as practicable, be recorded through audio-visual electronic means and preserved, promoting transparency and facilitating subsequent judicial review.

Engineering Partnership Model

Tech giants are expanding Forward Deployed Engineering (FDE) roles to turn AI pilots into measurable business value. The role is rapidly emerging as a high-demand, high-paying AI career globally and in India.

Forward Deployed Engineering (FDE)

- » Forward Deployed Engineering (FDE) is a multidisciplinary role combining software engineering, AI implementation, solutions architecture and

business consulting. FDEs work directly with clients to deploy AI solutions in real-world business environments.

- » **Aim:** The primary aim is to close the AI value gap by converting experimental AI models into secure, practical workflows that improve business efficiency, productivity and revenue.

How It Works?

- » **Direct Client Integration:** FDEs work closely with clients to understand real-time business problems, integrate sensitive enterprise data securely and rapidly build customised AI solutions.
- » **Cross-Model Orchestration:** They integrate AI models from multiple providers and open-source platforms into unified workflows, reducing dependence on any single technology vendor.
- » **Standardised Interoperability:** FDEs use protocols such as Model Context Protocol (MCP) and Agent2Agent (A2A) to enable different AI agents and cloud platforms to communicate effectively.

Key Features of the FDE Domain:

- » **High-Premium Compensation:** Strong demand and limited skilled talent make FDE one of the highest-paying emerging AI careers, with lucrative opportunities in both global and Indian markets.
- » **Two-Pronged Talent Pool:** Tech graduates primarily handle coding and data pipelines, while technically fluent MBAs translate business challenges into technology roadmaps and manage client relationships.
- » **Rapid Global and Indian Demand:** FDE job opportunities are expanding rapidly across AI companies, IT consulting firms and Global Capability Centres as enterprises scale AI adoption.
- » **University Educational Pivot:** Leading Indian institutions are introducing specialised programmes in forward-deployed AI, data analytics and agentic AI to meet growing industry demand.

Key Applications:

- » **Designing Resilient Enterprise Workflows:** FDEs integrate AI with ERP, CRM and supply-chain systems to automate processes, predict disruptions and improve real-time decision-making.



- » Mitigating Technology and Compliance Risks: Multi-model orchestration reduces vendor dependence, protects sensitive data and helps enterprises manage geopolitical, regulatory and technology risks.
- » Emergency and Humanitarian Logistics: FDEs develop localised AI systems for satellite-image analysis, disaster response and drone logistics, including in areas with disrupted communication networks.

Global Food Standards Council

India secured major advancements at the 49th Session of the Codex Alimentarius Commission (CAC49) held in Geneva, Switzerland, where the commission officially adopted seven food standards and guidelines developed under Indian leadership.

The Codex Alimentarius Commission

- » The Codex Alimentarius (Latin for Food Code) is a comprehensive collection of internationally recognized and adopted food standards, guidelines, codes of practice, and related recommendations. Rather than operating as an independent, legally binding regulation, it serves as a scientifically backed international reference guide to help countries harmonize their sovereign food laws.

Established In: The Codex Alimentarius Commission (CAC) was established in early November 1961 by the Food and Agriculture Organization (FAO), with the World Health Organization (WHO) joining in June 1962.

Primary Aim:

The foundational goals of the Codex system are threefold:

- » Protecting the health of consumers worldwide.
- » Ensuring fair and ethical practices in the international food trade.
- » Facilitating transparent global trade by removing unnecessary technical barriers.

Key Functions of the Codex System:

- » **Science-Based Operational Limits:** Sets maximum permissible levels for food additives, contaminants, toxins, pesticide residues and veterinary drug residues.
- » **Independent Risk Assessment:** Uses scientific evidence from expert bodies such as JECFA to develop objective, science-based food safety standards.



- » Standardised Labelling and Hygiene: Develops globally harmonised standards for food labelling, processing, packaging and hygiene practices.
- » Global Trade Reference: Serves as the WTO-SPS reference for food safety; stricter national measures generally require scientific justification.

Recent Outcomes of the 49th Session:

- » Adoption of India-Led Commodity Standards: The Commission formally adopted standalone international quality benchmarks for Dried Coriander Seeds and Fresh Curry Leaves developed under India's chairmanship, facilitating smoother export channels for South Asian spices. It also adopted unified standards for Vanilla and Large Cardamom developed under India's co-chairmanship.
- » Launch of New Cashew Kernels Standard: The CAC49 approved India's targeted proposal to formulate a brand-new international Codex Standard for Cashew Kernels under the Codex Committee on Processed Fruits and Vegetables (CCPFV), aiming to reduce technical trade friction for global tree nuts.
- » Election to New Food Technology Groups: India was elected Co-Chair of the newly established Electronic Working Group on New Food Sources and Production Systems (NFPS), putting the nation at the center of evaluating risk analysis principles for future global food technologies.
- » Broader Global Safety Revisions: The 49th Session adopted revised global control guidelines to reduce severe foodborne illnesses, specifically targeting the control of *Listeria monocytogenes* in ready-to-eat products and *Campylobacter* and *Salmonella* in poultry.

High Asia Plateau

A new international study published in Nature Geoscience by UK and Chinese geoscientists has revealed direct structural evidence detailing how the Tibetan Plateau was formed.

The Tibetan Plateau

- » The Tibetan Plateau—also known as the Qinghai-Tibet Plateau, the Tibetan Highlands, or the Roof of the World—is the highest and largest upland area on Earth. It is a vast, elevated region of tangled mountain belts and high-

altitude valleys that functions as a primary driver of the global climate system.

Location and Boundaries:

- » Geographical Core: Situated in southwestern China, it encompasses the entirety of the Tibet Autonomous Region, much of Qinghai province, and extends into western Sichuan and the southern Xinjiang region.
- » Mountain Framework: The plateau is geographically bound by the Kunlun Mountains and associated ranges to the north, and the Himalayas and Karakoram Range to the south and southwest. It extends eastward to the Daxue and Hengduan mountain chains.

Formation of the Tibetan Plateau:

- » Stage 1: Initial Continental Collision: Around 50 million years ago, the northward-moving Indian Plate collided with the Eurasian Plate, closing the Tethys Ocean and initiating crustal deformation.
- » Stage 2: Deep Crustal Subduction: The Indian Plate was forced beneath the Eurasian Plate, thickening the continental crust and causing massive uplift of the Tibetan Plateau.
- » Stage 3: Differential East-West Uplift: Between 45 and 20 million years ago, uplift occurred unevenly, with western Tibet experiencing earlier subduction, rock exhumation and topographic changes than central regions.

Key Geographical and Structural Features:

- » Massive Spatial Dimensions: The Tibetan Plateau covers about 5 million sq km, with an average elevation exceeding 4,500 metres, making it the world's highest and largest plateau.
- » World's Highest Topographic Edge: Its southern margin is bordered by the Himalayas, including Mount Everest, the world's highest peak, on the Nepal-China border.
- » Qiangtang Northern Lake Region: Northern Tibet's Qiangtang region is a cold, arid, high-altitude landscape dotted with numerous saline and brackish lakes.



- » Zoned Ecosystems and Agriculture: Grasslands support yak grazing, southern valleys contain forests, while fertile river valleys favour agriculture, particularly barley cultivation.

Significance:

- » The Tibetan Plateau feeds major rivers such as the Indus, Brahmaputra, Yangtze, Yellow, Mekong and Salween, supporting billions of people downstream.
- » Its vast elevated surface acts as a thermal engine, influencing atmospheric circulation and helping drive the timing and intensity of the South Asian monsoon.

National Services Benchmark

The Government of India released the first sub-sectoral Index of Services Production (ISP) for April 2026, covering 19 sub-sectors representing nearly 60% of India's services sector.

The Index of Services Production (ISP)

- » The Index of Services Production (ISP) is India's first high-frequency macroeconomic indicator dedicated to measuring the performance of the services sector.
- » It tracks short-term changes in the volume of output produced by the formal services sector relative to a specified base year.

Published By: The ISP framework has been developed by the Ministry of Statistics and Programme Implementation (MoSPI).

Aim: To provide a dedicated, high-frequency measure of services sector output, filling the statistical gap left by the Index of Industrial Production (IIP), which measures only industrial activity.

How Is the ISP Calculated?

- » The Deflator Requirement: Because primary service sector output data is collected in value terms, it naturally blends actual output with price fluctuations. The ISP requires price deflators to transform value-based (nominal) data into volume-based (real) data, isolating actual changes over time.
- » Deflator Allocation Matrix: Currently, different price deflators are used based on the sub-sector:



- Wholesale Price Index (WPI): Applied specifically to deflate wholesale trade.
- Consumer Price Index (CPI): The relevant or closest matching CPI series is used for most other sectors.
- CPI-General: Applied to banking, insurance, and repair & maintenance.
- CPI-Services: Applied to sub-sectors where a specific individual CPI is unavailable.
- » The Underlying Data Ecosystem: The compilation draws from three main data pillars:
 - Goods and Services Tax (GST) Data: Used for the first time in statistical applications, powering calculations for trade, accommodation, road transport, real estate, and professional services.
 - Administrative/Secondary Data: Leveraged to capture the performance of air transport, railway transport, banking, and insurance.
 - ASISSE Data: The Annual Survey of Incorporated Services Sector Enterprises will provide a database to eventually cover the non-government health and education sectors

Key Features of the Index of Services Production:

- » Base Year: 2024–25: The ISP uses 2024–25 as its base year, aligning it with other statistical sub-sectors that use the new 2024-based Consumer Price Index series.
- » High-Frequency Monthly Indicator: The ISP is designed as a monthly indicator to track short-term fluctuations in services output and provide more timely information on economic activity.
- » Release Schedule: Regular monthly trial indices will be published with a lag of approximately 60 days, generally on the 29th of every month or the next working day if the 29th is a holiday.
- » Initial Coverage of 19 Sub-Sectors: The first trial ISP for April 2026 covered 19 service sub-sectors, accounting for approximately 60% of India's services sector. Of these, 14 recorded double-digit year-on-year growth.
- » Major Growth-Performing Sub-Sectors:



The five strongest-performing sub-sectors in April 2026 were

- Accommodation and food: 37.2%
 - Retail trade: 30.8%
 - Administrative and support services: 28.7%
 - Real estate: 27.7%
 - Telecommunications: 22.8%
- » First-Ever Statistical Use of GST Data: The ISP marks the first use of GST data for statistical applications. GST information will support measurement across wholesale and retail trade, accommodation and food, and arts and entertainment, among others.
- » Excluded Service Sub-Sectors:

The ISP currently excludes:

- Public administration and defence
 - Financial services other than banking and insurance
 - Central bank and money market fund activities
 - Social work without accommodation
 - Membership organisations
 - Personal services
 - Private households employing persons
 - Extraterritorial organisations
 - Government-provided health and education
 - Gambling and betting activities
- » These sectors are excluded because they are associated with core government activities, non-market services or significant informal-sector dominance.
- » International Best-Practice Framework: The ISP methodology was developed with reference to international practices, particularly the OECD Compilation Manual for Index of Services Production (2007) and guidance from Eurostat.

Significance of the Index of Services Production:

- » The Index of Industrial Production (IIP) measures only industrial activity and cannot capture short-term trends in services. The ISP provides a dedicated high-frequency measure for India's largest economic sector.

- » Since services contributed nearly 9% of India's GVA in 2024–25, a dedicated high-frequency indicator can improve the accuracy and timeliness of national income and growth estimates.

National Seva Samman

Union Labour Minister highlighting 'Seva' (service) and 'Samman' (respect) for India's Shram Shakti as central to governance and worker welfare.

Seva and Samman for the Nation's Shram Shakti

What It Is?

- » 'Seva' and 'Samman' represent a worker-centric ethical governance approach that places the service, dignity, health, social security and welfare of India's workforce at the heart of national development.
- » It recognises Shram Shakti (labour force) not merely as an economic input but as a vital pillar of nation-building deserving dignity, respect and comprehensive social protection.

Key Features:

- » Dignity of Labour: Every worker deserves recognition and respect, affirming the intrinsic dignity of all forms of honest labour.
- » Ethics of Care: Healthcare and social security recognise workers as human beings with physical, social and familial needs beyond economic productivity.
- » Security for the Vulnerable: Expanding ESIC coverage promotes equitable access to healthcare and social protection, advancing social justice.
- » Reciprocity and Shared Responsibility: Cooperation among workers, employers and the State promotes harmonious industrial relations and sustainable national development.

Significance:

- » India's social security coverage has expanded from 19% in 2014 to over 64%, covering 94 crore people, strengthening protection against economic and social vulnerabilities.
- » By placing the dignity, health and welfare of workers at the centre of development, the approach strengthens productivity, social cohesion and the broader vision of Shramev Jayate and a developed India.

Principled AI Prompting

General Studies, Political Science and International Relations, Sociology, CSAT



A recent analysis has highlighted that AI ethics requires more than voluntary corporate pledges, calling for structural safeguards against algorithmic bias, mass surveillance, data extraction, copyright violations, and labour exploitation.

Ethical AI and Conscience Prompting

What is Conscience Prompting?

- » Conscience prompting is an advanced system-level engineering technique that embeds explicit ethical guidelines, human values, and contextual moral constraints directly into the foundational input prompts or instruction sets of Large Language Models (LLMs) and Generative AI systems.
- » Rather than relying solely on post-facto content filtering or unexplainable algorithms, conscience prompting forces the system to evaluate its own outputs through a structured moral framework before displaying them to the user.
- » It functions as a built-in digital conscience, guiding the AI to actively identify and suppress toxic generation, structural societal bias, and misinformation.

Key Features of Conscience Prompting:

- » System-Level Constitutional Anchoring: It integrates structural rules—such as Anthropic's Constitutional AI—requiring the system to check its outputs against core concepts of helpfulness, harmlessness, and honesty.
- » DynamicStructural Bias Detection: The model evaluates its own language generation to catch subtle discrepancies in word choices, preventing discriminatory shifts when analyzing personal characteristics.
- » Human-Centric Value Alignment: It uses a foundational prompt structure based on established frameworks, such as the UN Universal Declaration of Human Rights, rather than narrow commercial goals.
- » Transparent Verification Trails: The prompting system requires the AI to explain the reasoning and step-by-step logic it used to align its final output with its internal rules.

The Imperative Need for Conscience Prompting in Modern Times:

- » DismantlingEmbedded Structural Injustices: Standard AI models reflect historical social hierarchies and inequalities present in their training data.



Example: Audit studies like the landmark Gender Shades research showed that facial recognition tools suffered high error rates for darker-skinned women because the underlying datasets lacked diverse representation.

- » Countering Algorithmic Gender Bias: AI tools routinely warp language framing based on gendered names, even when the underlying skills or data are exactly the same.

Example: Real-world tests showed that changing a resume's first name from Jennifer to Jeff caused Gemini to upgrade the description of the exact same project from community service to leadership.

- » Halting Discriminatory Feedback Loops: Predictive software applications reinforce past biases by directing excessive state resources toward historical hotspots.

Example: Unchecked predictive policing systems deployed from New Delhi to Detroit focus heavy surveillance on over-policed communities, generating skewed data that falsely labels those areas as high-risk zones.

- » Protecting Vulnerable Demographic Target Groups: Systems trained without ethical prompts can produce biased metrics that harm marginalized populations in essential sectors like finance and medicine.

Example: Credit-scoring algorithms trained on legacy banking logs regularly replicate historical economic exclusions, blocking credit access for lower-income applicants.

Key Challenges Associated with Conscience Prompting:

- » Western Bias in Core Datasets: Most leading AI engines are developed by Silicon Valley firms, encoding specific regional assumptions onto global users.

Example: Current constitutional models continue to mirror the values of Western, educated datasets, leaving communities in Noida or Nairobi without a seat at the table when rules are written.

- » The Growth of Corporate Ethics Washing: Big Tech firms frequently adopt terms like trustworthy AI as marketing tools to avoid outside scrutiny and binding legislation.



Example: Massive tech firms use internal corporate policy statements as public relations shields while keeping their actual software models insulated from public accountability.

- » Exploitative and Severe Global Labor Disparities: Cleaning and testing raw data to ensure prompt compliance depends on low-wage contractors working under difficult conditions.

Example: Silicon Valley firms outsource data-labeling and content moderation to workers in Kenya and the Philippines, exposing them to disturbing digital content that causes documented psychological harm.

- » High Technical Evasion and Jailbreaking Risks: Creative adversarial prompting can bypass system-level rules, allowing users to trick the AI into ignoring its moral framework.

Example: Online communities use complex roleplay inputs to disable a model's safety settings, causing the AI to generate harmful instructions.

Methods to Develop Conscience Prompting:

- » Integrating Enforceable Proportionality Filters: Embed explicit instructions inside system prompts to enforce absolute safety limits on surveillance, bias, and data extraction.
- » Deploying Automated Double-Pass Self-Correction: Program a mandatory internal review step where a second, independent prompt layer checks the AI's draft response against structural safety rules before displaying it.
- » Using Diverse Global Datasets: Broaden the training base by incorporating indigenous knowledge and diverse language perspectives from the Global South.
- » Mandating Public Accountability Audits: Build independent oversight frameworks that allow external researchers to verify how well a model's prompt guardrails handle real-world scenarios.
- » Enforcing Context-Aware Equality Benchmarks: Implement strict prompt guidelines that require the AI to use neutral, non-discriminatory verbs and professional framing across all gender profiles.

Conclusion:

Conscience prompting offers a practical technical method to help models identify and correct historical biases, but it cannot serve as a total substitute for external



accountability. Ultimately, true safety will be achieved only when governments set clear, enforceable limits on mass surveillance and data extraction, ensuring that technology serves human rights rather than corporate profits.

Ravidassia Heritage Forum

Thousands of Ravidassia community members gathered in Phagwara, Punjab, renewing their demand for recognition of Ravidassia as a separate religion in the upcoming Census.

The Ravidassia Community

- » The Ravidassias are a distinct socio-religious Dalit community who follow the spiritual teachings, egalitarian philosophy, and mystic poetry of Guru Ravidas, a highly revered 15th-to-16th century saint of the Bhakti Movement.

Habitat and Demographics:

- » Primary Concentration: The bulk of the community—comprising nearly 12 lakh individuals—resides in the Doaba region of Punjab, which spans the districts of Jalandhar, Hoshiarpur, Kapurthala, and Nawanshahr.
- » Broader Footprint: Combined with the allied Ad Dharmi movement, the community stands at over 30.95 lakh members, representing more than 11% of Punjab's entire population and forming a major chunk of the state's 32% Dalit demographic.

History and the 2009 Turning Point:

- » Dera Sachkhand Ballan: Founded by Baba Sant Pipal Das, it emerged as the principal institutional and spiritual centre of the Ravidassia community.
- » Vienna Attack, 2009: An armed attack on a Ravidassia congregation in Vienna killed Sant Ramanand and injured several devotees, triggering widespread protests in Punjab.
- » Declaration of Separate Faith: In 2010, Dera Sachkhand Ballan formally declared the Ravidassia panth a separate faith, consolidating its independent religious identity.

Key Features of the Ravidassia Faith:

- » Sovereign Scripture — Amritbani: The Amritbani Guru Ravidas Ji, containing 200 hymns attributed to Guru Ravidas, serves as the community's distinctive sacred text.

- » Concept of Begampura: Guru Ravidas envisioned Begampura, or the city without sorrow, as a caste-free and egalitarian society without exploitation, fear or discrimination.
- » Independent Worship and Symbols: The community maintains distinct places of worship, religious greetings and sacred symbols, including the 'Har' insignia.
- » Major Pilgrimage Centre: Seer Goverdhanpur in Varanasi, the birthplace of Guru Ravidas, is the community's major pilgrimage destination, attracting lakhs of devotees annually.

Significance:

- » A separate Census category could provide accurate demographic data, prevent administrative misclassification and formally recognise the community's distinct religious identity.
- » With substantial electoral influence in the Doaba region, the Ravidassia community plays an important role in Punjab politics and broader debates over Dalit representation and identity.

Thukkachi Heritage Mandir

The 12th-century Abathsahayeswarar Temple at Thukkachi received global recognition after being conferred the prestigious UNESCO Asia-Pacific Award of Distinction (2024) for outstanding heritage conservation.

The Thukkachi Temple

- » The Abathsahayeswarar Temple is a historic 12th-century Hindu shrine that stands as a remarkable testament to the architectural brilliance of the later Chola period. It is designated as a living historic temple, meaning it continues to function as an active house of worship while being preserved as a protected heritage monument.

Location: Situated in the Thanjavur district of Tamil Nadu, India.

History:

- » Royal Foundations: The temple is closely associated with the later Chola emperors Kulottunga I and his son Vikrama Chola. Kulottunga I initially endowed the shrine specifically for the daily recitation of sacred Thevaram hymns.



- » The Vikrama Chola Connection: It holds unique historical significance as perhaps the only major temple built entirely during the reign of Vikrama Chola, who expanded and renovated the earlier structure.
- » Epigraphical Epithalamium: Historical inscriptions found on the temple walls refer to Thukkachi as Thenthirukalathi or Vikramacholeeswaram.

Key Architectural and Structural Characteristics:

- » Unique Chariot Design (Kara Kovil): The temple is structurally conceived and designed as a Kara Kovil—a rare architectural style in Tamil history where the temple sanctuary is built in the physical shape of a processional chariot.
- » Oldest Lord Sarabeshwarar Depiction: The complex houses a highly revered idol of Lord Sarabeshwarar, which is widely considered by historians to be one of the absolute oldest stone iconographic representations of this specific deity in existence.
- » Precision Digital Anastylis: The restoration used drone surveys and digital mapping to catalog the structure. Every single shifting granite block was individually numbered before being dismantled and later reassembled into its precise, original position.
- » Interdisciplinary Sthapatya Veda Framework: The conservation combined traditional temple-building knowledge (Sthapatya Veda) and Agama Shastra rules with modern conservation engineering, utilizing traditional sthapathis alongside contemporary structural engineers.

Significance:

- » The ₹5-crore Thukkachi restoration became a successful pilot, with its conservation methods incorporated into Tamil Nadu's official Manual for Temple Restoration and Conservation.
- » Local residents contributed funds and received conservation training, creating a sustainable model of community ownership and long-term heritage guardianship recognised by UNESCO.
- » Adjournment Motion (Rule 56): Similar in spirit to Rule 267. It interrupts the regular business of the Lok Sabha to discuss a definite matter of urgent public importance, involving an element of censure against the government.



Breaking Land Ownership Barriers

Maharashtra has become the first Indian state to enact the Maharashtra Women Farmers Empowerment Act, 2026, a landmark law recognizing and protecting the rights of women farmers.

- » The Act was introduced during the UN-observed International Year of the Woman Farmer, promoting inclusive and sustainable agrifood systems.

Maharashtra Gives Legal Recognition to Women Farmers

- » The Act represents a massive socio-economic shift designed to address deeply entrenched gender inequalities regarding access to land, water, credit, and other vital natural resources. Historically, government agricultural benefits, extension services, and formal bank loans have been legally tied to land ownership, which is overwhelmingly held by men.

Key Data and Statistics on Women in Agriculture:

- » National Female Baseline Comparison: Across India, an average of 73% of the rural female workforce is anchored in agriculture, compared to 47% of rural men.
- » The Legislative Milestones Pipeline: The groundwork for the Act builds directly upon the targets of Maharashtra's Fourth Policy for Women (2024), which mandated enhancing the role of women in agricultural income and asset ownership.
- » Wide Foundational Framework: The new law covers a broad spectrum of primary production sectors, aligning with India's National Policy for Farmers (2007).

Core Legal Features and Institutional Mechanisms:

- » Broad Inclusivity of "Farmer" Status: In line with the National Policy for Farmers (2007), the Act formally includes any woman engaged in crop husbandry, animal husbandry, poultry, fishery, agro-forestry, vermiculture, mushroom cultivation, or primary processing, working either as an owner or a laborer.
- » The Woman Farmer Certificate (WFC): Eligible women can apply for a formal WFC through their local Gram Sabha or Nagar Panchayat. This certificate serves as official proof of their occupation, successfully removing the requirement of holding a land title to access state benefits.



- » A Unified Digital Registry and Fund: The Act mandates the creation of a centralized digital registry to track certified women farmers, backed by a dedicated state-level empowerment fund to bankroll targeted welfare schemes.
- » Two-Tier Administrative Oversight Structure: Implementation will be managed by a State-Level Monitoring Committee headed by the Chief Secretary to facilitate multi-department coordination, while a supreme Governing Council led by the Chief Minister will oversee long-term policy guidance.

Significance and Strategic Opportunities:

- » Unlocking Formal Financial Credit: Issuing the WFC helps women farmers clear rigid banking checks, allowing them to secure formal crop insurance and low-interest institutional loans without pledging land as collateral.
- » Targeted Support for Vulnerable Demographics: The centralized digital registry allows the state to design gender-responsive skill development programs tailored specifically to single, widowed, or marginalized women farmers.
- » Fostering Climate Change Resilience: Because global studies show that women are among the strongest drivers of ecological adaptation, giving them legal status helps scale up sustainable practices like vermiculture and agro-forestry.
- » Institutionalizing Social Reform Legacies: This law advances the historic social justice legacy of Maharashtra, carrying forward the foundational work of pathbreakers like Jyotirao Phule and Savitribai Phule, who championed women's rights and education.
- » Securing Household Decision-Making Power: Legally recognizing women's labor gives them greater control over agricultural income, translating directly into better healthcare, nutrition, and education outcomes for rural families.

Key Challenges in Implementation:

- » Overcoming Entrenched Social Resistance: Changing deep-seated patriarchal norms around land inheritance and structural family



hierarchies requires continuous legal awareness campaigns at the village level.

- » Preventing Institutional Bottlenecks at the Local Level: Bureaucratic delays within Gram Sabhas or Nagar Panchayats could stall the early verification and smooth rollout of the Woman Farmer Certificates.
- » Bridging the Local Digital Divide: Rural women often face limited access to smartphones and digital literacy, which could slow down their enrollment in the state's new digital registry.
- » Reaching Displaced Contract Laborers: Extending the Act's benefits to highly mobile, seasonal, and landless migrant female laborers presents a difficult tracking challenge for district enforcement cells.
- » Ensuring Inter-Departmental Coordination: Blending new financial allocations across separate state ministries—including Agriculture, Finance, and Women & Child Development—requires constant administrative monitoring.

Way Forward:

- » Deploying Mobile WFC Enrollment Camps: Launch localized registration drives at the panchayat level, using frontline officers to help illiterate and single women farmers fill out certificate applications easily.
- » Mandating Gender Quotas in Banking Schemes: Coordinate with regional rural banks and NABARD to recognize the Woman Farmer Certificate as a valid document for zero-collateral agricultural credit.
- » Establishing the Mining and Agri-Tech Training Matrix: Link the new state empowerment fund with vocational institutes to deliver advanced training in food safety, post-harvest processing, and smart micro-irrigation.
- » Enforcing Strict Audits on Scheme Deliveries: Direct the State-Level Monitoring Committee to conduct annual audits, ensuring that at least 30% of all state agricultural subsidies are routed directly to WFC holders.
- » Launching Vernacular Legal Awareness Campaigns: Roll out community radio programs and village theater productions to educate rural households on women's equal rights to land, water, and economic assets.

Conclusion:



By replacing rigid land-ownership requirements with the flexible Woman Farmer Certificate, the law provides a scalable model for recognizing the vital labor of rural women. Ultimately, as climate change and male migration place greater pressure on the countryside, ensuring the smooth execution of this law will be essential to protect national food security and build a fairer, more inclusive rural economy.

Chip Revolution 2026

The Union Cabinet, chaired by Prime Minister, officially approved Semicon 2.0 with a massive budgetary outlay of ₹1,27,500 crore to accelerate India's semiconductor design and manufacturing ecosystem.

The Semicon 2.0

- » Semicon 2.0 is a comprehensive, macro-level national policy framework designed to provide sustained, long-term financial and infrastructure support to the semiconductor sector. It transitions India's technology ecosystem from basic chip assembly toward complete self-reliance in advanced fabrication, tool chain design, and raw material processing.
- » Part Of: The scheme is a core component of the India Semiconductor Mission (ISM).

Aim: The overarching objective of Semicon 2.0 is to place India permanently on the semiconductor map of the world.

Key Features of Semicon 2.0:

- » Massive Fiscal Outlay: Backed by an expanded, dedicated government budget of ₹1,27,500 crore.
- » Deepening the Design Ecosystem (Pillar 1): Focuses on turning India into a primary semiconductor chip design IP hub, moving past the initial success of its 105 chip-design startups to engineer proprietary IPs, commercial system blocks, and unique architectures.
- » Incentivizing Machines and Materials (Pillar 2): Provides financial incentives to firms manufacturing the heavy machinery, precision tools, specialized chemicals, and high-purity gases essential for running semiconductor fabs, creating a local precision manufacturing base.
- » Expanding Global Fabrication Units (Pillar 3): Focuses on attracting global manufacturers to build commercial plants, including silicon fabs, compound semiconductor fabs, discrete component fabs, and display fabs



(with India's first commercial silicon fab scheduled to be commissioned in 2028).

- » Strengthening Advanced Packaging (Pillar 4): Actively encourages the setup of high-tech Assembly, Testing, Marking, and Packaging (ATMP) and Outsourced Semiconductor Assembly and Test (OSAT) units, positioning India as the main global alternative for electronic component packaging.
- » Advanced Node R&D (Pillar 5): Transitions from the initial baseline nodes of 28nm–110nm to develop much more advanced sub-28nm nodes and frontier technologies in collaboration with leading local and international research centers.
- » Deepening Talent Development (Pillar 6): Builds on the 68,000 students already trained across 315 universities using industry-standard Electronic Design Automation (EDA) tools, expanding programs to include practical training in cleanroom operations, fab construction engineering, and facility management.

Significance:

- » Domestic chip manufacturing secures defence, satellites, telecom and critical infrastructure by reducing dependence on foreign semiconductor supply chains.
- » Local chip production supports consumer electronics, telecom, industrial automation and EVs while lowering import dependence and improving global competitiveness.

Digital Governance Risks

Security researchers have identified multiple vulnerabilities in the UMANG (Unified Mobile Application for New-age Governance) portal, potentially exposing sensitive user data, including EPFO UANs, LPG booking details and Aadhaar numbers.

UMANG Portal

- » UMANG is an integrated digital governance platform that aggregates over 2,400 services offered by Union and State governments through a single interface.

Key Findings:



- » Exposure of Sensitive Personal Data: The vulnerabilities exposed EPFO Universal Account Numbers (UANs), LPG cylinder booking details and Aadhaar numbers stored across several services.
- » Plaintext Aadhaar Numbers: Aadhaar numbers were reportedly found stored in plain text across multiple services, despite such storage being restricted under the Aadhaar Act, 2016. However, UMANG's dedicated Aadhaar module itself was not found vulnerable.
- » High-Risk EPFO Module: The EPFO service, UMANG's most-used module with over 40 crore transactions in three months, was affected, raising concerns about the security of a large volume of subscriber data.
- » Potential Financial Fraud Risk: Researchers warned that cybercriminals possessing UANs could potentially exploit vulnerabilities to alter bank account details and initiate fraudulent payouts, although rate limits made mass extraction of the entire EPFO database unlikely.
- » Inadequate Initial Security Fixes: MeitY acknowledged the flaws and encrypted plaintext information in affected APIs, but researchers argued that the initial fixes were inadequate and could be circumvented. The vulnerabilities were reported to MeitY and CERT-In.

Implications:

- » Exposure of Aadhaar numbers, UANs and financial information can facilitate identity theft, phishing, profiling and other forms of cyber fraud.
- » Security weaknesses in a platform aggregating over 2,400 government services could undermine public confidence in India's expanding Digital Public Infrastructure and e-governance ecosystem.

Digital India Manufacturing Scheme

The Union Cabinet, chaired by Prime Minister Narendra Modi, officially approved the Mobile Phone Manufacturing Scheme (MPMS) with a massive budgetary outlay of ₹62,500 crore.

The Mobile Phone Manufacturing Scheme (MPMS)

- » The Mobile Phone Manufacturing Scheme (MPMS) is a newly launched macro-level manufacturing incentive policy designed to provide direct financial support for mobile phone production, localized component sourcing, and design engineering. It serves as the new cornerstone



framework for India's high-tech electronics infrastructure over the coming years.

Aim: The core objectives of the MPMS are to scale up high-volume smartphone production, significantly deepen domestic value addition, and build supply chain resilience.

Key Features of the Scheme:

- » Substantial Budgetary Outlay: Backed by a dedicated fiscal commitment of ₹62,500 crore.
- » Five-Year Horizon: The tenure of the scheme spans a defined 5-year timeline, executing from FY 2026-27 to FY 2030-31.
- » Differentiated Base Incentives: Provides direct financial incentive support on eligible product sales manufactured in India at differentiated rates ranging from 25% to 5%.
- » Component Sourcing Linkage: Offers an additional financial incentive of up to 1.5% explicitly tied to the domestic sourcing of key components and sub-assemblies, encouraging localized ecosystem manufacturing.
- » Dedicated Brand and R&D Incentive: To actively support the emergence of local brands, it awards an extra 3% incentive on eligible sales dedicated specifically to the product's design, engineering, and R&D phases.
- » Massive Production Targets: Over its tenure, the program expects to drive cumulative domestic mobile phone production to approximately ₹39,00,000 crore.
- » Job Creation Milestones: The deployment is projected to generate roughly 60,000 direct employment opportunities across manufacturing nodes.

Strategic Significance:

- » The 3% design and R&D incentive encourages indigenous innovation, helping Indian firms develop patents and reduce dependence on foreign technologies.
- » The MPMS builds on India's growing smartphone exports, supporting manufacturing expansion and deeper integration into global value chains after the PLI-LSEM scheme.

Gandak Basin



Due to heavy rainfall in Nepal's catchment area, the Gandak River has crossed the danger mark by 2 centimeters in the Gopalganj district of Bihar.

The Gandak River

- » The Gandak River—also known as the Gandaki, Sapt Gandaki, and the Narayani—is an ancient, major transboundary river in South Asia. It functions as one of the largest left-bank tributaries of the Ganges River in India.

Primary Source: The river originates at the border with Tibet at an elevation of 6,268 meters at the Nhubine Himal Glacier in the Mustang region of Nepal.

Course of the Gandak River:

- » Nepal: Originates as the Kali Gandaki, flows through deep gorges, and becomes the Narayani near Devghat before entering India.
- » India: Enters near Triveni, forms the UP–Bihar boundary briefly, then flows through West Champaran, Gopalganj, East Champaran, Muzaffarpur, Siwan, Saran, and Vaishali before joining the Ganga at Hajipur.

Key Hydro-Geological Features:

- » Large Drainage Basin: Covers about 46,300 sq km with a river length of nearly 640 km.
- » Kali Gandaki Gorge: Flows through one of the world's deepest gorges, between Dhaulagiri and Annapurna peaks.
- » Extensive Megafan: Deposited sediments have formed a vast megafan across eastern Uttar Pradesh and northwestern Bihar.
- » Glacial Lake Risks: Upper basin contains moraine-dammed glacial lakes, including Thulagi Lake, posing GLOF risks.

Significance:

- » Connects Chitwan National Park (Nepal) with Valmiki Tiger Reserve (India), supporting rhinos, tigers, gaurs, and leopards.
- » Supplies irrigation through the Valmikinagar Barrage canal system, supporting cultivation of rice, wheat, and pulses across Bihar and Uttar Pradesh.

Grey Forest Sentinel

More than 60 years after disappearing from Gujarat's Gir forests, the Indian Grey Hornbill has successfully established its presence again following a landmark reintroduction program by the Gujarat Forest Department.

The Indian Grey Hornbill

- » The Indian Grey Hornbill (*Ocyrceros birostris*) is a medium-sized, highly adaptive arboreal bird belonging to the hornbill family (Bucerotidae). It is one of the most common hornbill species native to the Indian subcontinent, widely recognized for its distinct cascading calls and unique nesting rituals.

Habitat and Distribution:

- » Geographical Range: Endemic to the Indian subcontinent, found extensively across India, Pakistan, Nepal, and Bangladesh.
- » Ecological Niche: Unlike its deep-forest relatives, it thrives in open deciduous forests, thorn scrublands, riparian woodlands, rural fields, and even urban parks or old avenue plantations containing mature, hollow fruit-bearing trees.

IUCN Red List Status: Least Concern (LC)

Key characters:

- » Distinctive Appearance: About 24 inches long, with silvery-grey and brownish plumage, a pale eyebrow line, and a long tail tipped with white.
- » Casque and Bill: Has a large curved bill topped by a prominent pointed casque, which is smaller and more pointed in females.
- » Mud-Sealing Nesting Ritual: The female seals herself inside a tree cavity using mud, faeces, and fruit pulp, leaving only a narrow slit for receiving food.
- » Total Dietary Dependence: While nesting, moulting, and raising chicks, the enclosed female depends entirely on the male for food.
- » Social Behaviour: Monogamous and usually seen in pairs or family groups, it flies with alternating flaps and glides while producing loud squealing calls.

Significance:

- » Farmers of the Forest: By consuming fruits and dispersing intact seeds over long distances, Indian Grey Hornbills promote forest regeneration and plant diversity.



- » Natural Pest Controllers: By feeding on insects, lizards, scorpions, and other small animals, they help control pest populations in forests and nearby agricultural areas.

Iran strategic disruption

A month after signing a temporary peace memorandum, the United States and Iran resumed hostilities in West Asia with retaliatory strikes.

- » The conflict escalated after Iran's Revolutionary Guards threatened to halt regional energy exports, declaring that oil and gas would flow "for everyone or for no one."

Iran's Disruptive Strategy, Its Global Consequences

- » Iran's disruptive strategy represents a calculated geopolitical doctrine of coercive brinkmanship designed to challenge Western influence and dominate regional dynamics.
- » Instead of relying on traditional diplomatic channels or global consensus, Tehran utilizes an overlay of state-backed military power, geographic control over the Strait of Hormuz chokepoint, and an asymmetric network of proxies known as the "Axis of Resistance."

Background of the U.S.–Iran Conflict:

- » The Proxy Networks: Beginning in the late 1990s, Iran systematically engineered a disruptive proxy strategy by building and arming the "Axis of Resistance"—comprising Hamas, Hezbollah, and the Houthis—to establish tactical leverage across West Asia.
- » The February 28 Attack and Blockade: The long-standing friction erupted into a large-scale war on February 28, 2026, when the U.S. and Israel launched a massive bombing campaign, prompting Iran to retaliate by blockading the Strait of Hormuz.
- » The Failure of the Islamabad Memorandum: In June 2026, both sides briefly halted hostilities to sign an interim peace agreement called the Islamabad Memorandum of Understanding; however, the deal completely broke down within a month following a renewed U.S. maritime blockade on Iranian ports.
- » The Shift to Hardline Clerical Consolidation: The regime's hardline approach has intensified inside Iran following the high-profile funeral of its slain



supreme leader, Ali Khamenei, which left the state apparatus under the firm control of the Islamic Revolutionary Guard Corps (IRGC) and ultra-conservative clerics.

Recent Tensions:

- » A New Wave of Air Strikes: The U.S. Central Command launched heavy air raids near the critical port cities of Bandar Abbas, Qeshm, Bandar Imam Khomeini, and Bushehr to degrade Iran's ability to attack commercial shipping.
- » Direct Regional Interceptions: Iran's Revolutionary Guards launched direct missile and drone barrages targeting the U.S. Fifth Fleet in Bahrain, while Jordan's armed forces actively intercepted and downed three inbound missiles from Tehran.
- » Targeting Neutral Maritime Vessels: Coercive actions spread directly into international waters, marked by an explosion disabling a Norwegian tanker off the Omani coast and an Iranian missile strike wounding four crew members on a Kuwaiti naval vessel.

Consequences of the Iranian Disruption Strategy:

Global Impacts:

- » Rapid Spikes in Global Energy Prices: The return to war instantly disrupted international oil markets, driving the spot price of Brent crude higher by 15% to near \$85 a barrel.
- » Erosion of Spare Supply Buffers: The renewed blockage of the Strait of Hormuz has forced the drawdown of global oil reserves, leaving the International Monetary Fund (IMF) to warn that the world has used up its capacity to buffer future shocks.
- » The Strait of Hormuz Chokepoint Crisis: A prolonged closure of the strait effectively bottles up one-third of global helium production and a massive share of world oil and liquefied natural gas (LNG), threatening global industrial networks.
- » Weaponization of Transit Tariffs: Iran has introduced a disruptive plan to levy "special transit rates" on select friendly nations using the strait, deliberately splitting collective international action against its blockade.

Impacts on India:

General Studies, Political Science and International Relations, Sociology, CSAT



- » Severe Vulnerability to LPG Cutoffs: Because approximately 90% of India's LPG imports transit directly through the Strait of Hormuz, the sudden closure creates an immediate risk to India's domestic cooking fuel security.
- » Disruption of Strategic Trade Corridors: The maritime warfare directly threatens India's heavy capital investments in regional connectivity nodes, particularly the Chabahar Port and the International North-South Transport Corridor (INSTC).
- » Forced Shifts in Crude Oil Sourcing: Heightened regional risk has accelerated India's costly macro shift away from West Asian energy inputs to search for more expensive, alternate suppliers in a tightening market.
- » Diplomatic Realignment and Condemnation: Moving away from its traditional quiet stance, India co-sponsored and voted for UN Security Council Resolution 2817, formally condemning Iran's attacks on Jordan and the GCC nations.

Way Forward:

- » Building Global Non-Western Collective Pressure: Elicit diplomatic pressure from large, emerging Asian middle powers—rather than just Western economies—to pressure Iran into stopping its maritime blockades.
- » Utilizing De-Frozen Assets as Peace Leverage: Establish diplomatic entry points that link the gradual un-freezing of Iran's foreign financial assets to verifiable halts in proxy rocket and drone attacks.
- » Transitioning to Alternative Regional Shipping Channels: Coordinate with regional partners like Oman and Saudi Arabia to map out alternative land-based transit and pipeline bypass routes that avoid the Strait of Hormuz.
- » Diversifying Domestic Strategic Fuel Inventories: Accelerate national initiatives to expand domestic energy buffers, scale up strategic petroleum reserves, and increase compressed biogas blending to insulate the economy from West Asian supply cuts.

Conclusion:

Iran's reliance on coercive brinkmanship and maritime disruptions may offer short-term tactical advantages, but it ultimately acts as a long-term blunder that isolates the country from global trade. The breakdown of the Islamabad MoU and the immediate spike in Brent crude prices to \$85 demonstrate that regional conflicts



rapidly destabilize global energy security. Moving forward, India must look past traditional ties to protect its trade routes, support multilateral UN mandates, and rapidly expand its own domestic energy alternatives.

National Health Research Framework

The Centre's Department of Health Research has officially released the Draft National Health Research Policy, 2026, for public feedback until July 27.

The Draft National Health Research Policy

- » The policy is India's first unified national framework designed to span biomedical science, clinical medicine, public health, epidemiology, digital health, health systems, behavioral sciences, and emerging technologies. It treats health research as a national problem-solving architecture rather than a collection of isolated academic studies.
- » Aim: The policy aims to address long-standing issues in India's scientific ecosystem, including fragmented research efforts, wide regional disparities in institutional capacity, and slow translation of scientific findings into government policy or last-mile healthcare delivery.

Key Features of the Draft Policy:

- » Targeted GDP Investment Boost: Proposes a six-fold increase in government spending on health research, raising it from the current 0.24% of GDP to 0.072% by 2037, and reaching 0.15% by 2047.
- » Three-Tier Governance Structure: Establishes a clear division of labor: a National Health Research Stewardship Committee for strategic alignment, the Department of Health Research as the nodal implementation agency, and the ICMR providing scientific and technical leadership.
- » Dynamic Research Agenda: Replaces disjointed research models with a National Health Research Agenda to identify priorities based on disease burden, equity, and pandemic preparedness, focusing on targets like tuberculosis, antimicrobial resistance (AMR), cancer, and child malnutrition.
- » Impact-Based Scientist Evaluation: Shifts the focus of scientific evaluation away from conventional paper counts and journal metrics to the ICMR Impact of Research and Innovation Scale (ICMR-IRIS), which grades researchers on clinical translation and policy influence.



- » Institutional Decentralization: Aims to expand research capacity out of a few elite states and institutions by mandating state governments to compile local agendas based on regional disease patterns.
- » Simplified Ethics and Administration: Proposes streamlining ethical approvals for multi-center clinical trials, establishing a National Research Integrity Office (NRIO) to curb misconduct, and ensuring shared access to public labs and biobanks.
- » Core Technological and Data Standards: Places rigorous data governance, cybersecurity, community engagement, and the responsible use of Artificial Intelligence (AI) in medical diagnostics at the absolute center of the research framework.

Significance:

- » The ICMR-IRIS framework directs public research towards real-world health needs, promoting affordable indigenous technologies, vaccines, and diagnostics.
- » State-level research empowers regional institutions to study local health challenges and strengthen early-warning systems for future outbreaks, supporting Viksit Bharat 2047.

Parasitic intestinal disease

The U.S. Centers for Disease Control and Prevention (CDC) issued a major health advisory, following a massive, widespread outbreak of cyclosporiasis across 34 states.

Cyclosporiasis

- » Cyclosporiasis is a type of food poisoning caused by *Cyclospora cayetanensis*, a microscopic, single-celled parasite. While generally not life-threatening, the infection targets the human digestive system, leading to prolonged intestinal distress and potential complications if left untreated.

How It Occurs?

- » Transmission: Spreads through the fecal-oral route by consuming food or water contaminated with infected fecal matter.
- » No Direct Person-to-Person Spread: The parasite must mature in the environment before becoming infectious, preventing immediate transmission between people.

- » Major Sources: Commonly linked to contaminated fresh produce such as leafy greens, basil, cilantro, raspberries and snow peas.

Key Features:

- » Seasonal Pattern: In the U.S., cases typically peak during spring and summer, particularly from May to August.
- » Difficult Diagnosis: Requires specific stool PCR or microscopy tests, often involving multiple samples because the parasite is shed intermittently.
- » Underreporting Risk: Testing difficulties and unreported mild cases mean actual infections may significantly exceed official figures.
- » Disinfectant Resistance: Standard sanitizers and vegetable washes may not completely remove or destroy the parasite on fresh produce.

Symptoms and Complications:

- » Primary Symptom: Frequent and prolonged watery diarrhoea, typically beginning about one week after exposure.
- » Other Symptoms: Loss of appetite, stomach cramps, bloating, fatigue, nausea, mild fever and weight loss.
- » Vulnerable Groups: Children, elderly people and immunocompromised individuals face greater risks of prolonged illness and relapse.
- » Potential Complications: Severe dehydration, nutrient malabsorption, gallbladder inflammation and reactive arthritis may occur.

Treatment:

- » First-Line Treatment: A 7–10-day course of trimethoprim-sulfamethoxazole (TMP-SMX) is the standard recommended therapy.
- » Immunocompromised Patients: Longer treatment may be required to prevent recurrent infection.
- » Rehydration: Adequate water and electrolyte replacement is essential to prevent dehydration caused by prolonged diarrhoea.

The Korku People

Around 2,000 members of the indigenous Korku community from 150 villages across the Khandwa and Burhanpur districts of Madhya Pradesh staged a protest march.

Korku Community

- » The Korkus are an ancient, primarily rural-based, and peaceful Adivasi ethnic group classified as a Scheduled Tribe by the Government of India. They are a Munda ethnic group living in close geographic proximity to the Dravidian-speaking Gond tribe.

Habitat and Distribution:

- » Geographical Strongholds: Concentrated largely across the Khandwa, Burhanpur, Betul, and Chhindwara districts of southern Madhya Pradesh.
- » Border Presence: They also inhabit adjoining northern regions of Maharashtra, particularly near the hills of the Melghat Tiger Reserve in the Amravati district.

History:

- » Historically, the Korkus are believed to have been a hunter-gatherer community that dwelt in the dense forests of the Satpura Mountain Range on both sides of the Tapi River. Over the centuries, they transitioned away from hunting and gathering to adapt to settled agriculture.

Key Characteristics of the Korku Tribe

- » Distinct Munda Language: The Korkus speak Korku, an endangered Austroasiatic Munda language generally written in the Devanagari script.
- » Traditional Governance: Village affairs are managed by the Korku Panchayat, headed by a Patel and assisted by the Padihar, Kotwar and respected elders.
- » Unique Dwelling Architecture: Villages consist of rows of thatched huts, each typically featuring a raised wooden platform for storing harvests and cattle feed.
- » Skilled Agriculturalists: Korkus practise seasonal double-cropping of cereals, pulses and oilseeds; those in Bhainsdehi also pioneered local potato and coffee cultivation.
- » Social Sects and Gotras: The community has four major sub-sects and 16 gotras, often named after natural elements, which regulate marriage alliances.
- » Community-Based Conservation: During Hari and Jitori festivals, the Korkus undertake tree planting to combat environmental degradation and strengthen food security.



Significance:

- » Korkus depend on Mahua, Chironji, Tendu leaves and medicinal plants, prompting demands to stop illegal forest clearance and protect grazing lands.
- » Growing land pressures and competing forest claims have intensified disputes, leading Korkus to seek stronger boundary protection, JFM institutions and action against re-encroachment.

Urea Self-Reliance Policy 2026

The Cabinet Committee on Economic Affairs (CCEA), chaired by Prime Minister Narendra Modi, officially approved the National Investment Policy for Urea-2026 for Atmanirbhar Bharat (NIPU-2026).

NIPU-2026

- » NIPU-2026 is a newly approved macroeconomic sector-specific investment policy aimed at reviving, expanding, and constructing advanced, domestic natural gas-based urea manufacturing plants. It serves as the programmatic successor to the New Investment Policy (NIP)-2012, whose investment window expired back in October 2019.

Objectives: The objective of the policy is to add 10 million tonnes of fresh, indigenous urea production capacity by supporting the establishment of eight to nine new natural gas-based fertilizer plants.

Key Features of the Scheme:

- » Targeted Capacity Expansion: Aims to create 10 million tonnes of fresh domestic manufacturing capacity by setting up 8 to 9 new natural gas-based manufacturing plants.
- » Separation of Fixed and Variable Costs: Calculations for government financial subsidies will explicitly separate fixed and variable costs, ensuring higher transparency and eliminating administrative inefficiencies.
- » Assured Return on Equity (RoE) Band: Introduces a viable, government-backed RoE band for project developers, guaranteeing a floor rate of 12 per cent and a ceiling rate of 16 per cent to offer high investment certainty.
- » Foreign Exchange Risk Mitigation: Project developers are protected against global currency market fluctuations by allowing fixed costs to be converted

fully into Indian Rupees (INR) after a period of four years based on prevailing exchange rates.

- » Massive Plant-Level Fiscal Savings: Due to structural transparency and cost optimization, these new rules are estimated to save over ₹250 crore for each plant established compared to the older NIP-2012 rules.
- » Addressing Pent-Up Market Proposals: The deployment framework acts as a single-window evaluation platform for various pending industrial factory proposals received by the Department of Fertilizers.

Strategic Significance:

- » NIPU-2026 aims to bridge India's nearly 10 million tonne urea deficit, reducing imports and moving the country towards self-sufficiency.
- » Clear cost norms and an assured 12–16% RoE reduce investment risks, encouraging greater public and private investment in modern gas-based urea plants.

Artificial Intelligence Squatting

Cybersecurity researchers have sounded the alarm on AI Squatting, a dangerous new class of cyber threats where attackers weaponize predictable AI hallucinations rather than software bugs.

The AI Squatting

- » AI Squatting is a cyberattack technique that exploits AI-generated hallucinations, where large language models (LLMs) create convincing but non-existent websites or software packages. Attackers register these fake assets to steal data, credentials, or distribute malware.

Types of AI Squatting:

1. Phantom Squatting (Internet Domains)
 - » Targets hallucinated website domains generated by AI chatbots.
 - » Attackers register fake domains before legitimate owners and use them for phishing, credential theft, and malware distribution.
2. Hallu Squatting (Software Supply Chain)
 - » Targets AI-generated fake software libraries or repositories suggested by coding assistants.



- » Attackers upload malicious packages with these names, tricking developers into installing compromised software.

Key Features:

- » Exploits AI Hallucinations: Does not require software vulnerabilities or prompt injection attacks.
- » Scalable Threat: Recurring AI-generated errors allow attackers to target many users simultaneously.
- » Difficult to Eliminate: Hallucinations arise from the probabilistic nature of LLMs and cannot be fully removed.
- » Growing Attack Surface: Thousands of malicious and unregistered AI-hallucinated domains have already been identified.

Implications:

- » Software Supply Chain Risks: Fake AI-recommended packages can introduce malware and backdoors into enterprise systems.
- » Threat to Agentic AI: Autonomous AI agents may unknowingly execute malicious links or install compromised software without human oversight.
- » Changing Cybersecurity Practices: Organizations must verify AI-generated links, code, and package names as part of routine security checks.

China's Fifth-Gen Warplane

While global attention focuses on China's emerging sixth-generation fighter designs, the Chengdu J-20 Mighty Dragon has quietly matured into the absolute backbone of the People's Liberation Army Air Force (PLAAF).

China's J-20 Fighter

- » The Chengdu J-20 (Mighty Dragon) is a twin-engine, fifth-generation stealth fighter designed for air superiority and precision strike missions. It is China's first indigenously developed operational stealth aircraft.

Developed By:

- » Developed by the Chengdu Aircraft Corporation (CAC) for the People's Liberation Army Air Force (PLAAF) under the J-XX programme.
- » First flight: 2011 | Entered service: 2017.



Key Features:

- » **Stealth & Agility:** Uses a canard-delta design, stealth shaping, and diverterless supersonic intakes (DSI) for high manoeuvrability and low radar visibility.
- » **Advanced Sensor Fusion:** Integrates AESA radar, Electro-Optical Targeting System (EOTS), Distributed Aperture System (DAS), and a digital cockpit for enhanced situational awareness.
- » **Indigenous Engines:** Powered by WS-10C and newer WS-15 engines, enabling improved performance and super cruise capability.
- » **Flexible Combat Roles:** Can operate in stealth mode with internal weapons or Beast Mode with external missiles for greater firepower.
- » **Manned-Unmanned Teaming:** The twin-seat J-20S can coordinate electronic warfare and control loyal wingman drones.

Strategic Significance:

- » **Strengthens China's Air Dominance:** Large-scale production is rapidly modernising the PLAAF and expanding China's fifth-generation fighter fleet.
- » **Enhances Indo-Pacific Power Projection:** The J-20 improves China's ability to challenge rival air forces by targeting high-value assets and supporting operations in the Taiwan Strait and South China Sea.

India's Nuclear Security Lapse

- » NASA astronaut Anil Menon launched aboard the Soyuz MS-29 spacecraft from Baikonur Cosmodrome, Kazakhstan, for his first mission to the International Space Station (ISS).

Anil Menon

- » Anil Menon is an Indian-origin NASA astronaut, physician, and mechanical engineer, selected as part of NASA's 2021 Astronaut Group.
- » He began his first space mission on Soyuz MS-29, travelling to the International Space Station (ISS) alongside two Russian cosmonauts.

Achievements:

- » **NASA Astronaut:** Selected by NASA in 2021 and launched on his first ISS mission aboard Soyuz MS-29.

- » **Medical and Aerospace Expertise:** Served as a physician and aerospace medicine specialist, contributing to astronaut health and human spaceflight programmes.
- » **International Space Collaboration:** Participates in the NASA–Roscosmos ISS mission, strengthening international cooperation in space exploration.

Significance:

- » His mission advances scientific research aboard the ISS, including experiments in microgravity, life sciences, and space medicine.
- » As an Indian-origin astronaut, his achievement inspires students and highlights the growing contribution of the Indian diaspora to global space exploration.

Kudankulam Cyber Breach

Reports emerged that a ransomware syndicate had leaked 14.3 GB of data containing 18,997 files explicitly linked to the Kudankulam Nuclear Power Plant (KKNPP) on the dark web.

The Kudankulam Data Leak

- » The Kudankulam data leak involves the unauthorized exfiltration and online publication of non-classified structural and administrative files associated with Units 3 and 4 of India's largest nuclear power facility. The leaked data does not contain core operational reactor software or safety systems.

How the Cyber Incident Happened?

- » **The Indirect Contractor Vulnerability:** Attackers did not breach the state-owned NPCIL's air-gapped core military infrastructure. The leak originated via an infiltration into the network of Reliance Infrastructure Ltd, which was awarded a \$112 million secondary engineering and construction contract for common utilities in 2018.
- » **Third-Party Cloud Compromise:** The targeted data was stored on a commercial server hosted by Yotta Data Services Private Limited, a prominent third-party Indian data center provider managing the contractor's private cloud network.
- » **The Endpoint Security Trigger:** Yotta's endpoint detection software flagged suspicious malware execution on a single file server. Technicians isolated the target asset, believing they had terminated the threat before active data encryption took place.



- » The Ransomware Syndicate Release: Despite containment efforts, threat actors from the cybercriminal syndicate World Leaks successfully scraped data before server isolation. When their subsequent extortion demands were ignored by the contractor, they published the 14.3 GB subset as part of a massive 1.2 TB multi-company data dump.

Measures in Place in India to Prevent Data Leaks

- » National Incident Coordination: The Indian Computer Emergency Response Team (CERT-In) operates as the national nodal agency for cyber threat tracking, vulnerability mitigation, and rapid emergency response across critical commercial and government grids.
- » Strict Sectoral Air-Gapping Mandatory Directives: Strategic state installations—particularly the automated industrial control networks managing nuclear reactors and ISRO telemetry lines—are completely isolated from the standard public internet and office administrative networks.
- » Three-Governance Cybersecurity Guidelines: The National Cyber Coordination Centre (NCCC) works continuously alongside intelligence frameworks to ingest threat warnings from international allies, proactively blocking actors targeting primary domain controllers.
- » Techno-Legal Privacy Obligations: Cyber operations must adhere to data security benchmarks under the Information Technology Act, 2000, and the Digital Personal Data Protection (DPDP) Act, which require companies to deploy robust technical controls to insulate private data.

Key Challenges Associated with Critical Infrastructure Leaks

- » The Security Flaw of the Supply Chain: While central governments heavily secure their primary assets, secondary private vendors and sub-contractors often have weaker technical protections, creating an ideal backdoor entry point for hackers.
- » Facilitating Reconnaissance Mapping: Even though conventional infrastructure details seem minor, exposing detailed layout plans, cooling paths, and vendor files gives hostile actors a map to plan targeted physical or digital sabotage.
- » Persistent Advanced Transnational Actors: Critical national assets are prime targets for continuous state-backed espionage syndicates—such as the 2019 DTrack malware incident linked to North Korean actors—that focus on technology theft.

- » The Proliferation of Triple-Extortion Models: Modern cybercriminals no longer just encrypt servers; they steal data, demand ransom, and leak files on the dark web, making traditional data backup systems insufficient against public exposure.

Way Forward

- » Mandating Zero-Trust Architecture for Supply Partners: Force all secondary private engineering contractors handling public infrastructure blueprints to undergo the same rigorous, continuous security checks required for primary ministries.
- » Enforcing Document Redaction and Dynamic Watermarking: Ensure that technical specifications shared during public tenders are dynamically watermarked, scrambled, and stripped of exact geographical locations to prevent systemic facility mapping if leaked.
- » Deploying Automated Continuous Threat Hunting: Upgrade the threat-hunting capabilities of CERT-In and private data centers to actively search for hidden, long-term malware before it can copy data.
- » Standardizing Incident Reporting Mandates: Enforce strict legal penalties under the DPDP Act for companies that fail to immediately report data breaches to the central government, cutting down on communication gaps between private firms and public security teams.

Conclusion

- » While the core reactor software remains secure inside its air-gapped system, the exposure of 14.3 GB of building blueprints highlights a serious vulnerability in supply chain cybersecurity. Moving forward, India must look past simple network isolation to enforce strict, uniform cybersecurity standards across all private partners to protect strategic state assets from global cybercrime syndicates.
- » Deploying the Combined ₹1,558 Crore Infrastructure Allocation: Accelerate the distribution of earmarked capital funds to purchase automated biomass machinery and build direct pipelines connecting rural plants to the national gas grid.

Malvan: India's Submarine Hunter



The Indian Navy is set to commission its second indigenous Mahe-class Anti-Submarine Warfare Shallow Water Craft (ASW-SWC), named Malvan.

The Anti-Submarine Warfare Craft 'Malvan'

- » Malvan is a specialized, new-generation Anti-Submarine Warfare Shallow Water Craft (ASW-SWC) engineered specifically to conduct sub-surface combat operations. Described by the Indian Navy as a compact, yet formidable shallow-water warrior, the vessel is built to perform agile, high-precision defensive and offensive sweeps in littoral or shallow coastal areas.

Built By: The warship was entirely constructed and integrated by Cochin Shipyard Limited (CSL) in Kochi, Kerala.

- » **Aim:** The central objective of deploying the Malvan is to strengthen India's coastal security matrix by detecting, tracking, and neutralizing hostile submarines, underwater drones, and sub-surface intruders operating close to the coastline, ports, and critical island territories.

Key Features of the Vessel:

- » **High Indigenous Content:** Over 80% indigenous content, showcasing India's self-reliance in warship design, construction, and combat systems.
- » **Shallow-Water Optimisation:** Designed to operate effectively in coastal and shallow waters, where larger warships have limited access.
- » **Compact & Agile Design:** Lightweight hull provides high speed, fuel efficiency, and quick response to underwater threats.
- » **Advanced Anti-Submarine Sensors:** Equipped with hull-mounted and towed array sonars for detecting and tracking submarines.
- » **Powerful Weapon Systems:** Armed with lightweight torpedoes, anti-submarine rocket launchers, and mine-laying capability.

Strategic Significance:

- » **Strengthens Coastal Defence:** Enhances India's ability to detect and counter enemy submarines and underwater drones in coastal waters.
- » **Protects Maritime Assets:** Safeguards ports, EEZs, offshore energy assets, and shipping lanes, allowing larger warships to focus on blue-water operations.



- » Boosts Indigenous Shipbuilding: Demonstrates India's growing capability to build advanced warships domestically while supporting defence exports and supply chain resilience.

New Primate Discovery

An international team of scientists has officially confirmed a new monkey species, locally known as Likweli, discovered hiding in the dense tree canopies of the Democratic Republic of Congo (DRC).

The New Monkey Species

- » The newly identified primate has been given the scientific name *Colobus congoensis* (Congo Colobus). It belongs to the larger *Colobus* genus—a group of critically important arboreal African monkeys known for their lack of thumbs and specialized leaf-eating diets.

Habitat and Distribution:

- » Geographical Core: Found exclusively in the remote, high-altitude tree canopies of Lomami National Park, located in the central-east region of the Democratic Republic of Congo.
- » Range Limitation: The species is highly secretive and rare, restricted to a very specific, isolated sector of the tropical rainforest that provides its necessary food resources and structural canopy layout.

Key Biological and Behavioral Characteristics:

- » Striking Facial Markings: The monkey features highly distinctive, bright pinkish-orange lips contrasted against a jet-black face and uniform black fur body. Researchers speculate these vivid facial markings act as visual signals for mate attraction or group identification within dark forest ceilings.
- » Thumbless Evolution: In line with all colobus monkeys, the species does not possess thumbs. This structural adaptation allows their hands to act as clean, curved hooks, optimized for rapid swinging and branch-leaping through dense branches.
- » Secretive, Arboreal Nature: The species is notoriously shy, avoiding human proximity by spending almost its entire lifecycle high in the top layer of the tropical forest canopy.

- » Deep Resonant Roaring: The monkeys possess a distinct, powerful roaring call note that echoes across long distances. Because of their hidden habitat, tracking teams frequently locate groups by their acoustic roars long before they can be visually spotted.

Significance:

- » By feeding on fruits and leaves, the species helps disperse seeds, promoting natural rainforest regeneration.
- » Recognition as a distinct species enables legal protection, targeted conservation measures, and international funding to curb poaching.

South Atlantic Islands

During Argentina's celebrations after reaching the 2026 FIFA World Cup final, players displayed a banner reading The Falkland Islands are Argentine, prompting a FIFA review for violating rules against political messages in sporting events.

The Falkland Islands (Islas Malvinas)

- » The Falkland Islands (Islas Malvinas) are a self-governing British Overseas Territory in the South Atlantic Ocean, claimed by both the United Kingdom and Argentina.

Location:

- » Located about 480 km east of the Strait of Magellan and northeast of the southern tip of South America.
- » Stanley, on East Falkland, is the capital and largest settlement.

Physical Features:

- » Covers about 12,200 sq km, comprising East Falkland, West Falkland, and over 700 smaller islands.
- » Features rolling hills, peatlands, indented, and a cool, windy maritime climate.

Historical Background:

- » First settled by the French (1764), followed by British and Spanish control.
- » Britain re-established control in 1833, while Argentina continues to claim sovereignty.
- » The 1982 Falklands War, fought for 74 days, ended with the restoration of British control.



Features:

- » Supports large populations of penguins, sea lions, elephant seals, and albatrosses.
- » Treeless landscape with extensive peatlands and rich marine biodiversity.
- » Traditionally based on sheep farming and wool exports.
- » Today, fishing (especially squid), tourism, and offshore oil exploration are key economic sectors.

Current Status:

- » Governed as a British Overseas Territory under the 2009 Constitution.
- » In the 2013 referendum, 99.8% of residents voted to remain under British sovereignty.
- » Argentina rejects the referendum and continues to assert its territorial claim, making the islands a continuing geopolitical dispute.

Transforming India's Learning Landscape

- » An education reform movement gained momentum amid a prolonged protest demanding systemic reforms to curb examination paper leaks and improve governance in the education sector, bringing national attention to the issue.

The Push to Renew Education in India

- » Renewing education in India refers to a structural shift away from standard rote-learning frameworks toward a student-centric system focused on critical thinking, real-world application, and academic excellence. The framework calls for moving past political compromises, treating education as a bipartisan national mission rather than a mechanism for short-term election goals.

Key Data and Statistics on the Indian Education System:

- » The Stagnant Vocational Baseline: While enrolment has expanded significantly, nearly 65.3% of the active workforce has received no vocational training of any kind, according to recent economic indicators.
- » The Coaching Industry Parallel Fleet: The intense focus on competitive memory tests has created a multi-billion-dollar parallel coaching industry, draining family savings due to rigid, single-window evaluation filters.



- » Widespread Institutional Deficits: More than 88% of the rural workforce remains trapped in elementary or semi-skilled sectors, reflecting a mismatch between degree inflation and actual industry absorption.
- » The Aspirational Renaissance Metric: Structural proposals mandate a three-year hard deadline to convert all major central entrance testing metrics (including JEE, NEET, CUET, and UPSC) entirely into competency-based formats.

Current Issues Plaguing the Indian Education System:

An Over-Reliance on Rote Memorization and Recall: Standard evaluations primarily reward a candidate's memory rather than their capacity for critical analysis.

- » Example: High-stakes testing setups require long hours of memorizing facts, causing schools to prioritize memory drills over independent thinking.

The Rise of a Hyper-Commercialized Coaching Culture: The premium placed on clearing selective competitive entries has led families to rely heavily on parallel coaching centers.

- » Example: The clustering of students in coaching hubs like Kota highlights an ecosystem that values intense repetition over deep reflection.

Persistent Massive Vacancies Across Public Academies: Long delays in teacher hiring compromise learning quality from primary schools to premier technical institutions.

- » Example: Unfilled faculty chairs across central universities and IITs leave thousands of students without consistent, high-quality guidance.

A Distinct Lack of Autonomy and Administrative Micromanagement: State regulators often impose rigid guidelines on local public institutions, stifling experimental learning.

- » Example: Bureaucratic micromanagement of university curricula and pedagogy limits the ability of local departments to respond to regional economic contexts.

Implications of Educational Failures:



The Stagnation of the Demographic Dividend: Failing to properly train the current youth generation risks turning a major development window into a long-term economic challenge.

- » Example: Millions of working-age youths remain underemployed or outside the active labour force due to a lack of marketable technical skills.

Deepening Inequalities Across Class Lines: Commercial parallel coaching frameworks create structural barriers that favor affluent applicants.

- » Example: Lower-income and rural candidates are frequently squeezed out of competitive positions because their families cannot afford expensive private coaching.

The Growth of Credential Inflation Without Opportunities: Rapidly expanding degree programs without a corresponding growth in formal employment creates widespread social frustration.

- » Example: Postgraduates frequently apply for entry-level Group D government posts because the job market cannot absorb their academic qualifications.

The Erosion of Trust in Public Schooling Networks: Unequal resource distribution between urban private facilities and rural schools drives low-income families to look for expensive private alternatives.

- » Example: Disadvantaged families stretch their finances to pay for private elementary schooling because local public schools lack basic sanitation, laboratories, and libraries.

Way Forward:

- » Transitioning to Competency-Based Assessments: Redesign major board and national entrance examinations within three years to evaluate conceptual understanding, creativity, and real-world problem-solving rather than rote recall.
- » Dismantling the Monopoly of Parallel Coaching Culture: Reduce the focus on single-day high-stakes tests by giving greater weightage to sustained school performance, student portfolios, and multiple examination windows.
- » Launching a National Teacher Excellence Mission: Treat teaching as a highly respected profession by providing rigorous preparation, continuous



mentoring, and dedicated research funding modeled on systems in Finland and Japan.

- » Filling All Public Teaching Vacancies Within Three Months: Implement transparent, merit-based recruitment drives to fill all operational vacancies from primary Anganwadis to premier central institutes like IITs and AIIMS.
- » Mandating Public Accountability Dashboards and Bipartisan Commissions: Establish an independent, statutory National Education Reform Commission alongside a real-time educational dashboard to track learning outcomes and hold governments accountable.

Conclusion:

- » Resolving India's educational challenges requires moving past political arguments to treat systemic reform as a vital, bipartisan national mission. If the country continues to reward simple memorization over critical thinking, it risks missing out on its greatest developmental opportunity of the century. Ultimately, transforming personal sacrifice into a national educational renaissance is essential to build a society of innovators who can secure a sustainable future.

White Rabbit Innovation Network

Union Minister inaugurated the White Rabbit Technology-based Indian Standard Time (IST) – Distribution Demonstration Network at the Regional Reference Standards Laboratory (RRSL) in Jakkur, Bengaluru.

The White Rabbit Technology Demonstration Network

- » The Jakkur demonstration network is India's first high-precision, Ethernet-based time distribution facility that uses advanced synchronisation protocols to transmit Indian Standard Time (IST) seamlessly over wide-area digital networks.

Developed By: The project is led by the Legal Metrology Division under the Ministry of Consumer Affairs, in collaboration with NPL, ISRO, BSNL, and SEBI.

How It Works?

- » Atomic Time Source: NPL and ISRO generate a sovereign Indian Standard Time (IST) reference, reducing dependence on foreign GPS systems.
- » Precision Time Protocol (PTP): Time is transmitted through Ethernet/fibre-optic networks using the IEEE 1588 standard for highly accurate synchronization.

General Studies, Political Science and International Relations, Sociology, CSAT



- » Automatic Clock Calibration: Devices continuously correct clock drift using phase-locking, ensuring stable, sub-nanosecond synchronization.

Key Features of White Rabbit (WR) Technology:

- » Ultra-High Precision: Delivers sub-nanosecond (<1 ns) synchronization across connected devices.
- » Deterministic Communication: Ensures data reaches devices with predictable and fixed latency for synchronized operations.
- » Highly Scalable: Supports thousands of devices across networks extending beyond 1,000 km.
- » Open-Source Platform: Based on CERN's White Rabbit technology, enabling customized indigenous development.

Strategic Applications:

- » Securing Critical Infrastructure: Protects defence, power, and nuclear networks from GPS spoofing and external timing attacks through an indigenous timing system.
- » Strengthening Financial Systems: Enables accurate timestamping for stock exchanges and digital banking, reducing fraud and improving transaction reliability.
- » Supporting Future Technologies: Provides precise timing for 5G/6G networks, quantum communication, and space operations, ensuring seamless high-speed connectivity.

Anti-Doping Compliance Framework

The Centre has notified the commencement of the National Anti-Doping Act, 2022 and the National Anti-Doping (Amendment) Act, 2025.

- » These were enacted to regulate anti-doping activities in sports and to give effect to the 'UNESCO International Convention Against Doping in Sport, 2005' (India ratified in 2007).

What is Doping?

- » Definition: It is the act of consuming artificial and often illegal substances to gain an advantage over others in sporting competitions (e.g., anabolic steroids, human growth hormones, stimulants and diuretics).

General Studies, Political Science and International Relations, Sociology, CSAT



- » Doping in India: Indian athletes' use of banned substances like stanozolol is rising sharply.
- » Stanozolol is prohibited at all times under the World Anti-Doping Agency (WADA) Prohibited List in the category of Anabolic Agents.

Key Provisions

National Anti-Doping Act, 2022

- » Statutory Bodies: Establishes the National Anti-Doping Agency (NADA) for execution and the National Board for Anti-Doping for oversight and advisory roles.
- » Dispute Resolution: Creates Disciplinary and Appeal Panels to adjudicate doping violations and hear grievances.
- » Search & Seizure: Empowers NADA personnel to search premises and seize evidence.
- » Testing Labs: Provides legal recognition to National Dope Testing Laboratories.

National Anti-Doping (Amendment) Act, 2025

- » Appeal Panel: Transfers the authority to constitute the Appeal Panel from the Board to the Central Government.
- » Lab Accreditation: Makes WADA accreditation mandatory for all testing laboratories
- » WADA Code: Gives the World Anti-Doping Code the force of law in India via a detailed schedule.
- » Operational Independence: Mandates strict autonomy for NADA staff from sports federations, Olympic committees, and the government.
- » Expanded Appellate Rights: Grants international bodies (like WADA and the IOC) the right to appeal decisions directly to the Court of Arbitration for Sport (CAS).

Central African Colobus

Scientists have categorised Colobus Congoensis monkey from Africa as a new species.

Colobus Congoensis

- » Known locally as the 'Likweli' and belongs to the genus Colobus.

Characteristics:

- » Small size, a striking orange cream patch surrounding the mouth, and a white perianal patch that is covered with fine white hairs in males and is glabrous (hair free) in females.

General Studies, Political Science and International Relations, Sociology, CSAT



- » Habitat: Tropical rainforests of Central Africa, especially the Congo Basin.
- » Behaviour: Arboreal (tree-dwelling), diurnal, and lives in social groups.
- » Ecological Role: Important seed disperser and helps maintain forest ecosystems.
- » Threats: Habitat loss, deforestation, hunting (bushmeat), and forest fragmentation.

Gateway of the Indian Ocean

US Central Command (CENTCOM) destroyed a surveillance tower at Iran's Shahid Kalantari Port in Chabahar.

Chabahar Port

- » Location: Sistan and Baluchestan province on the Makran coast in South-eastern part of Iran, on the Gulf of Oman and outside Strait of Hormuz
- » It is the only deep-sea port in Iran with direct ocean access.
- » There are two terminals in Chabahar Port project i.e. Shahid Beheshti and Shahid Kalantari.

Significance for India:

- » It offers India a direct maritime gateway to Iran, Afghanistan and Central Asia.
- » Counter- balance Pakistan's Gwadar Port and China's Belt and Road Initiative.

India Rupee Clearing Accounts

RBI issued consolidated circular on Special Rupee Vostro Accounts (SRVAs), rationalising instructions.

SRVAs

- » SRVAs are INR denominated accounts held by overseas banks with Indian Banks.
- » The framework, introduced by RBI in 2022, enables seamless cross-border trade by facilitating transactions in Indian Rupees (INR).

Salient features:

- » Invoicing: All exports and imports under this arrangement denominated and invoiced in Rupee (INR).
- » Exchange Rate: Exchange rate between the currencies of the two trading partner countries is market determined.
- » Settlement: The settlement of trade transactions under this arrangement takes place in INR.



- » Benefits: Reducing reliance on third-party currencies and enhancing financial stability.

India's First Geothermal Wells Report

Lieutenant Governor of Ladakh commissioned the country's first and deepest (1,000 m) geothermal wells (Executed by ONGC) at Puga Valley.

- » These two wells are critical to implementation of the 1 MW geothermal power project at Puga, which will be India's first demonstration-scale geothermal power project.

Geothermal Energy

- » It harnesses heat stored within Earth's crust.
 - The system consists of multiple components including production and reinjection (wells, pumps), transport (pipelines), distribution (heat exchangers) and end-use application.
- » Sources
 - High-enthalpy resources: Volcanic regions, geysers and hot springs primarily for electricity generation.
 - Low- to medium-enthalpy resources: Like hot rocks and shallow ground layers, better suited for direct-use applications (e.g. heating and cooling, agri-food, aquaculture), etc.
- » Potential In India
 - 381 hot springs (identified by Geological Survey of India) with surface temperatures ranging from 35°C to 89°C.
 - 10 geothermal provinces (identified) in India including Himalayan Geothermal Province; Cambay Graben; Aravalli etc.
- » Benefits: Reliable and uninterrupted electricity generation, low carbon emissions, reducing dependence on fossil fuels, ideal for remote areas etc.
- » Challenges: High initial investment, exploration risks, limited to certain regions, requires advanced technology, etc.
- » Policy: MNRE formulated National Policy on Geothermal Energy 2025 for exploration and development of geothermal resources in India.



India's Rural Lending Landscape

NABARD's Rural Economic Conditions and Sentiments Survey reveal expanded formal credit access and rising rural household consumption.

Institutional Architecture for Rural Credit

- » Apex Body: NABARD coordinates rural finance, supervising cooperative networks and 28 Regional Rural Banks (RRB) with over 22,000 branches.
- » Delivery Channels: Scheduled Commercial Banks (rural branches increased 35% to 56,193 by July 2025) and computerization of grassroots Primary Agricultural Credit Societies (PACS) undergoing digital transformation.
- » Priority Sector Lending (PSL): RBI mandates banks to allocate 18% of Adjusted Net Bank Credit to agriculture (10% sub-target for small and marginal farmers).
- » Ground Level Credit: GLC targets reached ₹32.50 lakh crore for FY26 (including ₹5 lakh crore to allied sectors).

Key Initiatives:

- » Modified Interest Subvention Scheme (MISS) provides short-term credit to farmers at affordable interest rates through KCC.
 - Budget 2025-26 raised KCC limits to ₹5 lakh.
- » The Prime Minister Dhan-Dhaanya Krishi Yojana (PMDDKY) converges 36 Central schemes across 100 low-performing districts.

Significance of Rural Credit Growth

- » Creation of Rural Demand: Enhances purchasing power, with 77.2% of rural households reporting increased consumption levels.
 - About 51% of households rely exclusively on formal credit.
- » Women Empowerment: Empowers rural women (10.05 crore mobilised into SHGs) and mitigates dependency on informal debt.
- » Boosts Rural Growth: Supports farm productivity, allied sectors (dairy, fisheries) and rural entrepreneurship.

Evolution of Rural Credit System

- » 1955-1982: Establishing the SBI, nationalising banks, and creating NABARD built a formal framework.

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- » 1992-2015: The SHG-Bank Linkage, Kisan Credit Card (KCC), JAM trinity (PMJDY), and MUDRA schemes successfully expanded direct and affordable credit.
- » 2022 onwards: Digital initiatives such as the Jan Samarth Portal, e-KCC and others.

International Artificial Intelligence Alliance

China recently launched the World Artificial Intelligence Cooperation Organisation (WAICO) in Shanghai.

- » Concurrently, China's Moonshot AI introduced Kimi K3, a 2.8-trillion-parameter (highest in the world) open-weight AI model with 1-million-token context.

WAICO (HQ: Shanghai)

- » Genesis: Inter-governmental body formally established July 16, 2026.
- » Members: 29 nations, including Indonesia, Brazil, Malaysia, South Africa, Senegal, Russia and Pakistan. (India is not a member yet).
- » Core Objectives: To promote international AI cooperation, shape global AI regulation, ensure equitable Global South access.
- » Geopolitical Significance: Counterbalances US tech dominance by opposing the weaponization of national security constraints in global AI development and semiconductor trade.

Life Stream of Central India

Madhya Pradesh's Sleemanabad Tunnel, a key component of Bargi Diversion Project, is on the verge of completion.

- » Part of 197 km long Right Bank Main Canal, Sleemanabad Tunnel is India's longest underground water conveyance tunnel.
- » Tunnel will carry Narmada waters from Bargi reservoir to drought prone Vindhya region and Son basin through gravity flow.

Narmada River

- » Narmada is fifth largest river in India and its basin extends over states of Madhya Pradesh, Gujarat, Maharashtra, and Chhattisgarh.
- » Bounded by Vindhyas, Maikala range, Satpuras, and Arabian Sea.
- » Originates from Amarkantak in Maikal Hills in Madhya Pradesh and flows westward through rift valley.

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- » Tributaries: Tawa, Banjar, Dudhi, Hiran, Kolar etc.

Liver Metabolic Dysfunction Syndrome

The Central Drugs Standard Control Organisation (CDSCO) recently approved Novo Nordisk's weight loss drug Wegovy (semaglutide) for treating MASH.

- » It is the first and only GLP-1 receptor agonist therapy to be approved both globally and in India for the treatment of noncirrhotic MASH.

MASH

- » Formerly called NASH (Non-Alcoholic Steatohepatitis), it is an advanced, progressive form of fatty liver disease.
- » Mechanism: Caused by excess fat accumulation in liver cells, triggering chronic inflammation, scarring (fibrosis), and cell damage.
- » Health Impact: Untreated MASH can progress to cirrhosis, liver failure, liver cancer, or need for transplant.
- » Risk Factors: It is intrinsically linked to metabolic syndromes such as obesity, insulin resistance, and type-2 diabetes.
 - Often asymptomatic in early stages, leading to delayed diagnosis.

Meridional Plasma Transport in Sun

Indian researchers have shown that the slow movement of plasma (hot gases) from the Sun's equator to poles (known as meridional flow) continues much higher (nearly 3000 Km) into the Sun's atmosphere than previously known.

- » The new study helps in understanding space weather that affect satellites, communication systems, navigation networks and even power grids on Earth.

Meridional Flow

- » It acts like a giant conveyor belt, helping transport the Sun's magnetic fields across its surface.
- » It plays an important role in controlling the Sun's 11-year solar cycle, which influences the appearance of sunspots and other forms of solar activity.
- » The "Magnetic Tree" Hypothesis: The study strongly supports this long-standing hypothesis which proposes that magnetic structures extending high into the solar atmosphere remain structurally tied to deeper layers, much like the branches of a tree are connected to its trunk and roots.

Mexico: Regional DevelopmentsMexico (Capital: Mexico City)

A 7.3-magnitude earthquake struck the southern Mexican Pacific coast.

Political features

- » Land Boundaries: United States (North), Guatemala (Southeast), Belize (Southeast).
- » Maritime: Pacific Ocean (West), Gulf of Mexico and Caribbean Sea (East).
- » Mexico is a member of the United Nations, G20, OECD.

Geographical Features

- » Natural Resources: Silver (World's leading producer), Petroleum, antimony, copper, gold, lead, zinc, natural gas, timber.
- » Major mountain ranges: Sierra Madre.
- » Major rivers: Rio Grande, Usumacinta, and Grijalva.

Naval Multi-Mission Rotorcraft

The Indian Navy has received another MH-60R Seahawk multi-role naval helicopter from the United States.

- » India had signed a deal in 2020 to procure 24 MH-60R helicopters from the U.S. to replace the ageing Sea King fleet.

MH-60R Seahawk

- » Manufactured by Lockheed Martin under the U.S. Foreign Military Sales (FMS) programme.

Features:

- » MH-60R is among the world's most advanced shipborne helicopters.
- » It is designed primarily for anti-submarine warfare (ASW), anti-surface warfare (ASuW), search and rescue (SAR), medical evacuation (MEDEVAC) and vertical replenishment (VERTREP).
- » It is equipped with a dipping sonar, sonobuoys, a multi-mode radar, electro-optical sensors and Mk-54 lightweight torpedoes.
- » It can also carry AGM-114 Hellfire missiles and machine guns to engage surface threats.

NITI Aayog Business Environment Study

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Announced in the Union Budget 2025-26, the Index aims to strengthen the spirit of both competitive and cooperative federalism by encouraging states to adopt best practices and continuously improve their investment ecosystems.

Key Findings of the Report

- » Evaluation Framework: Evaluates all 28 States and 8 UTs across 84 indicators grouped under 8 pillars (refer infographic).

Performance Categories and Results: States are scored out of 100 and classified into four performance tiers:

- » Top Performers (Score > 50): Gujarat (Score 56.6), Maharashtra, Tamil Nadu, Goa and Odisha.
- » Frontrunners (Score 45–50): Delhi, Madhya Pradesh, Andhra Pradesh, etc.
- » Emerging Performers (Score 40–44.9): Bihar, Jammu & Kashmir, Punjab, etc.
- » Aspiring States (Score < 40): Arunachal Pradesh, Ladakh, Lakshadweep, etc.

Peer-Group Rankings (3 Categories):

- » Large States: Gujarat
- » Hilly and North-Eastern States: Uttarakhand
- » UTs and City States: Goa

Why Investments are Significant for Growth?

- » Historical Driver of Growth: Investments have accounted for over half of India's economic growth since the economic reforms of 1992.
- » Multiplier Effects: Capital investments stimulate industrialisation, drive innovation, build critical infrastructure, and generate large-scale employment.
- » The Economic Survey 2022-23 estimated that economic output can increase by at least four times the amount of capital expenditure incurred.

Significance of State-level Reforms for Private Capital Flow

- » Jurisdiction over Key Inputs: Such as industrial land allotment, labour regulations, and utility access fall strictly under state governance.
- » Approval and Clearance Timelines: Implementing centralised single-window portals drastically reduces business setup times, replacing bureaucratic delays with predictable, fast-track approvals.



- » Fiscal and Infrastructure Enablers: States influence location decisions by offering targeted incentives like capital subsidies and developing robust local logistics, transport, and energy networks.

Smart Railway Station Initiative

The Prime Minister inaugurated 75 newly redeveloped railway stations across India under the Amrit Bharat Station Scheme.

Amrit Bharat Station Scheme

- » Nodal Ministry: The Ministry of Railways.
- » Core Aim: Envisions the holistic transformation of railway stations through a phased, long-term master planning approach.
 - Focuses on upgrading passenger amenities, improving station façades, and integrating stations smoothly with surrounding urban city centres.

Key Features:

- » Incorporates local cultural heritage, art, and traditional architecture into the design profiles of newly upgraded buildings.
- » Elevates accessibility by integrating standard Divyangjan-friendly facilities.
- » Promotes indigenous local crafts and regional economies by establishing dedicated 'One Station One Product' display and sale kiosks.

AI-Powered Autonomous Agents

Recent advances in Artificial Intelligence (AI) are moving beyond digital applications toward Embodied AI.

Embodied AI

- » It refers to the integration of artificial intelligence into physical systems, enabling them to interact with the physical world.
- » These systems can include general-purpose robots, humanoid robots, autonomous vehicles (AVs), and even factories and warehouse facilities.
- » The fusion of machine learning, sensors, and computer vision lets these systems perceive, reason, and act in real-world environments.
- » Unlike the AI chatbots that learn from texts, images, and videos, embodied AI must master gravity and balance, which are profoundly difficult.



Categorized Operational Assets

The RBI has notified the Third Amendment Directions, 2026 to establish a framework for the acquisition, valuation, management, and disposal of Specified Non-Financial Assets (SNFAs) by banks.

Specified Non-Financial Assets (SNFAs)

- » They are immovable properties acquired by banks from defaulting borrowers in settlement of outstanding loans.
- » They include: Residential properties, Commercial buildings etc.

Key Directions

- » Banks can acquire SNFAs only after a loan is classified as a Non-Performing Asset (NPA).
 - NPA is any advance or loan that is overdue for more than 90 days.
- » Acquisition must be through full or partial settlement of the outstanding loan.

Electronic Bullion Receipts

National Stock Exchange of India (NSE) introduced Electronic Gold Receipts (EGRs).

Electronic Gold Receipts (EGRs)

- » They are SEBI-regulated, exchange-traded securities that represent ownership of standardized physical gold stored in accredited vaults.
- » They represent gold ownership, tradable on exchanges like stocks and bonds, backed by physical gold that can be redeemed anytime.

Key Benefits

- » Transparent market-based pricing ("One Nation, One Price")
- » Easy buying and selling through stock exchanges.
- » Safe, secure, and convenient alternative to physical gold.

Global Life Sciences Olympiad 2026

The Indian Team won 1 Gold and 3 Silver Medals at the 37th International Biology Olympiad 2026 in Vilnius, Lithuania.

International Biology Olympiad 2026

- » It is the world's leading biology competition for high school students, held each year.
- » The inaugural event took place in 1989.

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- » Participation: 307 students from 78 countries
- » Medallists: Bhavyaa Gunwal (Gold), Soumil Maity (Silver), Nishit Kalani (Silver), Anmol Kumar (Silver).
- » Also India performed exceptionally well at the 58th International Chemistry Olympiad (IChO) 2026 held in Tashkent, Uzbekistan with four gold medals.

GPS-Enabled Content Marking

The Chhattisgarh government is using geotagging of river origin points to tackle river pollution.

Geotagging

- » It is the process of adding geographic location data to a photo's metadata.
- » The location data includes latitude, longitude, and sometimes altitude.

Use in controlling river pollution

- » Identifies the exact location of river source points using GPS.
- » Maps the source on the PM Gati Shakti platform for digital monitoring and planning.
- » Helps authorities monitor and protect river origins from encroachment, deforestation, pollution, and illegal activities.
- » Enables scientific planning of restoration measures such as catchment treatment, afforestation, desiltation etc.

Human-Relevant Testing Techniques

Also called New Approach Methodologies (NAMs), they are innovative testing methods and strategies used to assess the safety, efficacy, and quality of drugs.

- » To achieve India's \$500 billion pharma target by 2047, NAMs can be key to transitioning from a generics-based industry to a global hub for drug discovery and innovation.

Types of NAMs

Biological Models (In Vitro & Ex Vivo):

- » Organ-on-Chip: 3D chips created from human cells mimicking human organs. E.g. lung-on-a-chip
- » Organoids: Miniature, lab-grown human organs (e.g., liver, intestine) created from stem cells that mimic real organ functions. E.g. pivotal in proving that Zika virus causes microcephaly

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- » Human blood cell-based assays: E.g. replacing the rabbit pyrogen test (to detect fever-causing contaminants)

Computational (In Silico Models)

- » AI and Computer Modelling: Predict drug toxicity, efficacy and interactions.
- » E.g. Using recordings of human heart activity to test for arrhythmias, screening out dangerous compounds earlier.

Significance of NAMs

- » Reduced Attrition Rates: Traditional animal testing poorly predicts human responses, with only 10–14% of Phase I drug candidates ultimately approved.
- » Biological Precision: E.g., brain organoids linked the Zika virus to microcephaly, a discovery not possible in animal models due to brain differences.
- » Reduced Time and Cost: Recent report suggests NAMs can cut drug development timelines by more than half and reduce costs by ~70-90% in India.
- » Global Competitiveness: As regulators in the U.S., EU, and Japan establish national centers for NAMs, India's early adoption ensures it remains competitive.
- » Under India's New Drugs and Clinical Trials (Amendment) Rules, 2023, authorized use of human-relevant, non-animal testing methods for evaluating drug safety and efficacy.

Ethical issues in Animal testing

- » Animal Suffering: Millions of animals like rats, dogs are subjected to fear and pain in experiments. Concerns regarding humane and compassionate treatment and animal rights.
- » Categorical Imperative (Kant): Act only on principles that can be universally applied without contradiction. It asks can every single person be subjected to same treatment without society collapsing?
- » Speciesism: Coined by Peter Singer, it refers to human superiority-based exploitation of animals; critics argue discrimination against sentient animals is as unethical as racism or sexism.
- » Utilitarian Dilemma: Animal testing is justified only if human benefits (e.g., life-saving drugs) outweigh animal suffering; not for non-essential products like cosmetics.

International Fighter Tactics Exercise

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Indian Air Force (IAF) to start Exercise Pitch Black 2026 at Royal Australian Air Force (RAAF) Base, Darwin.

Pitch Black

- » It is the RAAF's premier biennial multinational air combat exercise.
 - Derives its name from its emphasis on night flying over large unpopulated northern Australian regions.
- » Aim: enhance multinational interoperability, strengthen professional partnerships etc.
- » Bilateral exercises between India and Australia: Austrahind (India-Australia army), Ausindex (India-Australian Navy) etc.

International Football Cup 2026

Spain beat Argentina (1-0) in the FIFA World Cup 2026 Final held at MetLife Stadium in New Jersey (USA).

- » This is Spain's second FIFA World Cup title (first 2010).
- » Awards: Rodri (Spain)- Golden Ball, Kylian Mbappe (France)- Golden Boot (10 goals), Unai Simon (Spain)- Golden Glove, Pau Cubarsi (Spain)- FIFA Best Young Player Award.

FIFA World Cup 2026 (23rd edition (men's))

Historic Expanded Format

- » Tri-Host Countries: For the first time in World Cup history, the tournament is co-hosted by three sovereign nations: Canada, Mexico, and the United States.
- » Expanded Teams: Features a record 48 nations (up from 32 teams in previous editions), divided into 12 groups of four teams each.
- » India has only qualified for the FIFA World Cup once (1950 in Brazil), but ultimately did not participate.

National Lipid Risk Assessment

ICMR study revealed that 87.3% of Indian adults have at least one abnormal lipid level, making dyslipidaemia one of India's most widespread health problems.

- » Low HDL was the most common abnormality, followed by elevated LDL, high triglycerides, and high total cholesterol.

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Key terms

- » Lipid: A group of Water-insoluble organic compounds (fats, oils, cholesterol).
- » Dyslipidemia: An unhealthy balance of fats in the blood that increases risk of heart disease/stroke.
- » Cholesterol: A waxy, fat-like substance found in all cells; synthesized primarily by the liver, but also absorbed from animal-based foods. (helps make Vitamin-D)
- » HDL (High-Density Lipoprotein): Good cholesterol- returns excess cholesterol to liver.
- » LDL (Low-Density Lipoprotein): Bad Cholesterol- excess deposits cholesterol in cells, causing arterial plaque buildup.
- » Triglycerides: Most common type of fat in the body; from dietary fat/excess calories, stored and used for energy.

North Bihar River Link Project

Bihar Chief Minister inaugurated a 68-km Belwa-Minapur link channel which is part of the Bagmati-Budhi Gandak River Interlinking Project.

- » It is Bihar's first operational intrastate river-interlinking project.

Bagmati-Budhi Gandak River Interlinking Project

- » Purpose: To divert part of the floodwaters of the Bagmati River into the Burhi Gandak River through the Belwadhar channel for flood moderation in North Bihar.
- » Connecting Points: Originates at Belwa (Sheohar District) and terminates in Minapur Block (Muzaffarpur District).
- » Source River: Bagmati River (diverts excess monsoon discharge) to Burhi Gandak River.
 - Bagmati river originates in Shivapuri range in Nepal- tributary of kosi.
 - Burhi Gandak River: tributary of Ganga and originate from chautarwa chaur, Bihar.

Private Orbital Launch Breakthrough

It is developed by Skyroot Aerospace under Mission Aagaman and demonstrated India's capability for commercial, on-demand satellite launches by the private sector.



- » India became the third country, after the United States and China, to have launching capabilities in the private sector.

Vikram-1

- » Fully designed and manufactured in India.
- » Capability: Small Satellite deployment (up to 350 kg into Low Earth Orbit (LEO) or up to 260 kg to Sun-Synchronous Orbit (SSO))

Features:

- » All-carbon composite structure.
- » 4-stage rocket with 3 solid stages and a liquid stage.
- » 3D-printed liquid-fuel engine.
- » Autonomous Guidance, Navigation and Control (GNC) system powered by the Ramanujan mission computer.
- » Mission Payload: SCOPE (Skyroot), Drishti (DCUBED technology demonstrator), SOLARAS S3 (Grahaa Space), Embrace (Cosmo serve) robotic arm for space debris capture.
- » Symbolic payloads: Cosmic Bloom (floral-shaped artwork); gold micro-rocket with sculptures of C. V. Raman, Vikram Sarabhai and A. P. J. Abdul Kalam.

Status of India's Space Sector

- » India accounts for only ~2% of the global space economy.
- » The number of space startups has increased from just 1 in 2014 to nearly 400 (2026).
- » India's space economy is currently valued at around USD 8.4 billion and is projected to grow to USD 40–45 billion over the next decade. It is further aimed to reach USD 100 billion by 2040.

Taxation Harmonization Agreement

India tightened its DTAA with Sri Lanka by bringing into force Principal Purpose Test (PPT).

- » PPT: An anti-avoidance rule that allows authorities to examine the commercial purpose of cross-border arrangements before granting treaty benefits.
- » Amendment: treaty benefits may be denied if obtaining those benefits was one of the principal purposes of the transaction.

DTAA

- » It is an agreement between India and other countries to avoid double taxation, ensure the exchange of tax-related information, and facilitate tax recovery, Promote trade and investment
- » Applicability: If the provisions of the DTAA are more beneficial than those in the Income-tax Act, the DTAA provisions will apply.
 - However, provisions under the General Anti-Avoidance Rule (GAAR) will override beneficial DTAA provisions

Tribal Rights in Development Policy

The 'Chita Andolan' (Pyre Protest) launched by tribal communities against the Ken-Betwa Link Project (KBLP) in Chhatarpur, Madhya Pradesh highlighted Economic development versus Tribal Rights debate.

The Issues of Tribal Right vs. Development

- » Displacement: Loss of land, forests, and traditional livelihoods due to dams and infrastructure projects.
 - While making up roughly 8% of the total population, they represent 40 to 50% of all people displaced by such projects.
- » Rehabilitation Concerns: Delays, inadequate compensation, and weak implementation of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR Act).
- » Forest Rights: Concerns over violation of Forest Rights Act (FRA), 2006 and inadequate recognition of community forest rights.
- » Consultation: Participation of Gram Sabhas in project decisions.
- » Other: Loss of biodiversity and cultural heritage, Resource Curse as tribal regions are rich in minerals resources, remain poor and subjected to atrocities.

Ethical Aspects of Tribal Right vs Development

- » Welfare vs. Development: Ignore tribal welfare in the name of economic development can lead to notion of alienation.
- » Human Dignity: Balancing national development goals with constitutional and human rights of indigenous communities.



- » Intergenerational Equity: Conserving natural resources for future generations while meeting present developmental needs.

For inclusive development we need to Ensure Free, Prior and Informed Consent (FPIC), effective implementation of FRA, 2006, PESA, 1996, and LARR Act, 2013 with transparent Social and Environmental Impact Assessments.

Empowering Indian Philanthropy

Social sector leaders called for building an “Atmanirbhar Philanthropy Ecosystem”, highlighting that domestic philanthropy has overtaken foreign funding as the main driver of social development.

Building an Atmanirbhar Philanthropy Ecosystem

What it is?

- » Philanthropy is the practice of voluntarily donating private resources—including financial capital, time, expertise, and governance—to advance the public good and address systemic social challenges.
- » Building an “Atmanirbhar” (self-reliant) philanthropy ecosystem means transitioning India away from historical reliance on international developmental aid toward a self-sustaining framework financed, led, and owned by domestic entrepreneurs, corporate entities, and ordinary citizens.

Key Features and Ethical Principles Behind Philanthropy:

- » Stewardship of Wealth: Viewing private capital accumulation not as personal property, but as a public trust to be used for the welfare of society.
- » National Ownership and Accountability: Ensuring that domestic citizens fund local social challenges, bringing direct governance, volunteerism, and local context to non-profit efforts.
- » Transparency and Governance: Operating with high standards of compliance and institutional trust, ensuring that non-profits earn public and investor confidence.
- » Democratization of Giving: Expanding participation beyond high-net-worth individuals so that everyday retail givers can contribute through modern digital rails.



- » Catalytic and Long-Term Capital: Providing patient, risk-tolerant funding for social innovation, research, and institutional capacity building that outlasts short-term market cycles.

The Rise of Domestic Giving:

- » Dominance of Domestic Private Capital: Domestic private giving now exceeds ₹1.18 lakh crore annually, making it more than five times larger than annual foreign philanthropic contributions.
- » Accelerated Family Philanthropy: Family philanthropy is growing at double-digit rates, driven by a new generation of wealth creators who integrate social giving into core business stewardship.
- » CSR as a Major Capital Pillar: Corporate Social Responsibility (CSR) has matured into a structural source of developmental funding, channeling over ₹40,000 crore per year into education, healthcare, and rural livelihoods.
- » Mass Digital Payment Infrastructure: The rapid spread of over 220 million demat accounts, systematic investment plans (SIPs), and Unified Payments Interface (UPI) networks provides the infrastructure for retail public giving.
- » FCRA Realities vs. Perceptions: While active Foreign Contribution (Regulation) Act (FCRA) registrations stand at around 14,500 out of six lakh voluntary organizations on NITI Aayog's NGO Darpan, total foreign contributions doubled from ₹10,000 crore to ₹22,000 crore over the decade.

Key Challenges Associated with the Sector:

- » Friction in Regulatory Compliance: Administrative delays in FCRA renewals, long processing times, or cancellations have disrupted legitimate development work in rural healthcare and education.
- » Uneven Governance and Institutional Readiness: Many voluntary organizations lack modern documentation systems, financial accounting capabilities, or compliance management, leading to regulatory scrutiny.
- » HNWI Giving Lagging Behind Wealth Growth: Giving among India's fast-growing High-Net-Worth Individual (HNWI) community has lagged behind their rate of wealth accumulation.
- » Restricted Tax Incentives Under Section 80G: Tax deductions under Section 80G are generally restricted to 50% of donations and capped at 10% of adjusted gross total income, failing to send a strong policy signal for philanthropic giving.

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- » **Illiquid Asset Donation Barriers:** First-generation entrepreneurs hold most of their wealth in company equity rather than cash, but regulatory frameworks for donating appreciated listed shares to charities remain underdeveloped.

Way Forward:

- » **Reforming FCRA Administration Toward Risk-Based Supervision:** Implement administrative improvements under FCRA 2.0—such as deficiency notices, fixed correction windows, and an independent appellate body—to punish fraud without penalizing minor administrative slips.
- » **Modernizing Tax Incentives Under Section 80G:** Raise 80G tax deductions from 50% to 100% and elevate the overall income ceiling to 25% to align tax policy with national development goals.
- » **Enabling Share-Donation Frameworks for Entrepreneurs:** Establish clear legal channels allowing founders to donate appreciated listed shares to charities with a 1-to-3-year structured sales window.
- » **Leveraging the Social Stock Exchange (SSE):** Operationalize the SSE as a trusted national platform to connect credible non-profits with retail donors through standardized impact reporting.
- » **Promoting Retail Micro-Donations via Digital Payments:** Leverage UPI and recurring digital payment platforms to encourage millions of households to contribute small monthly amounts (₹100–₹1,000) to verified social causes.

Conclusion:

India's philanthropic landscape has reached an important turning point, with domestic private capital stepping up as the main driver of social development. While foreign funding will continue to support research and innovation, building a self-reliant philanthropy ecosystem ensures that long-term social progress is led and sustained by Indian resources. Ultimately, simplifying regulations and encouraging domestic giving will turn financial wealth into public ownership and strengthen the national social contract.

Ethical Growth Index

NSE Indices Limited, in collaboration with the Ahimsa Foundation, launched the Nifty500 Ahimsa Index.



- » It tracks 326 companies from the Nifty 500 that follow Ahimsa (non-violence towards animals)

The Nifty500 Ahimsa Index

What It Is?

- » The Nifty500 Ahimsa Index is India's first specialized, rules-based equity index designed specifically to screen and track companies free from animal cruelty. It offers ethical investors a structured way to direct capital away from industries that cause harm to animals.

Launched By: Created by NSE Indices Limited in strategic partnership with the Ahimsagain Foundation, utilizing the foundation's proprietary Ahimsa Investment Movement (AIM) screening framework.

Aim: To provide retail and institutional investors with a transparent benchmark that aligns financial portfolios with compassion and ethical values, while serving as an underlying asset base for passive investment products like Mutual Funds, Exchange-Traded Funds (ETFs), and index funds.

Key Features of the Index:

- » **The AIM Banding Framework:** Evaluates the products, services, and operational models of Nifty 500 companies, categorizing them into Green (fully aligned), Orange (partially aligned), and Red (non-compliant) bands. Only Green-band companies qualify for inclusion.
- » **Selective Sector Inclusions:** Heavily features top-performing Information Technology (IT) service providers, software exporters, automobile manufacturers, capital goods firms, and telecommunications leaders.
- » **Strict Sector Exclusions:** Excludes companies involved in meat, dairy, poultry, leather, cosmetics, fashion using wool/leather, and pharmaceutical firms engaging in animal testing.
- » **Exclusion of Financial Services & Reliance Group:** Notably excludes all commercial banks and major Non-Banking Financial Companies (NBFCs) due to their financing of non-compliant sectors, as well as almost all Reliance Group entities.



- » Free-Float Market Capitalization Weighting: Base-dated to April 1, 2016 (with a base value of 1,000), weighted by free-float market capitalization, and reconstituted on a semi-annual basis.

Significance:

- » Expands Ethical Investing: Goes beyond traditional ESG by adding animal welfare and non-violence as investment screening criteria.
- » Promotes Values-Based Investing: Encourages ethical investment products and supports growing demand from socially conscious investors.

Future of Indian Banknotes

The Reserve Bank of India's (RBI) currency printing subsidiary—Bharatiya Reserve Bank Note Mudran Private Limited—invited global Expressions of Interest (EoI) for supplying opacified polymer substrate sheets with embedded security features.

Polymer Banknotes in India

What it is?

- » Polymer or plastic banknotes are currency notes manufactured using specialized biaxially oriented polypropylene (BOPP) rather than traditional cotton-rag paper. Over 60 countries worldwide—led by Australia, which pioneered a complete series three decades ago—use polymer currency in some form.
- » Designed primarily to modernize cash management, polymer notes offer enhanced physical durability, superior resistance to dirt and moisture, advanced anti-counterfeiting features, and longer circulation lifespans.

Key Data and Statistics on India's Currency System:

- » Durability Advantage: Polymer banknotes last 2.5 to 4 times longer in active circulation than traditional cotton-paper notes.
- » Manufacturing Cost Differential: Polymer notes cost 30% to 60% more to produce initially compared to paper banknotes, which can account for 20–24% of the face value for low-denomination notes.
- » Digital Expansion vs. Cash Growth: The Unified Payments Interface (UPI) processes over 24,000 crore transactions annually (accounting for 85% of retail digital payments), yet the Currency-to-GDP ratio remains above 11%.
- » Polymer Import Exposure: India relies on foreign imports for roughly 20% (one-fifth) of its domestic polypropylene consumption.



Advantages of Polymer Banknotes:

- » **Significantly Extended Lifespan:** Because they do not absorb moisture, sweat, or oils, polymer notes resist tearing and remain clean far longer, especially in low-denomination high-frequency notes like ₹10 and ₹20.
- » **Reduced Long-Term Replacement Costs:** Decreasing the frequency of note replacements lowers long-term manufacturing, transportation, and destruction costs for central authorities.
- » **Enhanced Anti-Counterfeiting Security:** Polymer substrates allow complex security features like see-through windows, color-shifting inks, and intricate metallic overlays that are difficult to replicate.
- **Lower Overall Environmental Footprint over Time:** A study by TERI found that fewer total manufacturing cycles and reduced transport trips give polymer notes a smaller lifetime carbon footprint than paper notes, despite higher initial production impacts.

Key Challenges and Concerns Associated with Plastic Currency:

- » **High Initial Production Costs:** Polymer notes require expensive, specialized substrates and anti-counterfeiting technology, raising costs significantly—especially for lower denominations where printing cost can rival face value.
- » **Petrochemical and Crude Price Vulnerability:** Being derived from polypropylene, polymer note production costs are directly exposed to global crude oil price swings and West Asian supply disruptions.
- » **Infrastructure Recalibration Expenses:** Rolling out polymer currency requires expensive modifications to ATMs, sorting hardware, and vending mechanisms across commercial banks and logistics firms.
- » **The Currency Demand Paradox:** Investing heavily in physical cash infrastructure comes at a time when digital transactions via UPI and the Central Bank Digital Currency (e-Rupee) are rapidly reducing relative cash dependency.

Way Forward:

- » **Conducting Targeted Phased Pilots on Low Denominations:** Limit initial polymer rollouts strictly to ₹10 and ₹20 notes in regions with diverse climatic conditions to verify actual lifecycle cost-savings.



- » Expanding Domestic Polypropylene Refining Capacity: Accelerate domestic polypropylene production through key public and private refiners to reduce reliance on imported substrates.
- » Establishing Closed-Loop Recycling Infrastructure: Build specialized recycling systems to melt down retired polymer notes into industrial plastic products, minimizing environmental waste.
- » Balancing Physical Currency and Digital Payments: Align cash production with the expansion of the digital rupee and UPI to ensure cost-effective currency management.

Conclusion:

The RBI's renewed push for polymer currency represents a pragmatic step toward building a cleaner, more durable cash ecosystem for an economy with over ₹41 lakh crore in circulation. While high initial production costs and petrochemical import dependencies pose real challenges, the substantial lifecycle savings on low-denomination notes make a strong economic case. Ultimately, balancing physical polymer currency with rapid digital adoption will ensure India maintains an efficient, secure, and future-ready monetary framework.

Hyper Glide Express

Scientific and industrial interest in magnetic levitation (maglev) technology has re-emerged in global transportation news as countries seek friction-free, ultra-high-speed rail solutions.

Maglev Trains

What It Is?

- » Maglev (a portmanteau of magnetic levitation) is an advanced high-speed rail transportation system. Instead of relying on traditional mechanical wheels, axles, and steel tracks, maglev trains use powerful, computer-controlled magnetic fields to suspend the train body above a specialized guideway and propel it forward.

How It Works?

- » Levitation (Lifting the Train): Because the electromagnetic force is approximately 1039 times stronger than Earth's gravity, magnetic fields easily lift heavy train cars (weighing 150 to 500 tonnes) off the ground.

- Electromagnetic Suspension (EMS): Used in systems like the *Shanghai Maglev*. Wrap-around C-shaped train arms exert attractive magnetic forces upward toward the steel underside of the guideway, levitating the train about 10 mm above the track.
- Electrodynamic Suspension (EDS): Used in Japan's *SCMAGLEV*. Superconducting magnets cooled to cryogenic temperatures induce electric currents inside track coils as the train moves, creating repulsive magnetic forces that hover the train 100 mm above the track.
- » Propulsion (Moving Forward): The track walls are lined with linear electric motor coils carrying an alternating current (AC). This AC continually flips the magnetic poles along the track. The train's magnets are attracted to opposite poles ahead and repelled by identical poles behind, pulling and pushing the vehicle forward. Increasing the frequency of the AC increases the train's speed.
- » Lateral Guidance & Braking: Side-mounted magnets counteract lateral drift, keeping the train centered along the guideway. To stop, the AC direction is reversed (regenerative braking). Emergency systems use friction pads or deploy auxiliary mechanical wheels.

Key Features of Maglev Systems:

- » Zero Rolling Friction: Eliminating physical wheel-on-rail contact removes mechanical friction, allowing for near-silent operation and lower structural wear-and-tear.
- » Extreme Operational Speeds: Easily exceeds 400 km/hr in commercial service (e.g., Shanghai's 431 km/hr service) and holds experimental rail world records up to 603 km/hr (Japan's SCMAGLEV).
- » Weather-Resistant Reliability: Because the vehicle hovers, operations remain unaffected by surface hazards such as heavy rain, snow, or ice.
- » Virtually Impossible Derailment: The train structure physically wraps around the guideway, making derailments nearly impossible even during severe seismic events.
- » High Infrastructure Costs: Requires dedicated, precision-engineered guideways with embedded electromagnets. They cannot run on existing standard-gauge railway tracks.



Applications Beyond High-Speed Trains:

- » Precision Factory Automation: Used in cleanroom environments, semiconductor chip manufacturing, and medical packaging to move components rapidly without dust-generating mechanical friction.
- » Industrial Turbines & Bearings: High-speed compressors and energy flywheel systems use active magnetic bearings (AMBs) to suspend rotating shafts, removing mechanical friction and eliminating the need for oil lubricants.
- » EMALS Aircraft Launch Systems: Modern military aircraft carriers (such as the Electromagnetic Aircraft Launch System or EMALS) use linear induction motors derived from maglev propulsion to launch heavy fighter jets off short runways.
- » Scientific Research: High-field magnets generate diamagnetic levitation to suspend liquids, biological cell cultures, and microgravity experiments on Earth without physical contact.

India's Dengue Shield

The Central Drugs Standard Control Organisation (CDSCO) granted official marketing authorization for Qdenga, approving India's first-ever dengue vaccine.

India's First Approved Dengue Vaccine (Qdenga)

What It Is?

- » Qdenga is a live, attenuated tetravalent dengue vaccine engineered using recombinant DNA technology. It uses a dengue virus type-2 backbone into which genes encoding surface proteins from the other three dengue serotypes are inserted. This structure provides balanced protection against all four dengue virus strains (DEN-1, DEN-2, DEN-3, and DEN-4).

Developed and Imported By:

- » Manufacturer: Developed and manufactured by Takeda GmbH, Germany.
- » Indian Importer: Imported and distributed locally by M/s Takeda Biopharmaceuticals India Pvt. Ltd.

Key Features of Qdenga:

- » Target Age Group: Indicated for the prevention of dengue disease in individuals between 4 and 60 years of age.



- » Two-Dose Immunization Schedule: Administered as a 0.5ml subcutaneous injection in a two-dose regimen given three months apart (at month 0 and month 3).
- » Global Regulatory Credentials: Possesses World Health Organization (WHO) prequalification and approval in over 42 countries, including the European Union, the UK, Indonesia, and Thailand, backed by over 24 million doses distributed globally.
- » Proven Indian Phase III Validation: Regulatory approval followed a successful pivotal Phase III trial in India, confirming high immunogenicity and safety across diverse Indian populations.

The CDSCO:

What It Is?

- » The Central Drugs Standard Control Organisation (CDSCO) is the national regulatory authority of India for pharmaceuticals, medical devices, and cosmetics. It operates under the Directorate General of Health Services within the Ministry of Health and Family Welfare.

Established In: Headquartered in New Delhi, the CDSCO derives its statutory authority from the Drugs and Cosmetics Act of 1940 and the Drugs Rules of 1945.

Key Functions:

- » Approval of New Drugs and Vaccines: Scientific evaluation and market licensing of new drugs, biologicals, and vaccines before commercial release in India.
- » Control Over Drug Imports: Grants licenses to import active pharmaceutical ingredients (APIs), finished formulations, and high-risk medical devices, ensuring compliance with Indian quality standards.
- » Clinical Trial Governance: Regulates, approves, and monitors all phases of clinical trials conducted across India to protect participant safety.
- » Standardization and Quality Surveillance: Coordinates with State Licensing Authorities (SLAs) to enforce uniform drug quality under the Drugs and Cosmetics Act, taking action against sub-standard or spurious medications.

Karlapat Mineral Reserve



India's top industrial giants—including Adani, Reliance Industries, Hindalco, Vedanta, Powercem, and Coal India—are competing to acquire the Karlapat bauxite block in Odisha.

The Karlapat Bauxite Block

What It Is?

- » The Karlapat-Pollingpadar block is one of India's largest unallotted, greenfield (previously unmined) bauxite deposits. Bauxite serves as the primary commercial ore required to produce alumina, which is then smelted into aluminium metal.

Location:

- » District: Kalahandi district, Odisha.
- » Geographic Belt: Situated within the mineral-dense Eastern Ghats Mobile Belt, known for hosting the East Coast Bauxite deposits.
- » Environmental Context: Located adjacent to the Karlapat Wildlife Sanctuary, an ecologically sensitive zone and elephant corridor.

Geological Formation:

- » Parent Rock weathering: The deposit formed through the in-situ chemical weathering (lateritization) of pre-existing Precambrian rocks—specifically khondalites (garnet-sillimanite-graphite gneisses) and charnockites.
- » Plateau Capping: The ore occurs as a gently undulating lateritic blanket capping high-altitude plateaus at elevations between 900 to 1,400 meters above mean sea level.

Mineral Potential and Ore Quality:

- » Resource Scale: Holds an estimated total resource of 207 to 220 million tonnes (including 153 million tonnes of proved reserves and 54 million tonnes of possible reserves).
- » Alumina Grade (Al_2O_3): Features an alumina content of approximately 45.2% to 47%, consisting predominantly of gibbsite.
- » Low Reactive Silica (SiO_2): Contains low reactive silica levels, which significantly reduces caustic soda consumption and energy costs during processing.

Key Features:



- » **Substantial Ore Thickness:** The deposit spans a plateau area of about 9.6 square kilometers (spanning over 3,100 hectares) with an average ore bed thickness of nearly 12 to 15 meters.
- » **Bayer Process Efficiency:** Due to its gibbsitic mineralogy, the ore allows low-temperature and low-pressure alumina extraction via the Bayer process.
- » **Uncommitted Greenfield Status:** Unlike other major regional deposits (such as Panchpatmali or Baphilimali) that are already tied to specific industrial plants, Karlapat remains one of the last major unassigned reserves capable of anchor-funding a new world-scale refinery.
- » **Boundary Rationalization:** The block's re-auction follows legal delays and boundary adjustments around the adjacent wildlife sanctuary.

Significance:

- » **Supports Aluminium Expansion:** Secures long-term bauxite supply for major aluminium expansion projects, strengthening domestic production.
- » **Strengthens Odisha's Resource Hub:** Reinforces Odisha's position as India's leading bauxite and aluminium hub, supporting EVs, infrastructure, aerospace, and manufacturing.

Nation's Economic Core Index

The Union Government released an updated series of the Index of Core Industries (ICI), introducing a revised base year of 2022–23 (replacing 2011–12).

The Updated Index of Core Industries (ICI)

What It Is?

- » The Index of Core Industries (ICI) is a monthly production volume index that measures the combined performance of key infrastructure-supportive core sectors in India. It acts as a high-frequency lead indicator for the broader Index of Industrial Production (IIP), in which these core sectors hold a significant combined weightage.

Published By: The index is compiled and published monthly by the Office of Economic Adviser (OEA), Department for Promotion of Industry and Internal Trade (DPIIT), under the Ministry of Commerce and Industry.

Aim: The revision aims to align the core sector gauge with structural shifts, modern consumption patterns, and updated macroeconomic metrics—including national

accounts (GDP/GVA), the Consumer Price Index (CPI), and the IIP—offering a more accurate view of contemporary industrial activity.

Key Changes in the Updated Series:

- » Base Year Update: Updated to 2022–23=100 from the outdated 2011–12 base year, better reflecting present-day manufacturing and industrial dynamics.
- » Expansion to Nine Sectors: Expanded from 8 to 9 core industries through the addition of Iron Ore. Iron ore was added due to its critical role as an industrial input, receiving a weight of 4.905%.
- » Gross Steel Production Accounting: Replaced the previous net production metric for steel with gross production data, establishing procedural consistency with the IIP framework.
- » Elimination of Double-Counting in Coal: Narrowed the coal index to track raw coal exclusively, excluding coal middlings and washed coal since both are derived from raw coal.
- » Significant Weight Redistribution: Rebalanced sector weights using pro-rata distributions derived from the 2022–23 IIP series:
 - Electricity: Gained significant weightage, becoming the largest sector at 30.932% (up from 19.85%).
 - Refinery Products: Decreased to 22.572% (down from 28.04%).
 - Coal & Natural Gas: Reduced to 5.596% (from 10.33%) and 3.841% (from 6.88%), respectively.
 - Fertilizers: Slightly increased to 2.731% (from 2.63%).

Significance:

- » Updating the base year to 2022–23 improves the accuracy of industrial output and economic assessment.
- » Aligns the ICI with IIP, GDP, WPI, and Producer Price Indices, supporting better economic and policy decisions.

PARIVARTAN: Pathway to Change

Delhi cabinet approved implementation of Central scheme PARIVARTAN (Programme for Accelerated Renewal and Incentivization of Vehicle Assets for Reducing Transport Air Pollution and Network Emissions).

General Studies, Political Science and International Relations, Sociology, CSAT



PARIVARTAN Scheme

- » Implementing Ministry: Ministry of Road Transport and Highways (MoRTH).
- » Objective: It seeks to phase out ageing, polluting trucks and buses and replace them with vehicles meeting BS-VI emission standards or electric vehicles (EVs).
- » Benefits: Owners replacing BS-IV or older goods vehicles and purchasing new BS-VI compliant or electric goods vehicles will receive 100% motor vehicle tax exemption for 10 years, full waiver of registration fees, five percent interest subsidy, eight percent discount from OEM etc.

Qdenga Dengue Vaccine

Central Drugs Standard Control Organisation (CDSCO) approved India's first dengue vaccine, Qdenga.

- » Dengue is a viral infection caused by the dengue virus (DENV), which is transmitted to humans through the bite of infected mosquitoes.

Qdenga

- » It is a live, attenuated tetravalent dengue vaccine developed using recombinant DNA technology by Takeda GmbH, Germany.
 - Recombinant DNA technology can be used to combine (or splice) DNA from different species or to create genes with new functions.
- » Manufactured in Vero cells using a DENV-2 backbone containing genetically modified organisms (GMOs).
- » Received World Health Organization (WHO) prequalification.

Samriddhi Yojana

The Delhi Cabinet approved the implementation of the Centre's 'Parivartan' scheme to replace old commercial vehicles with BS-VI-compliant and electric vehicles (EVs).

The Parivartan Scheme

What It Is?

- » Parivartan (Programme for Accelerated Renewal and Incentivisation of Vehicle Assets for Reducing Transport Air Pollution and Network Emission) is a Central Government scheme that promotes the replacement of old, polluting commercial

vehicles with BS-VI-compliant or electric vehicles (EVs) through financial incentives.

Aim: To phase out ageing commercial vehicles, reduce transport-related air pollution, accelerate clean mobility, and modernize India's commercial transport fleet.

Key Features:

- » **Financial Incentives:** Provides motor vehicle tax exemptions, registration fee waivers, interest subsidies, OEM discounts, and fuel voucher benefits for eligible vehicle replacements.
- » **Coverage of Commercial Vehicles:** Covers Light Goods Vehicles (LGVs), Medium Goods Vehicles (MGVs), Heavy Goods Vehicles (HGVs), and buses meeting eligibility criteria.
- » **Promotion of Clean Mobility:** Mandates electric LGVs and BS-VI CNG or electric buses for replacement under the scheme in Delhi.
- » **Scrappage & Tax Relief:** Offers relief from pending road tax and fitness penalties for eligible scrapped vehicles, with flexibility to sell BS-IV vehicles in eligible non-NCAP cities outside NCR.

Significance:

- » Accelerates replacement of ageing commercial vehicles with cleaner alternatives, improving urban air quality.
- » Promotes cleaner transport, strengthens the Delhi EV Policy 2026, and advances sustainable urban mobility.

Seamless Savings Initiative

The Employees' Provident Fund Organisation (EPFO) announced its upcoming EPFO 3.0 reform phase, moving beyond the claims-focused EPFO 2.0 framework.

The EPFO 3.0 Reforms

What It Is?

- » EPFO 3.0 represents the next generation of social security and retirement fund administration in India. It transitions the EPFO from a traditional formal-sector provident fund manager into a universal, multi-source social security platform capable of managing pension drawdowns, unorganized sector contributions, and gig-economy integrations.



Aim: The central objective of EPFO 3.0 is to eliminate pension exclusion by bringing unorganized sector workers, construction workers (BOCW), and gig/platform workers into a structured social security framework, while offering flexible, inflation-linked retirement solutions for all Indian workers.

Key Features of EPFO 3.0:

- » **Core Banking Solution (CBS) Tech Integration:** Implements an RBI-regulated Core Banking Solution software as its core engine. This replaces fragmented databases with a real-time, centralized transaction system built to seamlessly handle micro-transactions for over 60 crore workers.
- » **Target Retirement Sum (TRS) Framework:** Replaces rigid retirement payouts with a defined contribution system. Members set a personalized Target Retirement Sum (TRS) based on their desired pension goal and retirement age, tracking their real-time progress via personalized dashboards.
- » **Dual Retirement Conversion Options:** Upon reaching retirement, accumulated funds can be converted into either a traditional annuity or a flexible Systematic Withdrawal Plan (SWP), allowing retirees to adjust monthly payouts according to their changing financial needs.
- » **Gig and Platform Worker Coverage:** Operationalizes the Code on Social Security by integrating gig workers into the EPFO network, capturing 1–2% aggregator turnover contributions through automated split-payment systems.
- » **One-to-Many UAN Mapping:** Enables a single Universal Account Number (UAN) to link concurrently with multiple employers, aggregators, and digital platforms, maintaining an organized record of all contributions without creating duplicate accounts.
- » **Multi-Source & Third-Party Contributions:** Allows provident fund balances to be built through diverse sources, accepting co-contributions from workers, employers, government subsidies, CSR funds, donor organizations, and consumer tips integrated into food or delivery apps.

Significance:

- » **Expands Social Security:** Extends retirement and social security coverage to informal, construction, and gig workers through flexible contributions.
- » **Modernizes Retirement Planning:** Introduces flexible withdrawals and digital pension planning tools, enabling better long-term financial security.

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Strengthening Environmental Assessment Standards

The changes have been notified by the Union Ministry of Environment, Forest and Climate Change (MoEFCC) to resolve project appraisal delays at the state-level.

Key Features of the Notified Amendments

- » Establishment of Standing Bodies (for each state and Union territory):
 - Standing Authority on Environment Impact Assessment (SAEIA): To assume functions of State Level Environment Impact Assessment Authority (SEIAA) for maximum 1 year if it is non-functional or causes delay.
 - Standing Committee on Environment Impact Appraisal (SCEIA): To perform the duties of the State Level Expert Appraisal Committee (SEAC) for max 1 year, if it is non-functional.
- » Extended Tenure: The tenure for EAC and SEAC members has been extended from 3 to 4 years. (Maximum 2 terms).
 - The maximum age for appointment is 70 years (75 years in exceptional cases).
 - Removal Criteria: Members can be removed in case of delays in processing proposals for the grant or rejection of environmental clearances beyond specified timelines.
- » Removal of Central Safeguard: Replaces the former default mechanism (inactive state cases elevated to the Central EAC) with local appraisal by non-expert bureaucratic standing bodies

Environment Impact Assessment (EIA) Framework in India

- » Meaning: EIA is a systematic process to identify, predict, evaluate, and mitigate the environmental and social impacts of proposed developmental projects.
- » Legislative Framework: EIA Notification, 2006, under the Environment Protection Act 1986.

Categorisation of Projects:



- » Category A: Large-scale projects (e.g., major dams) require clearance from the Central Government based on recommendations from an Expert Appraisal Committee (EAC).
- » Category B: Moderately polluting or smaller-scale projects are reviewed at the state level by the State Level Environment Impact Assessment Authority (SEIAA) and the State Level Expert Appraisal Committee (SEAC).
 - Sub-category B1: Requires a full EIA study and public consultation.
 - Sub-category B2: Exempted from both a comprehensive EIA study and public consultation (usually smaller or less polluting activities).
- » EIA Steps: Screening, Scoping, Public Consultation, Decision Making and Monitoring. \

Transforming Begging into Livelihoods

SMILE (Support for Marginalized Individuals for Livelihood and Enterprise) Scheme of the Ministry of Social Justice & Empowerment aims to realise the vision of a "Bhiksha Vritti Mukta Bharat" (Begging-Free India).

The Scheme

- » Type: Central Sector Scheme.
- » Objective: Comprehensive rehabilitation of persons engaged in begging through a dignity-based and livelihood-oriented approach.
- » Extent: Operational in 216 cities, with a target to cover 295 cities and rehabilitate 35,000 persons by FY 2030–31.
- » Two Sub-Schemes:
 - Central Sector Scheme for Comprehensive Rehabilitation for Welfare of Transgender Persons
 - Central Sector Scheme for Comprehensive Rehabilitation of persons engaged in the act of Begging

Key Features:

- » Comprehensive Rehabilitation: Identification, rescue, shelter, healthcare, counselling and rehabilitation.



- » **Livelihood Support:** Skill development, education and sustainable employment opportunities.
- » **Social Reintegration:** Mainstreaming beneficiaries with dignity and self-reliance.
- » **Convergence-Based Implementation:** Coordination between the Central Government, States/UTs, District Administrations etc. while converging with schemes such as DAY-NULM, NRLM, Mission Vatsalya.
- » **Digital Monitoring & Transparency:** Uses the SMILE-Beggary National Portal for registration, monitoring and tracking of rehabilitation centres and beneficiaries.

Way Ahead

- » **Address Root Causes:** Tackle poverty, homelessness, mental illness, addiction and trafficking.
- » **Legal deterrence:** Ban on begging as well as giving alms in public places, with enforcement against violations.
- » **Enhance Public Awareness & Monitoring:** Promote community participation, discourage organized begging through monitoring.
- » **Best Practices (Indore):** India's first "Beggar-Free City" after a year-long rehabilitation campaign.

Wildlife Corridor of Segur Plateau

Supreme Court uphold removal of all commercial activity in the Segur plateau (Western Ghats area), which was declared as an Elephant corridor.

Segur Plateau

- » It connects the Western and the Eastern Ghats and sustains elephant populations and their genetic diversity.
 - It has the Nilgiri Hills on its southwestern side and the Moyar River Valley on its north-eastern side.
- » The plateau is a part of Mudumalai Tiger Reserve and a key component of the Nilgiri Biosphere Reserve (a UNESCO World Network site).

2D Boron Sheets



Scientists at the Institute of Advanced Study in Science and Technology (IASST), Guwahati, achieved a breakthrough by using borophene as a bio-lubricant additive in castor oil.

Borophene

What It Is?

- » Borophene is an ultra-thin, two-dimensional (2D) crystalline allotrope of boron. Consisting of a single-atom-thick layer of boron atoms, it is often referred to as the boron equivalent of graphene, possessing exceptional mechanical strength, flexibility, and electronic conductivities.

How It Is Formed?

Unlike graphene (which can be mechanically exfoliated from bulk graphite), borophene does not exist naturally in bulk form and must be synthesized artificially:

- » Chemical Vapor Deposition (CVD) / Molecular Beam Epitaxy (MBE): Synthesized under ultra-high vacuum conditions by evaporating pure boron gas onto hot, highly clean metallic substrates (such as silver, gold, or copper).
- » Substrate Interaction: The metallic substrate provides the necessary electrons to stabilize the planar 2D arrangement of boron atoms, forming a metallic sheet with mixed covalent and electron-deficient bonding networks.

Key Features of Borophene:

- » Anisotropic Physical Properties: Exhibits direction-dependent mechanical, thermal, and electrical properties due to its asymmetric atomic lattice structures.
- » Exceptional Mechanical Strength and Flexibility: Possesses an ultra-high tensile strength and high Young's modulus, while maintaining flexibility superior to graphene along specific crystallographic axes.
- » High Thermal & Metallic Conductivity: Unlike bulk boron (a semiconductor), borophene acts as a fully metallic conductor with high thermal conductivity.
- » Superior Tribological & Load-Bearing Capacity: Forms durable protective tribofilms during mechanical shear, significantly reducing surface roughness, friction, and mechanical wear.
- » High Chemical Reactivity: Its electron-deficient nature makes it highly reactive, enabling uniform dispersion in organic fluids (like vegetable/castor oil) without requiring chemical surface modification.

Key Applications:

- » Used as an additive in bio-based lubricants to reduce friction, improve efficiency, and lower energy consumption in industrial machinery and marine transport.
- » Its high capacity and fast ion transport make borophene ideal for next-generation batteries, supercapacitors, and hydrogen storage systems.

Empowerment Ashes 2027

England will host Australia in the first-ever Mixed Disability Ashes in 2027, marking a historic milestone in the international expansion of disability cricket. The series will be played as part of England's 2027 Ashes summer.

The First-Ever Mixed Disability Ashes 2027**What It Is?**

- » The Mixed Disability Ashes is the first bilateral Ashes cricket series between England and Australia featuring mixed disability men's teams. It extends the iconic Ashes rivalry to elite cricketers with disabilities, promoting inclusive participation in international cricket.

Aim: To strengthen inclusive sports, provide elite international competition for cricketers with disabilities, and integrate disability cricket into mainstream global cricket.

Key Features:

- » **Historic First Edition:** The inaugural Mixed Disability Ashes will be held in England in 2027 between England and Australia.
- » **Part of Ashes Summer:** It will be played alongside the Men's and Women's Ashes, making all three Ashes formats part of the same season.
- » **T20I-Based Series:** The contest will be played in the T20 International format, with venues and schedule to be announced.
- » **Boost to Disability Cricket:** The series expands the international calendar for mixed disability cricket, following England's bilateral series with India.

Significance:

- » Provides elite athletes with disabilities the opportunity to compete in one of cricket's most prestigious rivalries, advancing equality in sports.
- » Strengthens the institutional growth of disability cricket and encourages greater investment, visibility, and international participation.

Feeding the Future 2026

General Studies, Political Science and International Relations, Sociology, CSAT



The Food and Agriculture Organization (FAO) along with IFAD, UNICEF, WFP, and WHO officially released The State of Food Security and Nutrition in the World (SOFI) 2026 report.

State of Food Security and Nutrition in the World (SOFI) 2026 Report

What it is?

- » The SOFI report is the UN system's annual flagship assessment that tracks global, regional, and national progress toward ending hunger (SDG Target 2.1) and eliminating all forms of malnutrition (SDG Target 2.2).
- » Theme-focused on Understanding and addressing the high cost of a healthy diet, the 2026 edition evaluates the cost drivers of Healthy Diet Baskets (HDB), tracks progress across global maternal and child nutrition targets.

Key Findings in the Report:

- » Africa Overtakes Asia as Hunger Epicenter: For the first time, Africa hosts the largest population facing hunger at 309 million people (20.0% rate), surpassing Asia's 292 million people (6.0% rate).
- » Unaffordability of Healthy Diets: An estimated 2.69 billion people (32.7% globally) were unable to afford a healthy diet in 2025. In Africa, this figure rises to a staggering 66.6%.
- » Nutrient-Dense Cost Disparities: Animal-source foods, fruits, and vegetables account for nearly 70% of the total cost of a healthy diet, whereas starchy staples contribute only one-sixth of the total cost despite providing half the calories.
- » Poor Minimum Dietary Diversity: Only 30.8% of children aged 6–23 months and 62.7% of women aged 15–49 years achieved minimum dietary diversity globally.
- » Off Track for 2030 Zero Hunger Target: Projections show that 510 to 520 million people will still face chronic hunger in 2030, with 56% of them residing in Africa.
- » Worsening Women's Health & Adult Obesity: Anaemia among women aged 15–49 worsened to 30.7%, while global adult obesity steadily climbed from 12.1% (2012) to 16.2% (2024).
- » Urban vs. Rural Food Insecurity Gap: Food insecurity remained consistently higher in rural areas (29.7%) compared to peri-urban (25.4%) and urban areas (22.3%).

India and Report Findings:

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- » Significant Driver of Regional Progress: Southern Asia's substantial decline in undernourishment (from 13.9% in 2021 down to 9.3% in 2025) and food insecurity was largely propelled by improvements in India.
- » Lower-Middle-Income Group Dynamics: India plays a decisive role in the global affordability metrics; excluding India from the lower-middle-income group converts the regional trend of people unable to afford a healthy diet from a decrease to an increase.
- » On Track for Child Nutrition Goals: Aligned with broader Asian trends, India contributes to Southern Asia remaining on track to meet the 2030 global targets for child stunting reduction and halting child overweight.
- » Persistent Maternal Anaemia Challenges: Similar to global trends where anaemia is worsening, India faces significant hurdles in meeting the 50% reduction target for anaemia among women of reproductive age.
- » Subnational Diet Cost Sensitivity: Case studies in the report emphasize that price fluctuations in non-staples like vegetables and fruits disproportionately drive up the daily cost of a healthy diet across South Asian markets.

Key Challenges Associated with Food Security and Hunger:

- » Geopolitical & Energy Shocks: The 2026 West Asian conflict has disrupted oil, gas, and fertilizer supply chains, driving up agricultural input costs and threatening global food inflation.
- » High Post-Farmgate Supply Chain Costs: Post-farmgate logistics, transport, and processing account for 70% to 75% of consumer food costs, creating severe price markups on perishable fruits and vegetables.
- » Distorted Agricultural Subsidies: Roughly 70% of global government agricultural support is tied predominantly to staple grains, sugar, and livestock, systematically neglecting nutrient-dense fruits, vegetables, and legumes.
- » Climate Extremes & Infrastructure Deficits: Climate variability combined with weak cold-chain storage and poor rural road networks lead to high post-harvest losses and seasonal food price spikes.
- » Funding & Aid Reductions: Cuts in Official Development Assistance (ODA) and humanitarian funding strain emergency food assistance programs in crisis-affected regions.

Recommendations:

General Studies, Political Science and International Relations, Sociology, CSAT



- » Repurposing Agricultural Subsidies: Shift public farm support and procurement away from staple mono-cropping toward nutrient-rich fruits, vegetables, pulses, and legumes to lower their market cost.
- » Investing in Midstream Value Chain Infrastructure: Direct capital into cold-storage networks, rural transport infrastructure, processing facilities, and energy-efficient logistics to reduce post-harvest waste.
- » Enhancing Agricultural R&D for High-Value Crops: Reorient research and development investments toward non-staple crops to boost yields and build climate resilience.
- » Strengthening Data Collection and Social Protection: Institutionalize national monitoring of the Cost of a Healthy Diet (CoHD) using retail price data and expand nutrition-sensitive cash transfers for vulnerable households.

Conclusion:

The SOFI 2026 report emphasizes that while global hunger numbers have shown slight improvement, achieving Zero Hunger by 2030 remains out of reach without structural reform. High prices for nutritious foods continue to keep healthy diets out of reach for over 2.6 billion people, worsening global malnutrition. Ultimately, transforming agrifood systems through targeted infrastructure investments, subsidy repurposing, and robust social protection is essential to make healthy diets affordable for everyone, everywhere.

Flavor of India Mission

Union DoNER Minister launched Mission Golden Spice, a ₹175.45-crore project. The 5-year initiative aims to build a farm-to-global-market ecosystem for Meghalaya's GI-tagged Lakadong turmeric.

Mission Golden Spice

What It Is?

- » Officially titled the Integrated Lakadong Turmeric Value Chain Enhancement Project, Mission Golden Spice is a five-year (2025–2030) phased initiative designed to transform Lakadong turmeric into a globally competitive brand.
- » It operates as part of the Centre's broader Unlock the Economic Potential of India's Northeast (USP) initiative under the Ashtalakshmi strategy.

Organizations Involved:



- » Anchor Bodies: Ministry of Development of North Eastern Region (MDoNER) and the North Eastern Council (NEC).
- » State Implementation: Government of Meghalaya.

Aim: To double turmeric farmers' earnings (from ₹30–40/kg to ₹80/kg by 2030), overcome post-harvest losses, establish processing facilities, and position Lakadong turmeric as a flagship export product in markets across the US, EU, Japan, and the Gulf countries.

Key Features of the Mission:

- » Phased Roadmap (2025–2030): Implemented in two phases: Phase 1 focuses on strengthening value chain infrastructure, cold chains, and processing. Phase 2 concentrates on commercial expansion, branding, and export scaling.
- » Cultivation & Production Scaling: Expands land under Lakadong turmeric from 2,500 hectares to 7,000 hectares, targeting an annual yield of 49,400 metric tonnes by 2030.
- » Multi-Agency Funding Model: Financed jointly by MDoNER/NEC (50%), the Ministry of Agriculture & Farmers' Welfare (33.1%), and the Government of Meghalaya (16.9%).
- » Largest Extraction Facility in the Northeast: Establishes the region's largest integrated organic processing and curcumin extraction plant in Meghalaya to shift from raw exports to high-value processing.
- » Women-Led Economic Development: Directly impacts over 17,500 farming households across West and East Jaintia Hills, with women accounting for 99% of processing participation and creating 3,000 additional jobs.
- » Blockchain Traceability & GI Protection: Integrates digital authentication and blockchain tools to safeguard the Geographical Indication (GI) status and prevent unauthorized regional replication.

Global Harmony Declaration

An unprecedented assembly of Nobel laureates, AI scientists, religious leaders, and former heads of state gathered at Rome's Capitoline Hill to sign the Rome Declaration for an Unarmed and Disarming Peace.

The Rome Declaration for an Unarmed and Disarming Peace

What it is?



- » Inspired by Pope Leo XIV's Magnifica Humanitas, the Declaration calls for protecting human dignity from unchecked AI. It warns that AI-controlled nuclear systems pose an existential risk, arguing that algorithms lack morality, empathy, and judgment, and must never replace human decision-making in the use of nuclear weapons.

Core Principles of the Declaration:

Six General Principles

- » Disarming the Next Arms Race: Coordinated efforts to halt dual arms races in both AI and nuclear capabilities.
- » Responsible Development: Aligning technological progress with human ethics and transparent governance.
- » Responsible Use of AI: Ensuring algorithms serve human well-being rather than automated warfare.
- » Responsible Governance: Building international oversight frameworks tailored to high-risk emerging tools.
- » Responsible Leadership: Demanding accountability from state leaders and tech developers.
- » Nuclear Disarmament: Renewed commitment to the total and verifiable elimination of atomic arsenals.

Five Ethical and Operational Mandates:

- » Mandatory Meaningful Human Control: Absolutely barring any automated, algorithmic, or AI-driven platform from executing final nuclear launch decisions.
- » The Digital Commons Model: Expanding open-data access so independent global experts can evaluate ungoverned AI risks and protect non-tech-dominant nations.
- » Responsible Development Standards: Mandating that developers publish ethical frameworks and banning fully autonomous, self-improving systems that cannot be audited or halted by human operators.
- » Internal Arsenal Vulnerability Audits: Urging nuclear-armed states to conduct rigorous technical reviews protecting command-and-control systems from AI data-poisoning, hallucinations, or cyber-tampering.
- » Time-Bound, Verifiable Disarmament: Renewing good-faith global negotiations toward the permanent, irreversible removal of nuclear weapons.



Why the Declaration is Necessary in Modern Geopolitics?

- » Compression of Decision-Making Windows: Historical crises relied on human skepticism, delay, and moral pause to prevent war. Modern AI logistics compress operational response windows from hours to mere seconds, removing the safety valve of human doubt.
- » Vulnerability to Algorithmic Failure Modes: Deep neural networks suffer from black box opacity, data poisoning, and hallucinations. In a tense geopolitical standoff, an algorithm misinterpreting a routine network ping or physical probe as an incoming strike could automatically trigger catastrophic retaliation.
- » Erosion of Global Arms Treaties: Legacy agreements (INF, Open Skies, New START) have weakened, creating a security dilemma where states feel pressured to automate defense systems to avoid losing an algorithmic speed advantage.
- » Asymmetric Speed and Pre-Delegation Risks: States facing advanced adversaries may feel compelled to pre-delegate firing authority to automated software out of fear that human command structures will be outpaced or jammed.

Challenges:

- » Lack of Global Consensus: Major military powers remain reluctant to sign binding treaties that limit autonomous capabilities during active warfare.
- » Verifiability and Dual-Use Nature: AI software algorithms are easily hidden, duplicated, and deployed, making international verification far harder than tracking physical nuclear materials.
- » Technological Fatalism: The rapid pace of private-sector AI innovation frequently outstrips slow multilateral treaty negotiations.

Way Forward:

- » Translating Moral Restraint into Binding Law: Transitioning the Rome Declaration from a moral stance into a UN-backed treaty specifically targeting launch-on-warning automation.
- » Standardizing Red-Line Governance: Establishing mandatory Human-in-the-Loop architecture across all strategic military command networks.
- » Mobilizing Public Grassroots Pressure: As noted by Nobel laureate David Gross, raising public awareness is necessary to compel political leaders to prioritize AI-nuclear safety.



- » Mandating Sovereign Cyber Audits: Forcing nuclear states to isolate strategic software networks from commercial large language models and unverified cloud architectures.

Conclusion:

The Rome Declaration delivers a vital warning against outsourcing moral decisions to autonomous code. While technology can process data at speeds far beyond human capacity, collective moral responsibility—necessary to ensure human survival—must never be delegated to an algorithm. Achieving true global security requires world leaders to reject technological fatalism and ensure that human control remains an absolute, non-negotiable baseline.

Horn of Africa Channel

Yemen's Houthi rebels announced a targeted naval embargo on Saudi Arabia through the Bab el-Mandeb Strait, threatening to block oil tankers transiting the Red Sea.

The Bab el-Mandeb Strait

What It Is?

- » The Bab el-Mandeb Strait (translating to Gate of Tears in Arabic) is a narrow, strategic maritime passage connecting the Red Sea (northwest) to the Gulf of Aden and the Indian Ocean (southeast). It serves as the southern gateway to the Suez Canal, forming part of the shortest sea route connecting Europe, North Africa, and Asia.

Location and Bordering Nations:

Situated between the Arabian Peninsula and the Horn of Africa, the strait is bordered by three nations: Yemen, Djibouti and Eritrea

Key Geographical & Hydrographic Features:

- » **Narrow Width:** Spans approximately 32 km (20 miles) at its narrowest point between Ras Menheli in Yemen and Ras Siyyan in Djibouti.
- » **Perim Island Division:** Divided into two distinct navigation channels by volcanic Perim (Mayun) Island:
 - **Western Channel (Dact-el-Mayun):** ~26 km (16 miles) wide with a depth of around 200 meters (650 feet); serves as the main route for international commercial shipping.



- Eastern Channel (Bab Iskender): ~3 km (2 miles) wide with a shallow depth of 30 meters (100 feet); restricted mostly to local, small-vessel traffic.
- » Complex Surface Currents: Acts as the primary water exchange corridor between the Red Sea and the Gulf of Aden, featuring seasonal current reversals driven by monsoon winds.
- » Volcanic Archipelago: Dotted with volcanic islands, including the Seven Brothers (Sawabi Islands) near the coast of Djibouti.

Significance:

- » Carries 10–12% of global seaborne trade and about 10% of seaborne oil trade, making it the third busiest energy chokepoint after Malacca and Hormuz.
- » Closure forces ships to detour via the Cape of Good Hope, adding 3,500–4,000 nautical miles and 10–14 days, increasing fuel, insurance, and freight costs.

India 6G Vision Alliance

Minister of State for Communications announced that the Bharat 6G Alliance (B6GA) expanded its membership to 90 organizations.

The Bharat 6G Alliance (B6GA)

What It Is?

- » The Bharat 6G Alliance (B6GA) is an industry-led, government-facilitated collaborative platform established to position India as a global leader in 6G telecommunications. It brings together domestic and international stakeholders to drive research, intellectual property creation, and standard-setting for next-generation networks.

Nodal Support: Facilitated by the Department of Telecommunications (DoT), Ministry of Communications.

- » Global Strategic Partners: Operates under bilateral MoUs with international 6G bodies like the NextG Alliance (USA), 6G-IA (Europe), 6G Forum (South Korea), XGMF (Japan), 6G Brasil, and the European Space Agency (ESA).

Aim: To drive indigenous 6G research and development, helping build a self-reliant (Atmanirbhar), globally competitive 6G ecosystem.



- » It works to ensure India's technological, manufacturing, and intellectual property priorities are embedded into global 6G standards.

Key Functions of the Alliance:

- » **Formulating National Spectrum Roadmaps:** Analyzes high-frequency spectrum requirements and advises the Department of Telecommunications on spectrum planning, policy frameworks, and deployment timelines.
- » **Advancing Terahertz Testbeds & Advanced R&D:** Coordinates multi-institutional projects under the Telecom Technology Development Fund (TTDF), such as the 6G Terahertz testbed at SAMEER Kolkata for ultra-high-rate line-of-sight communication.
- » **Securing Intellectual Property & Standards:** Drives Indian contributions to the International Telecommunication Union (ITU) under the IMT-2030 framework, successfully embedding ubiquitous connectivity as a core 6G global requirement.
- » **Supporting Hardware Innovation for Startups:** Facilitates research into advanced System-on-Chips (SoCs), multi-chip modules, and IoT devices, utilizing DoT's Technology Development and Investment Promotion (TDIP) scheme to sponsor startup participation in international bodies like 3GPP and oneM2M.
- » **Building Global Supply Chain Resilience:** Partners with international research hubs (such as Finland's 6G Flagship) to establish secure, trusted cross-border supply chains and co-develop open 6G standards.

Significance:

- » B6GA enables India to shape global 6G standards through ITU and 3GPP, moving from a technology adopter to a standards leader.
- » Links IIT research with industry to commercialize Indian telecom technologies, strengthen cyber security, reduce imports, and boost domestic manufacturing.

India's Offline Hours

Following a mobile internet shutdown in Central Delhi during the Cockroach Janta Party's (CJP) 'Chalo Sansad' protest, concerns have been raised over the use of internet shutdown powers under the Telecommunications Act, 2023.

Internet Shutdowns in India

What It Is?

General Studies, Political Science and International Relations, Sociology, CSAT



- » An internet shutdown is an intentional, state-ordered disruption of telecommunications or digital communications. It renders internet services inaccessible or unusable within a specific geographic location—ranging from throttling network bandwidth and blocking targeted social platforms to executing complete network blackouts.

Governing Statutory Provisions & Constitutional Articles:

- » Constitutional Rights: As affirmed by the judiciary, shutdowns directly impact Article 19(1)(a) (Freedom of Speech and Expression), Article 19(1)(g) (Right to Practice Trade/Profession), and Article 21 (Right to Life and Personal Liberty).
- » Statutory Framework: Governed under Section 20(2)(b) of the Telecommunications Act, 2023 and the Telecommunications (Temporary Suspension of Services) Rules, 2024.

Procedure for Ordering a Shutdown:

- » Threshold Mandate: Suspensions can only be issued during a proven public emergency or in the interest of public safety to maintain public order. A peaceful protest alone does not meet the statutory threshold.
- » Competent Authority Directive: Orders must be formally issued in writing by authorized executive officials.
- » Proportionate & Reasoned Orders: The order must clearly document written reasons, state why less restrictive measures were insufficient, specify targeted cell sites or geographical boundaries, and be made publicly accessible for judicial review.
- » Mandatory Review Committee Oversight: Every order must be submitted to a designated Review Committee within statutory timelines to evaluate its necessity and proportionality.

Key Legal Features:

- » Strict Temporal Limit: Under the Telecommunications Suspension Rules, 2024, an individual suspension order cannot remain in force for more than 15 days. Indefinite suspensions are legally invalid.
- » Proportionality and Targeted Scope: Orders must adhere to the principle of least restrictive means, restricting shutdowns to specific cell sites rather than blanket regional blackouts whenever feasible.



- » Judicial Reviewability: Citizens and organizations retain the right to challenge suspension orders in High Courts (Article 226) or the Supreme Court (Article 32) on grounds of procedural illegality or arbitrariness.
- » Prohibition of Procedural Bypassing: State authorities cannot invoke repealed statutes (the Indian Telegraph Act, 1885 or 2017 Rules) to sidestep the stricter review safeguards mandated by the 2024 framework.

Supreme Court Guidelines (Anuradha Bhasin v. Union of India, 2020):

- » Fundamental Right Status: Recognized that freedom of speech and the right to carry out trade or business over the internet are constitutionally protected under Articles 19(1)(a) and 19(1)(g).
- » Proportionality Test: Ruled that broad, complete network suspensions are permissible only as an unavoidable last resort. Any order must satisfy tests of necessity, legality, and proportionality.
- » Prohibition of Indefinite Bans: Declared indefinite internet shutdowns unconstitutional.
- » Mandatory Publication: Directed that all shutdown orders and their underlying justifications must be published to allow affected citizens to challenge them before courts of law.

Prime Minister's Youth Excellence Scheme

Minister of State reaffirmed the Government's commitment to expanding educational opportunities for disadvantaged students through the PM-YASASVI scheme, highlighting scholarships and hostel support.

PM-YASASVI

What It Is?

- » PM-YASASVI (Prime Minister Young Achievers Scholarship Award Scheme for Vibrant India) is a comprehensive umbrella scheme implemented by the Department of Social Justice and Empowerment under the Ministry of Social Justice and Empowerment. It unifies scholarship support and residential hostel infrastructure for socially and educationally backward youth across India.

Launched In / Evolution:



- » Origin: The hostel construction component originated in 1998–99 to address educational backwardness among OBC youth, undergoing a major revision in 2017–18.
- » Umbrella Consolidation: Restructured and expanded into the present PM-YASASVI umbrella framework to cover financial assistance across all learning stages—from school level through top-tier college education.

Aim: To eliminate financial constraints and geographical barriers for students hailing from rural and economically weaker sections, ensuring equitable access to secondary and higher education through financial scholarships and quality hostel facilities.

Target Beneficiaries & Eligibility Criteria:

- » Identified Categories: Open to students belonging to Other Backward Classes (OBC), Economically Backward Classes (EBC), and Denotified, Nomadic, and Semi-Nomadic Tribes (DNT).
- » Non-Creamy Layer Requirement: Applicants must be listed in Central/State/UT lists of OBCs and fall strictly outside the creamy layer.
- » Priority Allocation: Hostels prioritize post-matric and undergraduate students coming from rural areas lacking local colleges, with a mandatory 5% seat reservation for students with disabilities.

Key Features of the Scheme:

- » Four-Tiered Scholarship Structure: Combines four major financial assistance channels:
 - Pre-Matric Scholarship Scheme
 - Post-Matric Scholarship Scheme
 - Top Class Education in Schools Scheme
 - Top Class Education in Colleges Scheme
- » Differentiated Hostel Cost Norms: Standardizes per-seat hostel construction costs across geographic regions:
 - North Eastern Region: ₹3.50 lakh per seat.
 - Himalayan Regions: ₹3.25 lakh per seat.



- Rest of India: ₹3.00 lakh per seat.
- » Strict Construction Timelines: Hostels must be completed within 18 months from the work order or two years from the first installment release, without project extensions.
- » Streamlined Land Utilization: Removes the need to acquire new land by permitting hostel construction within ongoing State Government projects, engineering colleges, medical campuses, polytechnics, and Saansad Adarsh Gram Yojana (SAGY) villages.
- » Performance-Linked Fund Release: Central grants are disbursed in a 3-stage 50:45:5 ratio, where the final 5% is withheld until physical occupation by OBC/EBC/DNT students is formally verified.
- » Quality & Audit Reserve: Sets aside 0.25% of the budget allocation (up to ₹10 lakh) for independent third-party quality inspections and impact evaluations.

Accelerated Trial Courts

Prime Minister of India announced the establishment of fast-track courts (FTCs) to deliver swift and stringent justice for offenses related to examination paper leaks.

Fast-Track Courts (FTCs)

- » Fast-track courts are special temporary judicial benches established to expedite the trial of specific, high-priority offenses, complex corporate frauds, or cases involving vulnerable demographics. They aim to reduce backlog and accelerate the judicial process by holding daily hearings and adhering to strict timelines.

Constitutional Framework:

- » Article 14 Guarantees: Special courts must satisfy Article 14 (Equality before the Law).

Governing Statutory Frameworks & Guidelines:

- » 14th Finance Commission (2015–2020): Recommended setting up 1,800 FTCs to address heinous crimes (like murder and kidnapping) and property disputes pending over five years.
- » Nirbhaya Fund Centrally Sponsored Scheme (2019): Established Fast-Track Special Courts (FTSCs) dedicated exclusively to trial cases under the Protection of Children from Sexual Offences (POCSO) Act and rape cases.

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- » Public Examinations (Prevention of Unfair Means) Act, 2024: Serves as the statutory backdrop for the newly proposed fast-track courts targeting organized paper leaks and examination fraud.
- » Bharatiya Nagrik Suraksha Sanhita (BNSS): Recommends completing trials within two years (and sexual offense trials within two months).

Key Functions:

- » Target Disposal Rates: FTSCs operate with a target disposal rate of 165 cases per judge annually (or ~41–42 cases per quarter).
- » High Efficiency Ratio: FTSCs dispose of an average of 9.5 cases per month—nearly three times higher than regular trial courts (3.3 cases per month).
- » Substantial Resolution Output: The disposal rate for operational FTSCs stands at approximately 96%.
- » Day-to-Day Trial Operations: Function on daily hearing schedules to bypass standard procedural adjournments.

Implication:

- » Fast-track courts provide speedy trials for sexual violence, vulnerable groups, and paper leak cases by reducing delays in the justice system.
- » Despite high disposal rates, over 2.4 lakh cases remain pending. Long-term reforms require better infrastructure, more judges, stronger forensic support, and improved investigations.

Cashless Without Internet India Offline UPI

The National Payments Corporation of India (NPCI) is developing an offline UPI payment system enabling Near Field Communication (NFC)-based, tap-and-pay transactions without active internet connectivity.

The Proposed Offline UPI System

- » An advanced, contactless payment architecture built on top of the existing Unified Payments Interface (UPI) framework. It allows users to complete digital transactions at merchant Point-of-Sale (PoS) terminals even when both the customer's smartphone and the merchant's terminal lack a real-time internet connection or mobile network access.



- » Developed By: Engineered and designed by the National Payments Corporation of India (NPCI), the umbrella organization managing retail payments and settlement systems in India.
- » Primary Aim: To eliminate digital payment failures caused by weak, intermittent, or absent cellular/Wi-Fi connectivity, expanding UPI usage into underground metro networks, inflight services, remote rural markets, and during urban network outages.

How It Works?

- » Pre-Authorization (Online Phase): While connected to the internet, the user's phone secures a set of cryptographic tokens or a prepaid monetary balance authorized directly by their bank.
- » Local Exchange (Offline Phase): When offline, the user taps their phone against an NFC-enabled merchant PoS terminal. Payment credentials and tokens are directly exchanged locally via short-range radio waves.
- » Deferred Settlement (Reconnection Phase): The transaction record is temporarily stored on both devices. Once either the merchant terminal or the customer's phone reconnects to the internet, the encrypted transaction log is pushed to NPCI for final bank-to-bank settlement.

Key Features:

- » Dual-Offline NFC Compatibility: Executes tap-and-pay merchant transactions even if both the customer's phone and the merchant's PoS terminal are completely disconnected from the network.
- » Cryptographic Tokenization & Fraud Prevention: Replaces live bank balance verification with single-use, pre-authorized tokens stored in the smartphone's hardware, preventing double-spending and safeguarding actual bank credentials.
- » Higher Transaction Limit (Up to ₹2,000): Designed for medium-value transactions (up to ₹2,000), offering a higher transaction threshold than existing small-value mechanisms like UPI Lite.
- » Merchant-Centric Store-and-Forward Model: Unlike UPI Lite X (which focuses on person-to-person transfers), this system targets retail PoS infrastructure, letting merchants accept payments continuously during network blackouts.

Limitations:

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- » Transaction Cap Restrictions: Capped at a maximum per-transaction limit (typically ₹2,000) and constrained by the total pre-allocated token balance stored on the device to minimize financial liability.
- » Hardware Requirement Constraints: Requires both the consumer's smartphone and the merchant's PoS machine to feature built-in NFC chips, excluding older or basic feature phones without short-range radio hardware.
- » Delayed Risk Reconciliation: Deferred settlement creates a brief lag between when a payment is executed and when money actually transfers between bank accounts, requiring robust risk-engine algorithms to reconcile duplicate claims or edge-case disputes.

Commonwealth Games 2026: Beyond Borders

The 2026 Commonwealth Games (officially the XXIII Commonwealth Games, commonly known as Glasgow 2026) run from July 23 to August 2, 2026.

The 2026 Commonwealth Games

- » The Commonwealth Games is an international, quadrennial multi-sport event featuring top athletes from the 74 member nations and territories of the Commonwealth of Nations. It provides a major global platform for sportsmanship, international camaraderie, and elite athletic performance.

Host: Glasgow, Scotland.

- » History in Scotland: Marks the fourth time Scotland has hosted the Games (following Edinburgh 1970 and 1986, and Glasgow 2014).

Compact Footprint: Hosted across four major existing venues within an eight-mile corridor:

- » OVO Hydro / Scottish Event Campus (SEC) (Netball, 3×3 Basketball, Boxing, Judo, Bowls, Weightlifting, and Ceremonies)
- » Scotstoun Stadium (Athletics and Para-Athletics)
- » Tollcross International Swimming Centre (Swimming and Para-Swimming)
- » Commonwealth Arena & Sir Chris Hoy Velodrome (Artistic Gymnastics and Track / Para-Track Cycling)

Host Selection History & Emergency Handover:

- » Initial Award & Victoria Cancellation: The Australian state of Victoria was selected to host in April 2022. However, in July 2023, the state government abruptly



cancelled its hosting agreement citing projected cost escalations (reaching A\$6–7 billion).

- » Glasgow's Rescue Plan: In 2024, Commonwealth Games Scotland proposed a scaled-back, low-cost concept using pre-existing infrastructure. Financed largely by a A\$200 million compensation payout from Victoria and CGF backing, the Scottish Government officially agreed to take over hosting rights without requiring local tax-payer funds.

Key Features of Glasgow 2026:

- » Streamlined 10-Sport Programme: Features 10 able-bodied sports (Athletics, Swimming, Weightlifting, Boxing, Judo, Artistic Gymnastics, Track Cycling, 3×3 Basketball, Netball, and Bowls).
- » Record Integrated Para-Sports: Includes 47 medal events across six integrated para-sports (Para-Athletics, Para-Swimming, Para-Powerlifting, Para-Track Cycling, 3×3 Wheelchair Basketball, and Para-Bowls)—the largest Para-sport integration in Commonwealth Games history.
- » No Athletes' Village: Operates without a costly, dedicated village; athletes are accommodated in local university student housing and commercial hotels across Glasgow.
- » Historical Transitions: The first Commonwealth Games celebrated under King Charles III as Head of the Commonwealth and under CGF President Donald Rukare.

Significance:

- » Demonstrates a cost-effective, venue-reuse approach, offering a sustainable blueprint for future Commonwealth Games.
- » Serves as a key preparation event for the 2028 Los Angeles Olympics, helping athletes gain international competitive experience.

Father of Indian Nationalism

Union Home Minister and Defence Minister paid national tributes to the iconic freedom fighter Lokmanya Bal Gangadhar Tilak on his birth anniversary.

Bal Gangadhar Tilak

- » Bal Gangadhar Tilak was an Indian nationalist, educator, journalist, and social reformer. Revered as the Father of the Indian Unrest by British colonial authorities and the Father of India's Revolution by Jawaharlal Nehru, he was a key leader of



the extremist/nationalist faction within the Indian National Congress prior to the Gandhian era.

Early Life & Social Reforms:

- » Birth: Born on July 23, 1856, in Ratnagiri, Maharashtra, to a middle-class family.
- » Educational Reforms: Believing that modern, nationalistic education was vital for political awakening, he co-founded the Deccan Education Society in 1884 to establish schools like Fergusson College in Pune.
- » Social Stance: Advocated passionate social reforms while prioritizing political liberation. He vehemently opposed untouchability, famously declaring: I would not recognise even God if he said that untouchability was ordained by him.

Contributions to the Freedom Movement:

- » Champion of Swaraj and Swadeshi: Tilak transformed the freedom struggle into a mass movement and coined the slogan, Swaraj is my birthright, and I shall have it! He led the Extremist (Lal-Bal-Pal) movement against Moderate politics after the Partition of Bengal (1905).
- » Sedition Trials and Mandalay Exile:
 - 1897: Convicted of sedition for writings in Kesari, emerging as a national leader.
 - 1908–1914: Sentenced to six years in Mandalay Prison (Burma), where he authored important scholarly works.
- » Home Rule League and Lucknow Pact: Founded the Indian Home Rule League (1916) at Pune to demand self-government. He also helped unite Moderates and Extremists and played a key role in the Lucknow Pact (1916) between the Congress and the Muslim League.

Literary Works & Journalism:

- » Journalistic Organs: Founded two influential newspapers to educate the masses and critique British misrule:
 - Kesari: A Marathi daily newspaper through which he preached nationalist doctrines.
 - Mahratta: An English weekly newspaper.



» **Major Books:**

- Gita Rahasya (1915): Written during his imprisonment in Mandalay, it is a commentary on the Bhagavad Gita emphasizing Karma Yoga (the philosophy of selfless action).
- The Arctic Home in the Vedas (1903): Proposed a novel origin theory regarding the ancestral home of the Aryans.

Key Organizations Associated With Tilak:

- » Deccan Education Society (1884): Co-founded to promote nationalist education in Maharashtra.
- » Indian National Congress (INC): Joined in 1889; led its Nationalist/Extremist wing.
- » Indian Home Rule League (1916): Established to demand self-rule across Maharashtra, Karnataka, Central Provinces, and Berar.
- » Sarvajanik Ganeshotsav & Shivaji Jayanti: Re-organized community festivals into public cultural gatherings to build national unity and circumvent British bans on political assemblies.

Last Days and Legacy:

- » Passing: Passed away on August 1, 1920, in Bombay (now Mumbai) at the age of 64.
- » Historical Transition: His death coincided with the launch of Mahatma Gandhi's Non-Cooperation Movement on the exact same day, marking the transition from the Tilak Era to the Gandhian Era of India's freedom struggle.

India at the Crossroads: Lessons from NATO Ankara 2026

The NATO Ankara Summit (2026) concluded with major commitments on higher defence spending, support for Ukraine, and strengthening Europe's defence industrial base.

The NATO Ankara Summit

- » A high-level politico-military conference where leaders of NATO's 32 ally nations review defense progress, align alliance-wide security priorities, and convert political commitments into active operational capabilities.
- » Host Country: Hosted in Ankara, Türkiye.



- » Strategic Context: Serves as a follow-up to the 2025 Hague Summit to enforce long-term defense spending targets and industrial scaling amid geopolitical conflict in Eastern Europe and West Asia.

Key Outcomes of the Ankara Summit:

- » Ironclad Collective Defence: All 32 member nations reaffirmed their commitment to Article 5 of the Washington Treaty and the transatlantic bond.
- » The 5%GDP Spending Commitment: Unanimously endorsed “The Hague defence commitment,” obligating all members to spend at least 5% of their GDP on defence by 2035.
- » Unwavering Ukraine Support: Declared long-term military, financial, and strategic support to defend Ukraine’s sovereignty and territorial integrity.
- » Building a Europe-Wide Defence Industrial Base (DIB): Pledged to build a high-technology network of factories, laboratories, and skilled labor across Europe to sustain long-term warfighting capability.
- » Focus on Execution and Scalability: Shifted alliance strategy from crisis management to rapid industrial production, innovation, and hardware delivery.

Challenges to India:

- » Transformation into a Sellers’ Market: As NATO nations aggressively step up procurement, the global arms market is shifting from a buyers’ market to a tight sellers’ market.
- » Defense Supply Chain Delays: Overstretched Western manufacturers are prioritizing NATO orders, leading to delivery delays for India—such as GE Aerospace’s delayed supply of F-404 jet engines for the Tejas LCA program.
- » Severe Global Ammunition and Hardware Bottlenecks: Heavy Western consumption in ongoing regional conflicts has exhausted inventories of air defense interceptors, precision-guided munitions, and artillery rockets.
- » Rising European Reliance on US Suppliers: European allies continue to draw heavily on US defence vendors, crowding out non-NATO buyers competing for the same production lines.
- » Risk to High-Tech Military Modernization: India’s reliance on foreign original equipment manufacturers (OEMs) leaves its induction of next-generation drones, AI systems, and electronic warfare assets vulnerable to vendor diversion.



Way Ahead for India:

- » Accelerating Atmanirbharta in Next-Gen Technologies: Focus domestic R&D on crucial future warfare domains, including autonomous drones, AI, cyber defense, and electronic warfare.
- » Indigenizing Propulsion and Jet Engine Manufacturing: Fast-track domestic jet engine development programs to eliminate critical vulnerabilities in aerospace manufacturing.
- » Scaling the Domestic Defence Industrial Base (DIB): Expand domestic private and public sector manufacturing capacity for precision-guided munitions, air defense systems, and heavy artillery.
- » Strategic Diversification of Global Defense Suppliers: Maintain flexible bilateral procurement channels while insisting on complete technology transfers and local co-production models.
- » Building Strategic Raw Material Buffers: Establish national inventory reserves for critical components, microchips, and raw materials to insulate defense production from international trade shocks.

Conclusion:

The NATO Ankara Summit highlights a massive shift in global arms trade where Western nations are prioritizing their own military rearmament. For India, relying on overstretched foreign defense suppliers poses a direct risk to national security readiness. Achieving comprehensive self-reliance in critical and next-generation military technologies is essential to safeguard India's strategic autonomy.

Rice Cultivation and India's Methane Burden

A new Nature Food study found that India's irrigated paddy fields are among the world's largest methane hotspots, emitting about 3.9 million tonnes of methane annually.

India's Rice Fields as Global Methane Hotspots

- » A global assessment published in Nature Food examined greenhouse gas (GHG) emissions from rice cultivation worldwide. It found that methane emissions from flooded paddy fields, coupled with declining soil carbon storage, have made India's irrigated rice fields among the world's leading methane emission hotspots.

Key Findings:



- » **Sharp Rise in Emissions:** Global GHG emissions from paddy fields nearly doubled since the 1960s, reaching about 1.1 billion tonnes CO₂-equivalent annually (2011–2020).
- » **India Among Methane Hotspots:** India's irrigated paddy fields emit around 3.9 million tonnes of methane annually, exceeding Germany's total yearly methane emissions.
- » **Declining Soil Carbon Sink:** Paddy soils have shifted from being carbon sinks to carbon sources, with over one-third of global paddy fields now losing soil organic carbon.
- » **Higher Future Emissions:** Rice-related emissions are projected to increase by about 26% during 2031–2050, driven by climate change and intensive agricultural practices.

Romania: Gateway to Eastern Europe

President of India arrived in Romania, the final stop of her three-nation Europe tour, marking the first Indian Presidential state visit to the country in over 30 years.

Romania

- » Romania is a sovereign country located in Southeastern Europe. Historically shaped by Dacian and Roman roots, it transitioned from a communist satellite state in 1989 to a modern democratic republic. It is a full member of both NATO (since 2004) and the European Union (since 2007).
- » **Capital:** Bucharest (also the largest economic and cultural hub).
- » **Bordering Nations:** Situated in Southeastern Europe around the Transylvanian Basin and the Danube River delta, Romania is bordered by five nations and one major sea: Ukraine, Moldova, Bulgaria, Serbia, Hungary, and The Black Sea.

Key Features:

- » **Symmetrical Topography:** Divided into approximately one-third mountains, one-third hills/tablelands, and one-third fertile lowlands/plains.
- » **The Carpathian Mountains Arc:** Forms a central crescent containing:
 - **Eastern Carpathians:** Known for volcanic cones, mineral springs, and copper/lead deposits.

- Southern Carpathians (Transylvanian Alps): Contains Romania's highest peak, Mount Moldoveanu (2,544 m), and the scenic Iron Gate gorge along the Danube River.
- Western Carpathians: Rich in iron, marble, and metallic ores.
- » Transylvanian Basin & Tablelands: The elevated heartland of the country, bordered by rolling plateaus and Subcarpathian hills.
- » Fertile Chernozem Plains: The southern Walachian Plain and western plains are covered with humus-rich black soils (chernozem), making the country an agricultural powerhouse for cereals.
- » The Danube Delta: A UNESCO World Heritage site located where the Danube River empties into the Black Sea; it is Europe's second-largest river delta and a critical wetland biosphere.

Significance:

- » Romania serves as a key EU trade hub for Indian investments in IT, pharmaceuticals, automobiles, and renewable energy, supporting deeper India–EU economic ties.
- » Located on the Black Sea with the Port of Constanta, Romania is vital for regional security, supply chains, and Europe–Asia trade connectivity.
- » Umbrella Consolidation: Restructured and expanded into the present PM-YASASVI umbrella framework to cover financial assistance across all learning stages—from school level through top-tier college education.

Aim: To eliminate financial constraints and geographical barriers for students hailing from rural and economically weaker sections, ensuring equitable access to secondary and higher education through financial scholarships and quality hostel facilities.

Target Beneficiaries & Eligibility Criteria:

- » Identified Categories: Open to students belonging to Other Backward Classes (OBC), Economically Backward Classes (EBC), and Denotified, Nomadic, and Semi-Nomadic Tribes (DNT).
- » Non-Creamy Layer Requirement: Applicants must be listed in Central/State/UT lists of OBCs and fall strictly outside the creamy layer.

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- » Priority Allocation: Hostels prioritize post-matric and undergraduate students coming from rural areas lacking local colleges, with a mandatory 5% seat reservation for students with disabilities.

Key Features of the Scheme:

- » Four-Tiered Scholarship Structure: Combines four major financial assistance channels:
 - Pre-Matric Scholarship Scheme
 - Post-Matric Scholarship Scheme
 - Top Class Education in Schools Scheme
 - Top Class Education in Colleges Scheme
- » Differentiated Hostel Cost Norms: Standardizes per-seat hostel construction costs across geographic regions:
 - North Eastern Region: ₹3.50 lakh per seat.
 - Himalayan Regions: ₹3.25 lakh per seat.
 - Rest of India: ₹3.00 lakh per seat.
- » Strict Construction Timelines: Hostels must be completed within 18 months from the work order or two years from the first installment release, without project extensions.
- » Streamlined Land Utilization: Removes the need to acquire new land by permitting hostel construction within ongoing State Government projects, engineering colleges, medical campuses, polytechnics, and Saansad Adarsh Gram Yojana (SAGY) villages.
- » Performance-Linked Fund Release: Central grants are disbursed in a 3-stage 50:45:5 ratio, where the final 5% is withheld until physical occupation by OBC/EBC/DNT students is formally verified.
- » Quality & Audit Reserve: Sets aside 0.25% of the budget allocation (up to ₹10 lakh) for independent third-party quality inspections and impact evaluations.

Strategic Energy Ties: The 123 Agreement



The United States and Saudi Arabia signed a landmark civilian nuclear cooperation pact—known as a 123 Agreement—alongside a bilateral safeguards agreement.

US–Saudi 123 Agreement

- » The agreement is a bilateral framework under Section 123 of the US Atomic Energy Act of 1954. It establishes the mandatory legal baseline required for the United States to transfer significant nuclear technology, reactors, material, and expertise to a foreign nation for peaceful purposes.

Parties Involved:

- » United States: Signed by US Energy Secretary Chris Wright under the administration of President Donald Trump.
- » Kingdom of Saudi Arabia: Signed by Saudi Energy Minister Prince Abdulaziz bin Salman, backed by Crown Prince Mohammed bin Salman (MBS).

Aim: To help Saudi Arabia diversify its energy grid away from crude oil reliance, powering domestic desalination plants and air conditioning with clean atomic energy.

History & Strategic Evolution:

- » Earlier Deadlock: The US earlier insisted Saudi Arabia accept the Gold Standard (no domestic uranium enrichment/reprocessing) and normalize ties with Israel.
- » Policy Shift (2026): The new deal drops the Israel normalization condition and allows flexibility for US-supported domestic uranium enrichment.

Key Features of the Agreement:

- » US Technology Transfer: Allows US firms to supply civil nuclear reactors, components, and technical expertise.
- » Domestic Enrichment Option: Permits Saudi uranium enrichment in US-built facilities, subject to agreed safeguards.
- » Bilateral Safeguards: Includes a verification framework to ensure nuclear material is not diverted for weapons.
- » No IAEA Additional Protocol: Does not require intrusive inspections under the IAEA Additional Protocol.
- » Congressional Review: Subject to a 90-legislative-day review by the US Congress.

Implications:

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- » Domestic uranium enrichment could heighten regional proliferation concerns and fuel a potential nuclear arms race.
- » Strengthens US influence in Saudi Arabia's nuclear sector while limiting opportunities for Russia and China.

The Corruption Trap: India's Struggle Ahead

Nationwide student protests erupted—spanning Delhi's Jantar Mantar to Amritsar and Mumbai—seeking systemic accountability following high-profile paper leaks in national entrance examinations like NEET-UG.

Is Corruption the Biggest Threat to India's Future?

- » Corruption is the systemic abuse of entrusted public or private power for personal, political, or financial gain. From an ethical standpoint, corruption represents a fundamental violation of the social contract, where duty-bearers substitute public interest and administrative integrity with self-interest, thereby dismantling societal trust and institutional credibility
- » Here is a structured breakdown of the primary classification of corruption (Collusive vs. Coercive) alongside common specific forms like bribery, embezzlement, and nepotism.

Classifications of corruption:

Collusive Corruption (Mutually Beneficial):

- » Definition: Occurs when both the bribe-giver and the bribe-taker act as willing partners to secure an illegal, mutually beneficial advantage.
- » Dynamics: There is no victim between the two parties; rather, the ultimate victim is the public or the state (e.g., taxpayers or natural resources).
- » Key Characteristics:
 - High level of secrecy and mutual trust between parties.
 - Harder to detect because neither party has an incentive to report the act.
- » Example: A private company bribes a public official to secure a multi-crore infrastructure contract or bypass environmental clearance norms.

Coercive Corruption (Extortionary):



- » **Definition:** Occurs when a public official forces or harasses a citizen/business into paying a bribe to receive a service or right to which they are legally entitled.
- » **Dynamics:** The bribe-giver is an unwilling victim subjected to extortion, threats, or deliberate administrative delays.
- » **Key Characteristics:**
 - Exploits asymmetric power dynamics, disproportionately affecting poorer or marginalized sections of society.
 - The victim has a strong incentive to report if protected by whistleblower frameworks.
- » **Example:** A police officer demanding a bribe to file an official complaint (FIR), or a clerk demanding money to release a legitimate pension payment.

Data and Statistics on Corruption in Competitive Exams:

- » **Over 150 Leaks in a Decade:** Analysis reveals that more than 152 competitive and recruitment exam papers were leaked between 2016 and 2026, impacting roughly 7.5 crore aspirants across the country.
- » **Dismal Conviction Rates:** Despite over 150 reported cases of organized exam syndicates, the historical conviction rate for paper-leak mafias remains near zero, creating an environment of high profit, negligible risk.
- » **Massive Student Impact in NEET Scams:** The cancellation and re-examination of NEET-UG 2026 directly affected over 2.27 million medical aspirants, with papers allegedly sold through organized multi-state syndicates for up to ₹40 lakh.
- » **Economic Inequality in Exam Markets:** Studies show a massive demand-supply gap—nearly 23 lakh students competing for ~1 lakh MBBS seats—which has created a parallel illicit exam-leak market valued in hundreds of crores.

Causes of Corruption in India:

- » **Erosion of Institutional Integrity and Non-Transparent Appointments:** Key anti-corruption and watchdog bodies suffer from delayed, non-transparent appointments, weakening external oversight.

Example: The Lokpal spends ₹50–₹60 crore annually in public funds but has struggled to deliver high-profile convictions or functional accountability.



- » Weakening of Transparency Frameworks: Amendments to the Right to Information (RTI) Act via the Digital Personal Data Protection (DPDP) Act 2023 have widened exemption clauses, allowing bureaucrats to withhold information under the guise of personal privacy.
- » Arbitrary Protection and Sanction Barriers: Requirements like Section 17A of the Prevention of Corruption Act force investigative agencies to seek prior government permission before probing public servants, protecting corrupt officials from immediate scrutiny.
- » Endemic Judicial Delays and Poor Deterrence: The average trial time for corruption cases extends to over 88 months, making justice delayed and ensuring that corrupt actors rarely face swift, deterrent punishment.

How Corruption Harms Future Generations?

- » Violation of Distributive Justice and Meritocracy: Paper leaks and cash-for-jobs scandals replace meritocracy with financial privilege. Deserving, economically disadvantaged youth are denied rightful opportunities, eroding their faith in state probity.
- » Severe Psychological and Human Toll: Repeated exam cancellations, legal deadlocks, and institutional apathy inflict acute anxiety and despair on young citizens.

Example: Scores of NEET aspirants have committed suicide in recent years due to the psychological stress induced by exam irregularities and uncertainty.

- » Degradation of Professional Capability: When doctors, engineers, or civil servants enter crucial sectors through illicit means or leaked papers, the overall quality of public health, infrastructure, and governance severely deteriorates, posing long-term public safety risks.
- » Institutional Cynicism and Moral Decay: When the youth witness corrupt actors operating with impunity, it normalizes unethical behavior, degrading the national moral compass and weakening the democratic social contract.

Way Forward:

- » Enforcing Time-Bound Judicial Disposals: Establish dedicated fast-track courts under the Public Examinations (Prevention of Unfair Means) Act, 2024, mandating the disposal of public corruption and paper-leak cases within one year.



- » Restoring the Independence of the RTI Architecture: Rebalance the relationship between privacy rights and the public interest by modifying restrictive DPDP clauses, ensuring that citizens can access data to expose systemic wrongdoings.
- » Structural Reform of Examination Authorities: Convert testing agencies like the National Testing Agency (NTA) from registered societies into statutory bodies with permanent, specialized cadres and secure Computer-assisted Testing (CPPT) frameworks.
- » Transparent Institutional Appointments: Institutionalize transparent, merit-based, and bipartisan appointment processes for Information Commissioners, Lokpals, and heads of investigative agencies (CBI, ED) to insulate them from executive interference.

Conclusion:

Corruption is a severe moral and developmental hazard that compromises the sanctity of India's democratic institutions and victimizes its youth. Restoring public trust requires moving beyond paper promises to establish swift judicial trial frameworks, robust statutory protections, and transparent administrative oversight. Ultimately, India can realize its vision of a fair and developed nation only when meritocracy and ethical governance prevail over cronyism and institutional impunity.

BitChat Collaboration Hub

The Indian Cyber Crime Coordination Centre (I4C), under the Ministry of Home Affairs, directed GitHub to remove three repositories hosting BitChat.

BitChat Repositories

BitChat is an open-source, decentralized, peer-to-peer (P2P) messaging application developed to operate completely without internet connectivity, cellular networks, or central servers. The repositories on GitHub host its source code and Android installation release files.

Conceived & Developed By: Conceived by Doris Lima and developed by Jack Dorsey (co-founder of Twitter/X and CEO of Block).

How It Works?

- » Device-to-Device Mesh Networking: Uses Bluetooth Low Energy (BLE) to discover nearby devices (within ~30 to 100 meters). Each device acts as both a

client and a relay node, hopping encrypted messages across a chain of smartphones until reaching the intended recipient.

- » Dual-Transport Layer: Integrates local BLE mesh connections with the decentralized, internet-based Nostr protocol whenever global internet connectivity becomes available.

Key Features:

- » Complete Infrastructure Independence: Functions seamlessly during total internet blackouts, natural disasters, or network throttling.
- » Zero Registration & Full Anonymity: Does not require phone numbers, email addresses, central accounts, or mandatory user verification.
- » End-to-End Encryption: Messages are secured using the Noise Protocol Framework, ensuring intermediate relay nodes cannot read or modify the payload.
- » Absence of Centralized Logs: Operates without central servers, leaving no centralized communication logs or subscriber databases for law enforcement to subpoena.
- » Ephemeral Data & Panic Mode: Features automated message deletion and quick data-wiping triggers to protect user data from physical seizure.

Implications:

- » Reduced Lawful Interception: Lack of user verification and central logging makes subscriber identification and criminal investigations more difficult.
- » Bypassing Public Order Measures: Mesh-based communication can facilitate coordination during internet shutdowns and evade lawful surveillance.
- » Due Process Concerns: Critics contend that invoking Section 79(3)(b) instead of Section 69A of the IT Act bypasses procedural safeguards and judicial oversight established by Shreya Singhal and Anuradha Bhasin.

Business Responsibility Scheme

The Indian Institute of Corporate Affairs (IICA) Shillong organized an awareness webinar on the Corporate Mitra Scheme for youth, students, and MSMEs in Arunachal Pradesh.

The Corporate Mitra Scheme

- » The Corporate Mitra Scheme is a central initiative designed to create a certified cadre of trusted, trained para-professionals known as Corporate Mitras. These



individuals provide accessible and affordable business compliance, accounting, and advisory services to Micro, Small, and Medium Enterprises (MSMEs).

Ministry: Ministry of Corporate Affairs (MCA), Government of India.

Aim: To empower MSMEs in Tier-2 and Tier-3 cities by reducing their regulatory and secretarial compliance burden, enhancing Ease of Doing Business (EODB), and equipping young graduates with practical, industry-relevant skills to foster employment.

Key Features of the Scheme:

- » Target Capacity: Initial pan-India target of 2,000 participants, with 200 seats reserved exclusively for the North Eastern Region (NER).
- » Financial Concessions for NER: Candidates from the North Eastern states receive a 50% fee concession on registration and training fees.
- » Scope of Services: Accredited Corporate Mitras handle non-core business operations for MSMEs, including regulatory filings, secretarial compliance, basic accounting, tax filings, financial documentation, and governance-related tasks.
- » Digital Training Integration: The formal 'Corporate Mitra' training course is hosted and accessible through the government's Swayam Plus educational portal.
- » Skill Development Bridge: Bridges the gap between academic education and industry needs by training young graduates to work as qualified para-professionals for local businesses.

Significance:

- » By outsourcing compliance to certified Corporate Mitras, MSMEs can reduce regulatory burdens, avoid penalties, and focus on business growth.
- » Creates skilled employment for graduates in the Northeast by training them as Corporate Mitras, supporting entrepreneurship and Viksit Bharat @ 2047.

India's Sovereign Stand: Rejecting Dependency

Renewed debates over India's China policy have emerged amid the Trump administration's shifting trade and strategic approach, prompting calls from sections of industry to normalize economic ties with China.

Do Not Surrender to China, Do Not Depend on the U.S

- » The strategic dilemma highlights New Delhi's complex foreign policy choice between two global powers: an erratic United States and an actively hostile China. India faces pressure from domestic business lobbies urging an economic reset

General Studies, Political Science and International Relations, Sociology, CSAT



with Beijing due to supply chain reliance, while simultaneously navigating transactional US policies under the Trump administration—including tariffs and stricter H-1B visa

Background:

- » **U.S. Policy Shifts & Friction:** The Trump administration imposed punitive tariffs on Indian steel and aluminum, stripped India's preferential trade status, tightened H-1B visa rules, and renewed diplomatic ties with Pakistan.
- » **Decade of Chinese Aggression:** China has consistently challenged Indian sovereignty through border incursions across the Line of Actual Control (LAC)—notably in Depsang (2013), Chumar (2014), Doklam (2017), and Galwan (2020).
- » **Economic Coercion & Dependence:** India remains heavily reliant on Chinese active pharmaceutical ingredients (APIs), machinery, industrial inputs, and rare earths, leading to an annual trade deficit exceeding \$100 billion.
- » **Sino-Pak Security Nexus:** During Operation Sindoor (May 2025), Beijing provided real-time tactical satellite data and intelligence to Islamabad, reinforcing its active support for Pakistan's security framework against India.

Critique of the Corporate Push for a China Reset:

- » **Focus on Short-Term Gains:** Corporate lobbies prioritize immediate balance-sheet profits—seeking cheap capital, machinery, and active pharmaceutical ingredients—over long-term national security.
- » **Disregarding Border Realities:** Proponents of a reset ignore a dozen years of deliberate Chinese Communist Party (CCP) aggression, treating international trade as an apolitical transaction.

Example: Overlooking PLA salami-slicing tactics across the LAC and the renaming of features in Arunachal Pradesh.

- » **Ignoring Economic Coercion:** A hasty reset overlooks China's history of abruptly cutting off critical components during diplomatic disputes.

Example: Beijing's weaponization of its monopoly over rare earths and tunnel-boring machines.

- » **Disregarding Anti-India Diplomatic Acts:** Corporate advocates ignore Beijing's active collusion against Indian interests in multilateral forums.



Example: China's use of its UNSC veto to block sanctions on Pakistan-based terrorist networks and stall India's entry into the NSG.

The Pitfalls of Unilateral Economic Relaxation:

- » Subsidizing Encirclement: Opening Indian markets to Chinese capital without resolving border disputes expands China's trade surplus and funds its strategic posture against India.
- » Providing an Economic Kill-Switch: Re-establishing deep industrial dependencies gives Beijing leverage to paralyze Indian manufacturing during future military or political crises.
- » Surrendering Diplomatic Leverage: Dismantling post-Galwan restrictions on Chinese apps, telecom infrastructure, and FDI without receiving territorial concessions amounts to unilateral diplomatic disarmament.
- » Encouraging Chinese Dominance: Relaxing economic defenses signals vulnerability to Beijing, allowing it to dictate terms on border settlements from a position of economic strength.

The Illusion of Relying on the United States:

- » Unpredictable Policy Shifts: Washington's foreign policy remains transactional, with strategic priorities shifting rapidly based on domestic political calculations.

Example: The imposition of steel/aluminum tariffs and tighter H-1B visa quotas under the Trump administration despite diplomatic outreach.

- » Risk of Bilateral Deals: Washington's history of sudden tactical shifts creates the risk that it could negotiate separate agreements with adversary states, leaving partners exposed.

Example: The rapid renewal of high-level engagements with Islamabad despite India's regional security concerns.

- » Absence of Ultimate Security Guarantees: Despite diplomatic engagement through officials like envoy Sergio Gor, the U.S. will not act as a primary security guarantor on India's land borders.

Example: India stands alone in managing border standoffs along the high-altitude terrain of Eastern Ladakh.



- » **Pragmatic Self-Reliance:** Acknowledging Washington's unreliability does not require drifting into an economic embrace with Beijing; India must maintain a balanced, self-reliant position between both powers.

Way Forward for India:

- » **Exercise Strategic Patience:** Maintain a firm, non-compromising posture along the LAC and in economic regulations until China demonstrates genuine, verifiable diplomatic reciprocity.
- » **Fortify Domestic Manufacturing:** Accelerate supply chain resilience and build domestic industrial capabilities for critical inputs, APIs, and high-tech components, accepting short-term inflationary costs for long-term security.
- » **Diversify Global Trade Networks:** Deepen economic, technological, and defense ties with alternative reliable partners across Europe, East Asia, and the Global South.
- » **Preserve Strategic Autonomy:** Resist the pressure to align completely with any power block, ensuring that India maintains the sovereign capacity to walk straight on its own terms.

Conclusion:

India's path to global leadership requires resisting short-term corporate pressures and navigating superpower rivalry without sacrificing its core territorial and economic sovereignty. By fortifying domestic manufacturing and maintaining firm leverage, New Delhi can safeguard its strategic dignity and secure its position in an evolving multipolar order.

National Council for Biodiversity Management

Following directions from a suo motu proceeding by the National Green Tribunal (NGT), the National Biodiversity Authority (NBA) constituted a multi-disciplinary Expert Committee on Invasive Alien Species.

The National Biodiversity Authority (NBA)

- » The National Biodiversity Authority (NBA) is an autonomous statutory body under the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India. It performs regulatory, advisory, and facilitative functions to safeguard India's biological resources and associated traditional knowledge.

Origin:

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- » Established: October 1, 2003.
- » Statutory Mandate: Formed by the Central Government to implement the provisions of the Biological Diversity Act, 2002 (following India's ratification of the UN Convention on Biological Diversity in 1992).

Aim: To ensure the conservation of biological diversity, promote the sustainable use of its components, and secure the fair and equitable sharing of benefits arising from the utilization of biological resources (Access and Benefit Sharing – ABS).

Key Functions:

- » Advising the Central Government: Provides strategic recommendations to the Union Government on biodiversity conservation, sustainable utilization, and fair benefit-sharing mechanisms.
- » Notification of Biodiversity Heritage Sites: Advises state governments on selecting and notifying areas of significant ecological importance as Biodiversity Heritage Sites under Section 37 of the Act.
- » Regulation of Intellectual Property & Commercial Access: Regulates and grants prior approvals under Sections 3, 4, and 6 of the Act for foreign individuals or entities seeking access to Indian biological resources, research transfers, or obtaining Intellectual Property Rights (IPR) based on biological material.
- » Overseeing Decentralized State Boards (SBBs): Coordinates with 28 State Biodiversity Boards (SBBs) that regulate commercial utilization and bio-surveys by Indian citizens within their respective territories.
- » Empowering Local Biodiversity Management Committees (BMCs): Oversees approximately 2.76 lakh local-level BMCs set up at panchayat and municipal levels, responsible for chronicling local traditional knowledge via People's Biodiversity Registers (PBR).
- » Constituting Expert Committees: Exercises statutory powers to form multi-disciplinary expert panels (such as the newly constituted panel on Invasive Alien Species) to address emergent national ecological risks.

Significance:

- » Prevents biopiracy by regulating access to India's biological resources and ensuring benefits are shared with local communities.



- » Supports India's commitments under the Convention on Biological Diversity (CBD) and the Kunming–Montreal Global Biodiversity Framework.

Quantum Leap in Cancer Vaccine Design

Researchers at the Technical University of Denmark (DTU) have demonstrated that combining artificial intelligence (AI) with a photonic quantum computer can improve the design of immune peptides for personalized cancer vaccines.

Can Quantum Computing Make AI Better at Designing Cancer Vaccines?

- » It is a quantum-AI hybrid approach where a photonic quantum computer generates structured quantum randomness that enhances an AI model's ability to design immune peptides for cancer vaccines.
- » The technology aims to improve peptide discovery, especially for rare Human Leukocyte Antigen (HLA) types used in personalized immunotherapy.

How Quantum Computing Works?

- » **Qubit-Based Processing:** Unlike classical computers that rely on binary bits (0 or 1), quantum computers utilize qubits that can exist in a superposition of both 0 and 1 simultaneously.
- » **Photonic Quantum Information:** Photonic processors use individual light particles (photons) as qubits to encode, transmit, and process computational data.
- » **Wave Interference Dynamics:** Quantum processors allow photons to physically interfere with one another, generating complex, correlated mathematical distributions rather than independent classical random numbers.
- » **Exploration of High-Dimensional Spaces:** The resulting quantum interference produces structured starting points that push AI models to sample broader, non-obvious areas of complex sequence spaces.

Role of Quantum AI in Developing Cancer Vaccines:

- » **Navigating Enormous Sequence Haystacks:** Peptides consist of short chains of amino acids with hundreds of billions of theoretical sequence combinations; quantum AI narrows this search space down to functional candidates.
- » **Unlocking Rare and Understudied HLA Alleles:** Common AI predictors perform well on well-documented HLA profiles but struggle on rare ones; quantum starting distributions significantly boost prediction accuracy for data-poor HLA types.



- » **Optimizing Peptide-HLA Binding:** The hybrid system generates peptides designed to sit stably inside the structural groove of HLA display shelf molecules, ensuring successful recognition by patrolling immune cells.
- » **Accelerating Personalized Neoantigen Vaccines:** By rapidly predicting custom binders for patient-specific tumor mutations, the platform supports the creation of targeted, individualized cancer immunotherapies.

Key Limitations:

- » **Does Not Demonstrate Full Quantum Advantage:** Current experiments use small-scale quantum processors that classical supercomputers can still mathematically simulate, meaning full quantum supremacy has not yet been reached.
- » **Binding Does Not Guarantee Immunogenicity:** Successfully binding a peptide to an HLA molecule in a laboratory dish is only the initial step; it does not automatically guarantee that the peptide will trigger an active T-cell immune response in a living patient.
- » **Need for Hardware Scaling:** The practical advantages of the platform rely on scaling up to larger, fault-tolerant quantum processors and higher-parameter generative AI architectures.
- » **Potential Classical Model Competition:** Advanced classical algorithms or optimized probability distributions could potentially achieve similar sequence exploration, making further benchmarking necessary.

Significance of the Research:

- » **Democratic Coverage for Underrepresented Populations:** Improves therapeutic peptide design for rarer, understudied HLA genetic variants that are often neglected by conventional data-heavy AI models.
- » **Real-World Laboratory Validation:** The DTU team synthesized and experimentally verified top candidate peptides, achieving high binding stability across challenging HLA targets.
- » **A New Hybrid Computing Framework:** Establishes a scalable blueprint for combining classical machine learning with NISQ (Noisy Intermediate-Scale Quantum) devices to solve complex biological challenges.



- » Broad Applications Beyond Oncology: The workflow can be expanded to design vaccines for emerging viral pathogens, autoimmune conditions, and hard-to-target protein families.

Conclusion:

Combining photonic quantum computing with generative AI represents a promising advance in computational biology and personalized medicine. By replacing classical randomness with quantum correlations, researchers can more effectively navigate complex biomolecular structures and design therapies for underrepresented genetic profiles. As quantum hardware scales further, this hybrid pipeline could accelerate the development of personalized neoantigen cancer vaccines from initial discovery to clinical implementation.

Sarnath Recognized A Global Buddhist Heritage

At the 48th Session of the World Heritage Committee in Busan, South Korea, India's official nomination Ancient Buddhist Site of Sarnath was inscribed on the UNESCO World Heritage List.

- » It marks India's 45th World Heritage property, placing the nation 6th globally and 2nd in the Asia-Pacific region for total UNESCO sites.

Ancient Buddhist Site of Sarnath Inscribed in the UNESCO World Heritage List

- » The Ancient Buddhist Site of Sarnath is a serial World Heritage property preserving one of the four principal destinations of Buddhist pilgrimage.
- » It was inscribed under UNESCO criteria (iii) for its enduring spiritual tradition and criteria (vi) for its direct association with pivotal events in the life of Gautama Buddha—specifically his first sermon (Dharmachakra pravartana) and the establishment of the Buddhist Sangha.

Geographical Location:

Located within Varanasi, Uttar Pradesh, India. The serial property comprises two primary components:

- » Chaukhandi Stupa
- » Archaeological Remains of Sarnath (encompassing Dhamekh Stupa, Dharmarajika Stupa, Mulagandhakuti Vihara, and the Ashokan Pillar site).

History & Sacred Context:

General Studies, Political Science and International Relations, Sociology, CSAT



- » Ancient Nomenclature: Known historically in Buddhist literature as Rishipatana, Ishipatana, and Mrigadava.
- » The First Sermon (6th Century BCE): Gautama Buddha visited Sarnath in the 6th century BCE to deliver his first sermon, Turning of the Wheel of the Law (Dharmachakra pravartana), introducing the principles of the Noble Eightfold Path and the concept of Triratna.
- » Multifaceted Patronage & Decline: Evolved over centuries through royal, monastic, and lay patronage from the pre-Mauryan era (5th–4th century BCE) up to its decline and destruction in the 12th century CE.
- » Rediscovery & ASI Excavations: Fell into obscurity until its rediscovery in the 18th century. For over 150 years, the Archaeological Survey of India (ASI) has conducted excavations revealing a continuous, stratified settlement spanning 16 centuries.

Architectural & Archaeological Features:

- » Dhamekh & Chaukhandi Stupas: Massive structural stupas marking sacred spots where the Buddha met his first disciples and delivered core teachings.
- » Mauryan Ashokan Pillar & Lion Capital: Features the historic Mauryan-era pillar carved from polished sandstone. Its polished Lion Capital, excavated during 1904–1906, was later adopted as the National Emblem of India.
- » Monastic Ensembles (Viharas): Preserved brick foundations of ancient monasteries, temples, and Mulagandhakuti Vihara, showcasing structural evolution across Mauryan, Kushan, and Gupta periods.
- » Classic Gupta Art: Yielded world-famous Masterpieces of Gupta art, including the Dharmachakrapravartana Buddha statue, currently housed at India's earliest site museum established in Sarnath in 1904.

Threatened Treasures of Humanity

At the 48th World Heritage Committee session in Busan, South Korea, UNESCO inscribed new cultural and natural sites on the World Heritage List and added six vulnerable sites to the List of World Heritage in Danger.

UNESCO's List of World Heritage in Danger

- » The List of World Heritage in Danger is an international conservation mechanism established under the 1972 World Heritage Convention.



- » It highlights World Heritage properties threatened by severe risks—such as armed conflict, natural disasters, rapid urbanization, poaching, or pollution—enabling UNESCO to allocate emergency technical assistance, mobilize global conservation resources, and urge member states to take corrective action.

Six New Sites Added to UNESCO's List of World Heritage in Danger:

Inscribed on an Emergency Basis:

- » Boma-Badingilo Migratory Landscape:
 - Location: South Sudan
 - Key Features: A vast East African savanna ecosystem that hosts the world's largest terrestrial mammal migration. It reflects rich cultural and herding traditions across diverse local ethnic groups.
 - Primary Threats: Commercial poaching, wildlife trafficking, infrastructure development, persistent local insecurity, and limited institutional capacity.
- » Mount Amel Castles:
 - Location: Southern Lebanon
 - Key Features: A network of five hilltop fortresses—including Beaufort, Toron, Dubieh, Maron, and Chama'—illustrating the evolution of regional defensive systems from the Crusades and Islamic dynasties through the 19th century.
 - Primary Threats: Heavy damage and ongoing structural jeopardy caused by active regional military conflicts.
- » Sebastia:
 - Location: State of Palestine (near Nablus, West Bank)
 - Key Features: Preserves continuous archaeological layers from the 9th century BCE (when Samaria-Sebaste was the capital of the northern Kingdom of Israel) through Hellenistic, Roman, Byzantine, Crusader, and Ottoman Throne Village periods.



- Primary Threats: Planned land expropriation for national park projects, conflict impacts, development pressure, and site erosion.

Inscribed Upon Committee Recommendation:

- » Ancient City of Tauric Chersonese and its Chora:
 - Location: Autonomous Republic of Crimea, Ukraine
 - Key Features: An ancient Greek city and its agricultural hinterland along the Black Sea coast.
 - Primary Threats: Lack of state conservation oversight due to temporary Russian military occupation, coupled with integrity loss from unauthorized construction and unmonitored excavations.
- » Historic Inner City of Paramaribo:
 - Location: Suriname
 - Key Features: A former Dutch colonial trading town featuring a distinct blend of European architecture and native South American materials.
 - Primary Threats: Modern high-density construction projects (such as a new National Assembly hall and multi-story parking garage) built without heritage impact assessments, compromising its historic urban landscape.
- » Tyre:
 - Location: Lebanon
 - Key Features: An ancient Phoenician island-city famed for its historic harbor, Roman hippodrome, and monumental ruins.
 - Primary Threats: Direct structural jeopardy and potential destruction arising from ongoing regional armed hostilities.

Task Force for Fairer Exams: Nilekani's Vision

Context: Prime Minister of India announced the formation of a high-powered task force on examination reforms under the leadership of Infosys co-founder Nandan Nilekani to strengthen the credibility, and technology-driven conduct of public examinations.

General Studies, Political Science and International Relations, Sociology, CSAT



The Nandan Nilekani-led Task Force on Examination Reforms

- » The Nandan Nilekani-led Task Force on Examination Reforms is a high-level multidisciplinary committee constituted by the Government of India to recommend structural and technological reforms for conducting secure, transparent, and reliable public examinations, particularly those conducted by the National Testing Agency (NTA).

Members:

- » Chairperson: Nandan Nilekani (Co-founder, Infosys)
- » Members:
 - Dr. S. Somnath (Former Chairman, ISRO)
 - Tapan Deka (Former Director, Intelligence Bureau)
 - Prof. V. Kamakoti (Director, IIT Madras)
 - Anita Karwal (Former Education Secretary)
 - Amrit Lal Meena (Logistics Expert)

Aim: To recommend technology-enabled and systemic reforms that enhance the integrity, security, transparency, and credibility of India's public examination system.

Key Features:

- » **Technology Integration:** Recommends greater use of advanced technologies to strengthen examination security, monitoring, and evaluation.
- » **Structural Reforms:** Suggests systemic improvements in examination processes to eliminate paper leaks and organized malpractice.
- » **Focus on NTA Examinations:** Reviews examination mechanisms conducted by the National Testing Agency and proposes robust safeguards.
- » **Expert-Led Multidisciplinary Approach:** Brings together experts from technology, education, internal security, logistics, and scientific institutions for comprehensive reforms.

Significance:

- » Enhances the credibility of competitive examinations by promoting fairness, transparency, and accountability.



- » Supports secure and technology-driven examination systems, reducing opportunities for paper leaks and examination fraud.

The Kimi K3 Model: Future of Machine Learning

Following a mobile internet shutdown in Central Delhi during the Cockroach Janta Party's (CJP) 'Chalo Sansad' protest, concerns have been raised over the use of internet shutdown powers under the Telecommunications Act, 2023.

Internet Shutdowns in India

What It Is?

- » An internet shutdown is an intentional, state-ordered disruption of telecommunications or digital communications. It renders internet services inaccessible or unusable within a specific geographic location—ranging from throttling network bandwidth and blocking targeted social platforms to executing complete network blackouts.

Governing Statutory Provisions & Constitutional Articles:

- » Constitutional Rights: As affirmed by the judiciary, shutdowns directly impact Article 19(1)(a) (Freedom of Speech and Expression), Article 19(1)(g) (Right to Practice Trade/Profession), and Article 21 (Right to Life and Personal Liberty).
- » Statutory Framework: Governed under Section 20(2)(b) of the Telecommunications Act, 2023 and the Telecommunications (Temporary Suspension of Services) Rules, 2024.

Procedure for Ordering a Shutdown:

- » Threshold Mandate: Suspensions can only be issued during a proven public emergency or in the interest of public safety to maintain public order. A peaceful protest alone does not meet the statutory threshold.
- » Competent Authority Directive: Orders must be formally issued in writing by authorized executive officials.
- » Proportionate & Reasoned Orders: The order must clearly document written reasons, state why less restrictive measures were insufficient, specify targeted cell sites or geographical boundaries, and be made publicly accessible for judicial review.

- » **Mandatory Review Committee Oversight:** Every order must be submitted to a designated Review Committee within statutory timelines to evaluate its necessity and proportionality.

Key Legal Features:

- » **Strict Temporal Limit:** Under the Telecommunications Suspension Rules, 2024, an individual suspension order cannot remain in force for more than 15 days. Indefinite suspensions are legally invalid.
- » **Proportionality and Targeted Scope:** Orders must adhere to the principle of least restrictive means, restricting shutdowns to specific cell sites rather than blanket regional blackouts whenever feasible.
- » **Judicial Reviewability:** Citizens and organizations retain the right to challenge suspension orders in High Courts (Article 226) or the Supreme Court (Article 32) on grounds of procedural illegality or arbitrariness.
- » **Prohibition of Procedural Bypassing:** State authorities cannot invoke repealed statutes (the Indian Telegraph Act, 1885 or 2017 Rules) to sidestep the stricter review safeguards mandated by the 2024 framework.

Supreme Court Guidelines (Anuradha Bhasin v. Union of India, 2020):

- » **Fundamental Right Status:** Recognized that freedom of speech and the right to carry out trade or business over the internet are constitutionally protected under Articles 19(1)(a) and 19(1)(g).
- » **Proportionality Test:** Ruled that broad, complete network suspensions are permissible only as an unavoidable last resort. Any order must satisfy tests of necessity, legality, and proportionality.
- » **Prohibition of Indefinite Bans:** Declared indefinite internet shutdowns unconstitutional.
- » **Mandatory Publication:** Directed that all shutdown orders and their underlying justifications must be published to allow affected citizens to challenge them before courts of law.

Empowered Villages Initiative

Union Minister of Panchayati Raj, launched the Atmanirbhar Panchayat Programme and the SAMARTH Panchayat Portal.

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The Atmanirbhar Panchayat Programme

- » An initiative by the Ministry of Panchayati Raj anchored under the Rashtriya Gram Swaraj Abhiyan (RGSA). It assists Gram Panchayats and Block Panchayats in identifying idle local assets and untapped opportunities, converting them into bankable, revenue-generating projects.

Ministry: Ministry of Panchayati Raj, Government of India.

Aim: To build sustainable Own Sources of Revenue (OSR) for Panchayati Raj Institutions, reducing their fiscal dependency on central and state grants.

Key Features:

- » Project Scale & Phasing: Targets the development of 350 projects over 4 years (50 projects in Year 1, followed by 100 projects annually in Years 2, 3, and 4).
- » Eligibility Thresholds: Open to Gram Panchayats with a minimum annual OSR of ₹50 lakh and Block Panchayats with a minimum annual OSR of ₹1 crore, provided they have at least 3 years of tenure remaining (with relaxed criteria for Special Category States).
- » Technical Guidance: Offers dedicated technical assistance from the Ministry to structure local ideas into commercially viable, bankable project proposals.
- » Diversified Financing: Leverages blended finance models including Public-Private Partnerships (PPP), Corporate Social Responsibility (CSR) contributions, scheme convergence, and institutional bank credit.

What It Is?

- » The SAMARTH Panchayat Portal is a unified, configurable national digital platform designed for end-to-end management of Own Sources of Revenue (OSR) for Gram Panchayats.
- » Aim: To digitize, streamline, and standardize the complete OSR lifecycle—improving fiscal transparency, tax collection efficiency, and accountability in rural tax administration.

Key Features:

- » Complete End-to-End Lifecycle Management: Handles taxpayer registration, automated demand notice generation, online digital payment processing, receipt collection, and real-time revenue monitoring.



- » **Standardization of Local Taxes:** Digitizes local revenue streams including property taxes, user charges, trade licenses, and non-tax fees.
- » **Proven Onboarding Track Record:** Already active in Chhattisgarh and Himachal Pradesh, with over 51 lakh taxpayers registered, demand notices worth ₹95 crore generated, and more than ₹27 crore collected.
- » **Phased Pan-India Expansion:** Onboarding is currently underway across Maharashtra, Mizoram, Assam, Haryana, West Bengal, and Uttar Pradesh.

Exploring the Fabric of Reality

CERN officially switched off the Large Hadron Collider (LHC) to begin its 4-year Long Shutdown 3 (LS3).

- » The temporary pause allows engineers to perform a major \$1.5 billion hardware upgrade, transforming the machine into the High-Luminosity LHC (HL-LHC).

Large Hadron Collider (LHC)

- » The Large Hadron Collider (LHC) is the world's largest, highest-energy, and most powerful particle accelerator. Built by the European Organization for Nuclear Research (CERN), it accelerates subatomic particles (protons or heavy lead ions) to near the speed of light and smashes them together to study fundamental physics and the origin of the universe.

Location:

- » **Geographic Site:** Built in a circular underground tunnel situated approximately 100 meters (328 feet) beneath the France–Switzerland border near Geneva.
- » **Facility:** Governed and operated by CERN (European Organization for Nuclear Research).

How It Works?

- » **Particle Injection & Acceleration:** Protons are separated from hydrogen gas, fed into a chain of pre-accelerators, and injected into two ultra-high vacuum beam pipes traveling in opposite directions.
- » **Superconducting Magnetic Guidance:** Over 1,200 dipole magnets—chilled to -271.3°C (-456°F) using liquid helium—generate powerful magnetic fields to bend and focus particle beams as they approach 99.9999991% of the speed of light.



- » Collision & Detection: Quadrupole magnets squeeze the beams together at four designated collision points, where massive particle detectors (ATLAS, CMS, ALICE, and LHCb) record subatomic debris from millions of collisions per second.

Key Features:

- » 27-Kilometer Superconducting Ring: Features a 26.7 km circular tunnel housing over 9,000 superconducting magnets cooled to temperatures colder than deep outer space (-271.3°C).
- » Massive Energy Output (13.6 TeV): Operates at record collision energies up to 13.6 Teraelectronvolts (TeV), creating thermal conditions similar to those fractionally after the Big Bang.
- » Discovery of the Higgs Boson (2012): Famous for experimentally confirming the Higgs Boson (God Particle) in 2012, completing the theoretical framework of the Standard Model of particle physics.
- » Four Flagship Detector Experiments: Houses four giant subterranean detection stations—ATLAS, CMS, ALICE, and LHCb—each specialized in probing dark matter candidates, antimatter asymmetry, and quark-gluon plasma.
- » Global Science Collaboration: Built and operated by an international network of over 10,000 scientists and engineers across more than 100 countries.

Why It Is Shutting Down (Long Shutdown 3)?

- » Transitioning to High-Luminosity LHC (HL-LHC): Over the 4-year shutdown period, engineers will replace 1.2 kilo meters of the tunnel to install new superconducting niobium-tin quadrupole magnets, advanced crab cavities, and updated subdetectors.
- » 10x Increase in Luminosity & Data Generation: The upgrade will increase collision rates from 60 to up to 200 simultaneous collisions per beam crossing.
- » Unlocking Dark Matter & Beyond-Standard-Model Physics: Boosting total collision data by ten times enables physicists to study extremely rare subatomic events, measure Higgs boson properties with unprecedented accuracy, and search for dark matter particles when operations resume in 2030.

India's Journey to Green Transit

The Ministry of Power circulated the third draft notification of the Corporate Average Fuel Efficiency (CAFE) III norms for public and industry consultation.

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- » Administered through the Bureau of Energy Efficiency (BEE) under the Energy Conservation Act, 2001, the proposed rules set tighter fleet-wide carbon emission limits for passenger vehicles for the FY2027–28 to FY2031–32 period.

India's Road to Cleaner Mobility

- » India's road to cleaner mobility represents the strategic regulatory, technological, and industrial transition of its transport sector away from internal combustion engines (ICE) reliant on fossil fuels toward electrified, hybrid, and alternative fuel powertrains.
- » Rather than operating as a simple environmental check, Corporate Average Fuel Efficiency (CAFE) standards establish sales-weighted average CO₂ emission targets across an automaker's entire annual fleet.

Key Data and Statistics on Mobility in India

- » CAFE III Carbon Reduction: The proposed CAFE III framework aims to lower fleet-wide average CO₂ emissions from roughly 113 gCO₂/km to 77 gCO₂/km by FY2031–32 (3.327 litres/100 km).
- » Lagging EV Penetration: According to the IEA Global EV Outlook 2026, electric vehicles represented roughly 4% of total new passenger car sales in India in 2025, compared to nearly 55% in China, 27% in the EU, and 10% in the US.
- » Voluntary Industry EV Targets: Major domestic Original Equipment Manufacturers (OEMs) have voluntarily pledged to achieve an average 20%–30% EV share by 2030, outpacing current regulatory minimums.
- » Low Bureau Credit Buyout Pricing: Under the draft rules, companies facing credit shortfalls can purchase compliance credits directly from the Bureau of Energy Efficiency (BEE) starting at ₹2,500 per gCO₂/km in FY2028 and rising to ₹4,500 by FY2032—less than half the standard penalty threshold mandated under the Energy Conservation Act (~₹5,000/gCO₂).

Need for Clean Mobility in India:

- » Mitigating Severe Macroeconomic and Crude Import Risks: India imports the vast majority of its crude oil, leaving its balance of payments vulnerable to West Asian conflict and global fuel shocks.

Example: Recent West Asian maritime chokeholds caused domestic fuel price spikes and imported inflation.

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- » **Curbs on Severe Urban Air Pollution:** Transportation remains a primary contributor to fine particulate matter (PM_{2.5}) and greenhouse gas accumulation in major metropolitan areas.

Example: Northern city clusters regularly top global toxic air quality indices during winter months.

- » **Industrial Competitiveness and Future-Proofing:** Establishing strong domestic EV and hybrid supply chains prevents Indian automakers from falling behind global technological shifts.

Example: China's early adoption of dual-credit policies created a manufacturing sector that exported over 13 million electric vehicles in 2025.

- » **Fulfilling International Climate Commitments:** Reducing transport sector emissions is necessary to meet India's Panchamrit targets announced at COP26 (Glasgow), including lowering economy-wide carbon intensity.

Example: Progressively reducing transport emissions directly supports India's goal of achieving net-zero emissions by 2070.

Initiatives Taken So Far:

- » **Rollout of Progressive CAFE Standards:** Implemented CAFE-I (FY2017–18) and CAFE-II (FY2022–23) standards, and introduced the Draft CAFE-III (FY2027–32) notification administered by the Bureau of Energy Efficiency (BEE).
- » **Demand and Infrastructure Subsidies (FAME & PM E-DRIVE):** Launched central incentive programmes—including the FAME Scheme and PM E-DRIVE—to subsidize public charging infrastructure and reduce the upfront cost of electric two-wheelers, three-wheelers, and four-wheelers.
- » **Production-Linked Incentive (PLI) Schemes:** Allocated public funds under the PLI Scheme for Automobile & Auto Components and Advanced Chemistry Cell (ACC) Battery Storage to promote domestic manufacturing.
- » **Biofuel and Ethanol Blending Programme:** Accelerated the national target of E20 (20% ethanol blending with petrol), providing carbon-neutrality compliance benefits for flex-fuel vehicles.

Challenges Associated with the Transition:

- » **Excessive Regulatory Flexibility Diluting Targets:** Compliance mechanisms—such as Carbon Neutrality Factors for E20, multi-year block averaging, and super-

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credits—allow automakers to meet targets without significant shifts toward zero-emission technologies.

Example: Strong hybrids receive super-credit multipliers despite relying primarily on internal combustion engines.

- » Low Buyout Prices Acting as an Easy Way Out: Allowing OEMs to purchase emission credits directly from the BEE at ₹2,500–₹4,500 per gCO₂/km makes compliance cheaper than investing in cleaner technologies.

Example: The statutory penalty under the Energy Conservation Act exceeds ₹5,000 per gCO₂, making the BEE buyout a lower-cost alternative.

- » Lower Fuel Efficiency with High Ethanol Blends: While E20 provides compliance incentives, ethanol's lower energy density reduces vehicle mileage and increases consumer fuel expenditure.

Example: Vehicle owners experience lower fuel efficiency on E20 petrol without a corresponding reduction in fuel prices.

- » Inequitable Credit Ecosystem (Lack of Dual-Credit Penalties): Unlike China's Dual Credit System, India's framework allows efficient petrol or CNG fleets to offset the absence of electric vehicle production.

Example: OEMs selling large volumes of small petrol or CNG cars can meet fleet targets without introducing EVs.

Way Forward:

- » Adopting a Dual-Credit System Modeled on China: Separate Corporate Average Fuel Consumption (CAFC) requirements from mandatory New Energy Vehicle (NEV) credit targets to encourage faster electrification.
- » Aligning Credit Buyout Prices with Statutory Penalties: Raise the BEE's credit buyout price above the Energy Conservation Act penalty threshold of ₹5,000 per gCO₂/km to discourage simple buyouts.
- » Rationalizing Super-Credits and Ethanol Compliance Discounts: Tighten super-credit multipliers for hybrids and align ethanol-related incentives with verified real-world emission reductions.

- » Transitioning to Real-World WLTP Testing Standards: Shift from the Modified Indian Driving Cycle (MIDC) to the Worldwide Harmonised Light Vehicles Test Procedure (WLTP) for more accurate real-world emission measurement.

Conclusion:

India's CAFE III standards present a significant opportunity to modernize the automobile sector and strengthen long-term energy security. However, regulatory loopholes such as low-cost credit buyouts and excessive incentives for partial electrification could weaken the transition to zero-emission mobility. A stricter and technology-driven regulatory framework is essential to build a globally competitive and sustainable automotive industry.

Technology Meets Informal Women Workers

Renewed attention was drawn to the need for ensuring that AI productivity gains benefit informal women workers. Without gender-responsive AI governance and design, digital expansion could deepen existing inequalities.

AI & India's Informal Women Workers

- » Integrating AI with India's informal female workforce involves leveraging technologies such as real-time advisory platforms, natural language processing, and automated decision-making to enhance productivity across agriculture, domestic work, and micro-enterprises.
- » Rather than replacing labor, gender-responsive AI can democratize economic opportunity by tailoring digital tools to local dialects, land access patterns, and mobility constraints.

Key Data and Statistics:

- » High Share of Informal Employment: Approximately 82% of employed women in India work in the informal sector, spanning agriculture, home-based production, and micro-enterprises.
- » Predominance in Agriculture: According to the PLFS 2023–24 report, 76.9% of rural working women are engaged in agriculture, making them the primary constituency for agricultural AI tools.
- » High Impact of Tailored AI Tools: A 2024 study on the multilingual AI tool Farmer.Chat across 12 states revealed that 61% of female users experienced an

improved quality of life within 45 days, recording engagement rates 2 to 3 times higher than male users.

- » Existing Digital Public Infrastructure: India has established foundational public assets including the IndiaAI Mission, the BHASHINI multilingual translation platform, and the national AI Governance Guidelines released in November 2025.

Governance Priorities to Empower Women via AI:

- » Mandating Gender Impact Assessments: Operationalize fairness and equity by requiring gender impact assessments for AI systems affecting economic welfare, examining whether outcomes vary across sex, caste, location, and disability.
- » Applying Gender-Responsive AI Budgeting: Subject public AI spending to structured evaluations checking which barriers (language, safety, access) are being addressed and identifying specific funding lines for corrective action.
- » Integrating AI Literacy into Community Infrastructure: Embed digital skilling programs within trusted schemes such as DAY-NRLM, DDU-GKY, Skill India, and Mission Shakti's Sakhi networks.
- » Establishing Digital Safety as a Precondition: Enforce the IT (Amendment) Rules 2021 and proposed mandatory labelling of AI-generated synthetic content to protect women from tech-facilitated gender-based violence.

Challenges and Threats Associated:

- » Amplification of Algorithmic Bias: AI systems trained on unrepresentative datasets risk reinforcing traditional gender stereotypes, discrimination, and digital exclusion.
- » Lack of Algorithmic Transparency ("Black-Box" Decisions): Unexplainable automated decisions in credit scoring, job allocations, or welfare delivery disproportionately erode trust among marginalized groups.
- » Digital "Chilling Effect" from Online Violence: Technology-facilitated harassment, deepfakes, and non-consensual imagery discourage women from participating fully in digital economic spaces.
- » Usability and Language Barriers: Conventional digital interfaces often fail to account for the time constraints, lower formal literacy levels, and regional language requirements of informal women workers.



Way Forward:

- » Enforcing Inclusive AI Procurement Standards: Require gender-responsive testing, local dialect integration, and clear explainability in all government-procured AI platforms.
- » Scaling Hyper-Local Multilingual Models: Expand voice-based interfaces built on BHASHINI to provide customized crop, credit, and market advisories for women farmers.
- » Focusing on Outcome-Based Skilling: Align community-level training through Self-Help Groups (SHGs) toward tangible outcomes, such as navigating service platforms or transitioning to better-paid work.
- » Implementing Inter-Ministerial Cyber Reforms: Act on National Commission for Women recommendations to establish swift, regional-language grievance redressal mechanisms for online safety.

Conclusion:

The true success of India's AI transformation on the road to Viksit Bharat 2047 will be judged by whether productivity gains reach women at the base of the economic pyramid. By embedding gender-responsive design, robust digital safety, and accessible community skilling into technological infrastructure, India can turn AI into an engine for inclusive growth. Ultimately, equipping informal female workers with tailored AI tools ensures that technological advancement translates directly into social and economic empowerment.

The Journey of Praxis

NASA selected an innovative early-stage mission concept called PRAXIS for its NASA Innovative Advanced Concepts (NIAC) 2026 Phase I funding.

The PRAXIS Mission

- » PRAXIS (acronym for Planetary Rings Autonomous EXploration with In-situ Sampling) is a futuristic spacecraft concept developed at NASA's Jet Propulsion Laboratory (JPL) under the leadership of Dr. B. Marco Quadrelli.
- » It integrates bio-inspired robotics, real-time artificial intelligence, and lightweight sampling mechanisms to interact directly with planetary rings.
- » Aim: To answer fundamental, high-priority questions identified by the Planetary Science Decadal Survey, including how planetary rings originate, how they



dynamically evolve, and what ring particles (from millimeter- to centimeter-scale) are composed of.

Mission Timeline & Status:

- » Phase I (Current – 2026): Received NIAC Phase I funding to conduct feasibility studies, numerical simulations, and system design evaluations.
- » Phase II (Future Potential): If approved for Phase II advancement, the development team will proceed to construct and test a physical prototype.
- » Operational Horizon: As a concept-stage study, actual flight mission implementation is targeted for future deep-space planetary exploration timelines.

Key Features of the Mission:

- » Non-Destructive Ring Grazing Flight Path: Rather than flying through hazardous ring structures—which would risk destruction from high-velocity debris—the spacecraft hovers safely outside the ring plane.
- » Touch-and-Go Deployable Boom Sampling: Uses a long, flexible, deployable robotic boom to extend into the ring plane, perform quick surface taps on target particles, snag free-floating material, and retract safely.
- » Autonomous AI-Driven Operations: Driven by an onboard artificial intelligence model that autonomously selects candidate particles, handles real-time collision avoidance, and navigates inter-ring gaps without waiting for Earth-bound radio instructions.
- » Milli meter to Centi meter Scale Focus: Designed specifically to collect and analyze particles larger than dust grains but smaller than house-sized boulders, bridging a vital gap in planetary observations.
- » Onboard In-Situ Instrumentation: Equipped with miniaturized instruments to measure particle size, internal porosity, and exact chemical composition directly in deep space.

The Mystery of Blue Stragglers

Indian astronomers from the Indian Institute of Astrophysics (IIA), along with international collaborators, have reported the rare discovery of a Blue Straggler Star (BSS) actively forming in the binary system TIC 327546480.

Blue Straggler Stars (BSS)

- » A Blue Straggler Star (BSS) is an unusually hot, luminous, blue, and massive star found within old star clusters (globular or open clusters).
- » While standard theories of stellar evolution dictate that stars of such high mass should have burned through their nuclear fuel and evolved into white dwarfs or red giants long ago, these stars appear much younger than the surrounding cluster population—effectively lagging behind or straggling in their evolutionary timeline.

Origin & How They Are Formed:

First observed by Allan Sandage in 1953 in the globular cluster M3, Blue Stragglers are formed when an older star gains extra hydrogen fuel, essentially resetting its nuclear clock through two primary mechanisms:

1. Mass Transfer in Binary Systems (Roche Lobe Overflow): In a close binary system, one star expands beyond its gravitational boundary (its Roche lobe) as it ages. Matter leaks from this donor star onto its smaller companion. Accreting this extra mass causes the companion to grow hotter, bluer, and more massive, spinning up rapidly as it transforms into a BSS.
- » Stellar Collisions / Mergers: In dense star cluster cores, direct physical collisions or mergers between two stars can fuse their mass into a single, highly energetic rejuvenated star.

Key Features of Blue Stragglers:

- » Defies Normal Stellar Ageing: Blue Straggler Stars (BSS) appear younger and hotter than other stars in the same ancient cluster, even though they formed at the same time.
- » Semi-Detached Binary System: In TIC 327546480, the smaller companion star continuously transfers gas to the larger Blue Straggler Star, causing it to gain mass.
- » High Rotation Due to Accretion: As the BSS receives gas from its companion, it also gains angular momentum, making it spin much faster.
- » X-Ray Evidence of Mass Transfer: The falling gas heats up when it strikes the BSS, producing strong X-rays that confirm active mass transfer.
- » Long-Term Rejuvenation: Scientists estimate that this mass transfer began about 5.46 billion years ago and is still continuing, keeping the star looking young.



Significance:

- » The discovery directly shows a Blue Straggler Star gaining mass from a companion, providing strong evidence that mass transfer can rejuvenate stars.
- » The system helps scientists better understand binary star evolution, mass transfer, and stellar life cycles, improving models of how stars evolve across the universe.

Transforming Lives with DWEEPTI

Chhattisgarh has launched the DWEEPTI Yojana (Decentralised Women Empowerment on Energy and Policy for Transformative Inclusion), making it the first Indian state to adopt a women-led distributed renewable energy policy.

The DWEEPTI Yojana

- » DWEEPTI Yojana (Decentralised Women Empowerment on Energy and Policy for Transformative Inclusion) is an initiative of the Chhattisgarh Panchayat and Rural Development Department, developed in collaboration with Transform Rural India (TRI) under the Green Economy Transition Mission.
- » It integrates women-led Self-Help Groups (SHGs) into the distributed solar energy ecosystem by enabling them to install, manage, and promote rooftop solar systems.

Aim: To promote women-led clean energy entrepreneurship, expand decentralized renewable energy adoption, and create sustainable livelihood opportunities while supporting rural energy self-reliance.

Key Features:

- » **Women-Centric Solar Ecosystem:** Trains SHG members as Solar Didis, enabling them to work as solar vendors, technicians, installers, managers, and entrepreneurs.
- » **Integration with PM Surya Ghar Yojana:** Cluster Level Federations (CLFs) are registered as authorized vendors under the PM Surya Ghar Muft Bijli Yojana in partnership with the Chhattisgarh State Power Distribution Company Limited (CSPDCL).
- » **Affordable Financing:** Provides flexible loans to SHG members for rooftop solar installations, promoting clean energy adoption and income generation.



- » **Statewide Expansion:** Successfully piloted in Kabirdham district, with plans to expand the model across all districts of Chhattisgarh.

Significance:

- » Creates skilled employment opportunities for rural women while advancing the Lakhpati Didi vision of sustainable income generation.
- » Strengthens decentralized renewable energy adoption, improves energy access, and supports India's clean energy and climate goals.

Waters of Odisha and Chhattisgarh

State-owned Oil and Natural Gas Corporation (ONGC) commenced drilling its first deepwater exploratory well (MN-DW18-1-H-D) in the offshore Mahanadi basin under the Union Government's Samudra Manthan mission (National Deep Water Exploration Mission).

The Mahanadi River

- » The Mahanadi (meaning Great River in Sanskrit) is one of the major peninsular river systems in east-central India. Spanning a total course of 560 miles (900 km) with a drainage basin of over 1,32,100 sq km, it is renowned for its large silt-depositing capacity and extensive deltaic network along the Bay of Bengal.

Origin & Course:

- » **Origin:** Rises in the Sihawa hill range in the Dhamtari district of Chhattisgarh.
- » **Flow Direction:** Flows northward draining the eastern Chhattisgarh plain, turns eastward into Odisha, pierces the Eastern Ghats through a forested gorge, and empties into the Bay of Bengal at False Point near Paradip.

States Covered: Chhattisgarh and Odisha.

Drainage Basin Extent: Extends across small portions of Madhya Pradesh, Jharkhand, and Maharashtra.

Key Features:

- » **Extensive Tributary System:** Feeder streams
- » Include the Seonath (Shivnath), Hasdeo, Mand, and Ib on the left bank, along with the Jonk, Ong, and Tel rivers on the right bank.



- » Hirakud Multipurpose Dam: Houses one of the world's longest earthen dams at Sambalpur, Odisha, forming a 55 km-long artificial reservoir that mitigates downstream floods and generates hydroelectric power.
- » Prolific Silt-Depositing Delta: Enters the Odisha plains near Cuttack, splitting into major distributaries (such as the Kathjodi and Birupa) to form a fertile coastal delta plain rich in agricultural lands and mangroves.
- » Historical Hydrocarbon-Rich Offshore Basin: The river's historical discharge has deposited thick sedimentary layers in the offshore Mahanadi Basin, making it an active zone for deepwater oil and natural gas exploration.

Significance of the MN-DW18-1-H-D Exploratory Well:

- » The well advances the Samudra Manthan initiative (National Deep Water Exploration Mission) by exploring ultra-deepwater hydrocarbon reserves opened under the Open Acreage Licensing Policy (OALP).
- » Successful exploration in the Mahanadi Basin can boost domestic oil and gas production, reduce import dependence, and support India's energy self-reliance goals.

Durable Notes for a Digital Age

The Union Government approved the Reserve Bank of India's (RBI) proposal to conduct field trials for polymer (plastic) banknotes in ₹10 and ₹20 denominations.

RBI's ₹10 and ₹20 Polymer Notes

- » An official pilot initiative by the Reserve Bank of India (RBI) and its subsidiary, Bharatiya Reserve Bank Note Mudran Private Limited (BRBNMPL), to introduce opacified polymer-substrate currency into public circulation alongside existing cotton-paper notes.
- » Regulatory Authority: Reserve Bank of India (RBI).
- » Currency Manufacturing Subsidiary: Bharatiya Reserve Bank Note Mudran Private Limited (BRBNMPL).

Aim: To extend the lifespan of lower-denomination banknotes that wear out quickly due to frequent handling, thereby reducing long-term currency printing costs, curbing environmental waste, and improving overall currency durability.



Key Features:

- » **Target Denominations & Volume:** Focuses on small-value notes (₹10 and ₹20), with an initial field trial batch consisting of 1 billion pieces per denomination.
- » **Non-Fibrous Polymer Substrate:** Unlike traditional Indian paper notes made from 100% cotton comber and linter fibers, polymer notes are printed on a non-porous, dirt- and moisture-resistant synthetic plastic film.
- » **Significantly Extended Lifespan:** Polymer notes last between 2 to 6 times longer than conventional cotton-paper notes, drastically reducing the frequency of replacement, transportation, and destruction of soiled currency.
- » **Co-Circulation Framework:** Polymer notes will circulate in parallel with existing paper notes. The government has explicitly clarified that there is no proposal to replace existing paper currency entirely.
- » **Environmental & Recycling Benefits:** According to studies highlighted by the International Monetary Fund (IMF), polymer banknotes reduce global warming potential by 32% and primary energy demand by 30% compared to paper notes, and can be recycled into plastic pellets at the end of their life cycle.
- » **Under Section 22 of RBI Act, 1934,** the RBI holds the exclusive legal monopoly to issue currency notes across India.
 - While ₹1 notes are issued directly by the Ministry of Finance, ₹10 and ₹20 notes are issued strictly under the authority of the RBI's Issue Department.

Global Adoption (Other Nations Using Polymer Notes):

Australia pioneered polymer banknotes in 1988, and today nearly 60 countries utilize plastic currency in some capacity:

- » **Full Series Transition:** Australia, Canada, New Zealand, Romania, and the United Kingdom.

Green Madanapalle Initiative

- » Madanapalle Municipality in Andhra Pradesh is emerging as a model Zero Waste City under Swachh Bharat Mission-Urban (SBM-U) 2.0 through scientific waste management and resource recovery.

The Madanapalle Municipality Waste Management Model

- » An integrated scientific solid waste management model implemented by Madanapalle Municipality (Andhra Pradesh) under Swachh Bharat Mission-Urban (SBM-U) 2.0.
- » It focuses on source segregation, decentralized waste processing, recycling, resource recovery, and legacy waste remediation to achieve the goal of a Zero Waste City.

Aim: To minimize landfill waste through scientific processing, maximize resource recovery, and promote a sustainable, circular urban economy.

Key Features:

- » **Scientific Waste Segregation:** Segregates waste at source into biodegradable, non-biodegradable, and upcycling categories for efficient processing.
- » **Decentralized Waste Processing:** Treats wet waste through composting and vermicomposting, while recyclable dry waste is processed at Material Recovery Facilities (MRFs).
- » **Resource Recovery & Circular Economy:** Non-recyclable waste is co-processed in cement plants, while RRR Centres promote the reuse of e-waste, clothes, books, and other reusable items.
- » **Legacy Waste Remediation:** Uses bio-mining and bio-remediation to reclaim landfill sites, converting recovered land into green spaces and productive public assets.

Significance:

- » Reduces landfill dependency, improves sanitation, and supports a circular economy through recycling and resource recovery.
- » Demonstrates how scientific waste management and community participation can help Indian cities achieve Zero Waste and Swachh Bharat Mission goals.

Land of Rich Heritage

Ghana has launched an official register to document properties and businesses lost by its citizens during anti-foreigner violence in South Africa.

- » It becomes the second African country, after Nigeria, to seek legal and diplomatic compensation from Pretoria.

Ghana



- » Ghana (officially the Republic of Ghana) is a sovereign country located along the Gulf of Guinea in West Africa. Renowned for being the first sub-Saharan African nation to gain independence from European colonial rule in 1957 under Pan-African leader Kwame Nkrumah, it serves as a major economic, cultural, and democratic hub in the region.

Geographic Location & Border Nations

- » Region: Coastal West Africa (along the Atlantic Ocean's Gulf of Guinea).
- » Capital: Accra (major commercial and political center).
- » Bordering Nations:
 - North & Northwest: Burkina Faso
 - East: Togo
 - West: Côte d'Ivoire
 - South: Atlantic Ocean (Gulf of Guinea)

Key Features:

- » The Massive Voltaian Basin & Lake Volta: Dominates the central and northern interior. It holds Lake Volta, one of the world's largest artificial lakes (covering ~8,500 sq km), impounded by the Akosombo Hydroelectric Dam.
- » Akwapim-Togo Mountain Ranges: A prominent narrow chain of folded Precambrian mountain ridges stretching along the eastern border with Togo. It contains Ghana's highest point, Mount Afadjato (2,903 feet / 885 meters).
- » Dissected Precambrian Peneplain & Scarps: Framing the Voltaian Basin are uplifted plateau scarps—most notably the Kwahu (Mampong) Scarp in the south and Gambaga Scarp in the north—drained by major rivers like the Pra, Ankobra, and Tano.
- » Impact Crater Lake Bosumtwi: Located south of Kumasi, Lake Bosumtwi is Ghana's only true natural lake, formed within an ancient meteorite impact crater with no natural outlet to the ocean.

Significance:

- » The first Sub-Saharan African country to gain independence (1957), Ghana remains a key voice in the African Union (AU) and ECOWAS.



- » A leading exporter of cocoa and rich in gold, bauxite, manganese, and offshore petroleum, making it a major West African economy.

Permanent Membership and India's Global Role

External Affairs Minister S. Jaishankar launched SHANTI (Securing Holistic Advancement through Norms, Trust and Integrity), India's campaign for a non-permanent UN Security Council seat (2028–2029).

- » The initiative also reinforces India's long-standing demand for a permanent UNSC seat and highlights the need for UNSC reforms and expansion.

India and Permanent UN Membership

- » India's quest for a permanent seat on the United Nations Security Council (UNSC) is a effort to reform global governance architecture to better reflect contemporary geopolitical and economic realities. While India seeks non-permanent stints to build coalitions and influence agendas, permanent membership remains the ultimate goal to secure a durable, veto-backed voice in global decision-making regarding international peace, sanctions, and military authorizations.

History of the UNSC:

- » Establishment (1945): Formed post-WWII under the UN Charter, reserving permanent seats (P5) and veto powers exclusively for the five war victors: USA, UK, France, Russia (formerly USSR), and China.
- » Single Historical Expansion (1965): The UNSC expanded its non-permanent member strength from six to ten, bringing total Council membership to 15, but left P5 permanence and veto power untouched.
- » Emergence of the G4 (2005): India, Brazil, Germany, and Japan formed the G4 grouping to mutually support each other's bids for permanent UNSC seats alongside representation for Africa.
- » Frequent Veto Paralysis: Decades of P5 geopolitical rivalry have frequently paralyzed the Council during major crises, highlighting an ongoing legitimacy crisis.

Eligibility and Strengths of India for Permanent Membership:

- » Demographic Weight: Represents the world's most populous country, housing over 18% of humanity.



- » **Economic Stature:** Represents the world's fourth-largest economy with high growth trajectory.
- » **Unmatched Peacekeeping Contributions:** Historically one of the largest troop contributors to UN Peacekeeping, deploying nearly 300,000 personnel across roughly 50 missions since 1948.
- » **Proven Institutional Record:** Served eight terms as an elected non-permanent UNSC member, demonstrating a track record of diplomatic bridging.
- » **Voice of the Global South:** Serves as a major voice for developing nations while embodying global civilisational values like Vasudhaiva Kutumbakam (the world is one family).

Key Challenges Associated with India's Bid:

- » **Strict Charter Amendment Rules:** Amending Article 108 of the UN Charter requires a two-thirds vote in the General Assembly plus unanimous ratification by all P5 members, giving each P5 country an absolute veto over reform.
- » **Chinese Veto Opposition:** China, as the sole P5 member from Asia, consistently blocks India's bid to prevent a regional peer from entering the permanent ranks.
- » **Opposition from the Coffee Club:** The Uniting for Consensus group—led by Italy and including regional rivals like Pakistan—actively opposes creating any new permanent seats.
- » **P5 Reluctance to Share Veto Power:** Existing permanent members remain hesitant to dilute their exclusive privileges or extend veto powers to new entrants.
- » **Regional Disagreements over Candidates:** Lack of consensus within broader regional groups over which nations should represent Asia, Africa, and Latin America creates diplomatic friction.

Way Forward:

- » **Leveraging Non-Permanent Term Alliances:** Utilize campaigns like the 2028–2029 SHANTI bid to build broad-based coalitions across the UN General Assembly.
- » **Pushing text-based Intergovernmental Negotiations (IGN):** Press for formal text-based negotiations in the UN General Assembly to move UNSC reform past vague discussions.
- » **Strengthening Plurilateral Platforms:** Deepen alternative strategic alignments via the Quad, G20, BRICS, and the International Solar Alliance to build diplomatic capital outside the UN framework.



- » Accepting a Phased Veto Option: Consider a compromise proposal featuring permanent seats without immediate veto powers during a transitional period to build P5 consensus.
- » Consolidating G4 and African Union (Ezulwini) Synergies: Align the G4 strategy with the African Union's Ezulwini Consensus to mobilize a decisive two-thirds majority in the General Assembly.

Conclusion:

India meets virtually every strategic and moral benchmark required for permanent UN Security Council membership, yet remains excluded due to procedural constraints and P5 self-interest. A Security Council that excludes nearly one-fifth of humanity cannot claim long-term global legitimacy. Ultimately, reforming the UNSC is necessary to ensure multilateralism remains representative and capable of managing contemporary threats to global peace.

The Future Milky Way Merger

Astronomers analyzing data from the Hubble Space Telescope mapped the last 500 million years of star formation in the Andromeda Galaxy, revealing that its star formation rate is dropping sharply—particularly over the last 40 million years.

The Andromeda Galaxy

- » The Andromeda Galaxy (also designated Messier 31 or M31) is a massive, barred spiral galaxy. It is the nearest major spiral neighbor to our own galaxy, the Milky Way, and the largest member of the Local Group of galaxies.

Location & Distance:

- » Constellation: Located in the constellation Andromeda.
- » Distance from Earth: Situated approximately 2.5 million light-years away.
- » Visibility: Visible to the naked eye under dark skies as a faint, elongated smudge.

Key Features:

- » Enormous Physical Scale: Spans a diameter of over 220,000 light-years—roughly 2 to 2.5 times the width of the Milky Way—and contains an estimated 1 trillion stars.



- » Transition to Cosmic Middle Age: New star birth is steadily slowing down across its concentric ring structures, marking its transition from an active, star-forming galaxy toward a quiescent state.
- » Disruptive Interaction with M32: Gravitational interactions and collision passes by its satellite galaxy, M32, have punched through Andromeda's stellar disk, disrupting dust clouds and creating a dead zone devoid of recent star birth.
- » Distinct Concentric Ring Structures: Hosts prominent ring-like dust structures at radii of 26,000 and 33,000 light-years, where its remaining gas and star-forming activity are concentrated.
- » Future Milky Way Collision Course: Gravitationally bound to the Milky Way, Andromeda is moving toward us at approximately 110 km/s. The two galaxies have a high probability of colliding and merging into a giant elliptical galaxy (Milkdromeda) in about 4 to 10 billion years.

Significance:

- » As the nearest large spiral galaxy, Andromeda helps scientists study how galaxies form, evolve, and eventually slow their star formation.
- » Its declining star formation rate helps refine models used to estimate the age and evolution of distant galaxies.

The Nobel of Mathematics 2026

The 2026 Fields Medal—mathematics' highest honor—was awarded to Yu Deng, John Pardon, Jacob Tsimerman, and Hong Wang at the International Congress of Mathematicians.

- » Hong Wang made history as only the third woman in the medal's 90-year history to receive the honor, while she and Yu Deng became the first Chinese nationals awarded since 1982.

The Fields Medal 2026

- » Often referred to as the Nobel Prize of Mathematics, the Fields Medal is the most prestigious global award recognizing outstanding mathematical achievement for existing research and the promise of future accomplishment.
- » Administering Body: Awarded by the International Mathematical Union (IMU) every four years during the International Congress of Mathematicians.



- » Origin: Established in 1936 from a trust fund established by Canadian mathematician John Charles Fields at the University of Toronto.

Key Features:

- » Strict Age Cap (Under 40): Candidates must be younger than 40 years old on January 1st of the award year, celebrating early-career breakthroughs and future potential.
- » Quadrennial Frequency: Conferred once every four years to a selected cohort of two to four mathematicians.
- » Global Diversity Balance: The IMU Executive Committee selects an anonymous Fields Medal Committee mandated to represent a broad diversity of mathematical sub-fields.
- » Endowment & Support: Funded through the J.C. Fields Trust at the University of Toronto, supplemented by institutional partners and the Fields Institute.

2026 Laureates and Their Contributions:

- » Yu Deng (University of Chicago):
 - » Key Contribution: Solved a critical part of Hilbert's sixth problem by establishing strong theoretical bridges between physical fluid dynamics (kinetic wave theory) and particle physics mechanics.
- » John Pardon (Simons Center / Stony Brook University)
 - Key Contribution: Resolved the 20-year-old MNOP conjecture in symplectic geometry by counting curves on complex Calabi-Yau 3-folds, developing the fundamental tool of virtual foundation cycles.
- » Hong Wang (NYU Courant Institute)
 - Key Contribution: Solved the decades-old 3D Kakeya conjecture alongside Joshua Zahl, connecting harmonic analysis and geometric measure theory to determine minimal rotational space for multi-dimensional sets.
- » Jacob Tsimerman (University of Toronto)
 - Key Contribution: Pioneered the application of o-minimality (from mathematical logic) to algebraic geometry and number theory, proving Griffiths' conjecture and early work on the André-Oort conjecture.

The Silent Liver Disease

India has accelerated interventions under the National Viral Hepatitis Control Programme (NVHCP) to eliminate viral hepatitis as a public health threat by 2030.

Hepatitis

- » Hepatitis is an inflammation of the liver tissue. While commonly caused by viral infections, non-infectious factors—such as heavy alcohol consumption, toxic substances, certain medications, and autoimmune diseases—can also trigger the condition.

Origin & Etiology:

Derived from the Greek words *hepar* (meaning liver) and *-itis* (meaning inflammation). Viral hepatitis originates from five distinct viral strains classified as Types A, B, C, D, and E.

- » Enteric Strains (A and E): Transmitted via the fecal-oral route through contaminated food and water.
- » Parenteral Strains (B, C, and D): Transmitted through contact with infected bodily fluids, blood transfusions, contaminated needles, or vertically from mother to child at birth.

Symptoms:

Many viral hepatitis infections remain asymptomatic or mild during early stages. When symptoms appear, they typically include:

- » Acute Symptoms: Jaundice (yellowing of the skin and eyes), dark urine, fatigue, fever, loss of appetite, nausea, vomiting, and abdominal pain.
- » Severe Complications: Pregnant women infected with Hepatitis E face heightened risk of acute liver failure.
- » Chronic Complications: Persistent infection with Hepatitis B, C, or D causes chronic liver disease, leading to cirrhosis (irreversible liver scarring), hepatocellular carcinoma (liver cancer), and liver failure.

Key Features:

- » Five Distinct Strains (A, B, C, D, and E): Caused by five distinct viruses with different modes of transmission, illness severity, and preventive options.



- » Major Infectious Disease Killers: Types B and C account for the vast majority of chronic infections, driving over 1.3 million deaths globally each year due to cirrhosis and liver cancer.
- » The Satellite Nature of Hepatitis D (HDV): HDV is a defective virus that cannot replicate independently; it infects only individuals already carrying Hepatitis B (HBV). Superinfection accelerates liver damage and cancer progression.
- » Vaccine Prevention vs. Direct-Acting Antivirals: Safe vaccines exist for HAV, HBV, and HEV. While no vaccine exists for Hepatitis C (HCV), modern Direct-Acting Antiviral (DAA) medications cure over 95% of chronic HCV cases.
- » High Burden of Unaware Carriers: An estimated 304 million people globally live with chronic HBV or HCV, yet most remain undiagnosed due to the silent, asymptomatic nature of early liver damage.

Transparent Justice System

Union Minister of State for Home Affairs informed Parliament that the e-Zero FIR system for cybercrime cases has been operationalized across 18 States and Union Territories, with over 12,000 e-Zero FIRs already registered.

The e-Zero FIR System

- » The e-Zero FIR system is a digital, borderless law enforcement framework designed to automatically generate a First Information Report (e-Zero FIR) for reported cyber financial crimes—regardless of territorial police jurisdiction.
- » Institutional Nodal Body: Developed by the Indian Cybercrime Coordination Centre (I4C) under the Ministry of Home Affairs (MHA).
- » Legal Alignment: Leverages Section 173(1) of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023, which mandates that information on cognizable offenses can be submitted electronically irrespective of location.

System Integration: Integrates three primary digital infrastructures:

- » National Cyber Crime Reporting Portal (NCRP) / Helpline 1930
- » State/UT e-Crime Police Stations
- » National Crime Records Bureau's (NCRB) Crime and Criminal Tracking Network & Systems (CCTNS)



Aim: To accelerate law enforcement action against cybercriminals, eliminate jurisdictional delays in filing complaints, enable instant freezing of defrauded funds, and facilitate the swift restoration of lost money to victims.

Key Features:

- » **Automated Threshold Triggers:** Complaints lodged via the 1930 helpline or NCRP portal that cross specified financial loss thresholds automatically generate an e-Zero FIR without requiring an initial physical station visit.
- » **Seamless Jurisdictional Transfer:** Registered e-Zero FIRs at central e-Crime Police Stations are instantly routed to the exact territorial cybercrime police station holding local jurisdiction.
- » **3-Day Conversion Window:** Complainants are required to visit the local territorial police station within 3 days to complete formal verification and convert the e-Zero FIR into a regular, fully registered FIR.
- » **Immediate Financial Lien Placement:** By generating an official e-FIR instantly, law enforcement and banking channels gain the immediate legal authority required to place a lien on suspect bank accounts and block the onward transfer of stolen funds.

Significance:

- » The e-Zero FIR system removes jurisdictional delays, allowing cyber fraud complaints to be registered immediately from any location.
- » Instant FIR registration through the 1930 helpline enables faster freezing of fraudulent accounts, increasing the chances of recovering stolen funds.