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FOR UPSC EXAM

COMPREHENSIVE | ANALYTICAL
EXAM-FOCUSED

VIDHVATH VIMARSHA

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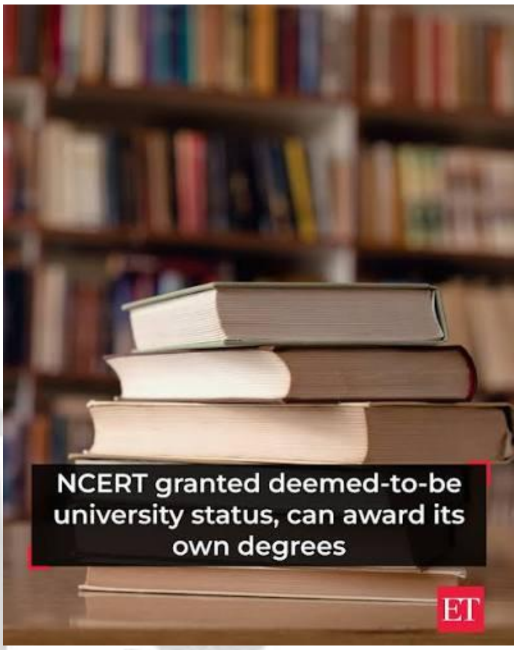
POLITY & CONSTITUTION

Grant of Deemed University Status to NCERT

- **Formal Academic Elevation:** The Ministry of Education declared the National Council of Educational Research and Training (NCERT), New Delhi, as an 'Institution Deemed to be University' under Section 3 of the University Grants Commission (UGC) Act, 1956.



- **Regulatory Compliance Framework:** The recommendation was finalized by a dedicated UGC Expert Committee following an evaluation under the UGC (Institutions Deemed to be Universities) Regulations, 2023.
- **Mandated Academic Mandate:** The deemed university status is contingent upon NCERT initiating advanced educational research, doctoral (Ph.D.) programs, and innovative postgraduate degree programs directly aligned with national educational priorities.
- **Institutional Autonomy & Governance:** Grants NCERT full academic autonomy to design its own curriculum, award graduate/postgraduate degrees, determine admission criteria, and establish specialized academic departments without relying on external university affiliations.
- **Reinforcing National Think-Tank Role:** Augments NCERT's mandate as an apex resource institution, empowering it to offer technical expertise to Central and State Governments on curriculum frameworks, pedagogical reforms, and teacher education.
- **Expanding Global Research Alliances:** Facilitates independent international academic collaborations, joint research ventures, faculty exchange programs, and bilateral credit-sharing agreements with foreign universities and international agencies.
- **Constitutional & Legal Architecture:** Grounded in Schedule VII Concurrent List Entry 25 (Education, including technical education, medical education and universities), Entry 66 of the Union List (Coordination and determination of standards in higher education), and Section 3 of the UGC Act, 1956.

- **Key Definitions for UPSC:**
    - **Deemed to be University:** An accreditation status granted to high-performing higher educational institutions by the Central Government on UGC advice, according them the administrative and academic privileges of a full university.
    - **UGC (Institutions Deemed to be Universities) Regulations, 2023:** Simplified regulatory guidelines governing eligibility, governance structures, academic quality assurance, and degree-granting powers for applicant institutions.
- **Implementation Challenges:** Major hurdles include transitioning from a purely regulatory/curricular body into a research-heavy degree-granting university, managing administrative restructuring across its regional institutes (RIEs), and avoiding operational overlaps with existing central universities.

Elevating NCERT to a Deemed University marks a key shift toward integrating foundational educational research with degree-granting authority, cementing its position as a central pillar for implementing the National Education Policy (NEP) 2020.

Revamped India Code Portal: Digital Innovation in Legal Transparency

- **Digital Transformation of Legal Access:** Launched on 13th August 2026 by the Ministry of Law & Justice, the revamped India Code Portal modernizes the unified digital repository of Central Acts, State Acts, Union Territory regulations, and subordinate legislation to ensure fast, citizen-centric legal access.
- **AI-Assisted and Semantic Search Capabilities:** Built in collaboration with the National Informatics Centre (NIC) and IndiaAI Mission, the platform incorporates artificial intelligence, semantic search, and speech-enabled query interfaces to shift the portal from a static document repository to an interactive legal gateway.
- **Multilingual Inclusivity via Eighth Schedule:** Aligned with the vision of inclusive governance, the portal enables AI-assisted multilingual translation and discovery across all 22 languages listed in the Eighth Schedule to the Constitution, breaking linguistic barriers to legal literacy.
- **Subordinate Legislation & e-Gazette Integration:** The portal establishes dynamic cross-linkages between primary Acts and their corresponding Rules, Regulations, and Notifications, integrating seamlessly with the e-Gazette ecosystem and providing structured, QR-enabled legislative history.
- **Enhancing Access to Justice & Ease of Living:** By streamlining navigation, document viewing, and feedback mechanisms, the portal lowers procedural costs for legal professionals, researchers, the judiciary, and common citizens, operationalizing the principle that legal discoverability is a prerequisite for justice.
- **Institutional Coordination:** The project represents a synchronized technical effort between the Legislative Department, Department of Legal Affairs, National Informatics Centre (NIC), and IndiaAI Mission to reinforce transparency and digital public infrastructure (DPI) in legal governance.
- **Constitutional & Legal Framework:** Grounded in Article 39A (Directive Principle on equal justice and free legal aid), Article 19(1)(a) (Right to Freedom of Speech and Expression, encompassing the right to know laws), Article 343/Eighth Schedule (Language provisions), and executed under the Information Technology Act, 2000.
- **Key Definitions for UPSC:**
  - **India Code Portal:** A centralized, digital repository maintained by the Legislative Department containing codified Central and State statutes, amendments, and subordinate legislations.
  - **Semantic Search:** An AI-driven search technique that understands the contextual meaning and intent behind search terms rather than relying solely on literal keyword matching.

- **Implementation Challenges:** Primary operational constraints include real-time updating of state-level subordinate legislations across diverse jurisdictions, technical standardization of legacy legal text formats, and ensuring high translation accuracy for complex statutory terminology in regional languages.

The technological revamp of the India Code Portal bridges the gap between citizens and statutory law, strengthening rule of law, legal empowerment, and citizen-centric governance under Viksit Bharat.

DRI Uncovers SAFTA Trade Fraud in Areca Nut Imports

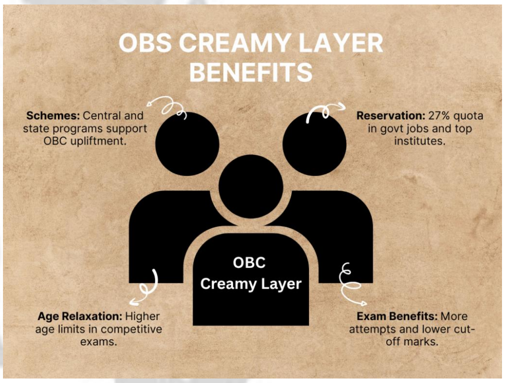
- **Modus Operandi & Tax Evasion:** A month-long investigation by the Directorate of Revenue Intelligence (DRI) dismantled an organized syndicate importing South-East Asian areca nuts (from Indonesia, Thailand, and Malaysia) while fraudulently mis-declaring Bangladesh as the country of origin to illegally claim zero-duty benefits under the South Asian Free Trade Area (SAFTA) agreement, causing a estimated revenue loss of over ₹2,500 crore.
- **Disruption of Trade Vulnerabilities:** The masterminds routed consignments into an Export Processing Zone (EPZ) in Bangladesh, changing packaging and containers, and fraudulently acquiring SAFTA Certificates of Origin from local authorities to bypass India's 100% Basic Customs Duty (BCD) levied on non-SAFTA imports.
- **Enforcement Actions & Seizures:** Multi-city raids across Kolkata and Visakhapatnam yielded the arrest of nine individuals, interception of a live 160 MT consignment, recovery of ₹75 lakh in illicit cash proceeds, and the immediate suspension of a implicated Customs Broker's license.
- **Financial Layering via Informal Channels:** The syndicate relied on dummy entities, Importer Exporter Code (IEC) holders, and underlying hawala networks to transfer, layer, and settle illicit financial proceeds and commission payments between Indian buyers and foreign facilitators.
- **Impact on Agrarian Economy:** Large-scale illegal inflows distort domestic market pricing, create unfair competition for domestic areca nut growers (primarily across Karnataka, Kerala, and Assam), undermine border economic security, and subvert trade regulation frameworks.
- **Institutional Coordination:** The operation highlights the proactive role of DRI—operating under the Central Board of Indirect Taxes and Customs (CBIC)—in monitoring preferential trade routes and enforcing commercial fraud countermeasures.
- **Constitutional & Legal Framework:** Governed under Article 307 (Appointment of authority for carrying out trade and commerce purposes), Customs Act, 1962 (Sections 111/112 for confiscation and penalties), Prevention of Money Laundering Act, 2002 (PMLA), and Foreign Trade (Development and Regulation) Act, 1992.
- **Key Definitions for UPSC:**
  - **Rules of Origin (RoO):** Mandated criteria under trade agreements used to establish the national source of a product, preventing trade deflection where non-member goods enter via member nations to claim preferential tariffs.
  - **Trade Deflection:** The transshipment of goods from non-member countries through a free-trade agreement partner country to exploit lower or zero tariff rates illegally.

- **Implementation Challenges:** Primary operational bottlenecks include verifying physical origin criteria in transit EPZs, cross-border verification delays of Certificates of Origin, real-time monitoring of hawala proceeds, and curbing the abuse of IEC licenses by dummy entities.

The enforcement action by the DRI underscores the critical need for rigorous verification of preferential origin certificates, strict Customs Broker oversight, and robust trade monitoring mechanisms to protect domestic agriculture and safeguard national revenue interests under Viksit Bharat.

OBC Creamy Layer Exclusion and Parental Income Test

- **Supreme Court Verdict on Parental Salary Exclusion:** In *Union of India v. Rohith Nathan* (March 2026), the Supreme Court ruled that parental salary income must be excluded when determining the Other Backward Classes (OBC) "creamy layer" status for candidates whose parents work in Public Sector Undertakings (PSUs), autonomous bodies, or private sector enterprises where formal post-equivalence with government services has not been established.
- **Violation of Constitutional Article 14:** The Court held that evaluating PSU and private sector employees based on gross salary while completely excluding salary and agricultural income for civil servants amounts to "hostile discrimination," violating the fundamental right to equality by treating equals unequally and unequals equally.



- **Quashing of 2004 DoPT Clarificatory Letter:** The Division Bench held that the Department of Personnel and Training's (DoPT) 2004 letter—which included parental salary for PSU employees—was executive overreach that contradicted the parent 1993 Office Memorandum (OM), where income from salary and agriculture was explicitly excluded under Category VI (Income/Wealth Test).
- **Creation of Supernumerary Posts:** To render justice without displacing already appointed officers, the Court directed the Union Government to create supernumerary posts within six months for affected Civil Services Examination (CSE) candidates who were unfairly denied Non-Creamy Layer (NCL) reservation due to parental salary.
- **Administrative Cascading Effect and Review Plea:** The Centre filed a clarification plea highlighting that retrospective implementation dating back to CSE 2012 would severely disrupt settled service allocations, alter inter-se seniority rosters, trigger administrative chaos, and prompt widespread litigation across general and reserved categories.
- **Request for CSE 2025 Allocation Relief:** The Union Government requested Supreme Court permission to continue allocating services for CSE 2025 candidates under existing administrative guidelines pending the constitution of a larger Bench to review the practical modalities of implementation.
- **Constitutional and Legal Architecture:**
  - **Articles 14 & 16(4):** Protect equality before law and enable the State to make reservation provisions for backward classes, provided advanced sections ("creamy layer") are systematically excluded as mandated in *Indra Sawhney v. Union of India* (1992).
  - **Administrative Law & Subordinate Legislation:** Establishes that executive letters or clarificatory circulars (2004 DoPT letter) cannot amend, override, or expand the scope of a fundamental policy framework (1993 OM).

- **Key Definitions for UPSC:**
  - **Creamy Layer:** A legal mechanism formulated to exclude socially, educationally, and economically advanced individuals within OBC communities from availing affirmative action benefits.
  - **Residual Income Test (Category VI):** The statutory evaluation under the 1993 OM applying an annual income threshold (currently ₹8 lakh per annum) calculated strictly from non-salary and non-agricultural sources like business, investments, or property.
- **Implementation Challenges:** Major operational friction points include executive inertia in framing post-equivalence frameworks between government and non-government posts, managing retrospective seniority adjustments, avoiding disruption to past recruitment cycles, and balancing administrative efficiency with constitutional equality.

The Supreme Court's ruling rectifies long-standing administrative arbitrariness by enforcing strict parity across public, private, and civil service employees regarding OBC creamy layer evaluation. Establishing clear post-equivalence rules and implementing court directives in a phased manner remains essential to protect settled administrative allocations while upholding constitutional fairness under Article 16(4).

Can Acting Chief Justices of High Courts Recommend Names for Judicial Appointments?

- **Resurgence of Constitutional Controversy:** The initiation of judge recommendations by Rajasthan High Court's Acting Chief Justice, Justice Sanjeev Prakash Sharma, during his extended tenure of nearly a year, has reignited the legal debate over whether an Acting Chief Justice (ACJ) possesses full administrative authority to initiate Collegium recommendations.
- **Supreme Court Collegium Examination:** The Supreme Court Collegium, headed by CJI Surya Kant, is reviewing four judicial recommendations made by the Rajasthan High Court ACJ, weighing institutional convention against practical administrative necessity.

- **Merit-Based vs. Conventional Viewpoint:** A pragmatic perspective within the judiciary argues that recommendations from an ACJ with an extended tenure should be evaluated strictly on candidate merit rather than procedural technicalities, preventing prolonged judicial vacancies.
- **Institutional Risks and Prolonged ACJ Tenures:** Counter-arguments warn that permitting ACJs to initiate appointments risks normalizing delayed appointments of permanent Chief Justices, undermining the constitutional mandate of High Court leadership and diluting established judicial conventions.
- **Historical Precedents and Consultative Norms:** While ACJs traditionally refrain from initiating appointments due to brief transitional tenures, precedents exist—such as the 2020 Bombay High Court recommendations initiated under then-ACJ B.P. Dharmadhikari—demonstrating that ACJ-led recommendations have occasionally been processed.
- **Adherence to Broad Bar Consultations:** Past instances reveal that failure to achieve full consensus among consultee judges or local Bar stakeholders during an ACJ's tenure often leads the Union Ministry of Law and Justice to return lists for reconsideration, underscoring the need for consultative rigour.
- **Constitutional and Legal Framework:**
  - **Article 223 of the Constitution:** Authorizes the President to appoint a High Court judge as Acting Chief Justice to discharge duties during a vacancy or temporary absence of the permanent Chief Justice.

  - **Article 217 of the Constitution:** Mandates that High Court judges be appointed by the President after mandatory consultation with the Chief Justice of India, the Governor of the State, and the Chief Justice of the High Court.
  - **Second (1993) & Third (1998) Judges Cases:** Established the judicial Collegium system and primacy of judicial consultation in judicial appointments.
- **Key Definitions for UPSC:**
  - **Acting Chief Justice (ACJ):** A High Court judge temporarily designated by the President under Article 223 to fulfill the judicial and administrative duties of the office of Chief Justice.
  - **Memorandum of Procedure (MoP):** An administrative document framed jointly by the Executive and Judiciary detailing step-by-step procedures, timelines, and consultation mechanisms for appointing judges to the Higher Judiciary.
- **Implementation Challenges:** Primary systemic hurdles include lack of explicit codified provisions in the MoP regarding ACJ administrative limits, executive delays in appointing permanent Chief Justices, growing vacancy rates across High Courts, and potential friction between consultee judges and temporary High Court leadership.

The debate surrounding the administrative scope of Acting Chief Justices reflects the ongoing friction between eliminating judicial backlog and adhering to procedural conventions. Codifying explicit guidelines within the Memorandum of Procedure regarding ACJ powers is vital to maintaining institutional consistency, eliminating operational ambiguities, and safeguarding judicial independence under Viksit Bharat 2047.

NCDC (Amendment) Act, 2026 and Federal Autonomy Concerns

Key Highlights & Summary

- **Parliamentary Passage:** Parliament passed the National Cooperative Development Corporation (Amendment) Bill, 2026, altering the parent NCDC Act of 1962 to broaden the mandate and financing scope of the statutory body.

- **Direct Financing Channel:** The amendment allows the NCDC to extend direct loans, grants, and equity investments to any cooperative society or entity, bypassing traditional state government routing.
- **Expansion Beyond Rural Areas:** The new law removes the requirement for industrial, cottage, and village cooperatives to operate strictly within rural regions, permitting operations in urban and non-agricultural sectors.
- **Broader Definition of Foodstuffs:** Statutory definitions were expanded to include processed foods and items notified by the Central Government, widening the eligibility pool for financial support.
- **Objections by Farmer Groups:** Organisations like Samyukt Kisan Morcha (SKM) labeled the law an "onslaught" on federalism, alleging resource diversion from agriculture toward corporate-style urban projects.
- **Information Sharing Powers:** The NCDC is now authorized to collect and share credit and operational data with the Reserve Bank of India (RBI), banks, and notified institutions.

Essential Definitions

- **National Cooperative Development Corporation (NCDC):** A statutory corporation established in 1963 under the Ministry of Cooperation to plan, promote, and finance cooperative programs for agricultural produce and notified commodities.

- **Federal Principle of Cooperation:** A governance model ensuring that local cooperative societies remain under state legislative oversight to preserve institutional autonomy and democratic decentralized control.

Legal and Constitutional Framework

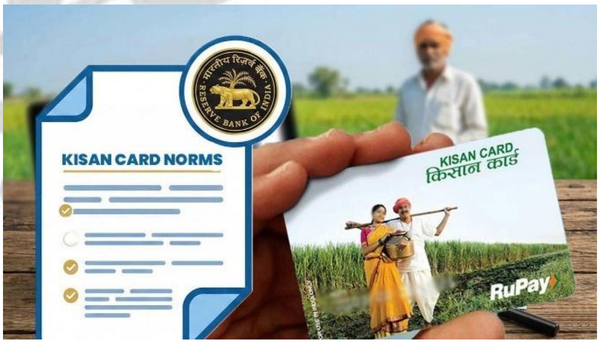
- **Seventh Schedule (Entry 32, List II):** "Cooperative Societies" (other than multi-state cooperatives) fall strictly under the State List, granting exclusive legislative authority to State Parliaments.
- **97th Constitutional Amendment Judgment (2021):** The Supreme Court upheld in *Union of India v. Rajendra N. Shah* that Central power over cooperative societies is limited, striking down parts of Part IX-B for state-level cooperatives.
- **Article 43B (DPSP):** Directs the State to promote voluntary formation, autonomous functioning, democratic control, and professional management of cooperative societies.

The NCDC (Amendment) Act, 2026 aims to modernize cooperative credit and expand industrial capacity beyond rural boundaries. However, the creation of a direct central financing mechanism raises critical concerns regarding federal friction and state regulatory autonomy. Striking a balance between capital access and constitutional state rights remains essential for a collaborative cooperative ecosystem.

ECONOMY

Impact Assessment of Kisan Credit Card–Modified Interest Subvention Scheme

- **Economic Multiplier Effect:** An independent third-party assessment by the Institute for Social and Economic Change (ISEC), Bengaluru, revealed that every ₹1 spent under KCC-MISS yields ₹2.30 in net value addition in the agriculture and allied sector, demonstrating strong macroeconomic efficiency.
- **Fiscal Outlay & Credit Discipline:** The scheme has absorbed an estimated ₹1.87 lakh crore in interest subsidies since inception through 2024–25, reducing interest burdens, improving input timeliness, and fostering credit discipline via Prompt Repayment Incentives (PRI).



- **Enhanced Cropping & Income Diversification:** Access to timely concessional credit has boosted cropping intensity, multi-season cultivation, and income diversification by expanding livestock, dairy, and inland fisheries—especially vital for working capital in the North-Eastern Region.
- **Raised Collateral-Free Credit Limit:** To expand financial coverage for small and marginal farmers, the government increased the collateral-free loan limit under KCC from ₹1.6 lakh to ₹2 lakh, effective 1 January 2025.
- **Digitalization of Ag-Credit Infrastructure:** Tech-driven platforms such as the Kisan Rin Portal, Jan Samarth Portal, e-KCC, and KRISHIKA have streamlined loan processing, minimized paperwork, and improved transparency in credit delivery.

- **Constitutional & Policy Imperative:** Aligns with Article 48 (Directive Principle to organize agriculture and animal husbandry on modern lines) and Priority Sector Lending (PSL) mandates set by the Reserve Bank of India (RBI) to ensure sustained credit flow to rural economies.
- **Key Definitions for UPSC:**
  - **Interest Subvention Scheme (MISS):** A central scheme providing 2% interest subvention alongside an additional 3% Prompt Repayment Incentive (PRI), lowering effective loan interest rates to 4% per annum for farmers.
  - **Cropping Intensity:** The ratio of gross cropped area to net sown area expressed as a percentage, reflecting how frequently a piece of land is cultivated within an agricultural year.
  - **Priority Sector Lending (PSL):** RBI regulation requiring commercial banks to allocate a specific percentage of their net bank credit to vulnerable sectors, including agriculture and allied activities.
- **Key Challenges in Ag-Credit:** Structural bottlenecks include regional disparities in credit distribution, high operational costs for rural branch networks, over-reliance on informal lenders in remote belts, and tenant farmer exclusion due to land title documentation hurdles.

The positive multiplier effect of KCC-MISS underscores how blending interest subvention with digital infrastructure transforms rural credit systems, driving productivity, strengthening climate-resilient multi-cropping, and enhancing farm income across diverse agro-climatic zones.

Near-Universal Banking Coverage and Financial Inclusion in India

- **Near-Universal Banking Reach:** According to Jan Dhan Darshak (JDD) App data, 99.92% of inhabited villages (6,00,868 out of 6,01,328) now have access to a banking outlet within a 5 km radius, driven by 1.81 lakh bank branches, 17.36 lakh Business Correspondents (BCs), and 1.65 lakh IPPB centers.

- **PMJDY Footprint Expansion:** As of July 2026, Pradhan Mantri Jan Dhan Yojana (PMJDY) accounts have reached 58.77 crore with total cumulative deposits exceeding ₹3,12,414 crore, serving as the foundational pillar for Direct Benefit Transfers (DBT) and formal financial deepening.
- **Institutional Regulatory Norms:** RBI mandates that commercial banks, SFBs, and RRBs allocate at least 25% of their total new banking outlets to unbanked rural centers, with State Level Bankers' Committees (SLBCs) monitoring local financial coverage.
- **Agri-Credit Digital Infrastructure:** Platforms like the Jan Samarth Portal, Kisan Rin Portal (KRP), and e-KYC integration streamline loan processing, enable identity verification, and expedite claim settlements under the Modified Interest Subvention Scheme (MISS) for KCC holders.
- **Cybersecurity & Anti-Fraud Measures:** To mitigate digital payment risks, the government and RBI established the India Digital Payment Intelligence Corporation (IDPIC), enforced Master Directions on Digital Payment Security Controls, deployed AI tools like 'MuleHunter', and integrated the I4C '1930' helpline.

- **Constitutional & Policy Imperative:** Aligns with Directive Principles of State Policy under Article 38 (minimizing socio-economic inequalities) and Article 39(c) (preventing concentration of wealth), reinforcing financial inclusion as a prerequisite for inclusive growth.
- **Key Definitions for UPSC:**
  - **Business Correspondent (BC):** Bank-appointed retail agents providing banking services in remote areas where setting up brick-and-mortar branches is commercially unviable.
  - **Money Mule Account:** A bank account used by criminals to launder illicit funds, often created using stolen identities or compromised PMJDY credentials.
  - **Jan Dhan Darshak (JDD) App:** A GIS-based mobile application identifying unbanked villages and mapping banking touchpoints within 5 km boundaries.
- **Implementation Challenges:** Core issues include dormant zero-balance accounts, low digital literacy among rural populations, recurring cyber financial frauds, and the commercial viability of BC networks due to low transaction values.

India's transition toward 99.92% village banking coverage showcases a shift from physical expansion to digital-led financial inclusion, where robust cybersecurity protocols like IDPIC and AI-based fraud detection are critical to sustaining public trust and economic empowerment.

Pradhan Mantri Shram Yogi Maandhan (PM-SYM) Scheme

- **Scheme Architecture & Enrollment:** Launched in February 2019 under the Ministry of Labour and Employment, PM-SYM is a central sector, voluntary, and contributory pension scheme providing social security to unorganized sector workers, with total enrollments exceeding 54 lakh (53.1% women) as of July 2026.

- **Eligibility Criteria:** Target beneficiaries comprise unorganized workers aged 18–40 years earning ≤₹15,000 monthly, who are not income tax assessees and not covered under statutory social security networks like EPFO, ESIC, or government-contributed NPS.
- **Financial Model & Matching Contribution:** Requires monthly contributions ranging from ₹55 to ₹200 based on entry age, matched equally (50:50 ratio) by the Central Government; cumulative central matching support has reached ₹2,011.01 crore.
- **Guaranteed Old-Age Pension:** Assures a monthly pension of ₹3,000 to beneficiaries upon attaining 60 years of age, with initial pension disbursements slated to begin from February 2039 onwards.
- **Institutional & Digital Delivery:** Enrollment operates through 4 lakh Common Service Centres (CSCs) and self-registration via the Maandhan portal, integrated two-way with the eShram portal for comprehensive database mapping.

- **Retention & Account Revival Measures:** To curb account dormancy caused by auto-debit failures, the government extended account revival periods from 1 to 3 years and introduced digital features like Voluntary Exit, Revival Modules, and real-time claim tracking.
- **Constitutional Directive Provisions:** Aligns with Article 41 (Right to work, education, and public assistance in cases of old age or sickness) and Article 43 (Securing a living wage and decent standard of life for workers) under the Directive Principles of State Policy.
- **Key Definitions for UPSC:**
    - **Unorganized Worker:** Home-based workers, street vendors, agricultural laborers, construction workers, or similar wage earners in informal setups lacking structured employment benefits.
    - **eShram Portal:** A comprehensive national database of unorganized workers designed to streamline targeted delivery of social security welfare benefits.
- **Implementation Challenges:** Key operational bottlenecks include low disposable incomes leading to contribution defaults, persistent auto-debit failures in zero-balance bank accounts, administrative informalization, and limited awareness among migratory rural workers.

The PM-SYM scheme serves as a crucial social safety net for India's vast informal workforce; however, addressing auto-debit friction and strengthening rural outreach are vital to ensure long-term retention and meaningful financial security in old age.

Samudra Manthan: National Offshore Exploration Scheme

- **Scheme Overview & Budgetary Outlay:** Approved on 31 July 2026 under the Ministry of Petroleum and Natural Gas, the "Samudra Manthan" scheme allocates a Phase-I outlay of ₹84,084 crore up to FY 2030–31 to de-risk and accelerate offshore deepwater and ultra-deepwater hydrocarbon exploration.
- **Core Macroeconomic Objectives:** Aims to unlock over 600 MMTOE of hydrocarbon reserves, elevate domestic production from 62 MMTOE to 80 MMTOE, reduce India's annual ₹13 lakh crore (~USD 144 billion) crude import bill by nearly ₹1 lakh crore, and foster domestic energy resilience.

- **Risk-Sharing & Drilling Subsidies:** Allocates ₹43,200 crore to drill 60 deepwater/ultra-deepwater wells, offering E&P operators financial support covering up to 50% of eligible drilling costs or ₹675 crore per well (whichever is lower) to mitigate high exploratory risk.
- **Key Components & Allocation Matrix:**
    - **Seismic Data Acquisition (₹28,534 crore):** Funds 2D/3D seismic surveys and AI-driven reprocessing of National Data Repository (NDR) datasets.
    - **Offshore Exploration & Infrastructure (₹55,200 crore):** Includes ₹43,200 crore for well drilling, ₹10,000 crore for common evacuation/production facilities, and ₹2,000 crore for an integrated Oil & Gas Manufacturing and Services Zone under Make in India.

- **Monitoring & Outreach (₹350 crore):** Digital program management, evaluation, and capacity building.

- **Unlocking EEZ & Upstream Reforms:** Builds on upstream reforms including the removal of "No-Go" restrictions across 99% of the Exclusive Economic Zone (EEZ), transition from Production Sharing Contracts (PSC) to Revenue Sharing Contracts (RSC) under HELP/OALP, and the Oilfields (Regulation and Development) Amendment Act, 2025.
- **Constitutional & Legal Provisions:**
  - **Article 297:** Establishes that all lands, minerals, and other things of value underlying the ocean within the territorial waters, continental shelf, or EEZ of India vest in the Union.
  - **Seventh Schedule (List I, Entry 53):** Places regulation and development of oilfields and mineral oil resources under the exclusive legislative domain of the Union Parliament.
  - **Legal Framework:** Governed via the Petroleum and Natural Gas Rules, 2025, and the Oilfields (Regulation and Development) Act.
- **Key Definitions for UPSC:**
  - **MMTOE (Million Metric Tonnes of Oil Equivalent):** A standardized energy unit quantifying energy content across diverse hydrocarbon sources.
  - **Appraisal Well:** A well drilled post-discovery to delineate the physical boundaries, flow rates, and commercial viability of a hydrocarbon accumulation.
  - **Revenue Sharing Contract (RSC):** A fiscal regime where operators share a predetermined percentage of gross revenue with the government from day one, eliminating complex cost-recovery audits.
- **Strategic Significance & Challenges:** While addressing deepwater capital intensity and production declines in legacy fields (6–7% annually), the scheme faces bottlenecks like high vessel chartering costs, severe marine weather windows, technological dependence on foreign deepwater rigs, and balancing fossil exploration with India's Net-Zero 2070 climate commitments.

Samudra Manthan represents a pivotal shift from policy liberalization to mission-mode execution, bridging state risk-sharing with private capital to harness deepwater energy reserves, conserve foreign exchange, and fortify national energy sovereignty.

Integration of Ayush Services into Ayushman Arogya Mandir

- **National Ayush Mission (NAM) Target:** Under the Centrally Sponsored Scheme NAM, 12,500 existing Ayush Dispensaries and Sub-Health Centres (SCs) are being upgraded to operational Ayushman Arogya Mandirs (Ayush) [AAM (Ayush)] to deliver holistic, preventive, and promotive healthcare across States and UTs.
- **Financial Assistance Norms:** The Union Government provides direct financial assistance via State Annual Action Plans (SAAPs) at a standardized unit cost of ₹16.22 lakh per Ayush Dispensary and ₹15.744 lakh per Sub-Centre for upgrading physical infrastructure, diagnostic capabilities, and medicine supply chains.

- **Holistic Healthcare Delivery Model:** AAM (Ayush) integrates traditional knowledge with mainstream public health by offering Ayurveda consultations, Yoga therapy, Naturopathy treatments, Prakriti Parikshan (individual constitution assessment), and community awareness regarding local medicinal plants.

- **Grassroots Community Integration:** Employs a team-based operational approach that leverages field-level healthcare functionaries, particularly Accredited Social Health Activists (ASHAs), to build community-level engagement, drive footfall, and strengthen public referral linkages.

- **Quality Assurance & Accreditation:** Ensures clinical standardisation through National Accreditation Board for Hospitals & Healthcare Providers (NABH) assessments, central monitoring visits, and third-party reviews to evaluate practitioner training and service quality.

- **Constitutional Underpinnings:** Aligns with Article 47 (Directive Principle imposing a primary duty on the State to raise the level of nutrition and standard of living and improve public health) and Article 21 (Right to Health as an integral facet of Right to Life).

- **Key Definitions for UPSC:**
  - **Prakriti Parikshan:** A foundational diagnostic tool in Ayurveda used to evaluate an individual's unique psycho-physiological baseline constitution (Dosha balance).
  - **State Annual Action Plan (SAAP):** A decentralized planning mechanism where States compile resource requirements under NAM to seek central funding allocation.

- **Implementation Challenges:** Key operational hurdles include acute shortages of certified Ayush medical officers, uneven inter-state distribution of functional centers, delayed fund flow through State Treasuries, and weak cross-referral mechanisms between primary Ayush centers and tertiary allopathic hospitals.

The operationalization of Ayushman Arogya Mandirs (Ayush) represents a paradigm shift toward an integrative healthcare ecosystem, harmonizing traditional Indian systems of medicine with primary healthcare infrastructure to achieve universal health coverage and sustainable wellness.

Risks and Calamities Covered Under PMFBY

- **Comprehensive Risk Coverage Framework:** Launched in 2016–17, Pradhan Mantri Fasal Bima Yojana (PMFBY) offers end-to-end yield insurance covering non-preventable natural risks from pre-sowing, standing crop (preventable sowing, mid-season adversity), to post-harvest stages for notified crops.

- **Voluntary Adoption Scheme:** The scheme operates on a voluntary basis for both State/UT Governments and farmers (including loanee and non-loanee categories), enabling flexible implementation tailored to regional agro-climatic demands.

- **Inundation Cover Mechanics:** Inundation is covered as a localized risk across notified crops; however, hydrophilic crops (e.g., paddy, jute, mesta, sugarcane) are excluded from localized inundation claims due to their high natural water tolerance, though widespread flood losses remain covered.

- **Add-on Cover for Wild Animal Attacks:** While crop damage from wild animals was historically excluded as a preventable loss, states can now notify wild animal attack coverage as an add-on policy, with the financial burden borne by the concerned State Government.
- **Actuarial Premium Structure:** Farmers pay a subsidized uniform premium capped at 2% for Kharif crops, 1.5% for Rabi crops, and 5% for commercial/horticultural crops, with the remaining actuarial premium split equally (50:50) between the Centre and States.
- **Constitutional & Legal Foundation:** Supports Article 48 (Directive Principle mandating modern agricultural organization) and Article 21 (Right to Livelihood), aligning with statutory financial relief standards under the Disaster Management Act, 2005.
- **Key Definitions for UPSC:**
  - **Hydrophilic Crops:** Water-loving crops requiring submerged or flooded conditions for optimal growth during critical developmental phases.
  - **Localized Calamities:** Loss or damage affecting isolated farms due to localized risks such as hailstorm, landslide, inundation, cloudburst, or natural fire.
  - **Preventable Risk:** Agricultural risk arising from factors within human operational control, such as improper management, pest infestation due to negligence, or poor husbandry.
- **Implementation Challenges:** Key operational hurdles include delayed premium subsidy releases by states, disputes over crop cutting experiments (CCEs), low penetration among non-loanee farmers, and friction in assessing individual localized losses vs. area-approach yields.

By integrating technological tools like remote sensing and expanding add-on coverage for emerging localized threats, PMFBY serves as a vital risk-mitigation tool to stabilize farm incomes and enhance rural economic resilience against climate uncertainties.

Minimum Support Prices (MSPs) and Agricultural Price Policy in India

- **Comprehensive MSP Architecture:** Government fixes Minimum Support Prices (MSPs) annually for 22 mandated agricultural crops based on recommendations from the Commission for Agricultural Costs & Prices (CACP), enforcing a minimum margin of 50 percent over the all-India weighted average cost of production (A2+FL formula).
- **Diversified Institutional Procurement:** Physical procurement of marketable surplus is executed via specialized agencies: Food Corporation of India (FCI) for cereals, NAFED and NCCF under PM-

AASHA for pulses and oilseeds, Cotton Corporation of India (CCI) for cotton, and Jute Corporation of India (JCI) for jute.

- **PM-AASHA and Pulses Mission:** Under the Mission for Aatmanirbharta in Pulses (up to 2030–31), open-ended procurement of Tur, Urad, and Masur is assured from pre-registered farmers via NAFED and NCCF to curb import dependence and incentivize domestic crop diversification.

- **Market Intervention Scheme (MIS) Upgrades:** For perishable horticultural commodities, MIS triggers when ruling market prices fall by at least 10 percent below normal levels; recent additions include Price Differential Payment (PDP) options and freight/storage cost reimbursements for TOP (Tomato, Onion, Potato) crops.
- **Technological Integration & DBT:** Procurement operations mandate land record integration and direct benefit transfers (DBT) into farmer bank accounts to eliminate intermediaries and ensure transparent price support delivery.
- **Macro Procurement Trajectory:** Total MSP crop procurement reached 12,819 Lakh Metric Tonnes (LMT) between 2014 and 2026 (up to June 2026) with cumulative payouts of ₹27.80 lakh crore, reflecting significant scale expansion over the previous decade.
- **Constitutional & Legal Mandates:** Aligns with Article 39(b) (distribution of material resources to serve the common good), Article 48 (modern organization of agriculture), and State list obligations (Entry 14 & 28) regarding agricultural trade and markets.
- **Key Definitions for UPSC:**
  - **A2+FL Cost:** Operational cost formula covering actual out-of-pocket expenses incurred on inputs (seeds, fertilizer, labor) plus the imputed value of unpaid family labor.
  - **Price Differential Payment (PDP):** A financial mechanism compensating farmers directly for the gap between the Market Intervention Price (MIP) and the actual lower market realization without physical crop acquisition.
- **Key Challenges in Price Policy:** Major bottlenecks include geographical skewness in procurement efficiency, procurement concentration in wheat and paddy, infrastructure deficits in perishable handling, and limited market penetration of non-cereal price support.

Strengthening agricultural price policy through expanded PM-AASHA coverage, digital market integration, and decentralized procurement infrastructure is vital to securing farmer livelihoods, stabilizing rural incomes, and achieving long-term agricultural self-reliance.

Support for Farmer Producer Organisations (FPOs) in India

- **Targeted Scheme Implementation:** The Central Sector Scheme for "Formation and Promotion of 10,000 FPOs" (launched in 2020–21) has successfully achieved its initial target of establishing 10,000 FPOs across the country to collectivize smallholders and build agribusiness capability.

- **Financial Assistance & Handholding Architecture:** Envisages financial support up to ₹18 lakh per FPO for operational expenses over 3 years, a matching Equity Grant up to ₹15 lakh per FPO to strengthen capital bases, and credit guarantee cover up to ₹2 crore per FPO, alongside 5-year support via Cluster-Based Business Organizations (CBBOs).
- **Grassroots Economic Impact:** Over 65 lakh farmers—mostly small and marginal—have been integrated as shareholders; financial disclosures (2024–25) reveal 1,135 FPOs achieved turnovers exceeding ₹1 crore, while 862 generated between ₹50 lakh and ₹1 crore.

- **Forward and Backward Market Linkages:** Enhances farmer bargaining power through formal licensing (6,928 for seeds, 6,650 for fertilizers, and 4,987 for pesticides) while enabling higher value-addition, with 5,765 FPOs operating dedicated processing units and digital trade connections.
- **NAAS Policy Paper 144 Recommendations:** Emphasizes establishing strong FPO-industry linkages, connecting institutional buyers directly with farmer collectives, and embedding research and development (R&D) support to improve production standards and supply chain integration.
- **Constitutional & Statutory Framework:** Operates under Article 43 (promotion of cottage and cooperative industries in rural areas), Article 48 (modernization of agriculture), and legal incorporation under Part IXA of the Companies Act, 2013 (Producer Companies) or relevant State Co-operative Societies Acts.
- **Key Definitions for UPSC:**
    - **Farmer Producer Organisation (FPO):** A legal entity formed by primary producers (farmers, milk producers, fishermen) to leverage economies of scale in procurement, processing, and marketing.
    - **Cluster-Based Business Organization (CBBO):** A professional agency engaged at the field level to assist in baseline surveys, registration, business planning, and market integration for FPOs.

- **Key Operational Challenges:** Critical bottlenecks include limited access to collateral-free institutional credit, high dependency on CBBOs for governance, regional disparities in turnover, and insufficient professional management skills among primary farmer directors.

The structured promotion of FPOs serves as a cornerstone for agricultural transformation, shifting primary farming from subsistence to commercial agribusiness, enhancing rural creditworthiness, and securing smallholder incomes.

Cooperative Based Organic Farming in India

- **Central Scheme Architecture:** The Ministry of Agriculture and Farmers Welfare actively promotes cooperative and cluster-based organic farming via two flagship schemes initiated in 2015–16: the nationwide Paramparagat Krishi Vikas Yojana (PKVY) and the Mission Organic Value Chain Development for North Eastern Region (MOVCDNER).

- **End-to-End Value Chain Support:** Both schemes provide holistic support spanning production, cluster formation, organic certification, post-harvest processing, infrastructure development, and market linkages, explicitly prioritizing small and marginal farmers to achieve economies of scale.
- **PKVY Financial Incentives:** PKVY extends financial assistance of ₹31,500 per hectare over a three-year cycle, which includes direct financial aid of ₹15,000 per hectare via Direct Benefit Transfer (DBT) specifically targeted for procuring on-farm and off-farm organic inputs.
- **MOVCDNER Special Regional Focus:** Designed for the North Eastern States, MOVCDNER provides higher financial support of ₹46,500 per hectare over 3 years, incorporating ₹32,500 per hectare for inputs (including ₹15,000 as direct DBT to farmers) alongside dedicated funding for Farmer Producer Company (FPC) creation.

- **Certification Systems:** Employs two primary organic certification pathways—the Participatory Guarantee System (PGS-India) for peer-reviewed local farmer groups under PKVY, and Third-Party Certification under NPOP (National Programme for Organic Production) suitable for export markets.
- **Constitutional & Legal Provisions:** Aligns with Article 48 (Directive Principle to organize agriculture on modern and scientific lines), Article 39(b) (equitable distribution of material resources), and the 97th Constitutional Amendment Act, 2011 (Article 43B on promoting cooperative societies).
- **Key Definitions for UPSC:**
  - **Participatory Guarantee System (PGS):** A decentralized, quality assurance certification process that certifies organic producers based on active participation and mutual trust among local farming peers.
  - **Off-Farm Organic Inputs:** Externally sourced biological inputs such as bio-fertilizers, vermicompost, and neem-coated formulations added to enhance soil fertility without synthetic chemicals.
- **Implementation Challenges:** Key structural hurdles include transition-period yield dips, high logistics costs, fragmented supply chains, limited organic testing laboratories, and low consumer awareness regarding certified organic logos.

Cooperative-based organic farming bridges ecological sustainability with smallholder economic viability, leveraging collective strength to reduce input costs, secure fair market pricing, and position India as a global hub for chemical-free agriculture.

Operationalisation of SHE-LEAPS for SHG Enterprise Growth

- **Digital Onboarding & Monitoring Framework:** Launched under the Deendayal Antyodaya Yojana-National Rural Livelihoods Mission (DAY-NRLM), SHE-LEAPS (Self-Help Entrepreneur-Livelihoods and Enterprise Application for Prosperity and Sustainability) is operationalized across 34 States/UTs to capture real-time enterprise data for monitoring and decision-making.

- **Integration with LokOS Platform:** Developed as part of the LokOS digital ecosystem, SHE-LEAPS maintains dynamic records on annual turnover, operational continuity, and enterprise trajectories of Self-Help Group (SHG) micro-entrepreneurs.
- **Grassroots Enterprise Acceleration:** The platform supports scaling of rural micro-enterprises, illustrated by State Rural Livelihood Missions like Karnataka (KSRLM), which established nearly 80,000 SHG enterprises using Community Investment Fund (CIF) assistance over three fiscal years.
- **National and State Branding Strategy:** To boost market competitiveness, the Ministry of Rural Development operates centralized registered brands ("Saras", "Saras Aajeevika", "Aajeevika") alongside 25 state-specific brands (e.g., UMED in Maharashtra, Palash in Jharkhand, Mathi in Tamil Nadu).
- **Multi-Channel Market Linkages:** Facilitates physical and digital access through annual national/state Saras Melas, physical retail outlets like the Saras Aajeevika Gallery, the dedicated eSaras portal, and partnerships with major platforms including GeM, ONDC, Amazon, Flipkart, Meesho, and JioMart.
- **Constitutional & Statutory Context:** Aligns with Directive Principles under Article 39(a) (securing adequate means of livelihood) and Article 43 (promotion of cottage industries in rural areas), reinforced by financial inclusion targets under DAY-NRLM.
- **Key Definitions for UPSC:**
    - **LokOS:** A comprehensive ERP-based digital platform designed to digitize administrative, financial, and operational workflows of SHG federations.
    - **Community Investment Fund (CIF):** Financial assistance provided directly to SHG federations under DAY-NRLM to serve as seed capital for micro-enterprise development and member loans.
- **Key Implementation Challenges:** Sustained challenges include digital literacy gaps among rural entrepreneurs, ensuring quality standardization across high-volume production, overcoming last-mile logistics barriers, and avoiding credit oversaturation in traditional micro-enterprise domains.

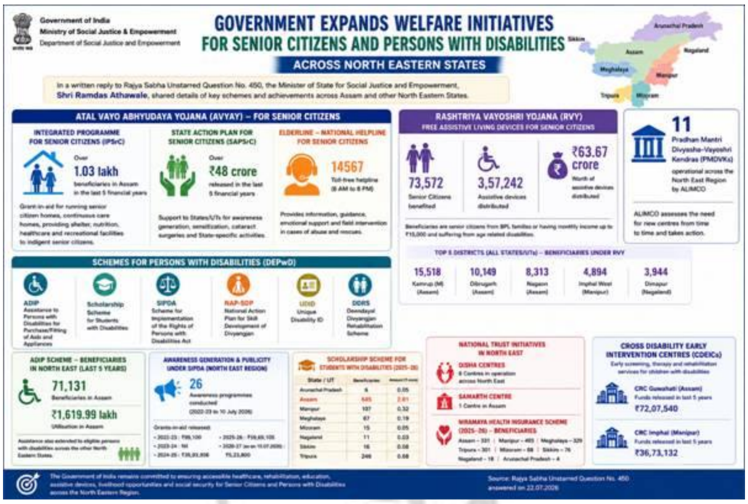
Operationalizing SHE-LEAPS strengthens the digital backbone of rural entrepreneurship, transforming informal self-help groups into sustainable, market-linked micro-enterprises while driving financial inclusion and women-led economic development across rural India.

Rashtriya Vayoshri Yojana and Deendayal Divyangjan Rehabilitation Scheme

- **Central Welfare Mandate:** Implemented by the Ministry of Social Justice and Empowerment, both schemes address physical, financial, and social vulnerabilities among senior citizens and Persons with Disabilities (PwDs) to foster inclusive community living.
- **Rashtriya Vayoshri Yojana (RVY) Core Focus:** A Central Sector Scheme launched in 2017 to provide physical aids and assisted-living devices to senior citizens belonging to the Below Poverty Line (BPL) category or suffering from age-related disabilities/infirmities.
- **Transformative Impact of RVY:** Recent third-party impact evaluations highlight that RVY significantly enhances functional independence, restores basic mobility, and reduces caregiver

dependency by distributing free, high-quality assistive devices like walking frames, hearing aids, and wheelchairs.

- **Deendayal Divyangjan Rehabilitation Scheme (DDRS) Overview:** A Central Sector Grant-in-Aid scheme that incentivizes Non-Governmental Organizations (NGOs) and voluntary bodies to deliver comprehensive rehabilitation services, specialized education, and vocational training to PwDs.



- **Digital Governance & Transparency under DDRS:** Leveraging the **e-Anudaan** digital platform, DDRS has streamlined grant-in-aid disbursements, enhanced operational transparency, improved timeliness, and strengthened school-community-parental engagement in special education and therapy.

- **Constitutional & Legal Framework:** Grounded in Article 41 (Directive Principle securing the right to work, education, and public assistance in cases of old age and disablement), reinforced by the Rights of Persons with Disabilities (RPwD) Act, 2016, and the Maintenance and Welfare of Parents and Senior Citizens Act, 2007.

- **Key Definitions for UPSC:**
  - **Assistive Devices:** External equipment, instruments, or software specifically designed or adapted to assist individuals with disabilities or age-related infirmities in performing daily activities.
  - **Grant-in-Aid:** Direct financial assistance provided by the central government to non-state actors or voluntary organizations to execute designated socio-economic rehabilitation programs.

- **Implementation Challenges:** Key structural hurdles include regional imbalances in NGO network distribution, delays in disability/BPL certification, last-mile awareness gaps in remote rural belts, and the need for periodic maintenance and repairs of distributed devices.

The impact evaluation of RVY and DDRS underscores their vital role in transforming vulnerable demographics from dependent populations into active society members, fulfilling constitutional mandates of social justice through targeted assistive aid and institutional rehabilitation.

Bharat Tex 2026: Global Textile Value Chain and Sustainability

- **PM's 5F Vision Alignment:** Organized by the Bharat Tex Trade Federation (BTTF) with Ministry of Textiles support, Bharat Tex 2026 operationalized the "Farm to Fibre to Factory to Fashion to Foreign" framework, physically mapping the full supply chain under a single platform.

- **Expanded International Footprint:** The 2026 edition saw record global participation with 6,090 international buyers from 138 countries, adding 22 new buyer markets and facilitating over 29,000 structured B2B meetings across 1,647 exhibiting companies.

- **Inclusive Grassroots Integration:** Featured dedicated platforms like "Indi Haat" alongside representation from Champion and Aspirational Districts, enabling regional weavers, handloom cooperatives, MSMEs, and traditional craft clusters to connect directly with global procurement teams.

- **Circular Economy Focus:** Hosted the "Eco-Stitch Sustainability & Circularity Hub" and promoted the "Weave the Future" initiative to drive textile recycling, upcycling, resource efficiency, and digital product passports in response to emerging global ESG regulations.
- **Strategic Partnerships & B2B Outcomes:** Concluded over 40 MoUs across trade, technology, and investment—including a Letter of Intent with Première Vision Paris—while onboarding over 500 new Indian exporters through Export Promotion Councils (EPCs).
- **Constitutional & Legal Context:** Aligns with Article 43 (Directive Principle to promote cottage and cooperative industries in rural areas) and Article 301 (Freedom of trade and commerce), supported by the Foreign Trade (Development and Regulation) Act, 1992.
- **Key Definitions for UPSC:**
  - **5F Vision:** An integrated agricultural and industrial value chain strategy linking primary cotton/silk farming directly to processing, manufacturing, fashion design, and global export markets.
  - **Digital Product Passport (DPP):** A data record detailing a product's components, materials, supply chain origin, and environmental footprint to ensure sustainability and regulatory compliance.
- **Key Operational Challenges:** Critical hurdles include ensuring ESG compliance across fragmented MSME clusters, high logistics costs, stiff price competition from regional exporters like Bangladesh and Vietnam, and raw material price volatility.

Bharat Tex 2026 reinforces India's position as a sustainable, vertically integrated global textile powerhouse, successfully bridging traditional artisanal craftsmanship with modern circular industrial practices.

India's Clean Energy Transition: 300 GW Non-Fossil Fuel Milestone

Key Terms & Definitions:

- **Non-Fossil Fuel Power Capacity:** Electricity generation derived from zero-carbon or low-carbon energy sources including solar, wind, hydro, bio-power, and nuclear power.
- **ALMM (Approved List of Models and Manufacturers):** A quality-assurance mandatory registry enforced by the Ministry of New and Renewable Energy to ensure domestic sourcing, reliability, and quality standards of solar PV cells and modules.

Key Highlights for Civil Services Exam:

- **Historic Milestone:** India achieved 300.50 GW in non-fossil fuel power capacity as of July 31, 2026, fulfilling over 60% of its target to establish 500 GW of non-fossil capacity by 2030.

- **Grid Share Elevation:** Non-fossil sources now account for over 54% of India's total electricity generation capacity, which stands at approximately 552 GW.
- **Capacity Breakdown:** The 300.50 GW total comprises Solar (164.59 GW), Wind (58.14 GW), Hydropower (57.24 GW), Bio-power (11.75 GW), and Nuclear Power (8.78 GW).
- **Record Annual Growth:** During FY 2025–26, India registered a record addition of 55.29 GW non-fossil capacity, led by 44.6 GW from solar and 6 GW from wind installations.
- **Generation Surge:** Total clean power output escalated from 190.96 billion units (BU) in 2014–15 to 477.79 BU in FY 2025–26, indicating structural operational maturity beyond simple grid installation.
- **Domestic Manufacturing Base:** Supported by the Production Linked Incentive (PLI) scheme, solar PV enlistment under ALMM expanded from 2.3 GW in 2014 to over 200 GW, securing domestic supply-chain self-reliance.
- **Industrial Decarbonization Push:** Aligns with the National Green Hydrogen Mission to reduce industrial carbon footprints and establish India as a global manufacturing and export hub for green hydrogen.

Constitutional & Legal Framework:

- **Article 48A (DPSP):** Directs the State to protect and improve the environment and safeguard forests and wildlife through sustainable development policies.
- **Article 51A(g) (Fundamental Duties):** Enjoins citizens to protect and improve the natural environment and practice ecological stewardship.
- **Electricity Act, 2003:** Sets statutory provisions for Renewable Purchase Obligations (RPO) and open-access policies to integrate green power into the national grid.
- **Energy Conservation (Amendment) Act, 2022:** Mandates non-fossil energy consumption benchmarks for designated consumers and establishes the regulatory framework for India's Domestic Carbon Market.

Conclusion:

Crossing the 300 GW threshold highlights India's global leadership in the climate transition, proving that rapid industrial growth can coexist with deep decarbonization. By strengthening indigenous manufacturing and scaling up non-fossil infrastructure, India reinforces its commitment to Panchamrit climate goals, energy independence, and sustainable development.

GOBARdhan: National Circular Bioenergy Scheme

- **Unified Clean Energy Framework:** Approved by the Union Cabinet with an outlay of ₹23,731 crore (FY 2026-27 to FY 2035-36), GOBARdhan consolidates prior initiatives (SATAT, MDA, BAM) under the Ministry of Petroleum and Natural Gas to create an integrated ecosystem across the Compressed Biogas (CBG) value chain.

- **Targeted Production Scale-Up:** Aims for a nearly ten-fold expansion in domestic CBG production by processing agricultural residue, cattle dung, press mud, and municipal organic waste, strengthening national energy security and driving the rural waste-to-wealth transition.
- **Mandated CBG Offtake Trajectory:** Establishes a binding CBG Obligation for City Gas Distribution (CGD) entities in CNG (Transport) and PNG (Domestic) segments, targeting 3% in FY 2026-27, 4% in FY 2027-28, and 5% from FY 2028-29 onwards to ensure long-term demand.
- **Administered Pricing Mechanism:** Guarantees revenue visibility for developers via a stable administered price of ₹2,110 per MMBTU with a minimum 10-year horizon, supported through government-backed price assurance and market cost-sharing mechanisms.
- **Capital & Infrastructure Support:** Provides capital assistance up to ₹2 crore per ton/day capacity for greenfield/brownfield projects, alongside dedicated funding for pipeline infrastructure connecting CBG units directly to CGD networks and trunk pipelines.
- **Financial Inclusion & District Ecosystems:** Deploys a dedicated Credit Guarantee mechanism to lower collateral barriers for MSMEs and rural entrepreneurs, complemented by a CBG Ecosystem Challenge Fund for district-level feedstock mapping, technology adoption, and organic manure (FOM/LFOM) value addition.
- **Constitutional & Legal Context:** Aligns with Directive Principles under Article 48A (environmental protection) and Article 39(b) (distribution of material resources to serve the common good), advancing India's Nationally Determined Contributions (NDCs) under the Paris Agreement.
- **Key Definitions for UPSC:**
  - **Compressed Biogas (CBG):** Purified biogas (over 90% methane content) chemically equivalent to Commercial Natural Gas (CNG), produced through anaerobic digestion of organic biomass.
  - **Fermented Organic Manure (FOM):** Nutrient-rich organic byproduct of CBG plants used to enrich soil carbon, reducing dependence on chemical fertilizers.
- **Implementation Challenges:** Key operational hurdles include establishing reliable feedstock supply chains, managing seasonal biomass availability, resolving high upfront pipeline connectivity costs, and achieving market parity for organic manure.

The GOBARdhan scheme represents a strategic push toward a circular bioeconomy, converting agricultural waste into domestic clean fuel while enhancing energy independence, supporting decarbonization goals, and bolstering rural livelihoods.

Progress of Projects Under Namami Gange Mission-II

- **Sewage Treatment & Water Quality Transformation:** Under Namami Gange Mission-II (NGM-II), 146 sewerage infrastructure projects creating 4,263 MLD of sewage treatment capacity have been completed (out of 219 sanctioned projects creating 6,610 MLD capacity), leading to marked water quality improvements, such as the complete removal of Haridwar-Sultanpur in Uttarakhand from CPCB's Polluted River Stretches (PRS) list.
- **Aquatic Biodiversity Recovery:** Scientific monitoring by Wildlife Institute of India (WII) documented 3,037 gharials, leading to the National Gharial Conservation Action Plan; over 6,800 aquatic animals have been rescued, alongside targeted releases of Critically Endangered Red-crowned Roofed Turtles (*Batagur kachuga*) and the operation of India's first Dolphin Rescue Ambulance.
- **Gangetic Dolphin & Fauna Protection:** The first nationwide population estimation (2021–2023) confirmed 6,327 Gangetic Dolphins (*Platanista gangetica*) in India, backed by four dedicated Aquatic Animal Rescue and Rehabilitation Centres and the National Centre for River Research at WII, Dehradun.
- **Inland Fisheries & Scientific River Ranching:** In partnership with ICAR-CIFRI, over 2.05 crore fish seeds of native species (Indian Major Carps, Mahseer, and Hilsa) have been ranched into the Ganga basin across 215 identified fish species to restore native aquatic biodiversity and riverine ecological health.
- **Industrial Abatement & E-Flow Compliance:** Enforces minimum Environmental Flow (E-Flow) norms monitored by the Central Water Commission (CWC) to maintain *Aviral Dhara* (uninterrupted flow), alongside commissioning major Common Effluent Treatment Plants (CETPs) like Jajmau (20 MLD) and Mathura (6.25 MLD) for industrial pollution abatement.
- **Ecosystem Restoration & Community Cadre:** Integrated ecological measures include afforestation over 33,024 hectares across five basin states, establishing seven Ganga Biodiversity Parks, notifying priority wetlands under the Wetlands Rules 2017, and mobilizing over 5,500 trained local community volunteers called 'Ganga Praharis'.
- **Constitutional & Legal Architecture:** Operates under Article 48A (environmental protection and wildlife safeguarding) and Article 51A(g) (fundamental duty to protect natural environment), executing statutory mandates via the Environment (Protection) Act, 1986, and the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016.
- **Key Definitions for UPSC:**
  - **Environmental Flow (E-Flow):** The minimum quantity, timing, and quality of water flows required to sustain freshwater ecosystems, human livelihoods, and riverine biodiversity downstream.
  - **River Ranching:** The scientific practice of releasing hatchery-reared juvenile fish of native species into natural river systems to restore depleted fish stocks and maintain ecological balance.

- **Operational Challenges:** Primary implementation bottlenecks include delayed municipal sewer network interconnections, operating costs of CETPs/STPs borne by local urban bodies, non-point agricultural runoff, and untreated wastewater inflow from rapidly urbanizing secondary tributaries.

The Namami Gange Mission-II reflects a paradigm shift in river basin management, successfully blending civil sewage infrastructure with nature-based solutions, biodiversity restoration, and community stewardship to achieve the twin goals of *Nirmal* (clean) and *Aviral* (uninterrupted) Ganga.

Zero Transaction Charges for UPI Users and PSS Act Amendment

- **Explicit Free Usage Mandate:** The Ministry of Finance reaffirmed that all Person-to-Person (P2P) and general Person-to-Merchant (P2M) consumer transactions on the Unified Payments Interface (UPI) will remain completely free of charge for citizens.
- **Statutory Enabling Amendment:** The Taxation and Other Laws (Amendment) Bill, 2026 proposes to amend Section 10A of the Payment and Settlement Systems (PSS) Act, 2007, creating an enabling provision to ensure long-term system sustainability, infrastructure resilience, and cybersecurity upgrades.
- **Targeted Merchant Discount Rate (MDR):** Any future MDR introduction will be threshold-based, nominal, and applied strictly to a limited segment of high-value merchant transactions, keeping the vast majority of small and medium merchant transactions free of charge.
- **Governance and Oversight:** Following parliamentary approval of the amendment, specific decisions regarding MDR structures will be governed by the NPCI-headed "UPI and Services Steering Committee" in consultation with the Reserve Bank of India (RBI).

No Charges for UPI Users

Vast Majority of the Transactions to Remain Free of Charge for Merchants as well

Amendment to the Payment and Settlement Systems Act (PSS Act) an Enabling Provision to Ensure further proliferation of Financial Inclusion, UPI's Long-Term Sustainability, Technological Advancement, and Resilience Against Emerging Risks

Posted On: 08 AUG 2026 6:40PM by PIB Delhi

The Government of India wishes to categorically state:

- **No charges for users**: Consumers making payments will not face any transaction charges.
- **P2P transactions free**: All Person-to-Person transactions will continue to be free of charge.
- **Nominal MDR for merchants**: As and when MDR charges are introduced, they will apply only to a **limited set of merchant transactions**, above a certain threshold, at a **nominal rate**, far lower than debit or credit card MDRs.
- **Vast majority of the transactions** will remain free of charge for merchants on UPI. MDR, if introduced, will only be threshold based and not blanketly levied to all.
- Once the Parliament passes the Taxation and Other Laws (Amendment) Bill, 2026, which proposes to amend Section 10A of the Payment and Settlement Systems Act, 2007, the "UPI and Services Steering Committee" headed by NPCI will decide on the MDR, if any.

Why Amend the Payment and Settlement Systems Act?

The recent amendment to the **Payment and Settlement Systems Act (PSS Act)** has generated debate, with some misinterpreting it as a move to impose charges on ordinary users. In reality, the amendment is an **enabling provision** designed to ensure UPI's **long-term sustainability, technological advancement, and resilience against emerging risks**.

- **Growth of UPI**: With exponential transaction volumes, the system requires significant and continuous upgrades in cybersecurity, fraud prevention, and infrastructure.
- **Market Expansion**: It is necessary to increase competition by encouraging more companies to expand their operations, which requires a self-sustaining revenue model.
- **Self-sustainability**: Reliance on subsidies alone is not viable for the next wave of growth. A balanced framework is required to ensure that UPI remains robust, inclusive, and future-ready.

- **Unprecedented Transaction Scale:** Demonstrating massive financial inclusion, UPI processed 2,366 crore transactions valued at ₹29.9 lakh crore in July 2026 alone, expanding its operational presence across 11 foreign nations.

- **Systemic Self-Sustainability Drive:** The legislative transition reduces reliance on government subsidies, establishing a self-sustaining revenue model to attract fintech competition, fund fraud-pre
- vention systems, and expand digital payments into rural regions.
- **Constitutional & Legal Framework:** Grounded in Article 39(b) (material resources serving the common good) and executed under the Payment and Settlement Systems Act, 2007, overseen by the Reserve Bank of India (RBI) and National Payments Corporation of India (NPCI).
- **Key Definitions for UPSC:**
  - **Merchant Discount Rate (MDR):** A percentage fee charged to a merchant by payment service providers for processing transactions via digital channels.
  - **Payment and Settlement Systems Act, 2007:** The primary statutory framework regulating and supervising payment systems in India, designating the RBI as the authority.
- **Operational Challenges:** Key policy hurdles include balancing ecosystem financial viability with digital adoption, preventing predatory pricing by market players, and upgrading infrastructure against emerging cybersecurity risks.

The amendment to the Payment and Settlement Systems Act strikes a pragmatic balance between preserving free public access to digital payments and creating a self-sustaining financial model to power the next wave of India's global fintech expansion.

Achievements and Socio-Economic Impact under the PM SVANidhi Scheme

- **Scheme Architecture & Scale of Performance:** Launched on 1st June, 2020 by the Ministry of Housing and Urban Affairs (MoHUA), the PM SVANidhi scheme provides collateral-free working capital term loans to urban street vendors. Between its inception and July 2026, 76.95 lakh street vendors availed over 1.15 crore loans totaling ₹18,475 crore, facilitating systematic credit expansion.
- **Credit History Building & Financial Inclusion:** Impact studies by the Indian School of Business (ISB), Hyderabad (2023 & 2025 across ~100 Urban Local Bodies) revealed that the scheme served as the first formal bank loan for 95% of beneficiaries. By building formal credit histories, around 30% of borrowers subsequently accessed non-SVANidhi formal institutional loans.

- **Income Growth & Micro-Entrepreneurial Graduation:** Between 2023 and 2025, average annualized business income among borrowers increased by around 20%. The scheme's tiered structure allows vendors to graduate to higher loan tranches upon timely repayment, with 29.71 lakh vendors accessing the 2nd tranche and 8.49 lakh accessing the 3rd tranche.
- **Digital Financial Ecosystem & Cashbacks:** To accelerate cashless adoption, beneficiaries receive up to ₹100/month cashback (max ₹1,200/year) per tranche for digital sales, plus quarterly cashbacks on wholesale purchases. Over 875 crore digital transactions totaling ₹412 crore in released cashback incentives were executed through May 2026.

- **Social Security via 'SVANidhi se Samriddhi':** Launched on 4th January, 2021, this component conducts socio-economic profiling to link vendors and their families to 8 Central Government welfare schemes, including PMJJBY, PMSBY, PMJDY, BOCW registration, PM-SYM, ONORC (NFSA), PMSY, and PMMVY. Over 50.63 lakh beneficiaries have been profiled, securing 1.56 crore scheme sanctions.
- **Broader Socio-Economic Spillover:** Beyond micro-business stabilization, studies confirm that household cash flow security under the scheme has directly improved living conditions, food security, healthcare accessibility, and educational continuity for vendors' children.
- **Constitutional & Legal Framework:** Operates in alignment with Article 19(1)(g) (Right to practice any profession, trade, or business), Article 38 (promoting social order and minimizing income inequalities), Article 39(a) (securing adequate means of livelihood), and the statutory mandates of the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014.
- **Key Definitions for UPSC:**
    - **Collateral-Free Working Capital Loan:** Short-term credit extended to meet daily operational business expenses without requiring the borrower to pledge assets or security.
    - **SVANidhi se Samriddhi:** An integrated social safety net drive within PM SVANidhi that profiles vendor households to extend multi-schematic welfare coverage across insurance, pension, and food security.
- **Operational Challenges:** Core implementation bottlenecks include persistent digital literacy gaps in tier-2/3 ULBs, delays in municipal identification via Town Vending Committees (TVCs), sporadic transaction failures, and regional disparities in bank processing efficiency.

The PM SVANidhi scheme has successfully transformed urban informal vending from a vulnerable survival strategy into a digitally integrated, credit-linked formal enterprise, serving as a vital instrument for achieving inclusive urban growth under Viksit Bharat.

Welfare Schemes for Hill-Based Minority Communities

- **Targeted Beneficiaries & Geographic Coverage:** The Ministry of Minority Affairs implements targeted socio-economic empowerment schemes for six centrally notified minority communities—Buddhists, Christians, Jains, Muslims, Parsis, and Sikhs—across all topographies, including hill-based minority populations in regions like West Bengal.
- **Integrated Livelihood Framework (PM VIKAS):** Pradhan Mantri Virasat Ka Samvardhan (PM VIKAS), a Central Sector Scheme, converges five erstwhile schemes (Seekho Aur Kamao, USTTAD, Hamari Dharohar, Nai Roshni, and Nai Manzil) to streamline education, skilling, and livelihood opportunities.

Key Definitions for UPSC:

- **Notified Minority Communities:** Religious groups officially designated under Section 2(c) of the National Commission for Minorities Act, 1992 (Buddhists, Christians, Jains, Muslims, Parsis, and Sikhs).
- **State Channelising Agency (SCA):** State-level institutional bodies nominated by State Governments to process, disburse, and recover NMDFC concessional loans at the grass-roots level.

- **Core Pillars of PM VIKAS:** Focuses on four main interventions: (i) Skilling and Training, (ii) Women Leadership and Entrepreneurship, (iii) Education, and (iv) Infrastructure Development in operational convergence with PMJVK.
- **Community Infrastructure Creation (PMJVK):** Pradhan Mantri Jan Vikas Karyakram (PMJVK) operates as a Centrally Sponsored Scheme to build critical socio-economic assets in Minority Concentration Areas (MCAs) covering healthcare, education, skill development, sanitation, sports, and renewable energy.
- **Concessional Credit Architecture (NMDFC):** The National Minorities Development & Finance Corporation (NMDFC) provides soft loans to promote micro-entrepreneurship among notified minorities through a two-tiered family income eligibility structure: Credit Line-1 (annual income up to ₹3.00 lakh) and Credit Line-2 (annual income up to ₹8.00 lakh).
- **State Channelising Implementation (SCAs):** NMDFC executes its credit delivery through State Channelising Agencies (SCAs), such as the West Bengal Minorities Development & Finance Corporation (WBMDFC), ensuring targeted credit reach to vulnerable hill-based minority beneficiaries.
- **Constitutional & Legal Provisions:** Anchored in Article 29 (Protection of interests of minorities), Article 30 (Right of minorities to establish and administer educational institutions), Article 38 (State to secure a social order for the promotion of welfare of the people), and the National Commission for Minorities Act, 1992.
- **Implementation Challenges:** Key operational bottlenecks include complex terrain accessibility in hill areas, limited physical banking infrastructure, low awareness regarding financial convergence schemes, and delays in project execution by state-level agencies.

The integrated implementation of PM VIKAS, PMJVK, and NMDFC credit lines strengthens soft infrastructure and economic self-reliance among hill-based minorities, serving as a crucial pillar for achieving inclusive growth under the vision of Sabka Saath, Sabka Vikas.

PAIMANA: Strengthening Data-Driven Infrastructure Governance

- **Platform Genesis & Scope:** Launched on 25 September 2025 by the Ministry of Statistics and Programme Implementation (MoSPI), PAIMANA (Project Assessment, Infrastructure Monitoring and Analytics for Nation-Building) replaced the legacy OCMS-2006 to monitor Central Sector infrastructure projects costing ₹150 crore or more.
- **Unified Central Repository (PAIMANA-CRIP):** Introduced on 8th July 2026, the PAIMANA-CRIP module replaces DPIIT's Integrated Project Monitoring Portal (IPMP), serving as the single-source Central Repository of Infrastructure Projects to feed high-level review mechanisms like PRAGATI and the Project Monitoring Group (PMG).

- **Automated Data Integration:** Over 20+ Ministries and Departments update project statuses via direct data entry or API modes; currently, over 60% of projects dynamically sync from existing line-ministry Management Information Systems (MIS) and DPIIT's Indian Infrastructure Grid (IIG).
- **Multi-Dimensional Performance Indicators:** Expanded on 16th April 2026, the Performance Monitoring Dashboard tracks 165 indicators across 6 sub-sectors (Civil Aviation, Roads, Power, Ports/Shipping, Telecom, Railways) mapped to the Department of Economic Affairs' Harmonized Master List (HML) of Infrastructure (2022) in partnership with NIPFP.
- **Holistic Analytical Shift:** Paradigmatically shifts evaluation from routine output tracking to a five-dimensional governance framework evaluating Access (reach), Quality (reliability), Fiscal Cost & Revenue (resource efficiency), Utilization (capacity output), and Affordability (economic accessibility).
- **Macro Portfolio & Sectoral Footprint:** As of June 2026, PAIMANA tracks 1,847 ongoing projects worth ₹40.54 lakh crore (with 54.18% cumulative expenditure), led numerically and financially by the Ministry of Road Transport & Highways (1,022 projects; ₹9.89 lakh crore) and the Ministry of Railways (255 projects; ₹8.69 lakh crore).
- **Constitutional & Statutory Context:** Anchored in Directive Principles under Article 38 (minimizing regional economic disparities) and Article 39(b) (distribution of material resources to serve common good), adhering to General Financial Rules (GFR) 2017 for capital project execution and public procurement transparency.
- **Key Definitions for UPSC:**
    - **Central Sector Infrastructure Project:** Infrastructure initiatives fully funded and executed by Central Ministries or Central Public Sector Enterprises (CPSEs) from Union Budget allocations.
    - **Harmonized Master List (HML) of Infrastructure:** The standardized national framework issued by the Department of Economic Affairs (DEA) defining sectors eligible for institutional infrastructure financing and policy benefits.
- **Implementation Challenges:** Primary operational hurdles involve data latencies in manual entry from remote sites, inter-ministerial coordination friction, cost overruns due to delayed land acquisition, and environmental clearance bottlenecks.

PAIMANA's integration of automated tracking with multi-dimensional performance metrics marks a major shift toward evidence-based infrastructure governance, resolving structural execution delays to achieve the capital creation goals of Viksit Bharat.

Sustainable Agricultural Practices and Resource Management in India

- **Balanced Nutrient Governance:** Under the Soil Health & Fertility Scheme, over 26.18 crore Soil Health Cards have been generated to drive Integrated Nutrient Management (INM); NITI Aayog evaluations confirm that 63.78% of adopting farmers achieved higher fertilizer use efficiency and improved crop yields.
- **Micro-Irrigation & Fertigation Expansion:** The Per Drop More Crop (PDMC) scheme has brought 114.60 lakh hectares under micro-irrigation, benefiting ~100 lakh farmers; precision

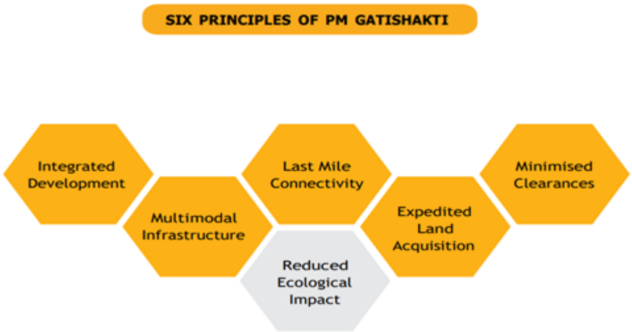
fertigation delivers water-soluble nutrients directly to root zones, with 62.46% of farmers reporting notable yield increases.

- **Organic & Natural Farming Architecture:** Paramparagat Krishi Vikas Yojana (PKVY) covers 18.93 lakh hectares (33.63 lakh farmers) and MOVCDNER covers 2.36 lakh hectares in the North East via ₹15,000/ha DBT assistance; the National Mission on Natural Farming (NMNF, approved Nov 2024) covers 11.81 lakh hectares in 24,031 clusters, with 90.1% of farmers reporting reduced input costs.
- **Agroforestry & Ecological Infrastructure:** The Agroforestry Scheme funds nursery creation (up to ₹16 lakh for 1 ha and ₹10 lakh for 0.5 ha setups), establishing 826 nurseries and raising 1062.18 lakh saplings over three years to integrate trees with arable crops for diversification.
- **Water Conservation & Groundwater Stability:** Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) incorporates Har Khet Ko Pani (HKKP), Surface Minor Irrigation, and water body restoration, complemented by 110 Natural Resource Management (NRM) works under VB-G RAM-G; Central Ground Water Board (Pre-Monsoon 2026) data shows 87.8% of 9,085 monitoring wells operate within normal levels.
- **Crop Diversification & Macro Output Trajectory:** Mission for Aatmanirbharta in Pulses, NMEO-Oilseeds, NFSNM, and MIDH promote high-value diversification; total food grain production expanded from 252.03 million tonnes (2014–15) to a record 357.73 million tonnes (2024–25), alongside horticulture reaching 370.73 million tonnes.
- **Constitutional & Legal Framework:** Grounded in Schedule VII State List Entry 14 (Agriculture, including education and research), Entry 17 (Water supplies, irrigation, and canals), Union/Concurrent List coordination, Directive Principles under Article 48 (organizing agriculture and animal husbandry on modern, scientific lines), and Article 48A (environmental protection).
- **Key Definitions for UPSC:**
    - **Fertigation:** The application of dissolved fertilizers, soil amendments, or water-soluble nutrients through an automated micro-irrigation system directly to the plant root zone.
    - **Integrated Nutrient Management (INM):** A scientific soil management framework combining chemical, organic, and biological nutrient sources to maintain soil fertility and crop productivity.
- **Implementation Challenges:** Key structural hurdles include regional disparities in micro-irrigation uptake, initial yield drops during the organic conversion phase, high upfront costs for agroforestry nurseries, over-reliance on chemical subsidies, and variable ground-level extension services across states.

The systematic transition toward micro-irrigation, natural farming, and balanced nutrient application builds climate resilience in Indian agriculture, balancing national food security imperatives with ecological sustainability under Viksit Bharat.

PM GatiShakti National Master Plan: Integrated Infrastructure Governance

- **Integrated Governance Architecture:** Launched in October 2021 by the Ministry of Commerce and Industry, PM GatiShakti National Master Plan (PMGS NMP) operates as a "Whole of Government" spatial planning portal that synchronizes infrastructure execution across 58 Central Ministries/Departments and all 36 States/UTs.
- **Planning Framework without Direct Outlays:** PMGS NMP functions exclusively as a geospatial decision-support and coordination mechanism without separate budgetary provisions; individual project approvals, targets, and funding remain anchored within the respective line ministries and state governments.



- **Institutional Rigor via Network Planning Group:** The Network Planning Group (NPG) scrutinizes major infrastructure projects prior to sanctioning to ensure multimodality, inter-modality, and last-mile connectivity; NPG has evaluated 396 projects worth ~₹18.66 lakh crore, with 256 sanctioned and 198 actively under implementation.
- **Macroeconomic Logistics Optimization:** Supported by the National Logistics Policy and PRAGATI, a joint DPIIT-NCAER assessment (2025) estimates India's logistics cost at 7.9% of GDP, bringing it at par with advanced economies; an IIM Bangalore study indicates that every ₹1 spent on National Highway development yields a ₹3.2 GDP expansion.
- **Geospatial Tech Stack & Open Access Expansion:** The platform integrates over 1,800 geospatial data layers, 65 software tools, and 100+ applications; the launch of the PM GatiShakti public platform (ugi.pmgatishakti.gov.in) in September 2025 extended query-based spatial analytics to private entities, alongside expanding district-level planning.
- **Social & Economic Infrastructure Synergy:** Beyond transport corridors (roads, rail, ports), the platform integrates social sector asset planning (schools, hospitals, Anganwadis) with economic nodes like industrial corridors and energy grids to foster balanced regional development.
- **Constitutional & Legal Provisions:** Anchored in Article 301 (Freedom of trade, commerce, and intercourse), Schedule VII List I Entry 22 (Railways), Entry 23 (Highways), Entry 24 (Shipping), and List III Entry 20 (Economic and social planning), reinforcing cooperative federalism in capital creation.
- **Key Definitions for UPSC:**
  - **Network Planning Group (NPG):** An inter-ministerial body under PM GatiShakti responsible for unified appraisal of infrastructure projects to eliminate siloed planning and optimize multimodal integration.
  - **Geospatial Data Layers:** Digitized, location-based mapping data (covering topography, forest boundaries, utility lines, and existing transport links) stacked on a single GIS platform to streamline project design and land use alignment.

- **Implementation Challenges:** Key operational hurdles include data-sharing friction across inter-governmental silos, varying technical capabilities at the ULB/district levels, land acquisition delays, and the need for continuous real-time spatial layer updates.

PM GatiShakti replaces legacy silo-based infrastructure execution with data-driven multimodal alignment, serving as a critical operational pillar for reducing supply chain friction and driving sustainable economic growth under Viksit Bharat.

Governance Reforms and Financial Integrity in Cooperative Societies

- **Macro Sectoral Footprint:** Data from the National Cooperative Database (NCD) reveals that out of 8.53 lakh cooperative societies in India (encompassing ~32 crore members), 6.63 lakh are functional, 1.41 lakh are non-functional, and 49,177 are under liquidation.

- **Audit & Compliance Gaps:** Among the 6.63 lakh functional cooperatives, 5.95 lakh societies are audited, while 0.68 lakh (~68,000) societies remain unaudited, highlighting operational vulnerabilities caused by weak management, delayed statutory audits, and financial embezzlement.

- **Liquidation Mechanism under MSCS Act:** Multi-State Cooperative Societies (MSCS) operate as autonomous entities; under Sections 86, 89, and 90 of the MSCS Act, 2002, winding-up proceedings, appointment of liquidators, and asset liquidation are triggered to settle member and investor claims, with 115 MSCSs currently under liquidation.

- **Legislative Overhaul (MSCS Amendment Act, 2023):** The 2023 amendments revamped governance by reforming electoral processes, introducing strict accountability metrics, and establishing the Cooperative Rehabilitation, Reconstruction and Development Fund (Section 63A) to revive sick MSCSs and fund infrastructure.

- **Digitalization & ERP Integration:** To eliminate audit deficits and financial opacity at the grass-roots level, Primary Agricultural Credit Societies (PACS) are being integrated into a unified National ERP-based software, backed by Model Byelaws enabling business diversification (e.g., LPG distribution, Common Service Centers).

- **Institutional Supervision & Grievance Redressal:** Rural Cooperative Banks have been integrated into the RBI Integrated Ombudsman Scheme, creating an external statutory mechanism to address financial irregularities and enhance consumer protection.

- **Constitutional & Statutory Framework:** Guided by Article 19(1)(c) (Right to form cooperative societies), Article 43B (Directive Principle on promotion of voluntary formation and professional management), Part IXB (Articles 243ZH to 243ZT inserted via 97th Constitutional Amendment Act, 2011), Schedule VII List II Entry 32 (State cooperative societies), and List I Entry 44 (Primary objects multi-state cooperatives).

- **Key Definitions for UPSC:**
  - **Primary Agricultural Credit Societies (PACS):** Village-level cooperative credit institutions that form the base unit of the short-term cooperative credit structure in India.
  - **Multi-State Cooperative Society:** A cooperative entity registered under the MSCS Act whose objects and area of operation extend beyond the boundaries of a single state.
- **Structural Bottlenecks:** Key systemic challenges include political interference in board elections, delay in conducting statutory annual audits, inadequate digital literacy among rural members, and regulatory dualism between state registrars and central authorities.

Reforming the cooperative sector under the vision of "Sahakar-se-Samriddhi" requires balancing autonomous management with strict audit oversight and ERP-driven transparency, ensuring these institutions serve as secure instruments for financial inclusion.

MSME Development (Amendment) Act, 2026: Enhancing Ease of Doing Business

- **Economic Footprint & Legislative Intent:** Passed in August 2026, the MSMED (Amendment) Act updates the 2006 framework for a sector driving 31.1% of GDP, 35.4% of manufacturing, 48.58% of exports, and 40+ crore jobs across 9.16 crore Udyam-registered units.
- **Unified Dual-Criteria Classification:** Formally enshrines composite criteria based on investment (in plant, machinery, or equipment) and turnover, while making memorandum filing free, voluntary, and digitally integrated via national and state platforms.
- **Mandatory TReDS Invoice Settlement:** Mandates Central Public Sector Enterprises (CPSEs) to settle MSME invoices via the Trade Receivables Discounting System (TReDS)—which handled ₹3.47 lakh crore in 2025-26—while empowering state governments to extend TReDS usage to state PSEs.

- **Strengthened Dispute Resolution Framework:** Empowers states to establish multiple MSE Facilitation Councils (MSEFCs) with dedicated digital and physical infrastructure, while authorizing the Central Government to establish an Online Dispute Resolution (ODR) mechanism for fast-track ODR mediation and arbitration.
- **Time-Bound ADR & Mandatory Interim Relief:** Mandates mediation completion within 90 days, referral to arbitration within 30 days of failure, and arbitral awards within 90 days; courts must release at least 50% of the deposited award amount to MSE suppliers if set-aside applications remain pending past six months.
- **Revenue Recovery & Decriminalization:** Enables recovery of mediated settlements or arbitral awards as arrears of land revenue via District Collectors, while replacing criminal convictions for procedural violations with a graded warning-and-penalty mechanism.

- **Constitutional & Legal Architecture:** Grounded in Schedule VII List III Entry 20 (Economic and social planning), Entry 33 (Trade and commerce), List I Entry 52 (Industries under Central control), Article 301 (Freedom of trade), and Article 39(a) (Directive Principle for securing adequate means of livelihood).
- **Key Definitions for UPSC:**
  - **TReDS (Trade Receivables Discounting System):** An RBI-regulated institutional electronic platform enabling MSMEs to auction and discount their trade receivables from corporate and government buyers through multiple financiers.
  - **MSE Facilitation Council (MSEFC):** A statutory quasi-judicial body constituted at the state/UT level to adjudicate delayed payment disputes between micro/small enterprises and buyers under alternative dispute resolution procedures.
- **Systemic Execution Bottlenecks:** Operational challenges include delayed compliance by state-level PSEs, technical capacity gaps in regional MSEFCs leading to arbitral backlog, limited awareness among informal micro-enterprises regarding ODR tools, and delayed recovery via revenue authorities.

The MSMED (Amendment) Act, 2026 shifts the MSME ecosystem toward structural formalization and institutional liquidity, removing delayed payment bottlenecks to turn India's micro-enterprises into globally competitive industrial drivers under Viksit Bharat.

Regulation and Rationalisation of Maximum Retail Prices of Medicines

- **Regulatory and Policy Architecture:** Drug prices in India are regulated under the Drugs (Prices Control) Order, 2013 (DPCO, 2013), issued pursuant to the National Pharmaceutical Pricing Policy, 2012 (NPPP, 2012), balancing industrial growth with affordable public access to essential medicines.
- **Role of National Pharmaceutical Pricing Authority (NPPA):** Under the Department of Pharmaceuticals, NPPA fixes market-data-driven ceiling prices for essential formulations in Schedule-I of DPCO and retail prices for 'new drugs'; manufacturers may price below these ceilings, but cannot exceed them (plus applicable GST).
- **Price Dynamics for Non-Scheduled Formulations:** For non-scheduled formulations, manufacturers possess operational flexibility to fix market prices, subject to a statutory cap prohibiting Maximum Retail Price (MRP) increases beyond 10% over the preceding 12 months.

Constitutional & Legal Framework: Rooted in Article 21 (Right to Life, encompassing health), Article 47 (Directive Principle to raise nutrition and public health), Schedule VII List III Entry 33 (Drugs and poisons), and executed under Section 3 of the Essential Commodities Act, 1955.

- **Impact on Out-of-Pocket Expenditure (OOPE):** Drug price rationalization, alongside targeted health interventions, contributed to a reduction in out-of-pocket expenditure as a share of Total Health Expenditure from 62.6% in 2014–15 to 43.4% in 2022–23.
- **Compliance, Monitoring, and Labeling Enforcement:** NPPA monitors market compliance via State Price Monitoring and Resource Units (PMRUs) and State Drug Controllers; DPCO 2013 mandates mandatory MRP printing on packaging, legally prohibiting sales above the labeled price or notified price list.

- **Institutional Schemes for Affordable Healthcare:** Complementary supply-side initiatives include PM Bhartiya Janaushadhi Pariyojana (over 20,000 Kendras providing generics at 50%–80% lower costs), AMRIT Pharmacies (up to 50% discount on cancer/cardiovascular drugs/implants), NHM Free Drugs Service Initiative, AB-PMJAY (₹5 lakh coverage/family/year), and Rashtriya Arogya Nidhi.
- **Key Definitions for UPSC:**
  - **Ceiling Price:** The maximum retail price fixed by NPPA for a scheduled formulation, calculated based on the simple average price of all brand/generic versions having market share equal to or more than 1% of total turnover.
  - **Scheduled Formulation:** Any drug formulation included in Schedule-I of the DPCO 2013, which aligns with the National List of Essential Medicines (NLEM).
- **Implementation Challenges:** Core operational hurdles include price distortions caused by brand differentiation, supply chain leakages, delays in updating NLEM lists, variable state-level PMRU enforcement capacity, and regulatory arbitrage in fixed-dose combinations.

Price rationalization under DPCO 2013 and market interventions through generic procurement networks serve as critical pillars for achieving Universal Health Coverage, mitigating catastrophic health expenditures, and safeguarding public health under Viksit Bharat.

NITI Aayog Report on Strategic Sectors to Position India as a Global Manufacturing Hub

- **Policy Framework & Strategic Intent:** NITI Aayog's data-driven report outlines a multi-phase framework designed to boost domestic capabilities, enhance value addition, and expand export-oriented production across high-impact manufacturing sectors, driving the vision of Viksit Bharat.
- **Structured Four-Phase Methodology:** The report employs a structured 4-phase analytical model: Phase 1 shortlists sectors by relative attractiveness; Phase 2 conducts a comprehensive assessment of market potential and competitiveness; Phase 3 benchmarks international best practices; and Phase 4 formulates actionable roadmaps.

- **Chemicals Sector Expansion:** The domestic chemical landscape—comprising petrochemicals, specialty chemicals, and inorganic chemicals—requires downstream value addition, optimized feedstock utilization, strategic FTAs, and targeted capital investments to reduce import dependencies and secure critical industrial inputs.
- **Textiles & Apparel (T&A) Modernization:** Contributing ~2% to GDP, 11% to manufacturing GVA, and 9% to merchandise exports ($37.7 billion in FY 2024–25), the sector supports 45+ million jobs; policy emphasis centers on technical textiles, man-made fiber (MMF) scaling, infrastructure clusters, and deeper trade integration.
- **Telecom & Networking Equipment Integration:** Operating within the world's second-largest telecom market (1.2+ billion subscribers), interventions align with the National Telecom Policy 2025

targets (doubling sectoral GDP contribution and exports by 2030) through component localization, joint ventures, and integrated technology clusters.

- **Solar PV Ecosystem Localization:** To scale installed solar capacity from 106 GW (March 2025) toward the 280 GW target by 2030, the report mandates upstream value-chain integration (polysilicon-to-wafer manufacturing), clean-tech industrial parks, advanced performance-linked incentives, and green hydrogen linkage.
- **Constitutional & Legal Architecture:** Grounded in Schedule VII List III Entry 20 (Economic and Social Planning), List I Entry 52 (Industries declared by Parliament to be expedient in public interest), List I Entry 41 (Trade and commerce with foreign countries), and executing principles under Article 39(b) for public good resource distribution.
- **Key Definitions for UPSC:**
  - **Manufacturing Gross Value Added (GVA):** The measure of total economic output generated by the manufacturing sector after deducting the cost of intermediate inputs and raw materials used in production.
  - **Upstream vs. Downstream Manufacturing:** Upstream involves initial material processing and core component production (e.g., polysilicon in solar or basic petrochemical feedstocks), whereas downstream covers final consumer-ready goods assembly and technical processing.
- **Systemic Execution Bottlenecks:** Primary operational constraints include high capital costs for technology transfer, raw material supply chain disruptions, inverted duty structures in import tariffs, fragmented land acquisition mechanisms, and delays in establishing dedicated clean-tech industrial corridors.

NITI Aayog's strategic framework establishes an actionable roadmap for structural industrial transition, aligning targeted fiscal incentives, digital public infrastructure, and international joint ventures to elevate India's position in global value chains under Viksit Bharat.

Introduction of Polymer Banknotes in India: BRBNMPL Bidding and Security Mandates

- **Global Expression of Interest (EOI):** Bharatiya Reserve Bank Note Mudran (P) Ltd (BRBNMPL), a wholly owned subsidiary of the Reserve Bank of India (RBI), issued a global EOI for an immediate requirement of approximately 68,000 reams of opacified polymer substrate sheets with embedded security features.
- **Strict Animal-Tallow-Free Certification:** Participating bidders must explicitly submit laboratory certification verifying that the polymer substrate contains zero animal tallow or animal DNA, preventing socio-religious controversies like those previously encountered in foreign jurisdictions such as the UK.
- **Geopolitical & Security Firewall Mandate:** Bidders are required to execute an integrity pact, confidentiality contract, and no-agent agreement, alongside a strict undertaking to firewall Indian operations from any presence in China and Pakistan, prohibiting raw material sourcing or personnel deployment from these nations.
- **Pilot Target Denominations & Testing:** The central bank targets an initial pilot rollout in lower denominations of ₹10 and ₹20, evaluating submitted samples across diverse Indian climatic zones before final tender allocation and field trials.

- **Key Bidders & Technical Collaboration:** Prominent contenders include Indian manufacturer Cosmo First (partnered with UK-based De La Rue), Australia's CCL Secure (supplying over 40 central banks worldwide), and Vietnam's Q&T Hi-tech Polymer Company.
- **Durability & Operational Lifecycle Advantages:** Manufactured from Biaxially Oriented Polypropylene (BOPP), polymer banknotes last 2.5 to 4 times longer than traditional cotton-rag paper currency, offering higher resistance to moisture, soil, and tearing, while reducing long-term replacement costs under the Clean Note Policy.
- **Constitutional & Legal Architecture:** Governed by Section 22 and Section 25 of the Reserve Bank of India Act, 1934 (sole right to issue banknotes and Central Government approval of currency material/design), Public Procurement (Preference to Make in India) Order, and Seventh Schedule (Union List, Entry 36) reserving exclusive legislative powers over currency, coinage, and legal tender to Parliament.

- **Key Definitions for UPSC:**
  - **Polymer Substrate:** A non-fibrous, non-porous plastic film—typically Biaxially Oriented Polypropylene (BOPP)—used as a durable, water-resistant base material for banknote printing.
  - **Bharatiya Reserve Bank Note Mudran (P) Ltd (BRBNMPL):** A wholly owned subsidiary of the RBI established in 1995 to manage banknote printing and bolster currency production infrastructure in India.
- **Implementation Challenges:** Core operational hurdles include high initial production costs (30–60% higher than paper), machine recalibration for currency counting and ATMs, dependency on imported polypropylene raw materials, and establishing dedicated recycling pathways for plastic currency waste.

The transition toward polymer banknotes marks a major structural modernization in India's physical currency management. By enforcing non-animal tallow certifications, rigorous security firewalls against sensitive foreign jurisdictions, and advanced anti-counterfeiting features, the RBI ensures that technological modernization aligns with both cultural sensitivities and national security imperatives under Viksit Bharat.

GEOGRAPHY & ENVIRONMENT

Glaw Lake: Arunachal Pradesh's First Ramsar Site

- **Milestone Landmark Designation:** Glaw Lake in Arunachal Pradesh has been declared India's 101st Ramsar site, marking the state's maiden entry into the Wetlands of International Importance register.

- **Location and Geography:** Situated in Lohit district within the Kamlang Tiger Reserve and Wildlife Sanctuary in the Eastern Himalayas, Glaw Lake is a pristine freshwater ecosystem fed by perennial mountain streams.

- **Rich Floral and Faunal Biodiversity:** The site and its catchment host over 150 tree species and 49 orchid species, while supporting flagship fauna like the tiger, clouded leopard, hoolock gibbon, and endangered waterbirds.

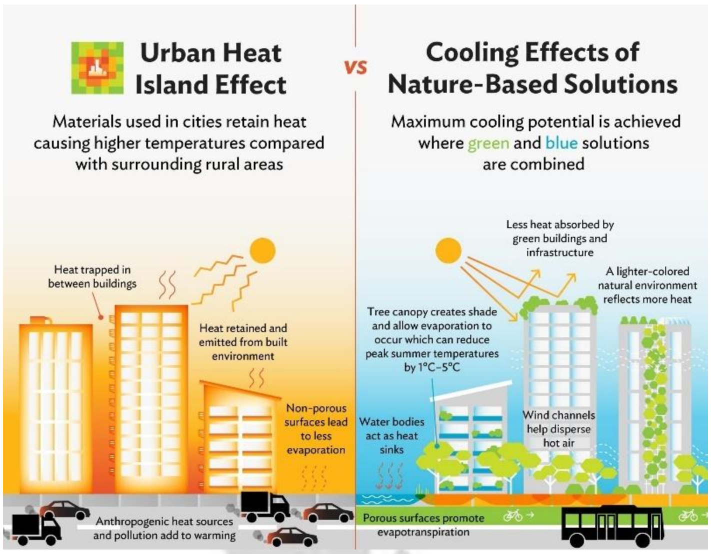
- **Growth of India's Ramsar Network:** India's Ramsar site count has expanded substantially from 26 in 2014 to 101, underscoring enhanced national commitments to wetland conservation and climate resilience.
- **Constitutional and Statutory Directives:** Wetland preservation aligns with Article 48A (protection of environment and wildlife) and Article 51A(g) (fundamental duty to protect natural environment), implemented under the Environment (Protection) Act, 1986 and Wetland (Conservation and Management) Rules, 2017.
- **International Framework:** The Ramsar Convention (signed 1971 in Ramsar, Iran; India joined 1982) promotes the "wise use" of wetlands to maintain their ecological character through international cooperation and sustainable management.
- **Key Definitions for UPSC:**
  - **Ramsar Site:** A wetland designated as internationally important based on ecological, botanical, zoological, or hydrological criteria under the Ramsar Convention.
  - **Wise Use:** The maintenance of wetland ecological character achieved through sustainable development approaches that benefit both nature and local communities.
  - **Catchment Area:** The surrounding land area from which rainfall and snowmelt drain into a specific water body or wetland system.
- **Ecological Challenges and Risks:** Key threats to high-altitude fragile wetlands include unregulated eco-tourism, climate-induced hydrological shifts, soil erosion from surrounding slopes, and potential habitat fragmentation along border infrastructure corridors.

The inclusion of Glaw Lake as India's 101st Ramsar site strengthens the Eastern Himalayan conservation matrix, reinforcing the balance between biodiversity protection, indigenous community reliance, and sustainable regional development.

Climate Resilient Cities and Urban Heatwave Mitigation

- **Constitutional Framework & Governance:** As per the 12th Schedule (74th Constitutional Amendment Act), urban planning and public health lie within the domain of State Governments and Urban Local Bodies (ULBs), with the Ministry of Housing and Urban Affairs (MoHUA) providing policy guidelines, financial aid, and technical support.
- **Heat Action Plans (HAPs) Architecture:** Under NDMA's 2019 National Guidelines for Heat Wave Management, 23 states, 195 districts, and 64 cities have implemented HAPs incorporating vulnerability assessments to mitigate the Urban Heat Island (UHI) effect.
- **Protection for Informal Labor Force:** NDMA advisories mandate gender-sensitive heat adaptation for street vendors and outdoor workers by integrating shaded vending zones, hydration stations, cooling centers, regulated working hours, and real-time early warning alerts into municipal HAPs.

- **Sustainable Urban Planning Guidelines:** MoHUA promotes urban heat stress mitigation through the Urban Green Guidelines (2014) and URDPFI Guidelines (2014), advocating green cover, urban forests, water body conservation, cool roof policies, and compact, transit-oriented development.



- **Technology Sub-Missions in Housing:** Under PMAY-Urban, the Technology & Innovation Sub-Mission (TISM) advances climate-responsive, disaster-resilient building technologies and green construction standards to improve indoor thermal comfort and reduce energy consumption.

- **India Cooling Action Plan (ICAP):** Formulated by MoEFCC, ICAP aims to reduce cooling demand across sectors by enforcing Energy Conservation Building Code (ECBC) standards in transit infrastructure, upskilling MAC technicians, and promoting low-GWP refrigerants.

- **Key Definitions for UPSC:**
    - **Urban Heat Island (UHI) Effect:** A microclimatic phenomenon where urban regions experience significantly higher temperatures than rural surroundings due to dense concrete, asphalt structures, human activity, and depleted green cover.
    - **Thermal Comfort:** The condition of mind that expresses satisfaction with the thermal environment, achievable via passive design, natural ventilation, and heat-reflective materials.

- **Implementation Challenges:** Key governance hurdles include poor enforcement of building bye-laws at the ULB level, insufficient funding for local climate adaptation, fragmented inter-agency coordination, and the unorganized nature of informal labor making targeted heat relief difficult to deliver.

Building climate-resilient cities requires translating national frameworks like ICAP and NDMA guidelines into actionable municipal bye-laws, ensuring that urban development balances infrastructural expansion with environmental sustainability, public health protection, and social equity for vulnerable populations.

Flood Mitigation Measures in the North Eastern Region

- **Central Financial & Technical Support:** Under the Centrally Sponsored Scheme "Flood Management and Border Areas Programme" (FMBAP), the Union Government supplemented NE States with ₹2,536.96 crore across 263 flood management projects up to March 2026.

- **Early Warning Infrastructure:** Central Water Commission (CWC) operates 53 flood forecasting stations (38 Level, 15 Inflow) in the North East, providing 24-hour short-range forecasts alongside a 7-day basin-wise advance flood advisory using rainfall-runoff mathematical modeling.

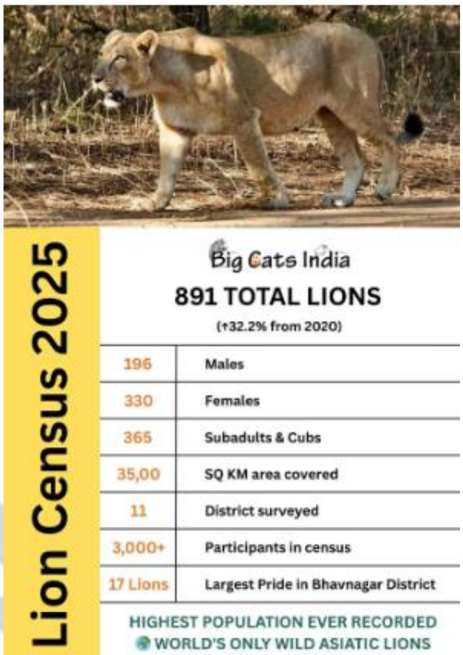
- **Integrated Alert Dissemination:** Real-time advisories are integrated with the Common Alert Protocol (CAP) platform, Flood Watch India Mobile App, and dedicated portals to enable swift evacuation and disaster response by State Disaster Management Authorities (SDMAs).

- **Cross-Border Data Sharing:** Transboundary hydrological and meteorological data sharing mechanisms with neighboring countries (like China and Bhutan) facilitate predictive modeling and river basin management for upper catchment areas.
- **Non-Structural Measures & Zoning:** Ministry of Jal Shakti circulated updated technical guidelines for Flood Plain Zoning (FPZ) in August 2025 to regulate developmental activities in vulnerable flood zones and limit economic damage.
- **Comprehensive Basin Planning:** The statutory Brahmaputra Board has formulated 52 Master Plans covering short, medium, and long-term structural and non-structural interventions across the North Eastern States.
- **Disaster Response Mechanism:** Primary relief is funded via State Disaster Response Funds (SDRF), while NDRF (National Disaster Response Fund) provides supplemental funding for severe disasters following Inter-Ministerial Central Team (IMCT) assessments under the Disaster Management Act, 2005.
- **Key Definitions for UPSC:**
    - **Flood Plain Zoning (FPZ):** A non-structural regulatory mechanism classifying flood-prone land into zones to restrict high-density settlement and infrastructure in high-risk zones.
    - **Common Alert Protocol (CAP):** A standardized digital format for emergency alerts enabling simultaneous multi-channel dissemination across public safety platforms.
- **Challenges in the North East:** High seismicity, intense cloudbursts, severe soil erosion, shifting river courses of the Brahmaputra system, and delayed implementation of land-use zoning by states hamper long-term mitigation efforts.

Managing floods in the geologically fragile North Eastern Region requires transitioning from reactive relief to proactive, climate-resilient river basin governance by integrating non-structural flood plain zoning with advanced digital forecasting platforms.

Asiatic Lion Population Growth and Project Lion

- **Demographic Growth & Range Expansion:** The Asiatic Lion (*Panthera leo persica*) population in India increased from 523 in 2015 to 891 in 2025, while its distribution range expanded from ~30,000 sq. km in 2020 to nearly 35,000 sq. km across the Gir landscape in Gujarat.
- **Institutional Framework of Project Lion:** Launched in August 2020, Project Lion implements a landscape-level conservation approach focusing on habitat improvement, wildlife disease surveillance, advanced veterinary infrastructure, and technology-driven population tracking.
- **Community-Led Coexistence Model:** The growth reflects successful community participation, notably involving the Maldhari pastoralists and local eco-volunteers (*Vaniya Mitra*), highlighting human-wildlife coexistence alongside state-led anti-poaching and forest management efforts.
- **Conservation Status & Habitat Concentration:** Listed as 'Endangered' on the IUCN Red List and under Schedule I of the Wildlife Protection Act (WPA), 1972, the entire wild population remains restricted to the Greater Gir Region, making it vulnerable to single-event risks like disease outbreaks or natural disasters.

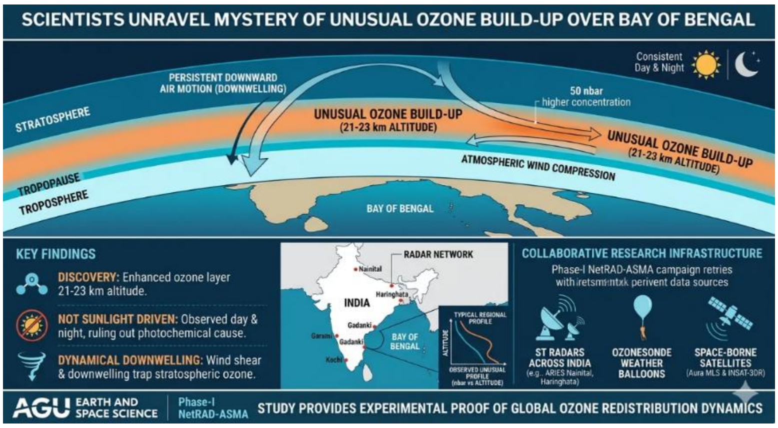


- **Proposed Alternative Habitat (Barda & Kuno):** To mitigate catastrophic risk from infectious diseases like Canine Distemper Virus (CDV), conservation strategies emphasize establishing secondary habitats, such as the Barda Wildlife Sanctuary in Gujarat and Kuno National Park in Madhya Pradesh.
- **Technological & Medical Safeguards:** Integrates AI-based monitoring, radio-telemetry, automated water holes, habitat corridor mapping, and specialized immunizations against CDV and babesiosis to safeguard genetic integrity and health.
- **Constitutional & Legal Framework:** Supported by Article 48A (mandating the State to protect environment, forests, and wildlife), Article 51A(g) (fundamental duty to show compassion for living creatures), and statutory enforcement under the Wildlife Protection Act, 1972 (amended in 2022).
- **Key Definitions for UPSC:**
  - **Asiatic Lion (*Panthera leo persica*):** A distinct subspecies of lion surviving exclusively in India's Gir landscape, characterized by a longitudinal fold of skin along its belly and a smaller mane than African lions.
  - **Landscape-Level Conservation:** An ecosystem-based management strategy that conserves wildlife across large, contiguous geographic areas beyond protected boundary lines.
- **Operational & Sectoral Challenges:** Major conservation hurdles include high population concentration in a single geographical zone, linear infrastructure hazards (rail tracks and highways passing through lion corridors), open agricultural wells leading to drowning, and human-lion conflict along urban-rural peripheries.

The steady increase in Asiatic Lion numbers demonstrates the effectiveness of community-centered conservation under Project Lion, underscoring the need to secure alternative translocated habitats to safeguard the species' long-term survival.

Atmospheric Anomaly: Discovery of High Stratospheric Ozone Over Bay of Bengal

- **Atmospheric Discovery:** Scientists detected an unusually thick, high-concentration ozone layer in the lower stratosphere at an altitude of 21–23 km over the North Bay of Bengal, persisting for over 24 hours.
- **Institutional Framework (NetRAD-ASMA):** The anomaly was uncovered during the Phase-I Network of ST Radars for Atmospheric Science Studies over the Indian Region (NetRAD-ASMA) campaign, a nationwide atmospheric research initiative.
- **Indigenously Driven Multi-Sensor Approach:** Research relied on the indigenously developed 206.5 MHz Stratosphere-Troposphere (ST) Radar at ARIES (Aryabhatta Research Institute of Observational Sciences), Nainital, alongside radars at Haringhata, Gadanki, and Kochi, Ozonesondes (balloon-borne sensors), and satellites (Aura MLS and INSAT-3DR).



- **Non-Photochemical Origin:** The enhanced layer was recorded continuously during both daytime and nighttime, ruling out sunlight-driven photochemical reactions as the primary cause for its localized formation.
- **Physical Transport Mechanism:** Observations revealed persistent downward atmospheric motion; the anomaly was driven by horizontal advection of ozone-rich air followed by downward subsidence and adiabatic compression in the lower stratosphere.
- **Significance for Subtropical Circulation:** The study provides quantitative experimental evidence of dynamical ozone redistribution across the Indian subtropical region during winter, improving models for stratosphere-troposphere exchange (STE).
- **Constitutional & Policy Links:** Aligns with Article 51A(h) (duty to develop scientific temper, humanism, and the spirit of inquiry) and national initiatives promoting indigenous R&D under the Department of Science and Technology (DST).
- **Key Definitions for UPSC:**
    - **Stratosphere-Troposphere Exchange (STE):** The physical process involving the transport of air masses, ozone, and trace gases across the tropopause separating the troposphere and stratosphere.
    - **Advection & Subsidence:** Advection refers to the horizontal transfer of atmospheric properties (e.g., heat or ozone) by wind, while subsidence denotes the large-scale downward sinking motion of an air mass.
- **Operational & Scientific Challenges:** Primary hurdles include sparse long-term vertical profiling stations in the tropics, complex integration of satellite-balloon-radar data streams, and high temporal variability of dynamic atmospheric events.

This discovery highlights the dynamic nature of India's subtropical upper atmosphere, reinforcing the importance of indigenous radar networks and multi-institutional observational campaigns in refining regional climate and radiation models.

Conservation and Management of Open Natural Ecosystems (ONEs)

- **Global Policy Milestone:** India launched its first-ever *Guide to Grasslands and Other Open Natural Ecosystems (ONEs) of India* at the 17th Session of the Conference of the Parties (COP17) to the UN Convention to Combat Desertification (UNCCD) in Ulaanbaatar, Mongolia.
- **Shift from "Wasteland" Paradigm:** The guide reframes non-forested ecosystems—savannas, deserts, scrublands, ravines, and rocky plateaus—moving away from legacy colonial land-use definitions that classified non-timber open landscapes as unproductive "wastelands".

- **Institutional Collaboration:** Spearheaded by the Ministry of Environment, Forest and Climate Change (MoEF&CC), the guide was developed in partnership with the Ashoka Trust for Research in Ecology and the Environment (ATREE), IUCN, and the Centre of Excellence on Sustainable Land Management (CoE-SLM).
- **Ecological & Livelihood Value:** Covering key landscapes like the Banni and Thar grasslands, Terai, and Deccan savannas, ONEs house specialized endemic wildlife, support soil-carbon sequestration, regulate hydrology, and sustain pastoral and livestock-dependent rural communities.
- **Alignment with Land Degradation Neutrality (LDN):** Science-based conservation of ONEs directly supports India's international commitment under UNCCD to achieve Land Degradation Neutrality by 2030 and restore degraded land footprints.
- **Integration of Indigenous Knowledge:** Emphasizes traditional community-conserved rangelands such as *Orans* and *Gauchars*, integrating customary pastoralist governance models with contemporary conservation biology and fire-ecology management.
- **Constitutional & Legal Architecture:** Grounded in Article 48A (Protection and improvement of environment), Article 51A(g) (Fundamental Duty to protect natural environment), the Biological Diversity Act, 2002, and the Environment (Protection) Act, 1986.
- **Key Definitions for UPSC:**
    - **Open Natural Ecosystems (ONEs):** Semi-arid, arid, or sub-humid non-forested landscapes dominated by grasses, herbs, or shrubs with sparse canopy cover, possessing distinct evolutionary and ecological characteristics.
    - **Land Degradation Neutrality (LDN):** A state whereby the amount and quality of land resources necessary to support ecosystem functions and services remain stable or increase within specified spatial and temporal scales.
- **Implementation Challenges:** Core operational hurdles include land-use conversion for industrial projects, invasive plant species (e.g., *Prosopis juliflora*), lack of dedicated statutory protection compared to dense forests, and tenure insecurity among pastoralist groups.

Recognizing Open Natural Ecosystems alongside dense forests provides a science-backed, inclusive framework for environmental conservation, strengthening ecological resilience, pastoral livelihoods, and sustainable land management under Viksit Bharat.

Waste to Woods: Legacy Dumpsite Remediation in Raichur

- **Project Overview & Objectives:** Raichur City Corporation in Karnataka transformed the 35-acre Yakalaspura dumpsite into an urban green asset under Swachh Bharat Mission-Urban 2.0 (SBM-U 2.0), executing the core paradigm of "Toxic Waste to Ecological Wealth".
- **Legacy Waste Processing:** Using biomining and scientific remediation techniques, approximately 62,252 MT of decades-old accumulated municipal solid waste was processed, eliminating severe risks of toxic leachate, foul odor, ground contamination, and public health hazards.
- **Land Reclamation Footprint:** The remediation successfully reclaimed nearly 22 acres of prime urban land, significantly curbing local environmental degradation and creating a benchmark model for city-wide land-use revival.

- **Miyawaki Afforestation Model:** Over 5 to 7 acres of reclaimed land, a dense Miyawaki forest comprising 60,000 saplings (including native species and bamboo) was established to accelerate soil restoration, microclimate cooling, carbon sequestration, and biodiversity enhancement.
- **Corporate & Institutional Collaboration:** The ecological restoration was driven through strategic partnerships involving the Raichur City Corporation, Security Printing and Minting Corporation of India Limited (SPMCIL), and New India Space Limited under corporate social responsibility (CSR) frameworks.
- **National Urban Governance Alignment:** Inaugurated on World Environment Day (5 June 2026), the initiative serves as a scalable model for achieving "Garbage-Free Cities" under SBM-U 2.0 and integrated urban climate resilience.
- **Constitutional & Legal Provisions:** Aligned with Article 48A (Protection and improvement of environment), Article 21 (Right to a clean environment), Schedule XII Entry 6 (Public health, sanitation, conservancy, and solid waste management), and executed under the Solid Waste Management Rules, 2016.
- **Key Definitions for UPSC:**
    - **Legacy Waste:** Accumulated municipal solid waste stored in open dumpsites over prolonged periods that undergoes anaerobic decomposition, posing severe environmental risks.
    - **Miyawaki Method:** An urban afforestation technique developed by Japanese botanist Akira Miyawaki, involving dense, multi-layered planting of native species to achieve rapid forest growth within compact land parcels.
- **Implementation Challenges:** Major operational bottlenecks include long-term leachate treatment of reclaimed subsoil, high maintenance requirements of dense urban sapling cover, financial sustainability of municipal biomining, and preventing re-encroachment or fresh dumping.

The Yakalaspura transformation highlights how scientific legacy waste remediation combined with urban forestry can restore degraded ecosystems, converting historical urban liabilities into sustainable ecological assets under Viksit Bharat.

INTERNATIONAL RELATIONS

BRICS WAVES Bazaar: Empowering the Global Creative Economy

- **High-Level Global Confluence:** Hosted in Mumbai under India's BRICS Chairship theme, "Building for Resilience, Innovation, Cooperation, and Sustainability," the two-day BRICS WAVES Bazaar brought together over 500 delegates from 21 member and partner countries to foster international creative trade.
- **Economic Pillar & 'Orange Economy':** Aligned with the vision of positioning India as a global cultural and intellectual hub, the event leveraged the 'Orange Economy'—where heritage, digital media, and modern commerce intersect—to drive global GDP growth, job creation, and trade expansion.

- **Institutional Linkages & Platforms:** The event strengthens institutional pathways alongside the BRICS Film Festival and the International Film Festival of India (IFFI) 2026, establishing recurring trade platforms like WAVES Bazaar, the Indian Institute of Creative Technologies, and India Cine Hub.

- **Cross-Border Sectoral Coverage:** Promotes B2B partnerships, co-productions, content financing, and distribution across key sectors including audio-visual production, film, television, animation, VFX, gaming, music, digital media, and emerging technology startups.

- **Promoting South-South Cooperation:** Seeks to improve the intra-BRICS circulation of creative content, expanding market access across member states and leveraging shared capabilities in technology and storytelling to foster strong South-South economic and cultural ties.

- **Strategic Global Impact:** The global creative economy accounts for 3.1% of global GDP and over $1.4 trillion in international service exports, placing BRICS in a strategic position to lead digital transformation, IP protection, and soft power diplomacy.

- **Constitutional & Policy Framework:** Complements Article 51A(f) (valuing and preserving rich cultural heritage) and aligns with the Foreign Trade Policy (FTP) framework aimed at boosting service exports, audio-visual services, and digital media globalization.

- **Key Definitions for UPSC:**

  - **Orange Economy:** An economic sector driven by architecture, visual and performing arts, audio-visual media, software, gaming, and design, where value is derived primarily from intellectual property and creative concepts.

  - **South-South Cooperation:** A framework for political, economic, social, and technical collaboration among developing countries in the Global South to achieve mutual development goals.

- **Key Sectoral Challenges:** Primary hurdles include navigating inconsistent intellectual property (IP) enforcement across borders, overcoming local content distribution barriers, bridging technology adoption gaps in emerging media, and establishing unified co-production frameworks.

The BRICS WAVES Bazaar serves as a catalyst for transforming soft power into tangible economic collaboration, establishing India as a primary hub for global audio-visual trade, creative entrepreneurship, and digital innovation.

India, Uzbekistan Upgrade Ties to Comprehensive Strategic Partnership

- **Elevation to Comprehensive Strategic Partnership:** Marking the 15th anniversary of their strategic partnership, India and Uzbekistan elevated their bilateral relationship to a Comprehensive Strategic Partnership during Prime Minister Narendra Modi's state visit to Tashkent.

- **Long-Term Uranium Supply Framework:** Both nations established a strategic framework for the long-term procurement of uranium from Uzbekistan to fuel India's expanding domestic civil nuclear power program and enhance clean energy security.

- **Bilateral Trade Expansion Target:** The leaders set an ambitious target to scale annual bilateral trade turnover fivefold from current levels of over $1 billion to $5 billion by 2030, addressing market access, banking channels, payment mechanisms, and connectivity bottlenecks.
- **Upgraded Institutional Governance Structure:** The nations decided to establish a high-level Coordination Council co-chaired by Foreign Ministers and elevated the existing Joint Commission from the secretary level to the ministerial level to ensure time-bound project execution.
- **Key Bilateral Agreements Signed:** The two sides exchanged 11 agreements spanning critical minerals exploration, mining, joint defense co-production, agriculture, pharmaceuticals, health, digital public infrastructure, and education.
- **Digital Public Infrastructure & Defense Synergy:** A commercial pact was inked between NPCI International Payments Ltd (NIPL) and Uzbekistan's National Interbank Processing Centre (HUMO) for UPI integration via UZQR, alongside commitments to direct defense co-development and joint military exercises like *Exercise Dustlik*.
- **Cultural Preservation & Regional Security:** Reaffirmed a zero-tolerance policy against terrorism, extremism, and separatism, while signing a Letter of Intent for the conservation and restoration of ancient Buddhist heritage sites at Fayaz Tepa and Kara Tepa in Uzbekistan.
- **Constitutional & Legal Framework:** Grounded in Article 51 (Directive Principle to promote international peace, maintain just relations, and foster respect for treaty obligations), the Atomic Energy Act, 1962 (regulating central oversight over nuclear fuel imports), and the Foreign Trade (Development and Regulation) Act, 1992 (governing trade expansion and commercial policies).
- **Key Definitions for UPSC:**
  - **Comprehensive Strategic Partnership:** An elevated bilateral governance framework signifying high-level political alignment, broad-based economic integration, multi-sectoral institutional coordination, and joint security cooperation.
  - **Digital Public Infrastructure (DPI):** Interoperable, open digital network systems (such as UPI) deployed at population scale to facilitate seamless public service delivery, financial inclusion, and cross-border payments.
- **Implementation Challenges:** Primary operational constraints include physical land-connectivity barriers (dependence on transit routes through Chabahar Port and INSTC), regulatory divergences in banking and payment systems, and navigating geopolitical instability along the Afghan border region.

Upgrading ties to a Comprehensive Strategic Partnership positions Uzbekistan as the anchor of India's Central Asian engagement. Securing long-term uranium supplies alongside UPI deployment, critical mineral exploration, and defense co-production consolidates India's energy resilience, strategic footprint, and economic integration across Eurasia under Viksit Bharat 2047.

Sri Lanka Waives Legal Barriers for Returning Tamil Refugees

- **Removal of Immigration Prosecution Risk:** The Sri Lankan Cabinet approved a framework waiving criminal prosecution under the Immigrants and Emigrants Act (1948) for refugees who fled the civil war before May 19, 2009, without valid passports or through unauthorized departure points.
- **Mandatory Intelligence Clearance Protocol:** Returning refugees must undergo identity verification via Sri Lankan diplomatic missions in India and security vetting by the State Intelligence Service

(SIS) to confirm no involvement in serious offences like treason or murder before receiving temporary travel documents.

- **Policy Trigger and UN Welcome:** The United Nations and UNHCR welcomed the cabinet framework as a key step toward facilitating safe, voluntary, and dignified repatriation, addressing long-standing legal anomalies exemplified by the arbitrary arrest of returning elderly refugees at Jaffna airport.

- **Demographic Landscape in Tamil Nadu:** Approximately 89,000 Sri Lankan Tamil refugees reside in India, with around 58,000 staying across 103 state-run rehabilitation camps in 29 districts of Tamil Nadu and nearly 30,000 living outside camps under local police registration.
- **Intergenerational Disconnect:** Over four decades of displacement (since 1983) have created a distinct generational divide; while older refugees retain emotional and property links to Sri Lanka, over 40% of the current camp population was born in India and lacks direct ties to their ancestral homeland.
- **Socio-Economic Barriers to Return:** Despite legal waivers, voluntary repatriation remains low due to lingering anxieties over land restoration in the North-East, military-occupied properties, housing stability, loss of civil documents, and economic reintegration in Sri Lanka.
- **Constitutional and Legal Framework:**
  - **Article 21 of the Indian Constitution:** Guarantees fundamental protection of life and personal liberty to citizens and non-citizens alike, ensuring basic dignified living conditions in refugee camps.
  - **Foreigners Act, 1946 & Passport (Entry into India) Act, 1920:** Primary Indian statutory laws regulating the registration, movement, and legal status of non-citizens within national borders.
  - **Customary International Law:** While neither India nor Sri Lanka are signatories to the 1951 Refugee Convention, both adhere to the customary principle of *non-refoulement* (prohibiting forced return to unsafe environments).
- **Key Definitions for UPSC:**
  - **Voluntary Repatriation:** An international human rights principle enabling refugees to return to their country of origin based on a free, informed choice under guaranteed conditions of safety and dignity.
  - **Principle of Non-Refoulement:** A core pillar of international customary law prohibiting states from expelling or returning a refugee to a territory where their life or freedom would be threatened.
- **Implementation Challenges:** Core operational hurdles include delayed background clearances by intelligence agencies, land-tenure disputes in former war zones, lack of dual citizenship options under Indian law, and socio-economic integration uncertainties for Indian-born youth.

While Sri Lanka's policy intervention eliminates a major legal bottleneck for returning refugees, achieving meaningful repatriation requires bilateral cooperation between India and Sri Lanka to ensure land restoration, sustainable livelihoods, and comprehensive socio-economic rehabilitation for war-affected families under Viksit Bharat 2047.

US Unilateral Renaming of Lake Ontario as Lake America

- **Unilateral Executive Order:** US President Donald Trump signed Executive Order 14422 directing US federal agencies to rename Lake Ontario, situated on the US-Canada border, as "Lake America", asserting domestic sovereign rights based on water volume claims.

- **Canadian Rejection & Indigenous Heritage:** Canadian Prime Minister Mark Carney and Ontario Premier Doug Ford rejected the move, highlighting that "Ontario" derives from the Indigenous Wendat word *oniatarío* ("beautiful lake"), predating both Canadian Confederation (1867) and the US Declaration of Independence (1776).
- **Strategic Value of the Great Lakes:** Lake Ontario forms an integral part of the transboundary Great Lakes system (alongside Superior, Michigan, Huron, and Erie), which holds nearly 20% of global surface freshwater and provides drinking water, commercial navigation, and ecological stability to over 40 million people across both nations.
- **Geopolitical Trade Catalyst:** The directive follows a collapse in bilateral trade negotiations and subsequent tariff escalations (including a 50% tariff imposition on Canadian goods), echoing the early 2025 unilateral renaming of the Gulf of Mexico to the "Gulf of America".
- **Extraterritorial Jurisdiction Limits:** The executive order strictly binds domestic US federal agencies—such as the US Geological Survey (USGS) and Board on Geographic Names (BGN)—and holds zero legal force under international law to alter official nomenclature within Canadian territory or international hydrographic bodies.
- **Digital Mapping Protocol:** Private mapping platforms (Google Maps, Apple Maps) updated local map layers based on user geographic IP; US users see "Lake America", Canadian users see "Lake Ontario", while global users (including India) see dual nomenclature like "Lake Ontario (Lake America)".
- **Constitutional & Legal Architecture:**
  - **Boundary Waters Treaty (1909):** Governs shared transboundary water bodies via the bi-national International Joint Commission (IJC), emphasizing mutual consent and joint environmental oversight over shared resources.
  - **UN Group of Experts on Geographical Names (UNGEGN):** Sets global standardized guidelines prioritizing historical consensus and bilateral agreement for naming transboundary geographical features.
  - **Article 253 of the Indian Constitution (Comparative Context):** Empowers Parliament to enact legislation for implementing international treaties, illustrating how constitutional mechanisms prevent unilateral executive overrides on transboundary agreements.

- **Key Definitions for UPSC:**
  - **Transboundary Watercourses:** Shared water systems (lakes, rivers, aquifers) crossing or forming international political boundaries, governed by customary international water law and bilateral conventions.
  - **Geographical Hydronym:** The proper name assigned to a water body, serving as a critical marker of cultural heritage, spatial sovereignty, and cartographic standardization.
- **Implementation Challenges:** Primary friction points include cartographic inconsistency in international civil aviation and maritime charts, trade friction escalation, potential legal challenges within international arbitration forums, and the erosion of bi-national trust regarding shared ecosystem management under the International Joint Commission.

Unilateral renaming of transboundary natural resources serves as a political lever during diplomatic and trade impasses but carries no legal validity under international law. Sustainable management of vital global resources like the Great Lakes relies on bilateral consensus, respect for Indigenous heritage, and strict adherence to established international water treaties.

Russia Turns to India for Emergency Petrol Supplies Amid Refinery Infrastructure Disruptions

- **Unprecedented Shift in Energy Trade Dynamics:** Extensive damage caused by long-range Ukrainian drone strikes on Russian refining infrastructure reduced domestic crude processing, forcing Russia—traditionally a major global fuel exporter—to import finished gasoline from India for the first time.
- **Significant Indian Export Volumes:** Ship-tracking data from analytics firms like Kpler and Vortexa indicates that Indian refiners dispatched over 1.6 million barrels of gasoline to Russia across June and July 2026 via direct and transshipment maritime routes.
- **Central Role of Vadinar Refinery:** The primary Indian supplier is Nayara Energy's 400,000 barrel-per-day Vadinar refinery in Gujarat, which operates on Russian equity backing (49% owned by Rosneft) and relies almost entirely on Russian crude feedstock.
- **Circular Energy Flow Architecture:** The trade creates a unique circular loop where discounted Russian crude imported by Indian refiners is processed domestically and exported back to Moscow through intermediary traders as value-added finished gasoline.
- **Russian Domestic Export Restrictions:** Facing a severe national fuel supply deficit, Russia extended its blanket ban on domestic gasoline exports through late 2026 and instituted retail purchase caps across several federal regions.

Legal Architecture:

- **Article 73 of the Indian Constitution:** Extends executive power of the Union over international trade agreements, foreign affairs, and energy diplomacy.
- **Foreign Trade (Development and Regulation) Act, 1992:** Empowers the Central Government to formulate national export-import policies, regulate strategic energy shipments, and issue export permissions.
- **UN Convention on the Law of the Sea (UNCLOS):** Governs high-seas commercial navigation, maritime transit rights, and international Ship-to-Ship (STS) cargo transfer protocols.

- **Transshipment and Logistics Protocols:** To navigate international sanctions and logistics challenges, a significant portion of the Indian gasoline was delivered using dark Ship-to-Ship (STS) cargo transfers at hubs near Damietta (Egypt) and Mersin (Turkey) before heading to Russian ports.
- **Key Definitions for UPSC:**
  - **Refining Margin (GRM):** The financial margin representing the difference between the total market value of refined petroleum products produced by a refinery and the benchmark cost of crude oil inputs.
  - **Ship-to-Ship (STS) Transfer:** The maritime operational technique of transferring liquid hydrocarbon cargo directly between ocean-going vessels at sea to optimize shipping routes or bypass regional transit bottlenecks.
- **Implementation Challenges:** Core operational friction points include navigating Western sanction enforcement, managing payment clearing mechanics without direct banking exposure, handling war-risk maritime insurance premiums, and maintaining AIS tracking compliance during transshipments.

The reversal of refined petroleum flows between India and Russia highlights the global flexibility and technical capacity of India's downstream oil processing sector. By converting imported crude into high-value exports during global supply shocks, India strengthens its role as a pivotal hub for global energy security while safeguarding its national economic interests.

Behind Israel's West Bank Push: Domestic Political Imperatives

- **Controversy Over E-1 Settlement Expansion:** The advancement of plans to construct over 1,200 housing units in the strategic E-1 zone—a 12-square-kilometre corridor connecting East Jerusalem to the Ma'ale Adumim settlement—has reignited intense regional and global diplomatic pushback.
- **Domestic Electoral Calculations:** Driven by coalitional survival ahead of the Knesset elections, Prime Minister Benjamin Netanyahu's settlement expansion strategy aims to prevent right-wing voter defection toward far-right nationalist factions like Otzma Yehudit.
- **Structural Impact on Two-State Viability:** Establishing permanent settlements in the E-1 enclave physically divides the northern (Ramallah) and southern (Bethlehem/Hebron) sectors of the West Bank, severing territorial contiguity essential for a viable, independent Palestinian state.
- **Security Gains vs. Political Vulnerability:** Despite tactical military operations across regional fronts post-October 7, electoral polling indicates that the ruling Likud-led coalition struggles to secure an absolute majority without catering to ultranationalist settlement demands.
- **Geopolitical Resistance and Diplomatic Friction:** Settlement construction in E-1 faces opposition from the US, European Union, and Arab signatories of the Abraham Accords, creating diplomatic friction and complicating broader regional normalization efforts.
- **Resistance to Judicial Inquiries:** To maintain coalition unity, the Israeli government continues to resist public calls for establishing a formal State Commission of Inquiry to investigate security and political oversights surrounding the October 7 attacks.

E-1 Settlement -

E1 is a planned Israeli settlement corridor east of Jerusalem, between East Jerusalem and Ma'ale Adumim, whose development is controversial because it could sever the territorial continuity of the West Bank.

- **International Law and Legal Framework:**
  - **Fourth Geneva Convention (Article 49):** Prohibits an occupying power from transferring parts of its own civilian population into the territory it occupies, forming the foundational legal objection under International Humanitarian Law.
  - **UN Security Council Resolution 2334 (2016):** Reaffirms that Israeli settlement activities in territories occupied since 1967 have no legal validity and constitute a flagrant violation under international law.
  - **Oslo Accords Framework (Area C):** Places roughly 60% of the West Bank (including E-1) under full Israeli military and administrative control pending final-status negotiations.
- **Key Definitions for UPSC:**
  - **E-1 (East-1 Zone):** A 12-square-kilometre land parcel in Area C of the West Bank positioned strategically between East Jerusalem and Ma'ale Adumim.
  - **Area C:** The administrative zone defined under the 1995 Oslo II Accord encompassing all Israeli settlements, military bases, and rural land in the West Bank.
- **Implementation Challenges & Implications for India:** Core challenges include balancing historical support for a two-state solution with growing strategic, defense, and economic ties with Israel, ensuring the safety of Indian diaspora personnel in the Middle East, and managing energy stability and trade maritime routes through the Red Sea and Gulf region amidst West Asian volatility.

The acceleration of settlement expansion in the E-1 corridor demonstrates how domestic coalition dynamics heavily influence West Asian geopolitical stability. Prioritizing short-term political survival over international legal consensus further delays peaceful conflict resolution, threatens regional integration, and undermines global diplomatic frameworks under international law.

SOCIAL

Eradication of Manual Scavenging & Sanitation Worker Welfare in India

- **Zero Manual Scavengers Reported:** A nation-wide survey across all districts conducted under the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 (MS Act, 2013) identified no manual scavengers, marking a formal shift towards complete mechanization.
- **Validation under NAMASTE Scheme:** Under the National Action for Mechanised Sanitation Ecosystem (NAMASTE) launched in FY 2023–24, 89,915 Sewer and Septic Tank Workers (SSWs) have been profile-validated across the country to deliver targeted safety, health, and economic entitlements.
- **Core Interventions of NAMASTE:** The scheme focuses on replacing hazardous manual entry with mechanization through PPE kit distribution, occupational safety training, setting up Emergency Response Sanitation Units (ERSUs), capital subsidies for sanitation machinery/vehicles to sanitation workers and private operators, health insurance coverage, and mandatory safety workshops.
- **Used Water Management (UWM) under SBM-U 2.0:** Swachh Bharat Mission-Urban 2.0 (launched 1 October 2021) integrates Used Water Management as a pivotal component specifically designed to eliminate hazardous sewer entry by standardizing mechanized cleaning infrastructure.
- **Constitutional Safeguards:** Manual scavenging directly violates Article 17 (Abolition of Untouchability, as manual scavenging remains tied to caste hierarchy), Article 21 (Right to Life with Dignity), and Article 23 (Prohibition of forced labor and hazardous work conditions).

- **Key Legal Statutory Provisions:** The MS Act, 2013 strictly prohibits the construction or maintenance of insanitary latrines along with the manual cleaning of sewers and septic tanks without protective gear, making violations a cognizable and non-bailable offense.
- **Key Definitions for UPSC:**
  - **Manual Scavenger:** A person engaged or employed for manually cleaning, carrying, disposing of, or handling human excreta in an insanitary latrine or an open drain/pit.
  - **Hazardous Cleaning:** The manual entry of an employee into a sewer line or septic tank without prescribed personal protective equipment (PPE) and safety gear.
  - **ERSU (Emergency Response Sanitation Unit):** A specialized municipal-level body equipped with mechanized devices and trained personnel to manage sewer maintenance safely.
- **Ground Realities & Implementation Challenges:** Despite statutory bans and official surveys reporting zero manual scavengers, civil society organizations highlight under-reporting, contractor-driven informalization, lack of mandatory safety equipment on ground, and recurring sewer-related fatalities as persistent governance bottlenecks.

While legislative frameworks like the MS Act, 2013 and targeted programs like NAMASTE reflect a strong policy intent toward zero-fatalities and full mechanization, bridging the gap between formal administrative reporting and ground-level execution remains crucial to upholding the dignity and safety guaranteed under Article 21 of the Constitution.

Nutrition Equivalence and Flexi-Interventions in PM POSHAN

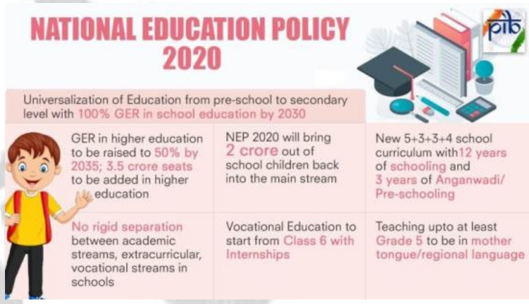
- **Cooperative Federalism Framework:** Since Education falls under the Concurrent List (Seventh Schedule), the PM POSHAN Scheme operates as a Centrally Sponsored Scheme where operational execution, menu formulation based on local agri-produce, and daily meal delivery rest with State/UT administrations.
- **Target Audience & Frequency:** The scheme guarantees one hot-cooked nutritious meal on every school working day to all children enrolled in Bal Vatika (pre-primary) and Classes I to VIII in Government and Government-aided schools.
- **Mandatory Nutritional & Food Norms:** Prescribed daily norms mandate 450 Calories and 12 gms protein (from 100 gms foodgrains, 20 gms pulses, 50 gms vegetables, 5 gms oil) for Primary classes, and 700 Calories and 20 gms protein (from 150 gms foodgrains, 30 gms pulses, 75 gms vegetables, 7.5 gms oil) for Upper Primary classes.
- **Flexi-Component for Local Customization:** States/UTs can utilize 5% of the total recurring budget as a flexi-component to establish School Nutrition Gardens (SNGs) and introduce district-specific supplementary nutrition (e.g., eggs, milk, millets, fruits) catering to local dietary habits.
- **Constitutional Underpinnings:** The scheme fulfills Article 21A (Right to Education by improving school retention and attendance), Article 47 (Duty of the State to raise the level of nutrition and standard of living), and Article 21 (Right to Life including right to food).
- **Legal Framework under NFSA, 2013:** Section 5 of the National Food Security Act (NFSA), 2013 gives statutory backing to free, daily meal entitlements for children aged 6–14 years, creating enforceable rights against malnutrition and hunger.
- **Key Definitions for UPSC:**
  - **School Nutrition Gardens (SNGs):** Micro-farming spaces within school premises used to grow fresh vegetables and leafy greens, enhancing micronutrient intake while imparting practical agricultural education.
  - **Flexi-Component:** A dedicated financial mechanism empowering sub-national governments to tailor central scheme guidelines to regional ecological and nutritional needs without central re-approval.

- **Operational Challenges:** Persisting issues include quality variation across central kitchens vs. local self-help groups (SHGs), delayed fund transfers, regional resistance to dietary substitutions (e.g., egg debates), and monitoring micronutrient deficiencies like anemia despite caloric adequacy.

By blending statutory guarantees under NFSA, 2013 with decentralized flexi-budgeting, the PM POSHAN Scheme serves as a vital socio-economic instrument to eliminate classroom hunger, reduce dropout rates, and combat childhood malnutrition across India.

Implementation of National Education Policy in HEIs and School Education

- **Architectural & Qualification Frameworks:** Higher Educational Institutions (HEIs) have implemented the National Credit Framework (NCrF) and National Higher Education Qualification Framework (NHEQF), facilitating Multiple Entry and Exit Options (MEEO), credit transfer via Academic Bank of Credits (ABC), and a unique lifetime Automated Permanent Academic Account Registry (APAAR ID).
- **Skill Integration & Industrial Synergy:** Mainstreams vocational training via Internship/Apprenticeship Embedded Degree Programmes (AEDP), National Apprenticeship Training Scheme (NATS), and SWAYAM Plus platform (partnering with 89 industry leaders across 17 sectors for Industry 4.0 skilling), while introducing the "Professor of Practice" cadre to integrate industry expertise.

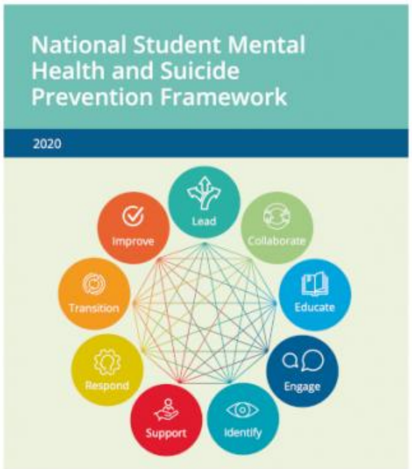


- **Digital Infrastructure & Accessibility:** Combines school-level platforms like DIKSHA, PM e-VIDYA, and NDEAR with higher education infrastructure (SWAYAM, SWAYAM Prabha, SAMARTH ERP), reinforced by BharatNet rural secondary school broadband expansion and the Bharatiya Bhasha Pustak Scheme (BBPS) delivering digital books across 22 scheduled languages.
- **Faculty Capacity Building & Governance:** Re-envisions faculty development through the Malaviya Mission Teacher Training Programme and NISHTHA (1.0, 2.0, 3.0), supported by performance monitoring via Vidya Samiksha Kendras to drive outcome-based pedagogy.
- **Internationalization & Equity Infrastructure:** Enables global academic mobility via guidelines for Twinning, Joint, and Dual Degree programs, alongside setting up foreign university campuses in India; promotes inclusion by funding unserved regions via Pradhan Mantri Uchchatar Shiksha Abhiyan (PM-USHA) and introducing Viability Gap Funding for district-level STEM girls' hostels.
- **Foundational & Inclusive School Initiatives:** Operationalizes early childhood education via PM SHRI, NIPUN Bharat (Foundational Literacy and Numeracy by Grade 3), NCF-FS with "Jadui Pitara" learning materials, pre-vocational "Bagless Days" (Grades VI–VIII), and non-literate adult education under the ULLAS scheme.
- **Constitutional & Legal Provisions:** Grounded in Article 21A (Right to Free and Compulsory Education), Schedule VII Concurrent List Entry 25 (Education, including technical education, medical education and universities), and Directive Principles under Article 45 (Early childhood care and education) and Article 46 (Educational interests of weaker sections).
- **Key Definitions for UPSC:**
  - **Academic Bank of Credits (ABC):** A digital repository designed to store academic credits earned by students from recognized HEIs, enabling seamless credit transfer, mobility, and flexible multi-entry/exit learning pathways.
  - **APAAR ID (Automated Permanent Academic Account Registry):** A lifelong 12-digit unique digital identifier assigned to students from pre-primary to higher education, tracking academic credentials, degrees, and credit transfers.
- **Operational & Sectoral Challenges:** Implementation faces interstate regulatory friction regarding Concurrent List mandates, variable digital infrastructure between rural and urban HEIs, delays in faculty absorption across state universities, and difficulties in maintaining standardized assessment rigor across decentralized credit frameworks.

The structured implementation of NEP 2020 across higher and school education breaks traditional academic siloes, fostering a flexible, skill-integrated, and technology-driven ecosystem essential for building a knowledge-based economy under Viksit Bharat.

National Level Study on Student Suicides and Mental Health Framework

- **Systemic Drivers & Statistical Tracking:** National Crime Records Bureau (NCRB) data in the Accidental Deaths & Suicides in India (ADSI) reports identifies multifaceted triggers behind student suicides, including academic pressure, career uncertainty, isolation, family issues, and financial distress.
- **National Psychological Support Interventions:** The Ministry of Education's *MANODARPAN* initiative offers 24x7 toll-free psychological guidance, 'Sahyog' interactive sessions, and 'Paricharcha' webinars integrated via PM e-Vidya channels to foster emotional well-being across educational ecosystems.



- **Institutionalization of Campus Counseling:** Affiliation bylaws mandate Wellness Teachers and Counsellors across CBSE schools, Jawahar Navodaya Vidyalayas (JNVs), and Kendriya Vidyalayas (KVs); higher education institutions (HEIs) like IITs, NITs, and IIMs operate dedicated campus counseling centers staffed by clinical psychologists.
- **Regulatory Interventions & Coaching Directives:** The Ministry of Education's 2024 Guidelines for Regulation of Coaching Centres curb extreme academic pressure by prohibiting batch segregation based on marks, regulating fee structures, and mandating institutional student-counseling frameworks.
- **Anti-Ragging and Peer Safety Protocols:** UGC enforces strict Anti-Ragging Regulations (2009) through mandatory annual undertakings, 24x7 anti-ragging helplines, multilingual outreach across 21 languages, and the implementation of institutional frameworks like IIT Kharagpur's SETU (Support, Empathy, Transformation & Upliftment).
- **Faculty Empowerment & Pedagogical Reforms:** The Malaviya Mission Teacher Training Programme integrates bi-weekly sessions to train higher education faculty in early distress detection, supported by regular National Wellbeing Conclaves and regional mental health workshops.
- **National Tele-Mental Health Infrastructure:** Under the Ministry of Health and Family Welfare, Tele-MANAS operates 53 cells across 36 States/UTs (handling over 43 lakh calls via audio/video consultations), while Ayushman Arogya Mandirs deliver integrated mental healthcare at the primary healthcare level.
- **Constitutional & Legal Framework:** Grounded in Article 21 (Right to Life and Personal Liberty, which encompasses the right to a dignified life and mental well-being), the Mental Healthcare Act (MHCA), 2017 (guaranteeing access to mental healthcare services), and the National Suicide Prevention Strategy (NSPS).
- **Key Definitions for UPSC:**
  - **Tele-MANAS:** A national digital mental health network providing 24x7, multi-tier, tele-counseling and psychiatric consultation services across India.
  - **MANODARPAN:** A comprehensive psychosocial support ecosystem covering students, teachers, and families to safeguard mental health during and post-academic stress periods.
- **Operational & Social Challenges:** Key hurdles include deep-seated social stigma surrounding mental illness, acute shortages of certified clinical psychologists, uneven last-mile tele-density in rural areas, and hyper-competitive academic environments driven by commercialized test-prep cultures.

A multi-tiered strategy combining early clinical intervention, regulatory oversight of coaching ecosystems, and empathetic campus culture is vital to reducing student suicides and protecting the youth demographic under Viksit Bharat.

SECURITY & DEFENCE

Empowering SC-led Innovation: VCF-SC and Defence Electronics

- **VCF-SC Financial Intervention:** Thrishanku Technologies, founded by SC entrepreneur Suneel Kumar Sirigiri, secured ₹4.47 crore in 2022 through equity and optionally convertible debentures under the Ministry of Social Justice and Empowerment's Venture Capital Fund for Scheduled Castes (VCF-SC).
- **Boosting Indigenous Defence Manufacturing:** The capital enabled establishing an advanced electronics manufacturing unit at KIADB Hi-Tech Defence & Aerospace Park for PCBs, radar systems, and EDGE AI, supporting major bodies like DRDO, BEL, L&T, and ECIL under Make in India and Atmanirbhar Bharat.
- **Socio-Economic Outcomes:** The enterprise created 30 direct skilled jobs (including 8 SC personnel), built assets worth ₹7 crore, attained a net worth of ₹3.92 crore, generated ₹2.85 crore in revenue, and proved the commercial viability of SC-led high-tech ventures.
- **Constitutional Mandate:** The VCF-SC aligns with Article 46 (Directive Principles of State Policy to promote educational and economic interests of SCs/STs) and Article 38 (minimizing inequalities in income, status, facilities, and opportunities).
- **Institutional Framework:** Managed by IFCI Venture Capital Development Ltd., VCF-SC is a flagship concessional financial scheme aimed at encouraging entrepreneurship among SC youth to transition from job seekers to job creators in high-growth sectors.
- **Key Definitions for UPSC:**
    - **VCF-SC:** A social sector venture fund offering concessional capital (equity/debt) to SC-promoted business entities holding at least 51% SC shareholding for over 6 months.
    - **EDGE AI:** Decentralized processing of artificial intelligence algorithms directly on local hardware devices without relying on cloud data centers, crucial for real-time defence electronics.
    - **Optionally Convertible Debentures (OCD):** A hybrid financial debt instrument that offers the lender the option to convert debt into equity shares at a predetermined time and rate.
- **Challenges in SC Entrepreneurship:** Key barriers include high credit aversion, historical capital constraints, limited access to collateral-free risk capital, lower representation in technology-intensive industries, and procedural delays in institutional fund disbursement.

The success of Thrishanku Technologies exemplifies how targeted financial inclusion through VCF-SC fosters high-tech innovation, shifts social equity from welfare to wealth creation, and accelerates indigenous technological self-reliance.

Agni-4 Medium-Range Ballistic Missile (MRBM) Test-Fired

- **Operational Validation:** A successful training launch of the Medium-Range Ballistic Missile (MRBM) 'Agni-4' was executed from the Integrated Test Range (ITR) in Chandipur, Odisha, confirming all operational and technical performance metrics.

- **Strategic Command Execution:** The flight test was conducted under the aegis of the Strategic Forces Command (SFC), demonstrating the operational readiness, doctrine adherence, and high reliability of India's nuclear deterrence capability.
- **Technical Specifications:** Developed indigenously by the Defence Research and Development Organisation (DRDO), Agni-4 is a two-stage, solid-fuel propelled missile capable of delivering nuclear payloads up to a strike range of approximately 4,000 kilometers.

- **Advanced Avionics & Guidance:** Features state-of-the-art Ring Laser Gyro-based Inertial Navigation System (RINS) and Micro-Navigation System (MINGS), ensuring pinpoint target accuracy and high resistance against electronic countermeasures.
- **Mobility & Survivability:** Designed for flexible, road-mobile or rail-mobile launch platforms, allowing rapid re-location and enhancing second-strike survivability under hostile conditions.
- **Indigenization Milestone:** Highlights progress under the Atmanirbhar Bharat initiative in defence manufacturing, utilizing advanced composite rocket motors and lightweight structural materials to optimize payload-to-weight ratios.
- **Institutional Architecture:** The Strategic Forces Command (SFC)—part of India's Nuclear Command Authority (NCA) created in 2003—manages the operational control and deployment of the nation's land, air, and sea-based strategic nuclear assets.
- **Key Definitions for UPSC:**
  - **Medium-Range Ballistic Missile (MRBM):** A ballistic missile with an operational range classification typically spanning between 1,000 km and 3,000–4,000 km.
  - **No First Use (NFU) Policy:** India's official nuclear doctrine element stipulating that nuclear weapons will only be used in retaliation against a nuclear attack on Indian territory or forces.
- **Key Strategic Considerations:** Key operational aspects involve strengthening survivability against anti-ballistic missile defence systems, maintaining supply chains for critical components, and balancing strategic stability within the Indo-Pacific theatre.

The successful test-firing of Agni-4 reaffirms India's robust, credible minimum deterrence capabilities, validating the reliability of its indigenously developed strategic missile systems within the Nuclear Command Authority framework.

India Acquires US Javelin Anti-Tank Missiles via Foreign Military Sales

- **Foreign Military Sales (FMS) LOA Finalization:** India signed a Letter of Offer and Acceptance (LOA) with the US government under the FMS route to procure shoulder-fired, medium-range FGM-148 Javelin Anti-Tank Guided Missile (ATGM) systems.
- **Historical Procurement Timeline (2010–2026):** Procurement deliberations initiated in 2010 under the Defense Technology and Trade Initiative (DTTI) stalled over US reluctance to provide 100%

Transfer of Technology (ToT) for core imaging-infrared seeker components, leading India to explore Israel's Spike system before reviving the Javelin dialogue.

- **Shift to Distributed Co-Production Architecture:** Marking a departure from pure import models, state-owned Bharat Dynamics Limited (BDL) and Tata Advanced Systems Limited (TASL) entered MoUs with the Javelin Joint Venture (Lockheed Martin and RTX) to explore local assembly, integration, and supply-chain co-production.

- **Modernization of Frontline Infantry Arsenal:** The acquisition addresses operational anti-armour deficiencies along high-altitude mountain borders, replacing legacy second-generation wire-guided systems like Milan-2T and Konkurs while domestic Man-Portable ATGMs (MPATGM) transition toward mass induction.

- **Multi-Track Emergency and Long-Term Procurement:** The deal leverages Emergency Procurement (EP) provisions for fast-track off-the-shelf deliveries alongside a broader framework for long-term supply, lifecycle maintenance, and co-assembly.

- **Key Technological Capabilities:** Features "fire-and-forget" imaging-infrared guidance, top-attack trajectory targeting vulnerable tank turrets, and a two-stage "soft launch" mechanism enabling safe firing from enclosed bunkers or structures.

- **Constitutional & Legal Framework:**
    - **Seventh Schedule (Union List, Entry 2):** Grants exclusive legislative powers to Parliament over defense, armed forces, and international defense procurement policies.
    - **Defence Acquisition Procedure (DAP) 2020:** Governs capital acquisitions under Inter-Governmental Agreements (IGA), Foreign Military Sales (FMS) channels, and emergency procurement limits.
    - **US Arms Export Control Act (AECA) [Title 22, US Code]:** Regulates US government defense transfers, end-use monitoring protocols, and Congressional notification procedures.

- **Key Definitions for UPSC:**
    - **Foreign Military Sales (FMS):** A US government-to-government procurement mechanism facilitating defense hardware and services transfers to international allies under standardized terms.
    - **Fire-and-Forget Technology:** An autonomous guidance system where a missile uses self-contained homing sensors (such as IIR seekers) to hit targets after launch without requiring operator command links.

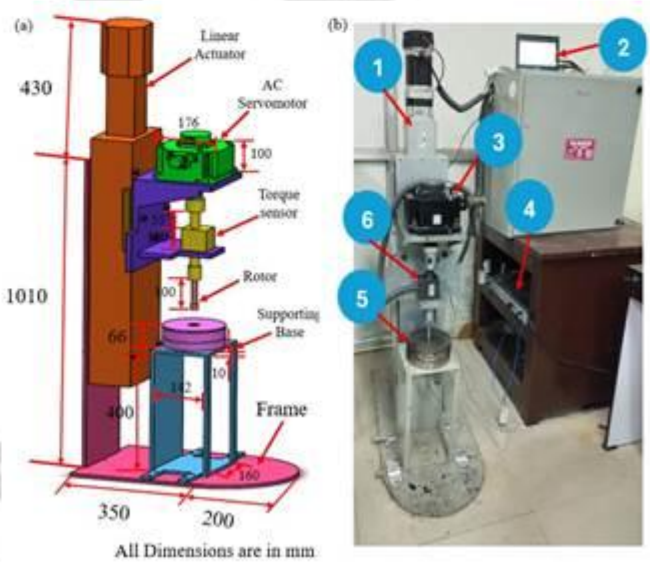
- **Implementation Operational Challenges:** Primary constraints include integrating foreign missile systems into existing infantry structures, managing sub-assembly component dependency on US supply lines, navigating stringent US end-use monitoring requirements, and balancing imported system inductions with DRDO's indigenous MPATGM development timeline.

Finalizing the Javelin acquisition resolves critical infantry capability gaps while marking a strategic evolution in Indo-US defense ties from simple buyer-seller transactions to joint industrial co-production. Moving toward distributed manufacturing strengthens India's defense-industrial ecosystem while securing frontline tactical operational readiness.

SCIENCE & TECHNOLOGY

Hybrid Magneto-Rheometer: Advancing Smart Magnetorheological Fluids

- **Indigenous Innovation at IIT Patna:** Scientists at IIT Patna, supported by the Department of Science and Technology (DST), have developed a novel hybrid magneto-rheometer to measure the rheological (flow) and tribological (friction/wear) behavior of nano iron powder-based Magnetorheological (MR) fluids.
- **Overcoming Testing Bottlenecks:** Conventional characterization tools struggle to analyze MR fluids under mixed operating conditions; the new device successfully maps fluid performance under non-conventional compression and shear modes simultaneously, both with and without magnetic fields.
- **Mechanism of Smart MR Fluids:** MR fluids are "smart" viscoelastic materials that rapidly transform from liquid to near-solid states upon exposure to a magnetic field, drastically increasing their apparent viscosity to transmit controllable mechanical forces.
- **Cross-Sectoral Industrial Applications:** Precise characterization via this prototype enables optimized deployment of MR fluids in adaptive engineering systems including aerospace dampers, defense actuators, automotive shock absorbers, robotics, and targeted medical devices.



All Dimensions are in mm

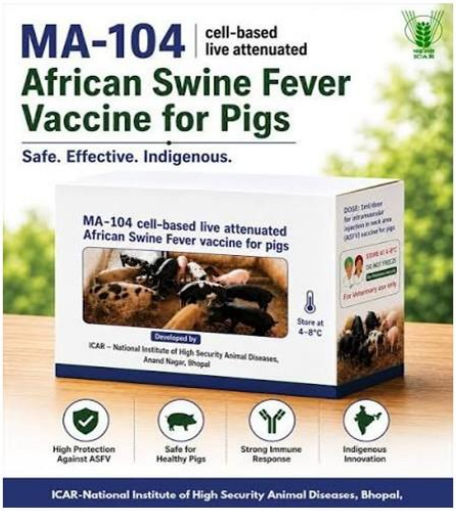
- **Broader Material Science Impact:** Beyond defense and aerospace, the hybrid rheometer's comprehensive testing capability provides crucial data on viscoelastic properties essential for polymers, pharmaceuticals, cosmetics, food processing, and petrochemical industries.
- **Policy & National Alignment:** This innovation directly supports national mandates under the National Quantum Mission and Deep Tech initiatives, furthering the vision of Atmanirbhar Bharat by reducing dependence on imported high-precision scientific testing equipment.
- **Key Definitions for UPSC:**
    - **Magnetorheological (MR) Fluid:** A type of smart fluid containing micron-to-nano-sized magnetic particles suspended in a carrier fluid that reversible thickens when subjected to a magnetic field.

  - **Rheology & Tribology:** Rheology studies the flow and deformation of matter under applied stress, while tribology examines the science of interacting surfaces in relative motion, focusing on friction, lubrication, and wear.
  - **Viscoelasticity:** The property of materials that exhibit both viscous (fluid-like) and elastic (solid-like) characteristics when undergoing deformation.
- **Key Technological Challenges:** Key barriers in MR fluid commercialization include particle settling/sedimentation over time, high initial material costs, mechanical wear of containment seals, and maintaining precise thermal stability during prolonged electromagnetic operation.

The development of the hybrid magneto-rheometer by IIT Patna bridges a critical experimental gap in smart material characterization, empowering Indian researchers to design high-performance, energy-efficient MR devices for strategic aerospace, defense, and industrial automation applications.

Indigenous African Swine Fever (ASF) Vaccine Developed by ICAR

- **Pioneering Veterinary Innovation:** Scientists at ICAR-National Institute of High Security Animal Diseases (ICAR-NIHSAD), Bhopal, have developed India's first indigenous cell-line-based live-attenuated African Swine Fever (ASF) vaccine using a novel attenuated ASFV Genotype II strain.
- **Technological & Cost Advantage:** Unlike existing commercial vaccines produced on patented proprietary cell lines, ICAR's vaccine utilizes the widely accessible MA-104 cell line, enabling affordable, large-scale domestic manufacturing and positioning India as a potential global exporter.



- **Clinical Protocol & Safety:** Administered as a 1 mL primary intramuscular injection to healthy pigs above eight weeks of age followed by a booster dose after 14 days, the vaccine has completed rigorous safety, genetic stability, immunogenicity, and DAHD-led field validation trials.
- **Socio-Economic Mitigation:** Directly addresses severe livelihoods losses in pig farming—especially in the North-Eastern region where localized historical ASF outbreaks caused estimated direct financial damages exceeding ₹1,200 crore—by reducing high mortality rates nearing 100 percent.

- **Institutional Alignment & Self-Reliance:** Represents a milestone under the Atmanirbhar Bharat initiative in animal health security, reinforcing national biosecurity, disease preparedness, and livestock productivity.
- **Constitutional & Statutory Context:** Aligns with Directive Principle Article 48 (organization of agriculture and animal husbandry on modern and scientific lines) and Entry 15 of the State List (preservation, protection, and improvement of stock and prevention of animal diseases), implemented via the Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009.
- **Key Definitions for UPSC:**
  - **Live Attenuated Vaccine:** A vaccine containing a weakened form of the live pathogen that reproduces inside the host without causing severe clinical disease, stimulating a strong and lasting immune response.

- **MA-104 Cell Line:** An established, non-proprietary continuous cell line derived from African green monkey kidney cells, commonly utilized as a stable biological medium for viral propagation.
- **Transboundary Animal Disease:** Highly contagious epidemic livestock diseases that spread rapidly across international borders, causing major economic and public health impacts.

- **Key Operational Challenges:** Critical future hurdles include scaling commercial manufacturing via public-private partnerships, ensuring cold-chain maintenance across remote hilly regions, and preventing viral reversion to virulence in wild boar populations.

The development of an indigenous, cost-effective ASF vaccine marks a decisive leap in safeguarding India's livestock economy, fortifying regional biosecurity while establishing sustainable livelihoods for smallholder livestock farmers across the country.

C-DAC and GSI Umbrella MoU for Advanced Geoscience Technologies

- **Strategic Technological Alliance:** The Centre for Development of Advanced Computing (C-DAC, MeitY) and the Geological Survey of India (GSI, Ministry of Mines) signed an Umbrella MoU to deploy High-Performance Computing (HPC), AI, and digital tools for geoscience, mineral exploration, and disaster management.
- **3D Subsurface Mapping & AI Analytics:** Combines C-DAC's supercomputing infrastructure with GSI's geological datasets to execute high-resolution 3D subsurface mapping, complex geophysical data processing, and predictive modeling for precise deep-seated mineral targeting.
- **Domain Large Language Model (LLM):** Envisages cognitive processing and digitization of decades of unstructured historical geological records into a specialized domain LLM to streamline geoscientific knowledge retrieval and data-driven decision-making.

Key Definitions:

- **Critical Minerals:** Non-fuel mineral resources (e.g., Lithium, Cobalt, REEs) essential for economic development and national security, characterized by high supply chain vulnerability.
- **Synthetic Aperture Radar (SAR):** An active radar system that generates high-resolution terrain images day or night and through cloud cover, crucial for micro-deformation monitoring.

- **Disaster Risk Reduction & Climate Monitoring:** Enhances natural hazard mitigation through slope-scale landslide monitoring using Synthetic Aperture Radar (SAR), early warning system development, and real-time monitoring of Glacier Lake Outburst Floods (GLOFs) in fragile Himalayan ecosystems.
- **Critical Minerals Security:** Focuses on accelerating the discovery and mapping of critical minerals and Rare Earth Elements (REEs), directly bolstering national supply chain resilience, clean energy transitions, and technological self-reliance under Atmanirbhar Bharat.
- **Constitutional & Legal Mandate:** Aligns with Article 51A(h) (developing scientific temper and spirit of inquiry), Entry 55 of List I (Union regulation of mines and mineral development), and operational provisions of the Mines and Minerals (Development and Regulation) Amendment Act, 2023.

- **Implementation Challenges:** Key hurdles include integrating legacy non-digital geological data, ensuring real-time computational bandwidth across remote field sites, and bridging inter-agency data-sharing protocols between computational scientists and field geologists.

This inter-ministerial synergy between C-DAC and GSI establishes a data-driven paradigm in earth sciences, leveraging high-performance computing to secure strategic mineral reserves while strengthening real-time disaster resilience across vulnerable geomorphic zones.

Safeguarding India's Intangible Cultural Heritage

- **Historic Hosting of UNESCO 20.COM:** India hosted the 20th Session of the Intergovernmental Committee for Safeguarding Intangible Cultural Heritage (ICH) at the Red Fort, New Delhi, marking the 20th anniversary of India's ratification of the UNESCO 2003 Convention.
- **Inscription of Deepavali:** Deepavali was officially inscribed on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity, becoming the 16th element from India to achieve this global recognition for fostering social cohesion and cultural continuity.
- **Multinational Nomination Strategy:** India initiated a joint multinational nomination for "Chhath Mahaparva" alongside countries like Mauritius, utilizing cultural diplomacy to strengthen soft power and diaspora connections across the Global South.
- **Institutional Architecture & Nodal Agency:** Sangeet Natak Akademi (SNA) serves as the primary nodal agency under the Ministry of Culture, maintaining the National Inventory of ICH which currently lists 54 prioritized elements for future global nominations.
- **UNESCO Procedural Constraints:** Under current UNESCO Operational Directives, member states face strict nomination ceilings, permitting only one nomination per two-year cycle, creating a bottleneck for cataloging India's vast living traditions.
- **Constitutional & Legal Context:** Complements Fundamental Duties under Article 51A(f) (valuing and preserving rich heritage) and Directive Principles under Article 49 (protection of monuments and objects of national importance), aligned with the UNESCO 2003 Convention.
- **Key Definitions for UPSC:**
    - **Intangible Cultural Heritage (ICH):** Practices, representations, expressions, knowledge, and skills—along with instruments and cultural spaces—that communities recognize as part of their living cultural identity.
    - **Representative List:** A UNESCO registry established to ensure better visibility of living heritage, raise awareness of its significance, and encourage dialogue that respects cultural diversity.
- **Operational Challenges:** Key administrative hurdles include managing community consent verification, mitigating risk of commercialization of traditional practices, expanding documentation capacity across remote rural clusters, and navigating the restrictive two-year nomination quota set by UNESCO.

India's active engagement with the UNESCO 2003 framework highlights a strategic shift toward leveraging living heritage and community-led preservation efforts as vital instruments of international soft power, cultural diplomacy, and sustainable development.

Scheme for Promotion of Culture of Science (SPoCS)

- **Institutional Nodal Agency:** Implemented by the National Council of Science Museums (NCSM), an autonomous body functioning under the Ministry of Culture, Government of India, serving as the primary driver for science communication infrastructure.
- **Core Objective & Vision:** Aims to foster scientific temper, rational thinking, and technological awareness among citizens and students, while highlighting the applications of science and technology in industry, national development, and human welfare.
- **Infrastructure Capabilities:** Facilitates the setup of modern physical science infrastructure nationwide, including high-capacity Science Cities, regional Science Centres, hands-on Innovation Hubs, and state-of-the-art Digital Planetariums.
- **Financial Allocations & Utilization:** Demonstrates significant budgetary expansion, with approved allocations rising from ₹6,150 lakh in FY 2023-24 to ₹11,767.75 lakh in FY 2025-26, alongside an improved fund release utilization reaching ₹11,757.75 lakh in FY 2025-26.
- **Public Outreach & Footfall:** Achieved a cumulative public engagement footprint of 1,68,55,110 visitors (including school and college students) across SPoCS-established science facilities as of March 31, 2026.
- **Interactive Pedagogical Approach:** Deploys experiential learning methodologies through interactive exhibitions, live science demonstrations, innovation-driven youth projects, and mobile science outreach initiatives in tier-2 and tier-3 regions.
- **Constitutional & Legal Context:** Directly operationalizes the Fundamental Duty under Article 51A(h) of the Constitution of India, which mandates every citizen to develop a scientific temper, humanism, and the spirit of inquiry and reform.
- **Key Definitions for UPSC:**
  - **Scientific Temper:** An attitude of logical reasoning, critical inquiry, empirical observation, and open-mindedness that rejects dogma and superstition.
  - **Innovation Hub:** A dedicated laboratory space within science centres designed to mentor students in practical tinkering, problem-solving, and experimental design.
- **Key Operational Challenges:** Critical hurdles include ensuring equitable distribution across rural remote districts, maintaining long-term financial viability and exhibit upkeep, updating content with emerging technologies, and securing skilled STEM educators.

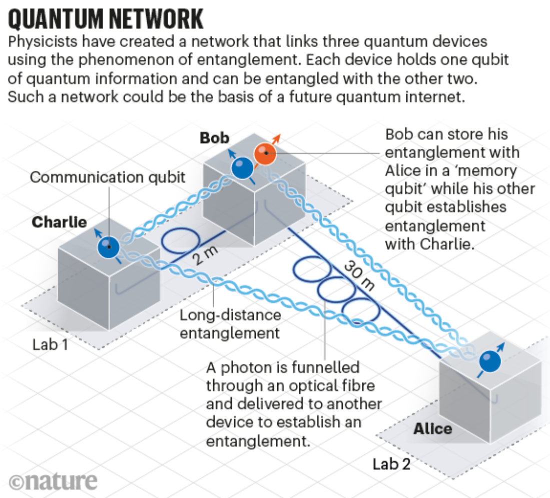
The SPoCS initiative plays a vital role in democratizing scientific knowledge and building a rational, inquiry-driven society essential for sustaining India's innovation-led economic growth.

Novel Blueprint for Connecting Quantum Communication Networks

- **Breakthrough Quantum Network Protocol:** Scientists at the Bose Institute, Kolkata (an autonomous institute under the Department of Science and Technology), introduced the **General Concurrence Percolation (GCP)** protocol to establish scalable, efficient long-distance quantum networks.
- **Overcoming Environmental Noise:** Real-world environmental noise inherently degrades quantum entanglement over distance; GCP addresses this by extracting strong, maximally entangled

operational links from a complex network composed predominantly of weak, low-entanglement links.

- **Preserving Network Topology:** Unlike existing theoretical models that systematically isolate or disconnect intermediate nodes—thereby consuming critical physical resources and destroying structural topology—GCP preserves physical node infrastructure using localized geometric routing.
- **Shortest-Path Entanglement Amplification:** The protocol operates along the shortest spatial paths to amplify entanglement strength, efficiently transforming a sparse physical grid into a dense, highly connected operational quantum network.
- **Lower Entanglement Thresholds:** Computer simulations validated that GCP significantly lowers the minimum initial entanglement threshold required to achieve full-network connectivity, vastly reducing experimental and physical resource demands.



- **Statistical Physics Alignment:** The research demonstrates that GCP adheres strictly to the universal principles of percolation theory in statistical physics, providing a robust theoretical foundation for future quantum internet architectures.
- **Strategic National Alignment:** Supports the objectives of the National Quantum Mission (NQM), approved by the Cabinet to advance quantum communication, secure key distribution (QKD), and quantum computing infrastructure under Atmanirbhar Bharat.
- **Key Definitions for UPSC:**
  - **Quantum Entanglement:** A fundamental phenomenon in quantum mechanics where physical properties of two or more particles remain intrinsically linked, regardless of spatial distance.
  - **Percolation Theory:** A mathematical framework in statistical physics that models the movement, connectivity, and behavior of interconnected clusters within a complex network grid.
- **Implementation & Technical Hurdles:** Major operational challenges include fabricating low-loss physical quantum repeaters, mitigating environmental decoherence, and scaling precision-hardware components for field deployment across long distances.

The General Concurrence Percolation protocol provides a resource-efficient theoretical model for quantum routing, offering a practical blueprint for developing robust, fault-tolerant national quantum networks and secure communication infrastructure.

Odisha's Science-Led Roadmap: Rare Earths, Marine Biotech, and Space Capabilities

- **Integrated Coastal Infrastructure Framework:** The Ministry of Science & Technology and the Government of Odisha finalized a multi-sectoral roadmap unifying the Rare Earth Corridor, marine biotechnology, space manufacturing, and atomic energy to accelerate Eastern India's blue economy and technological self-reliance.

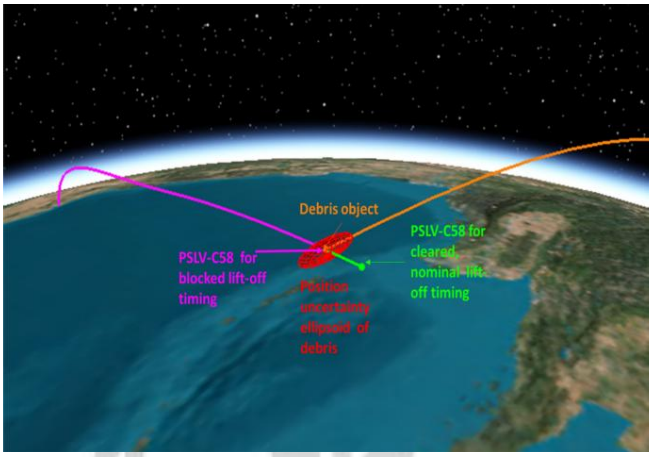
- **Institutional Expansion of ILS Bhubaneswar:** Under the Bio-E3 (Biotechnology for Economy, Environment, and Employment) policy framework, the Department of Biotechnology's Institute of Life Sciences (ILS) at Bhubaneswar will expand across an additional 50 acres provided by the Odisha government to advance marine bio-resource and health innovation.
- **OMBRIC Ecosystem Synergy:** The Odisha Marine Biotechnology Research & Innovation Corridor (OMBRIC)—partnering with IIT Bhubaneswar, NIT Rourkela, IISER Berhampur, and state universities—will integrate with CSIR, the Ministry of Earth Sciences, and the Department of Biotechnology for deep-sea and coastal resource utilization.

- **Rare Earth Corridor & Critical Minerals:** Operationalizing the Union Budget 2026–27 mandate for dedicated Rare Earth Corridors across Odisha, Kerala, Andhra Pradesh, and Tamil Nadu, the initiative leverages Odisha's heavy beach sand minerals to build domestic value chains for atomic minerals and strategic materials.
- **Space Capabilities & PPP Manufacturing:** Discussions advanced closer alignment of the state's space capabilities with ISRO, exploring the creation of a Space Research and Manufacturing Centre via Public-Private Partnership (PPP) mode to foster downstream space applications and hardware assembly.
- **Deep Ocean Alignment & Fisheries Mission:** Integrates the national Deep Ocean Mission with the state's Odisha Deep Sea Fishing Mission (2026–2036), harnessing offshore marine resources, deep-sea fisheries, and sustainable oceanography, alongside public engagement through the 'Swachh Sagar, Surakshit Sagar' campaign.
- **Constitutional & Legal Architecture:** Grounded in Schedule VII List I Entry 6 (Atomic energy and mineral resources), Entry 65 (Union agencies for scientific research), List II Entry 21 (Fisheries), and Article 51A(h) (duty to cultivate scientific temper), executing statutory compliance under the Mines and Minerals (Development and Regulation) Act, 1957.
- **Key Definitions for UPSC:**
    - **Rare Earth Corridor:** A designated geographic and industrial node integrating exploration, mining, chemical separation, and processing of rare earth elements (REEs) to secure critical mineral supply chains.
    - **Bio-E3 Policy Framework:** A national strategy focusing on high-performance biomanufacturing to drive economic growth, environmental sustainability, and employment generation through advanced biotechnology.
- **Implementation Challenges:** Major operational hurdles include environmental clearance delays in ecologically sensitive coastal zones, high capital requirements for rare earth separation processing, complex inter-institutional governance across central-state entities, and technological gaps in deep-sea exploitation.

The convergence of marine biotechnology, critical minerals, and spatial analytics positions Odisha as a pivotal driver of India's Eastern Coastal growth, transforming regional resource endowments into strategic national assets under Viksit Bharat.

ISRO’s Strategy for Space Debris Mitigation and LEO Sustainability

- **Proliferation of LEO Constellations & Collision Risks:** Rapid deployment of multi-thousand satellite internet constellations in Low Earth Orbit (LEO) significantly elevates orbital collision risks; non-functional or unmaneuverable satellites combined with untrackable small-sized debris pose mission-ending cascade risks.
- **Debris Free Space Mission & Active Debris Removal (ADR):** Spearheaded by ISRO, the 'Debris Free Space Mission' aims to protect Indian space assets, enforce post-mission disposal, and limit debris generation through precursor on-orbit technology demonstrations for Active Debris Removal (ADR).



- **Multilateral Engagement & IADC Membership:** ISRO has been a member of the Inter-Agency Space Debris Coordination Committee (IADC) since 1996, actively contributing to multilateral technical frameworks, UN-COPUOS guidelines, and UN-STSC working groups on Long-Term Sustainability (LTS) of outer space activities.
- **Policy Mandates & IN-SPACe Regulatory Guidelines:** The Indian Space Policy mandates strict adherence to international space debris mitigation protocols, complemented by IN-SPACe’s 2024 Norms, Guidelines and Procedures that require all Indian space actors to ensure post-mission disposal or limit orbital lifespans through natural decay.
- **Space Situational Awareness (SSA) Infrastructure:** Developing indigenous monitoring capabilities under ISRO's System for Space Object Tracking and Analysis (NETRA) is critical for self-reliance in collision avoidance, orbit determination, and threat assessment, supplemented by international tracking data-sharing agreements.
- **Key Technical Requirements for Operators:** Sustainable LEO management necessitates satellite operators to fulfill strict technical benchmarks, including autonomous collision avoidance maneuverability, enhanced trackability, public registration of orbital elements, and verified post-mission de-orbiting systems.
- **Constitutional & International Legal Framework:** Guided by the Outer Space Treaty, 1967 (principles of non-appropriation and peaceful use), Liability Convention, 1972, Registration Convention, 1975, and Article 51(c) of the Indian Constitution (fostering respect for international law and treaty obligations).
- **Key Definitions for UPSC:**
    - **Space Situational Awareness (SSA):** The comprehensive knowledge and tracking of space objects, debris, space weather, and operational environments to prevent orbital collisions and safeguard space assets.
    - **Active Debris Removal (ADR):** Targeted space missions employing robotic arms, nets, lasers, or tethers to capture, de-orbit, or relocate non-functional artificial objects from crowded orbits.

- **Implementation Challenges:** Primary operational constraints include high technological and financial costs of ADR missions, tracking limitations for sub-centimeter debris, absence of legally binding international enforcement mechanisms, and orbital crowding from commercial mega-constellations.

Implementing robust Space Situational Awareness alongside strict de-orbiting norms under the Debris Free Space Mission is essential to preventing space property loss, mitigating Kessler Syndrome dynamics, and ensuring long-term outer space sustainability for India's growing space economy.

RSVC-AMRIT Platform: Digitizing Rural Innovation and Technology Transfer

- **Launch & Institutional Synergy:** Launched on 15th August 2026 by Principal Scientific Adviser (PSA) Prof. Ajay Kumar Sood, the RSVC-AMRIT (Accelerated Medium for Rural Innovations and Technologies) platform is developed by NABARD in collaboration with the Office of the Principal Scientific Adviser (OPSA).
- **Digital Backbone for RuTAGe Ecosystem:** AMRIT serves as the digital layer for the RuTAGe Smart Village Centre (RSVC) network, establishing an online national repository to discover, validate, track, and deploy grassroots technologies across rural India.
- **Multi-Stakeholder Convergence Platform:** The digital ecosystem unifies research institutions, startups, technology providers, accelerators, funding agencies, corporate CSR partners, and rural communities to bridge the last-mile technology dissemination gap.
- **Targeted Priority Sectors:** Physical RSVC hubs and the AMRIT platform focus on transferring affordable, validated technologies in agriculture, rural micro-enterprises, renewable energy, education, assistive tools, water, sanitation, and citizen services.

- **Implementation & CSR Architecture:** Supported by NABARD's Centre of Excellence in Mumbai, RSVCs are set up via corporate CSR partnerships, with NABFOUNDATION (a wholly-owned subsidiary of NABARD) acting as the primary execution partner.
- **Synergy with RuTAG Framework:** Operates in tandem with the Rural Technology Action Group (RuTAG) initiative (launched by OPSA in 2004), scaling demand-driven, S&T-based rural innovations from laboratory conceptualization to field-level commercialization.
- **Constitutional & Policy Imperatives:** Aligned with Article 48 (Organizing agriculture and animal husbandry on modern lines), Article 43 (Promoting cottage industries in rural areas), Schedule VII List II Entry 14 (Agriculture), and the overarching objective of inclusive technology-led growth under Viksit Bharat 2047.
- **Key Definitions for UPSC:**
  - **RuTAGe Smart Village Centre (RSVC):** Village-level technology hubs designed to facilitate the physical demonstration, adaptation, and adoption of appropriate technologies for rural livelihoods.

- **Appropriate Technology:** Scalable, low-cost, eco-friendly technological solutions specifically tailored to the socio-economic and geographical constraints of local rural ecosystems.

- **Systemic Execution Bottlenecks:** Primary challenges include digital illiteracy among smallholder farmers, high initial adoption resistance, operational sustainability of village-level hubs, gaps in localized repair and maintenance services, and fragmented CSR funding commitments across remote geographies.

The integration of the RSVC-AMRIT digital layer with physical rural hubs bridges the long-standing gap between lab-based scientific innovation and field-level adoption, catalyzing rural entrepreneurship, self-reliance, and sustainable grassroots development under Viksit Bharat 2047.

HISTORY & CULTURE

Gyan Bharatam Mission: Preserving India's Manuscript Heritage

- **Mission Overview & Budget:** Announced in Union Budget 2025–26 under the Ministry of Culture, the Gyan Bharatam Mission (GBM) has been sanctioned ₹491.66 crore for 2025–2031 to survey, register, digitize, conserve, and catalogue India's vast manuscript heritage.

- **National Manuscripts Survey:** Launched in March 2026 across all States/UTs, the survey identified over 1.19 crore manuscripts; currently, out of 8 lakh digitized manuscripts nationwide, over 4.40 lakh are accessible state-wise in view mode on the Gyan Bharatam portal.

- **Institutional Architecture:** Implementation relies on Cluster and Independent Centres (universities, research institutes, libraries, religious bodies, and private custodians), with State/UT governments acting as Nodal Coordinating Authorities to build a centralized National Digital Repository (NDR).

- **Open Access & Intellectual Property:** Access to digitized texts is granted under a balanced framework respecting custodian rights—open metadata and permissible manuscripts are hosted on the NDR for scholarly research, while restricted or sensitive texts remain under conditioned access.

- **Constitutional Imperative:** Aligns directly with Article 51A(f) (Fundamental Duty to value and preserve the rich heritage of our composite culture) and Article 49 (Directive Principle to protect monuments, places, and objects of artistic or historic interest).

- **Key Definitions for UPSC:**
    - **Manuscriptology:** The scientific study, cataloguing, textual criticism, and physical conservation of handwritten historical documents.
    - **National Digital Repository (NDR):** A centralized digital infrastructure designed to securely store, index, and provide controlled public access to digitized manuscript corpora.

- **Strategic Importance:** Beyond heritage conservation, GBM boosts scholarly research in indigenous knowledge systems (IKS), classical Indian languages, scripts, and traditional science/medicine, furthering the vision of *Viksit Bharat*.
- **Implementation Challenges:** Major hurdles include fragmented private ownership, decay of organic writing materials (palm leaves, birch bark), lack of trained paleographers, script extinction, and balancing open scholarly access with community cultural rights.

The Gyan Bharatam Mission bridges India's ancient intellectual traditions with modern digital governance, ensuring that centuries of indigenous knowledge are safeguarded, digitized, and made accessible for global research without compromising custodian rights.

Promotion of Indian Classical Dances Among Students

- **NEP 2020 Integration:** The Ministry of Culture promotes Indian classical and folk dance forms in school education in alignment with the National Education Policy (NEP) 2020, focusing on art-integrated, experiential, and multidisciplinary pedagogy.
- **Institutional Architecture:** Autonomous bodies like the Centre for Cultural Resources and Training (CCRT), Sangeet Natak Akademi (SNA), and Kalakshetra Foundation execute nationwide teacher-student training, outreach series (e.g., Kala Dharohar), and regional art preservation.
- **Cultural Talent Search Scholarship Scheme (CTSS):** Implemented by CCRT for talented students aged 10-14 years (including children of traditional performing families), offering ₹3,600/year scholarship plus up to ₹9,900/year tuition reimbursement for training under recognized Gurus.
- **Scholarships to Young Artists (SYA) Scheme:** Provides advanced training financial support of ₹5,000 per month for two years to young artists aged 18-25 years specializing in classical dance and other performative fields.
- **Focus on Regional & Tribal Art Forms:** In addition to classical traditions, training modules integrate regional folk dances like Rai, Matki, Karma, and Grida, supported by CCRT regional centers such as the Damoh facility in Madhya Pradesh.
- **Financial Allocations:** Central grant support for autonomous cultural institutions rose from ₹106.94 crore in 2021-22 to ₹150.61 crore in 2025-26, alongside expanding CTSS awards (313 classical dance scholarships awarded in 2025-26).
- **Constitutional & Legal Framework:** Grounded in Article 51A(f) (fundamental duty to value and preserve the rich heritage of our composite culture) and Article 29(1) (protection of culture and conservation rights of citizens).
- **Key Definitions for UPSC:**
  - **Art-Integrated Learning:** A cross-curricular pedagogical model where various facets of art and culture are utilized as primary tools for teaching concepts across subjects.
  - **Guru-Shishya Parampara:** The traditional, direct knowledge-transmission model in Indian performing arts where knowledge is passed interactively from a master teacher to a disciple.
- **Implementation Challenges:** Core hurdles include standardizing traditional Guru-Shishya learning within rigid school timetables, limited certified arts instructors in rural government schools, and low long-term financial viability for youth pursuing classical performing arts professionally.

Sustained institutional support and targeted scholarship schemes for classical dance nurture cultural literacy among youth, preserving India's living heritage while operationalizing the holistic educational vision of NEP 2020.

Formulation of National Framework for Cultural Diplomacy

- **The Global Engagement Scheme (GES):** Serves as the flagship umbrella initiative under the Ministry of Culture designed to project India's civilizational heritage, soft power, and contemporary creative industries through structured global partnerships.
- **Four Pillars of GES:** Comprises the International Cultural Exchange Programme (ICEP), Project Mausam, Brihattar Bharat (Greater India), and the Scheme for Safeguarding the Intangible Cultural Heritage and Diverse Cultural Traditions of India.
- **Expanding Bilateral Frameworks:** Under ICEP, India maintains active Cultural Exchange Programmes (CEPs) and MoUs with 98 countries, facilitating international 'Festivals of India', exchange of cultural troupes, and collaborative heritage conservation.
- **Multilateral Cultural Alignment:** Integrates soft power strategies within key international groupings, including G20, BRICS, Shanghai Cooperation Organisation (SCO), and BIMSTEC, positioning cultural heritage at the center of global dialogue.

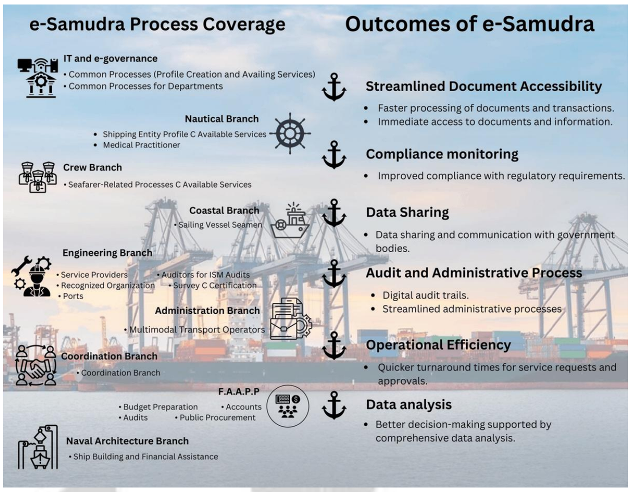
- **Synergy with ICCR:** The Indian Council for Cultural Relations (ICCR), under the Ministry of External Affairs, complements GES by managing Indian Cultural Centres abroad, running Art Residencies, and organizing flagship events like the International Day of Yoga.
- **Strategic Initiatives (Project Mausam & Brihattar Bharat):** Focuses on re-establishing historical maritime trade routes and cultural linkages across the Indian Ocean world, asserting India's historical role as a cultural and trade hub.
- **Constitutional & Legal Framework:** Aligns with Article 51(c) of the Directive Principles of State Policy (fostering respect for international law and treaty obligations) and Article 51A(f) (valuing and preserving the rich heritage of our composite culture).
- **Key Definitions for UPSC:**
    - **Cultural Diplomacy:** The strategic exchange of ideas, art, values, and traditions to foster mutual understanding and enhance international diplomatic relations.
    - **Soft Power:** The ability of a nation to attract and persuade foreign actors through culture, political values, and foreign policies rather than economic or military coercion.
- **Implementation Challenges:** Primary hurdles include fragmented coordination between MoC and MEA, inadequate long-term budgetary support compared to global peers, and risks of commercialization dilute traditional art authenticity.

The institutionalization of India's cultural diplomacy under the Global Engagement Scheme strengthens its soft power footprint, translating ancient civilizational ties into contemporary geopolitical goodwill and strategic global leadership.

EDITORIALS & OPINION

E-Samudra: Digitizing Maritime Governance and Seafarer Welfare

- **Launch of E-Samudra Platform:** The Union Ministry of Ports, Shipping and Waterways (MoPSW) launched 'E-Samudra', an integrated single-window digital platform designed to streamline maritime governance, enable faceless administration, and provide real-time services to seafarers, ports, and shipping firms.



- **Seafarer Welfare Interventions:** Introduced key digital welfare initiatives, including the e-NAVIK 24x7 grievance redressal mechanism, Digital Seafarer Employment Agreements (d-SEA), a Seafarer Tracking Dashboard, and expanded social security measures through the Seafarers Welfare Fund Society (SWFS).

- **Strategic Growth in Seafarer Workforce:** India's active seafarer pool expanded from ~1.03 lakh in 2013 to over 3.23 lakh in 2025, establishing India as the second-largest supplier of seafarers globally, aligned with targets under Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047.

- **Ease of Living and Business:** Replaces fragmented physical processes with end-to-end digital workflows, online fee payments, automated tracking, and verifiable electronic certificates to promote Minimum Government, Maximum Governance in maritime administration.

- **Inclusivity and Wellbeing Initiatives:** Promotes 'Sagar Mein Yog' for physical and mental health at sea and 'Sagar Mein Samman' to expand career pathways and safety protocols for the growing workforce of female seafarers.

- **Geopolitical Crisis Management:** Highlights DGMA's coordination with the Ministry of External Affairs and Indian Navy, facilitating over 40,000 communications and safely repatriating more than 4,000 stranded Indian seafarers from conflict zones.

- **Constitutional & Legal Framework:** Complements the statutory mandates under the Merchant Shipping Act, 2025 (recognizing seafarers as 'Key Workers'), Article 21 (Right to Life and Personal Liberty including dignity at work), and Article 39(e) (safeguarding health and strength of workers).

- **Key Definitions for UPSC:**
  - **Faceless Governance:** A technology-driven administrative model where service delivery, approvals, and regulatory compliance occur without physical interface between citizens and government officials, eliminating discretionary biases.
  - **Maritime Amrit Kaal Vision 2047:** A long-term strategic roadmap formulated by MoPSW to upgrade port infrastructure, boost domestic shipbuilding, expand green shipping, and establish India as a dominant global maritime power.

- **Operational & Sectoral Challenges:** Major implementation hurdles include mitigating cybersecurity risks across interconnected maritime databases, ensuring continuous digital connectivity for seafarers on high-seas, and harmonizing domestic digital certification with international maritime regulatory standards.

The deployment of E-Samudra marks a major transition toward transparent, digital-first maritime administration, reinforcing India's strategic vision to lead the global seafaring economy while safeguarding the rights and welfare of its maritime workforce.

Strategic Expansion of National Waterways Corridors in India

- **Statutory Framework & Operational Footprint:** Enacted under the National Waterways Act, 2016, 111 inland waterways have been declared as National Waterways (NWs), out of which 32 NWs are currently operational for commercial cargo and passenger movement under the nodal supervision of the Inland Waterways Authority of India (IWAI).
- **Phased Expansion for Tourism & Passenger Transit:** Pursuant to the Union Budget 2026-27, 19 additional new NWs have been identified for phased rollout over five years (FY 2026-27 to FY 2030-31), explicitly focusing on cruise tourism, riverine passenger ferry operations, and last-mile coastal connectivity.

- **Geographic Matrix of Targeted Corridors:** Multi-state rollouts span strategic river systems including Jhelum (NW-49), Chenab (NW-26), and Ravi (NW-84) in J&K; Kabini (NW-51) and Sharavati (NW-90) in Karnataka; Subarnarekha (NW-96) in Odisha; Savitri (NW-89) in Maharashtra; and Gandak (NW-37) in Uttar Pradesh.
- **Focused Infrastructure Augmentation (NW-4):** On National Waterway-4 (Krishna River), IWAI has operationalized a Roll-on/Roll-off (Ro-Ro) terminal at Muktyala, transferred floating jetties to APTDC, and initiated land acquisition (3.80 acres) at Ibrahimpatnam for expanded logistics hubs, driving 5.71 Million Tonne cargo and 2.34 Million passenger traffic in 2025-26.
- **Investment Escalation for Water Logistics:** Central expenditure on NW-4 expanded significantly from ₹0.67 crore in 2023-24 to ₹18.28 crore in 2025-26, reflecting the strategic priority given to shifting bulk freight traffic from rail/road to fuel-efficient inland water transport (IWT).
- **Multi-Modal Integration & Logistics Alignment:** The expansion of NWs aligns with the PM GatiShakti National Master Plan and National Logistics Policy, aiming to cut logistics costs toward global benchmarks (7-8% of GDP) through eco-friendly, high-capacity water transport.
- **Constitutional & Legal Architecture:** Governed by Schedule VII List I Entry 24 (Shipping and navigation on inland waterways declared by Parliament to be national waterways), List III Entry 32 (Inland waterways not declared national), Article 301 (Freedom of trade and commerce), and the Inland Vessels Act, 2021 for standardizing vessel safety and navigation rules.
- **Key Definitions for UPSC:**
  - **Inland Waterways Authority of India (IWAI):** A statutory body constituted in 1986 under the Ministry of Ports, Shipping and Waterways, responsible for the development, maintenance, and regulation of National Waterways.

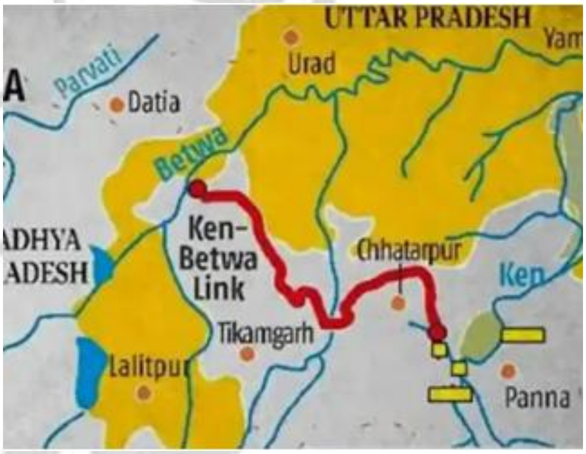
- **Ro-Ro (Roll-on/Roll-off) Logistics:** A multimodal transport mechanism allowing wheeled cargo vehicles (trucks, trailers) to drive directly onto and off water vessels, reducing transit delays and road congestion.

- **Systemic Execution Bottlenecks:** Primary operational challenges include seasonal draft variations due to dam releases (e.g., Pulichintala Dam on NW-4), presence of low-clearance bridges, old navigational locks, siltation requiring continuous capital dredging, and land acquisition delays from state irrigation departments.

The systematic expansion of National Waterways marks a vital transition toward eco-friendly multimodal logistics, relieving pressure on rail and road corridors while unlocking riverine cruise tourism to boost local economies under Viksit Bharat.

Factual Position and R&R Framework of Ken–Betwa Link Project

- **Project Scope & Regional Objectives:** As the pioneer major river-interlinking project under the National Perspective Plan, the Ken–Betwa Link Project (KBLP) transfers excess water from the Ken River to the water-deficit Betwa River, targeting the chronic drought-prone Bundelkhand region across Madhya Pradesh and Uttar Pradesh.



- **Core Socio-Economic Benefits:** Executed by the Ken–Betwa Link Project Authority (KBLPA), the ₹44,604.99 crore project aims to irrigate 10.62 lakh hectares, supply drinking water to 62 lakh people, generate 103 MW of hydropower, and support groundwater recharge through Daudhan Dam construction.

- **Statutory Rehabilitation Architecture:** Land acquisition, compensation, and resettlement strictly comply with the RFCTLARR Act, 2013, alongside the MP Special Rehabilitation Package (2023), offering land compensation at statutory rates or ₹12.50 lakh/hectare (whichever is higher) plus specialized housing grants.

- **Financial Disbursement Status:** As of July 2026, ₹12,445.85 crore has been spent; agricultural compensation saw 88.85% disbursement (₹320.45 crore of ₹360.66 crore awarded), house property compensation reached 93.97%, and 93.78% of the ₹629.87 crore awarded for 5,039 identified project-affected families stands fully paid.

- **Grassroots Support & Verification:** District administrations utilize targeted welfare drives (e.g., Jan Vishwas camps at Karaondia) to extend health services, scholarships, animal husbandry support, and direct beneficiary schemes, while continuous land record verification prevents legitimate displacement claims from being overlooked.

- **Counter-Narrative on Local Protests:** Government position indicates that recent symbolic agitations ("Chita Andolan", "Jal Satyagraha") feature individuals unlisted in official project-affected family registers, attributing these movements to non-local external elements propagating false displacement narratives.

- **Constitutional & Legal Framework:** Grounded in Schedule VII List I Entry 56 (Interstate rivers and river valleys), List II Entry 17 (Water supply and irrigation), Article 21 (Right to Livelihood), and executed under the RFCTLARR Act, 2013 and Environment (Protection) Act, 1986.

- **Key Definitions for UPSC:**
  - **RFCTLARR Act, 2013:** The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, which mandates mandatory social impact assessments, consent norms, and statutory R&R benefits.
  - **National Perspective Plan (NPP):** Formulated in 1980 by the Ministry of Irrigation (now Jal Shakti) for inter-basin water transfer from surplus to deficit river basins through Himalayan and Peninsular components.
- **Implementation Challenges:** Core operational hurdles involve submerged forest land within Panna Tiger Reserve requiring wildlife corridors, delicate inter-state water-sharing agreements between UP and MP, monsoon-dependent seasonal flow variations, and localized R&R administrative disputes.

The Ken–Betwa Link Project exemplifies a crucial structural intervention for climate resilience in Bundelkhand; executing fair, time-bound R&R mechanisms alongside statutory ecological safeguards remains vital to balancing regional water security with inclusive social justice under Viksit Bharat.

ETHICS

Panchayat Advancement Index (PAI) and Grassroots SDG Localization

- **Framework Evolution & Onboarding:** The Ministry of Panchayati Raj developed the Panchayat Advancement Index (PAI), formerly known as the Panchayat Development Index (PDI), as a data-driven composite assessment tool to track incremental progress across 2.59 lakh Gram Panchayats (GPs) in 33 States/UTs under PAI 2.0.
- **Localization of Sustainable Development Goals (LSDGs):** The framework operationalizes global UN SDGs into nine localized thematic areas—including Child-Friendly Village, Water-Sufficient Panchayat, and Clean & Green Panchayat—translating macro sustainable development targets into actionable rural governance outcomes.

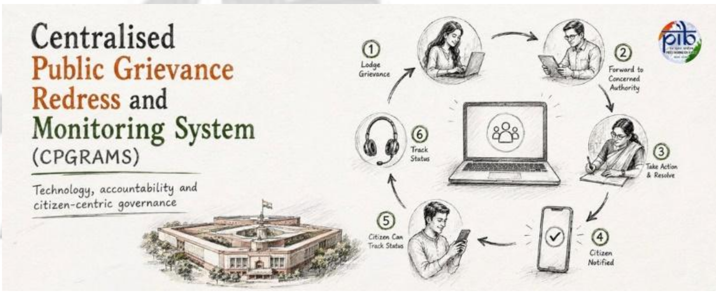
- **Gram Panchayat Development Plans (GPDP) & "Sankalp":** Incorporates a thematic planning approach where Gram Panchayats take a prior pledge ("Sankalp") to prioritize specific developmental sectors; over 1.56 lakh GPs adopted Sankalps for FY 2026–27, with significant focus on water sufficiency and ecological conservation.
- **Integration of Climate-Resilient Practices:** Climate-resilient agriculture, micro-irrigation (drip/sprinkler systems), watershed management, and agroforestry are structurally embedded within Theme 4 (Water-Sufficient) and Theme 5 (Clean & Green) to foster rural environmental sustainability.
- **Capacity Building via Revamped RGSA:** Backed by the Centrally Sponsored Scheme Revamped Rashtriya Gram Swaraj Abhiyan (RGSA), providing specialized orientation and thematic governance training to over 36.8 lakh elected representatives and functionaries between FY 2022–23 and FY 2026–27.

- **Constitutional & Legal Architecture:** Grounded in Article 243G read with the Eleventh Schedule of the Constitution (introduced via the 73rd Constitutional Amendment Act, 1992), which mandates the devolution of powers to Panchayats for economic development and social justice.
- **Key Definitions for UPSC:**
  - **Panchayat Advancement Index (PAI):** A standardized statistical tool that measures baseline conditions and tracks incremental performance across Panchayats to guide target-based evidence planning.
  - **Localization of SDGs (LSDG):** The process of adapting, planning, and monitoring global Sustainable Development Goals to match local grassroots priorities, governance structures, and community needs.
- **Implementation & Governance Bottlenecks:** Primary operational challenges include varying data entry capabilities across rural tiers, non-creation of thematic incentive funds for frontrunners, limited financial autonomy at the GP level, and heavy dependence on state-level administrative transfers.

By integrating localized SDG monitoring with structured capacity building, the Panchayat Advancement Index establishes a transparent baseline for evidence-based rural planning, fortifying decentralized governance and accelerating sustainable development at the grassroots level.

Centralised Public Grievance Redress and Monitoring System (CPGRAMS)

- **Flagship Digital Redressal Platform:** Developed by the Department of Administrative Reforms and Public Grievances (DARPG), CPGRAMS serves as an integrated 24x7 web portal connecting all Central Ministries, Departments, States, and UTs for transparent, technology-enabled public grievance resolution.
- **Radical Efficiency & Scale:** Disposal timelines dropped from 157 days in 2014 to 14–15 days in 2026 (mandated maximum limit rationalized to 21 days), handling ~27 lakh grievances annually via an expanded network of over 1.09 lakh Grievance Redressal Officers (GROs).
- **The 10-Step Reform Framework:** Introduced structural reforms including CPGRAMS 7.0 for auto-routing, language inclusivity via BHASHINI (22 scheduled languages), performance benchmarking via the Grievance Redressal Assessment and Index (GRAI), and dedicated Feedback Call Centres.



- **AI-Driven Governance Innovations:** Integrated the AI voice-chatbot "Samadhan Didi" leveraging speech-to-text and natural language processing to enable hands-free, multilingual grievance filing, alongside deploying NextGen CPGRAMS for predictive analytics and omni-channel tracking.
- **Last-Mile Rural Accessibility:** Democratizes access through integration with 5 lakh+ Common Service Centres (CSCs) under Village Level Entrepreneurs (VLEs), UMANG mobile app integration, and two-tier appellate mechanisms (resolvable within 30 days).
- **Explicit Exclusionary Mandate:** Statutory exclusions from CPGRAMS jurisdiction include Right to Information (RTI) matters, sub-judice court cases, religious matters, and service-related grievances of government employees.

- **Constitutional & Legal Architecture:** Operationalizes citizen-centric governance under Right to Good Governance (an integral facet of Article 21), aligns with Second Administrative Reforms Commission (2nd ARC) recommendations, and implements the *Sevottam* model for service delivery excellence.
- **Key Definitions for UPSC:**
    - **Sevottam Model:** A standardized service delivery framework comprising three pillars: Citizen's Charter, Public Grievance Redressal, and Service Delivery Capability.
    - **Auto-Routing:** An automated administrative process driven by AI/ML algorithms that maps and transfers lodged complaints directly to the concerned last-mile field officer without manual intervention.
- **Operational Bottlenecks:** Primary hurdles include systemic grievances caused by underlying policy deficits, administrative pendency in state-level sub-offices, variable quality of disposal closures, and digital literacy gaps among marginalized rural populations.

CPGRAMS represents a shift toward predictive, transparent, and accountable governance, bridging the administrative gap between citizens and the state while serving as a vital instrument for achieving Viksit Bharat@2047.

YOJANA & KURUKSHETRA

Bhubaneswari Opencast Project: Sustainable Coal Mining Model

- **Strategic Energy Role:** Located in the Talcher Coalfield of Odisha under Mahanadi Coalfields Limited (MCL), the Bhubaneswari Opencast Project (OCP) operates with a peak capacity of 30 MTPA, providing a major supply base for national thermal power stations.
- **Exceptional Operational Performance:** During FY 2025-26, the mine surpassed its annual target by producing 26.477 million tonnes (105.98% achievement), maintaining high financial profitability with a Profit Before Tax of ₹1792.60 crore.

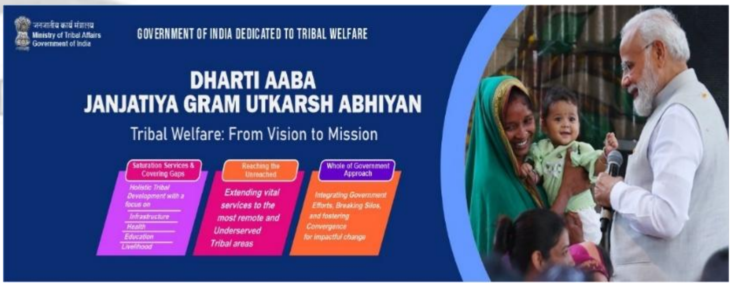
- **100% Blast-Free Surface Mining:** Implements eco-friendly Surface Miner technology for total coal extraction, completely eliminating drilling and blasting in coal seams, thereby reducing noise, ground vibration, and air pollution.
- **Advanced First Mile Connectivity (FMC):** Integrates covered conveyor belts with a 25 MTPA SILO loading infrastructure and Coal India Limited's first Automatic Truck Loading System (ATLS), facilitating over 85% coal evacuation via green rail transport.
- **Ecological Rehabilitation & Awards:** Features systematic afforestation supported by a dedicated five-hectare Sal Nursery, extensive dust suppression, and real-time monitoring, earning a Five-Star Rating and the Kalinga Environment Excellence Award.

- **Workplace Safety & Social Capital:** Achieved a zero-fatality record over five consecutive years while driving community development through local infrastructure, education, and CSR plantation initiatives to foster inclusive regional growth.
- **Constitutional & Legal Framework:** Operates under Article 39(b) (equitable distribution of material resources) and Article 48A (environmental protection), adhering to statutory mandates under the Mines Act, 1952, and Coal Mines (Special Provisions) Act, 2015.
- **Key Definitions for UPSC:**
    - **First Mile Connectivity (FMC):** Mechanized transportation infrastructure designed to move coal seamlessly from mine pits directly to rail loading points without road transport.
    - **Surface Miner:** Heavy mining equipment that mechanically cuts, crushes, and loads coal in a single continuous operation without explosives.
- **Critical Operational Challenges:** Key sectoral issues include managing land acquisition and local rehabilitation dynamics, minimizing overburden dump runoff, and balancing long-term coal reliance with national net-zero decarbonization commitments.

The Bhubaneswari OCP demonstrates a viable approach to modernizing India's extractive sector by combining high-capacity production, advanced evacuation technology, zero-fatality safety standards, and progressive environmental stewardship.

Dharti Aaba Janjatiya Gram Utkarsh Abhiyan (DAJGUA)

- **Mission Scope & Target Population:** Launched on October 2, 2024, the flagship umbrella scheme targets infrastructure saturation across 63,843 tribal-majority villages, covering over 5 crore tribal citizens across 549 districts, 2,911 blocks in 30 States and Union Territories over a five-year period.
- **Whole-of-Government Approach:** Integrates 25 specific developmental interventions executed across 17 line Ministries to eliminate critical deficits in housing, health, education, rural connectivity, renewable energy, and sustainable livelihood generation.
- **Eligibility Criteria for Village Inclusion:** Uses a objective baseline targeting mechanism where participating villages must possess a total population of 500 or more, with Scheduled Tribes (ST) constituting at least 50% of the resident population.



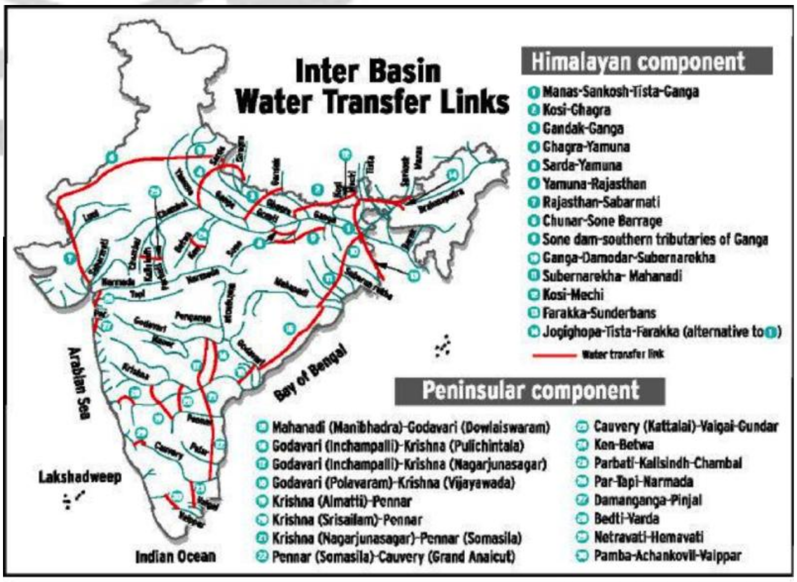
- **Key Interventions & Targets:** Infrastructure goals include constructing 20 lakh PMAY-G houses, laying 25,000 km of PMGSY roads, deploying 1,000 Mobile Medical Units, establishing 2,000 Anganwadi centres, saturating Jal Jeevan Mission tap water connections, and providing 25 lakh Ujjwala LPG connections.
- **Empowering Forest Rights Act (FRA) Beneficiaries:** Delivers targeted economic support to Individual Forest Rights (IFR) and Community Forest Rights (CFR) holders through agricultural inputs via PM-RKVY (~2 lakh holders), livestock management support via National Livestock Mission (8,500 holders), and PMMSY fisheries assistance.

- **Livelihood & Capacity Building Focus:** Establishes 1,000 homestays under Swadesh Darshan for responsible tourism, sets up 30 Jan Shikshan Sansthan (JSS) skilling centres, trains 1,000 Van Dhan Vikas Kendras (VDVKs), and upgrades Ashram Schools to build human capital.
- **Constitutional & Legal Foundation:** Operationalizes the Fifth and Sixth Schedules of the Constitution of India, aligns with Article 275(1) grants-in-aid for tribal welfare, and reinforces statutory rights under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA) and PESA Act, 1996.
- **Key Definitions for UPSC:**
  - **Saturation Approach:** A target-driven governance strategy ensuring 100% coverage of essential public services and welfare schemes to all eligible beneficiaries in a designated geography without leakages or exclusion.
  - **Van Dhan Vikas Kendra (VDVK):** An institutional enterprise framework under TRIFED designed to facilitate value addition, branding, and marketing for Minor Forest Produce (MFP) collected by tribal gatherers.
- **Implementation Challenges:** Major hurdles include navigating difficult terrain in remote left-wing extremism (LWE) affected pockets, inter-ministerial coordination delays, digital connectivity gaps in hilly areas, and ensuring sustainable maintenance of newly created community assets.

Dharti Aaba Janjatiya Gram Utkarsh Abhiyan serves as a comprehensive policy blueprint for tribal empowerment, bridging regional developmental disparities and ensuring inclusive growth in alignment with India's constitutional mandates for tribal welfare.

Status of National Rivers Interlinking Programme

- **National Perspective Plan Architecture:** Formulated by the Government of India, the National Perspective Plan (NPP) identifies 30 Interlinking of Rivers (ILR) projects (16 Peninsular and 14 Himalayan links) managed by the National Water Development Agency (NWDA) to address regional water imbalances.



Source: National Water Development Agency

- **Flagship Implementation (Ken-Betwa Link):** The Ken-Betwa Link Project (KBLP) is the first priority NPP link under implementation (estimated cost ₹44,605 crore), designed to irrigate 11.88 lakh hectares, furnish drinking water to 62 lakh people, and generate 103 MW hydro and 27 MW solar power.
- **Strategic National Projects (Polavaram):** The Polavaram Irrigation Project (PIP), incorporating the Godavari-Krishna link, holds National Project status with cumulative Central Assistance of ₹20,658 crore, aiming to irrigate 7.2 lakh acres, divert 80 TMC water, and supply power and domestic water across Andhra Pradesh.

- **Environmental & Socio-Economic Governance:** Every ILR project integrates Environmental Impact Assessments (EIAs), Land Acquisition, and Rehabilitation & Resettlement (R&R) provisions; KBLP features an Integrated Landscape Management Plan (ILMP) for biodiversity conservation and catchment area treatment.
- **Inter-State & Bilateral Consensus Mechanisms:** Projects like the Modified Parbati-Kalisindh-Chambal link rely on multi-state Memorandums of Agreement (MoA), while international dimensions have altered plans, such as dropping the original Kosi-Mechi link in favor of an Intra-State link within Bihar.
- **Infrastructure Optimization & Dropped Links:** Based on feasibility studies and local hydrologic shifts (e.g., Yettinahole project affecting the Netravati basin), links like Netravati-Hemavati, Damanganga-Pinjal, and Par-Tapi-Narmada were dropped or re-evaluated to optimize resource allocation.
- **Constitutional & Legal Framework:** Governed by Article 262 (Adjudication of inter-state water disputes), Schedule VII List I Entry 56 (Regulation of inter-state rivers), Schedule VII List II Entry 17 (Water supply and irrigation), and statutory compliance under the Environment (Protection) Act, 1986, and the RFCTLARR Act, 2013.
- **Key Definitions for UPSC:**
    - **Inter-Basin Water Transfer:** The artificial transfer of water from surplus river basins to water-deficit basins to mitigate droughts, enhance irrigation, and manage regional hydrologic variability.
    - **National Water Development Agency (NWDA):** An autonomous society under the Ministry of Jal Shakti tasked with conducting field surveys, preparing feasibility reports, and finalizing DPRs for river-linking projects under the NPP.
- **Operational & Sectoral Inter-State Hurdles:** Key challenges include political non-consensus over water-sharing ratios between riparian states, extensive forest submergence in ecological hotspots (such as tiger reserves), high financial capital outlays, and long-term socio-economic displacement requiring robust R&R implementation.

The National Rivers Interlinking Programme offers a structural approach to Indian water security, balancing agricultural irrigation demands with ecological conservation and cooperative federalism to build long-term climate resilience.

PIB & PARLIAMENTARY RESEARCH STUDIES (PRS)

Government Safety Framework for Indian Seafarers

- **Strategic Context & High-Risk Zones:** To protect Indian mariners operating in geopolitically sensitive corridors—including the Strait of Hormuz, Persian Gulf, Gulf of Oman, and Red Sea—the Directorate General of Maritime Administration (DGMA) instituted the comprehensive 'Seafarer-First' framework to manage emerging maritime threats.

- **Tiered Security Advisories:** The Directorate General of Shipping (DGS) issued targeted advisories restricting deployment to volatile conflict zones, enforcing rigorous ship-shore security drills against asymmetric threats like loitering munitions and unmanned surface vessels, while mandating pre-transit testing of Ship Security Alert Systems (SSAS).
- **Real-Time Surveillance Architecture:** Maritime tracking relies on the integrated **eNavik Portal** (operationalized July 2026), an online Ship Reporting Form, and 24x7 monitoring by the DG Communication Centre, coordinating continuously with the Indian Navy, the Information Fusion Centre – Indian Ocean Region (IFC-IOR), and international maritime bodies.
- **Incident Management & Communication:** Robust 24-hour control rooms have processed tens of thousands of calls and emails, dispatching daily Situation Reports and maintaining established emergency response channels (VHF Channel 16) with Indian Navy warships, UKMTO, and coastal states.
- **Evacuation & Financial Safety Nets:** The framework facilitated the safe transit of dozens of vessels alongside the repatriation of nearly 4,000 Indian seafarers from the region; it provides dedicated family welfare counseling and immediate ex-gratia relief of ₹10,00,000 via the Seafarers Welfare Fund Society in cases of fatality.
- **Systemic Non-Compulsion & Rights Safeguards:** Protects seafarers by requiring explicit individual consent for emergency crew changes, enforcing mandatory voyage risk disclosures through licensed Recruitment and Placement Services Licence (RPSL) agencies, and removing systemic pressure to sail into hazardous waters.
- **Constitutional & Legal Foundation:** Anchored in Article 21 (Right to Life and Personal Liberty), the Merchant Shipping Act, 1958, and compliance with the International Ship and Port Facility Security (ISPS) Code under the SOLAS Convention, supported by domestic statutory bodies like the Seafarers Welfare Fund Society.
- **Key Definitions for UPSC:**
  - **eNavik Portal:** A centralized digital maritime platform providing 24x7 casualty reporting, crisis management, and grievance redressal for seafarers.
  - **RPSL (Recruitment and Placement Services Licence):** A mandatory license issued by the DGS to maritime recruitment agencies to regulate recruitment standards and prevent exploitation of seafarers.
- **Operational & Geopolitical Challenges:** Ongoing challenges include handling sudden escalation cycles in critical maritime chokepoints, managing electronic warfare interference like GNSS disruption, and balancing global trade continuity with strict personnel protection protocols.

The 'Seafarer-First' initiative reinforces India's commitment to maritime security and workforce protection, blending real-time technology, Navy-coordinated tracking, and legal safeguards to protect its seafarers across volatile international waters.

National Green Hydrogen Mission: Decarbonizing Petroleum and Refining

- **Mission Objectives & Strategic Vision:** Launched by the Ministry of New and Renewable Energy (MNRE), the National Green Hydrogen Mission (NGHM) aims to make India a global hub for the production, usage, and export of Green Hydrogen and its derivatives, driving energy independence and India's net-zero 2070 targets.

- **SIGHT Mode-2B Allocation:** Under the Strategic Interventions for Green Hydrogen Transition (SIGHT) Mode-2B scheme, a dedicated Green Hydrogen production capacity of 30 Kilo Tonnes Per Annum (KTPA) has been awarded across major public sector oil refineries.
- **Refinery Allocation Matrix:** Production capacities are strategically distributed across four key refining nodes: Indian Oil Corporation Limited (Panipat, 10 KTPA), Numaligarh Refineries Limited (Numaligarh, 10 KTPA), Bharat Petroleum Corporation Limited (Bina, 5 KTPA), and Hindustan Petroleum Corporation Limited (Vizag, 5 KTPA).

- **Build-Own-Operate (BOO) Execution Model:** Projects are being implemented through private developers via BOO arrangements, leveraging private capital investment to accelerate technological adoption without burdening public exchequer capital expenditure.
- **Import Dependence & Decarbonization Benefits:** Replacing grey hydrogen (derived from natural gas/fossil fuels) with green hydrogen in desulfurization and hydrocracking processes reduces reliance on imported fossil fuels, cuts industrial carbon emissions, and enhances national energy security.
- **Targeting Industrial Anchor Demand:** The petroleum refining sector acts as an immediate anchor demand center for green hydrogen, providing economies of scale necessary to reduce production costs to parity with grey hydrogen.
- **Constitutional & Legal Framework:** Grounded in Article 48A (Directive Principle to protect and improve the environment), Article 51A(g) (Fundamental Duty to protect natural environment), the Energy Conservation Act, 2001 (as amended in 2022 to mandate non-fossil energy use), and the Electricity Act, 2003 (supporting open access for renewable power).
- **Key Definitions for UPSC:**
    - **Green Hydrogen:** Hydrogen generated through the electrolysis of water utilizing electricity generated exclusively from renewable power sources (e.g., solar, wind, hydro).
    - **SIGHT Scheme:** A financial incentive mechanism under NGHM designed to support domestic manufacturing of electrolysers and direct production of Green Hydrogen across key industrial sectors.
- **Implementation Challenges:** Major operational hurdles include high initial capital cost of electrolysers, grid infrastructure bottlenecks for continuous renewable power supply, high storage and transportation costs, and current price disparity between green and grey hydrogen.

The deployment of Green Hydrogen in petroleum refining marks a critical shift toward industrial decarbonization, creating an established off-take market that will drive domestic electrolyser manufacturing, lower green hydrogen unit costs, and accelerate India's overall energy transition.

Implementation of SASCI Scheme: Scaling Iconic Tourist Destinations

- **Scheme Architecture & Objective:** Managed by the Ministry of Tourism, the "Special Assistance to States for Capital Investment (SASCI)—Development of Iconic Tourist Centres to Global Scale" initiative aims to transform key domestic destinations into world-class iconic hubs to boost local economies, employment, and private investments.

- **Financial Allocations & 100% Central Funding:** In FY 2024–25, the Central Government sanctioned ₹3,295.76 crore for 40 projects across 23 States with 100% central funding; amended FY 2025–26 guidelines enabled unutilized states (e.g., Nagaland, Mizoram, Himachal Pradesh) to access up to ₹250 crore each under Part-II.
- **DPR Examination & Evaluation Parameters:** State Detailed Project Reports (DPRs) are rigorously evaluated based on site connectivity, existing tourism ecosystem, local carrying capacity, availability of utility infrastructure, projected increase in tourist footfalls/spending, job creation, and private sector capital attraction.
- **Multi-Tiered Institutional Governance Framework:** Operations are governed by a National Institutional Framework featuring a Central Sanctioning and Monitoring Committee (CSMC), a Mission Directorate, and parallel State Institutional Frameworks to oversee execution and statutory adherence.
- **Inter-Ministerial Convergence Strategy:** The CSMC and Mission Directorate integrate representatives from Culture, Urban Affairs, Civil Aviation, Road Transport, Environment, Rural Development, Railways, and the Archaeological Survey of India (ASI) to ensure coordinated infrastructure development.
- **Sustainability & Mandatory Statutory Compliance:** Sanctioned DPRs must explicitly integrate environmental impact assessments, carrying-capacity limits, multi-stakeholder consultations, applicable statutory clearances, and self-sustaining Operation & Maintenance (O&M) business models.
- **Digital Monitoring via PMIS Portal:** The Ministry utilizes a centralized Program Management Information System (PMIS)—a unified digital dashboard connecting the Ministry of Tourism, State Governments, UT Administrations, and Implementing Agencies for real-time progress tracking.
- **Constitutional & Legal Framework:** Rooted in Schedule VII List II Entry 32 (State public works and tourism-related infrastructure), List III Entry 20 (Economic and social planning), Article 282 (Financial grants given by the Union to States), and environmental compliance under the Environment (Protection) Act, 1986.
- **Key Definitions for UPSC:**
  - **SASCI Scheme:** A Central Government financial mechanism providing long-term, interest-free capital loans/grants to State Governments to execute high-impact infrastructure projects.
  - **Tourism Carrying Capacity:** The maximum level of visitor use an area can accommodate without causing unacceptable deterioration of physical, ecological, or socio-cultural resources.
- **Implementation Challenges:** Primary operational hurdles include land acquisition delays, complex inter-departmental statutory clearances in ecologically fragile zones, seasonal variations in tourist traffic affecting O&M viability, and variable technical capacity among state-level executing agencies.

The strategic implementation of the SASCI initiative bridges the gap between regional tourism potential and global destination standards, establishing sustainable, infrastructure-ready hubs that support long-term economic growth under Viksit Bharat.