SEPTEMBER-
2026 Edition

FOR UPSC EXAM

COMPREHENSIVE | ANALYTICAL
EXAM-FOCUSED

VIDHVATH
VIMARSHA



MONTHLY CURRENT AFFAIRS

- Prelims Facts
- Editorials
- Essay Themes
- Mains Analysis

"We help you reach for the star ★"

VIDHVATH IAS ACADEMY MYSURU

9972258970 / 9740702455 www.vaceias.com

vidhvath ias and kas academy mysuru vidhvath ias & kas academy

One Magazine..! All Dimension..!

Table of Contents

POLITY & CONSTITUTION 3

Raising District Judiciary Retirement Age: Addressing Judicial Attrition and Case Backlogs 3

Ladakh Clears 'Nautor Land' Regularisation Rules: Proprietary Rights & Decentralized Governance.....7

28th Western Zonal Council Meeting: Strengthening Cooperative Federalism and Regional Governance.....11

India's Sovereign Credit Rating Upgraded to 'A-' by Japan Credit Rating Agency (JCR) 16

Districts as Export Hubs (DEH): Unlocking Decentralized, District-Led Export Growth 21

Next-Gen Aquaculture in India: Harnessing RAS and Bio-floc Technology in the Blue Economy for the Atmanirbhar Bharat and Viksit Bharat Vision.....31

From Traditional skills to Rural Enterprises: How KVIC is creating new Livelihoods.....33

AI-Driven Precision Livestock Farming: Automated Behavioural Tracking of Mithun in Northeast India 35

Unincorporated Non-Agricultural Enterprises: District-Level Insights from ASUSE 2025.....38

Fueling the Blue Economy: Six Years of Empowering India's Fisheries Sector under PMMSY 40

Legal Reform: Bankers' Books Evidence Act, 2026.....43

Institutionalizing Traditional Medicine: BRICS Working Group on TCIM 45

GEOGRAPHY & ENVIRONMENT 47

National Biodiversity Authority Crosses ₹200-Crore Mark in Access and Benefit-Sharing (ABS) Disbursement.....47

Global Plastics Treaty: Architecture, Geopolitical Fault Lines, and Implications for India 53

Climate-Resilient Agriculture: CAZRI Moth Bean Varieties Excel Under El Niño Stress.60

Sustainability & Resource Management: World Circular Economy Forum (WCEF) 2026 63

INTERNATIONAL RELATIONS.....65

BRICS New Delhi Declaration 2026: Building for Resilience, Innovation, Cooperation and Sustainability 65

IndiaAI Mission and Sweden Discuss Strategic Cooperation in Artificial Intelligence and Digitalisation under SITAC 71

Strategic Studies & Foreign Policy: Hard Security Transitions in West Asia 73

SOCIAL.....76

PM-AJAY: Integrated Development of SC Communities.....76

NAPDDR & DDACs: Rehabilitation and Social Re-integration 77

RAKSHA: India's Defence Diplomacy Document and the Ten-Year Strategic Roadmap.....78

India-Belgium Defence Cooperation: Co-Development and Co-Production 79

SCIENCE & TECHNOLOGY 81

New Study on Temperature-Induced Structural Recovery in Jammed Systems: Implications for Drug Delivery.....81

Legal Metrology (Indian Standard Time) Rules, 2026: Vision of "One Nation, One Time" 84

BIO-NIVESH: Bridging Bio-Innovation and Private Investment.....88

ISRO's GSLV-F17 Mission: EOS-05 Satellite Launch 90

Metal-Free Supramolecular Photocatalysis for Green Hydrogen Production.....91

Waste Heat Conversion: Wave-Like Thermal Transport in TlCu5Se3 93

HISTORY & CULTURE 96

Cinema & Cultural Heritage: Anant Nag Conferred 56th Dadasaheb Phalke Award .96

EDITORIALS & OPINION.....98

From an Aspirational District to Academic Excellence: How NFSC Support Empowered Dr. Abinash Mandal.....98

ETHICS.....100

Vibrant Villages Programme 100

Water Security: 'Jal Sanchay Jan Bhagidari – Catch the Rain' Anthem Launched.....102

Administrative Reforms: DIPAM Achieves Zero Pendency Under Special Campaign 5.0 104

YOJANA & KURUKSHETRA 106

NAMASTE Scheme: Mechanised Sanitation and Occupational Safety 106

Transformation of School Education: PM SHRI and Future-Ready Exemplar Institutions.....107

PIB & PARLIAMENTARY RESEARCH STUDIES (PRS).....110

Tribal Development: Governance, PM-JANMAN, and DA-JGUA.....110

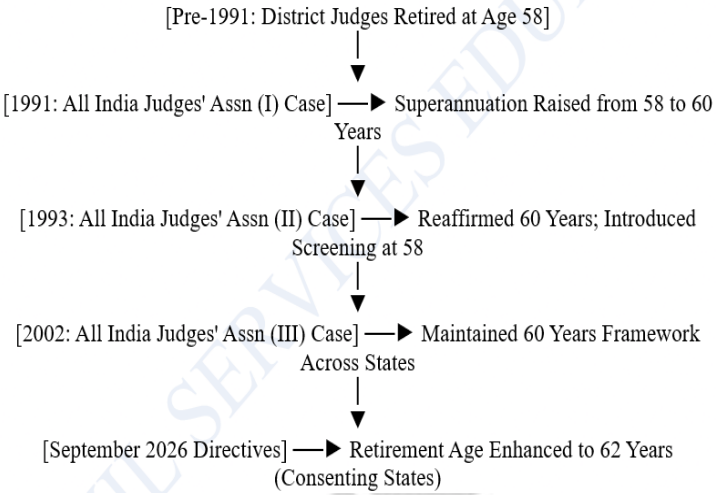
VIDHVATH IAS ACADEMY

POLITY & CONSTITUTION

Raising District Judiciary Retirement Age: Addressing Judicial Attrition and Case Backlogs

KEY HIGHLIGHTS & SUMMARY

- **Supreme Court Order:** A three-judge Supreme Court bench headed by Chief Justice Surya Kant directed seven consenting States—**Chhattisgarh, Karnataka, Madhya Pradesh, Maharashtra, Sikkim, Tamil Nadu, and West Bengal**—to amend their service rules within two months to raise the superannuation age of district judicial officers from 60 to 62 years.
- **Rejoining Provision for Retired Officers:** Officers who retired on or after March 31, 2026, in these seven States may opt to rejoin service, subject to performance/suitability evaluations and surrender of post-retiral benefits received.
- **Addressing Case Pendency:** The directive aims to arrest the severe "attrition of experienced judicial talent" amid a growing backlog exceeding **5.18 crore pending cases** in India's district courts.



- **Ultra-Strict Performance Screening:** High Courts must conduct suitability assessments at age 60 to filter out unproductive "deadwood" before granting extensions.
- **Notice to Non-Consenting Entities:** Non-consenting States and Union Territories were directed to re-evaluate their decisions within two weeks, acknowledging that public recruitment drives frequently fail to fill sanctioned judicial vacancies.
- **Rejection of Civil Parity:** The apex court reiterated that civil service employees cannot claim parity with judicial officers, as the judiciary is an independent, specialized sovereign organ.
- **Financial Burden Argument Dismissed:** The Court overruled financial objections from reluctant States, pointing out that extending active service defers immediate pension payouts while maintaining courtroom productivity.
- **Syllabus Relevance:** Directly aligns with **UPSC GS Paper II** (*Structure, Organization, and Functioning of the Judiciary; Issues Relating to Access to Justice and Judicial Reforms*).

WHY IN NEWS?

The Supreme Court revisited the superannuation benchmark for subordinate judicial officers—raising it from 60 to 62 years—for the first time since the landmark 2002 *All India Judges' Association* judgment. The order addresses mounting district court pendencies and chronic structural vacancies across state cadres.

BACKGROUND & EVOLUTION OF JUDICIAL RETIREMENT AGE

- **1991 (*All India Judges' Association v. Union of India*):** The Supreme Court increased the retirement age of subordinate judges from 58 to 60 years, emphasizing that judicial work requires specialized experience and maturity distinct from general administrative services.
- **1993 Review Judgement:** Retained the retirement age at 60 but established that continuation beyond 58 was contingent upon an evaluation of performance and "continued utility to the judicial system" by the respective High Court.
- **2026 Intervention:** Recognizing that recruitment pipelines across states have failed to match the rate of retirements, the Supreme Court pushed the age limit to 62 for experienced judges.

ESSENTIAL DEFINITIONS

- **Superannuation:** The statutory or legally defined age at which an employee or public official must retire from active service.
- **Judicial Attrition:** The loss of experienced judges due to retirement, resignation, or slow recruitment, which creates a gap between sanctioned and working judicial strength.
- **Pari Passu / Civil Service Parity Argument:** The assertion by state governments that judicial officers should share the same pay scales and superannuation terms as executive civil servants—an argument repeatedly rejected by the apex court.
- **Access to Justice:** A fundamental constitutional right guaranteeing citizens timely, effective, and meaningful resolution of disputes through functional institutional forums.

KEY FEATURES / IMPORTANT FACTS

Comparative View: Previous vs. Updated Framework

Parameter	**Previous Framework (2002 Directive)**	**Updated Framework (September 2026 SC Directive)**
Superannuation Age	60 Years	**62 Years** (in 7 initial consenting States)
Integrity / Efficiency Filter	Suitability assessment performed by High Court at age 58	Suitability and performance assessment performed by High Court at **age 60**
Rejoining Provision	No blanket rejoining for recent retirees	Officers retired on/after **March 31, 2026** may opt to rejoin service
Recruitment Reality	Widespread unfilled vacancies due to delayed exams	Immediate retention of talent while recruitment processes catch up

The Performance Assessment Rider

To prevent underperforming officers from automatically benefiting from the extension, the Supreme Court mandated that:

1. High Courts must conduct a thorough performance evaluation when a judicial officer turns 60.
2. Continuation to age 62 is granted **only if** the officer's track record demonstrates continued utility, integrity, and productivity.
3. Officers who do not clear this evaluation will retire at age 60, preventing "deadwood" from clogging career progression for younger entrants.

LEGAL AND CONSTITUTIONAL FRAMEWORK

Statutory and Constitutional Foundations

- **Article 233 & Article 234:** Govern the appointment, posting, and recruitment of District Judges and the subordinate judicial service in consultation with State High Courts and State Public Service Commissions.
- **Article 235:** Vests control over district and subordinate courts—including postings, promotions, leaves, and service conditions—in the respective State High Court.
- **Article 21:** Encompasses the Right to a Speedy Trial and access to justice as an integral component of the fundamental Right to Life and Personal Liberty.
- **Separation of Powers (Article 50):** Establishes that the judicial service is an independent organ of the state, distinct from the executive civil services.

PRELIMS PERSPECTIVE

- **Constitutional Articles:** Articles 233, 234, and 235 (Subordinate Courts chapter in Part VI).
- **Consenting States (2026 Order):** Chhattisgarh, Karnataka, Madhya Pradesh, Maharashtra, Sikkim, Tamil Nadu, and West Bengal.
- **Nodal Agency for Service Rules Amendment:** State Law Departments in coordination with respective High Courts.
- **Potential Prelims Traps:**
    - *Trap 1:* "High Court Judges and District Court Judges have the same retirement age under the Constitution." -> **False.** The retirement age of High Court Judges is fixed at 62 under Article 217(1) of the Constitution, whereas the service conditions and retirement ages of District Judges are governed by state service rules under High Court supervision.
    - *Trap 2:* "State Governments can unilaterally change judicial retirement ages without consulting the High Court." -> **False.** Under Article 235, service conditions and cadre management require mandatory consultation and concurrence with the respective High Court.

MAINS PERSPECTIVE

Strategic and Multi-Dimensional Significance

- **Immediate Pendency Reduction:** With over 5.18 crore pending cases across district courts, losing hundreds of experienced judges each year aggravates judicial delay. Retaining seasoned officers preserves disposal capacity.

- **Functional Distinction of the Judiciary:** The Supreme Court reaffirmed that judicial service is not mere "employment" under the state, but an exercise of sovereign judicial power, invalidating claims of civil service parity.
- **Structural Recruitment Gaps:** Public Service Commission examination cycles often face delays due to litigation, paper leaks, or lack of qualified candidates, leaving sanctioned seats vacant. Extending the service age bridges this administrative gap.
- **Financial Rationalization:** Extending active service delays immediate lump-sum post-retiral disbursements (like gratuity and pension commutations) while maintaining judicial output.

KEY CHALLENGES

- **Career Progression Concerns:** Retaining senior officers at the top of the cadre for an additional two years may temporarily delay promotions for junior judicial officers.
- **State Government Hesitation:** Non-consenting states expressed concerns regarding long-term pension liabilities and administrative parity requests from executive civil servants.
- **Uniformity Across States:** Because judicial service rules are state-specific, a staggered adoption across different jurisdictions creates temporary disparities in retirement ages.

MAINS VALUE ADDITION

- **Key Terminology:** *"Judicial Attrition", "Superannuation Standard", "Performance Rider / Screening at 60", "Access to Justice", "Subordinate Judiciary Cadre Management".*
- **Statistical Anchors:** Over 5.18 crore cases pending in subordinate courts; 7 initial consenting states; 2-year increase in superannuation age (from 60 to 62 years).
- **SDG Linkage: SDG 16** (*Peace, Justice, and Strong Institutions*).

POSSIBLE UPSC QUESTIONS

Mains Question 1

"The subordinate judiciary forms the foundational tier of India's justice delivery system, yet it faces structural challenges due to chronic judicial vacancies." In light of recent Supreme Court directives to raise the retirement age of district judges to 62, examine how this measure addresses judicial attrition while ensuring accountability. (250 Words, 15 Marks)

Mains Question 2

Critically analyze the proposition that judicial service cannot be equated with executive civil services regarding pay, superannuation, and working conditions. Refer to constitutional provisions and relevant judicial precedents. (150 Words, 10 Marks)

ONE-LINE TAKEAWAYS

- The Supreme Court directed seven states to amend service rules to raise district judges' retirement age from **60 to 62 years**.
- The decision targets a nationwide district court backlog exceeding **5.18 crore cases**.
- Extensions beyond age 60 require a mandatory **performance evaluation by the High Court** to screen out underperforming officers.

- Judicial service is an independent sovereign function and cannot be compared to general executive civil services.
- District judges retiring on or after **March 31, 2026**, in consenting states may opt to rejoin active service.

WAY FORWARD

Raising the superannuation age to 62 offers immediate relief against judicial attrition, but it must be paired with broader long-term structural reforms. State governments and High Courts should streamline annual recruitment schedules to systematically fill sanctioned vacancies, expand physical and technological courtroom infrastructure, and leverage AI-assisted case management systems. Strict performance evaluations at age 60 will ensure that extending service preserves judicial integrity while keeping India's lower courts functional and responsive.

Ladakh Clears 'Nautor Land' Regularisation Rules: Proprietary Rights & Decentralized Governance

KEY HIGHLIGHTS & SUMMARY

- **Policy Landmark:** Ladakh Lieutenant Governor Vinai Kumar Saxena approved the **Ladakh Autonomous Hill Development Councils (Nautor Regularisation) Rules, 2026**, establishing a formal framework to grant ownership rights over eligible barren and wasteland holdings.
- **Cap & Tenure Architecture:** Grants a one-time regularisation mechanism offering **proprietary ownership for up to 10 acres** of *nautor* land occupied before the cut-off date of **October 27, 2020**.
- **Leasehold Provision for Excess Holdings:** Land holdings exceeding the 10-acre threshold can only be allotted on a **leasehold basis**. Occupations post-October 27, 2020, remain completely ineligible for regularisation.
- **Massive Coverage:** Resolves a long-standing land tenure dispute involving over **60,000 acres** recorded as *nautor* holdings across revenue records.
- **Empowering Local Hill Councils:** Vests the **Ladakh Autonomous Hill Development Councils (LAHDCs)** of Leh and Kargil with explicit executive authority to administer, allot, and manage *nautor* land regularisation within their jurisdictions.
- **Socio-Economic Value:** Formal titling provides legal tenure security to high-altitude agrarian communities, enabling them to leverage land titles as **collateral for bank loans**, agricultural credit, and rural development schemes.
- **Syllabus Relevance:** Directly aligns with **UPSC GS Paper II** (*Functions and Responsibilities of Union Territories, Panchayati Raj/Hill Councils, Land Reforms, and Local Governance*).

WHY IN NEWS?

The approval of the *Nautor Regularisation Rules, 2026* addresses a decades-old policy gap in Ladakh's revenue administration. By establishing clear ownership benchmarks, the policy balances local indigenous demands for land rights with environmental protection and planned urban-rural growth.

BACKGROUND & CORE CONCEPT

Evolution of Nautor Land Holdings in Ladakh

- **Origin of Nautor:** Historically, in high-altitude cold desert terrain like Ladakh, local agrarian families brought uncultivated state-owned wastelands (*nautor*) under active cultivation through labor-intensive soil conditioning and mountain stream irrigation.
- **Lack of Formal Title:** Despite cultivating these lands for generations, farmers lacked formal ownership records, preventing them from accessing formal bank credit, agricultural subsidies, or infrastructure compensation.

[Pre-1970s: Traditional Reclamation of Barren & Mountain Wastelands (Nautor)]
↓
[1970s–2010s: Revenue Records Identify 60,000+ Acres as Occupied Wastelands]
↓
[2019: J&K Reorganisation Act Repeals Legacy Tenancy Frameworks]
↓
[October 27, 2020: Repeal of J&K Tenancy Act, 1980 (Established Cut-Off Date)]
↓
[September 2026: LG Approves LAHDC (Nautor Regularisation) Rules, 2026]

ESSENTIAL DEFINITIONS

- **Nautor Land:** Government-owned barren or uncultivated wasteland traditionally granted or brought under occupation by local residents for agricultural or homestead purposes.
- **Proprietary Rights:** Absolute legal title and ownership conferred by the government, enabling the owner to use, transfer, inherit, or pledge the land as collateral.
- **Leasehold Tenure:** A contractual occupancy arrangement where the state retains primary ownership, granting the occupant rights of use for a specified duration under set terms.
- **LAHDC (Ladakh Autonomous Hill Development Council):** Autonomous statutory bodies created to govern local administrative, developmental, and land-use matters in the Leh and Kargil districts.

KEY FEATURES / IMPORTANT FACTS

Summary of Nautor Regularisation Framework (2026)

Parameter	**Policy Provision**
Cut-Off Date	**October 27, 2020** (No post-cut-off occupation eligible)
Proprietary Cap	Up to **10 Acres** per eligible household
Excess Holding Treatment	Holdings >10 acres permitted strictly on a **leasehold basis**
Total Area Impacted	Over **60,000 Acres** across Leh and Kargil districts
Implementing Authority	Ladakh Autonomous Hill Development Councils (LAHDCs)
Cut-Off Basis	Date of repeal of legacy land laws following J&K Reorganisation

Key Policy Components

1. **Sanctity of Cut-Off Date:** Enforces October 27, 2020, as the strict baseline to prevent ongoing encroachment on fragile cold-desert ecosystems.
2. **One-Time Dispute Settlement:** Regularises historical occupancy, providing revenue stability and legal clarity.
3. **Decentralized Administration:** Hands the execution pipeline directly to the LAHDCs, reinforcing local self-governance.

LEGAL AND CONSTITUTIONAL FRAMEWORK

Statutory Foundations

- **Section 42 of the LAHDC Act, 1997:** Mandates that state land within the district stands transferred to the Council for local administration and development control.
- **Section 23(1)(i) of the LAHDC Act, 1997:** Vests explicit executive powers in the Hill Development Councils regarding the allotment, occupation, and management of lands vested in them.
- **J&K Reorganisation Act, 2019:** Repealed outdated land frameworks (including the *J&K Tenancy Act, 1980* on October 27, 2020), laying the groundwork for UT-specific land laws.
- **Article 239 of the Indian Constitution:** Governs the administration of Union Territories by an Administrator or Lieutenant Governor appointed by the President.

PRELIMS PERSPECTIVE

- **Nodal Authority:** Administration of the Union Territory of Ladakh in coordination with LAHDC Leh and LAHDC Kargil.
- **Potential Prelims Traps:**
    - *Trap 1:* "Post-2020 encroachments can be regularised by paying a fee." -> **False.** Encroachments occupied after October 27, 2020, are strictly ineligible.
    - *Trap 2:* "Land regularisation in Ladakh is executed directly by the Ministry of Home Affairs." -> **False.** Statutory authority for allotment and management is vested in the LAHDCs under the LAHDC Act, 1997.
    - *Trap 3:* "All nautor land holdings automatically convert to absolute freehold titles regardless of size." -> **False.** Land holdings exceeding 10 acres are restricted to leasehold tenure.

VIDHVATH IAS ACADEMY

MAINS PERSPECTIVE

Strategic and Governance Significance

- **Strengthening Grassroots Democracy:** Empowering the LAHDCs with direct executive authority over land regularisation restores institutional trust and reinforces decentralized governance in the UT.
- **Unlocking Rural Credit & Financial Inclusion:** Legal title deeds enable smallholder mountain farmers to secure formal institutional credit, overcoming historical dependence on informal moneylenders.

- **Ecological vs. Developmental Balance:** Enforcing a strict cut-off date prevents speculative land grabs in ecologically sensitive high-altitude zones while protecting the tenure security of indigenous communities.

KEY CHALLENGES

- **Revenue Record Reconciliation:** Ground truthing and satellite mapping over 60,000 acres of high-altitude, mountainous terrain will require updated revenue infrastructure.
- **Ecological Sensitivity:** Preventing land-use conversion from high-altitude pastures to commercial construction requires vigilant enforcement by the Hill Councils.
- **Managing Boundary Disputes:** Historical *nautor* holdings often lack precise demarcation, potentially leading to inter-community or intra-village boundary disputes during survey operations.

MAINS VALUE ADDITION

- **Key Terminology:** *"Nautor Land Regularisation", "Tenure Security", "LAHDC Executive Authority", "High-Altitude Agrarian Credit", "Proprietary vs. Leasehold Cap".*
- **Statistical Anchors:** 60,000+ acres covered; 10-acre ceiling for proprietary rights; October 27, 2020 cut-off date.
- **SDG Linkages: SDG 1** (*No Poverty*), **SDG 2** (*Zero Hunger*), **SDG 10** (*Reduced Inequalities*), and **SDG 16** (*Peace, Justice, and Strong Institutions*).

POSSIBLE UPSC QUESTIONS

Mains Question 1

"Granting land tenure security while preserving fragile eco-systems is a key challenge in high-altitude border territories." Analyze how the Ladakh Nautor Regularisation Rules, 2026 balance local socio-economic demands with environmental and administrative safeguards. (250 Words, 15 Marks)

Mains Question 2

Evaluate the role of Autonomous Hill Development Councils in strengthening local self-governance in Union Territories. How does vesting land management powers in LAHDCs fulfill constitutional principles of decentralization? (150 Words, 10 Marks)

ONE-LINE TAKEAWAYS

- Ladakh LG Vinai Kumar Saxena approved the **LAHDC (Nautor Regularisation) Rules, 2026**.
- Gives proprietary rights for up to **10 acres** of *nautor* land occupied before **October 27, 2020**.
- Holdings larger than 10 acres transition to a **leasehold basis**.
- Addresses ownership disputes over **60,000+ acres** across Ladakh.
- Vests statutory implementation power in the **Autonomous Hill Development Councils (LAHDCs)** under the LAHDC Act, 1997.

WAY FORWARD

To ensure smooth rollout, the UT Administration and Hill Councils should adopt GIS mapping and drone-based surveys under the SVAMITVA framework for precise boundary demarcation. Transparent village-level public disclosures of draft land maps will minimize disputes, ensuring that indigenous farmers gain long-overdue land security while protecting Ladakh's delicate ecology.

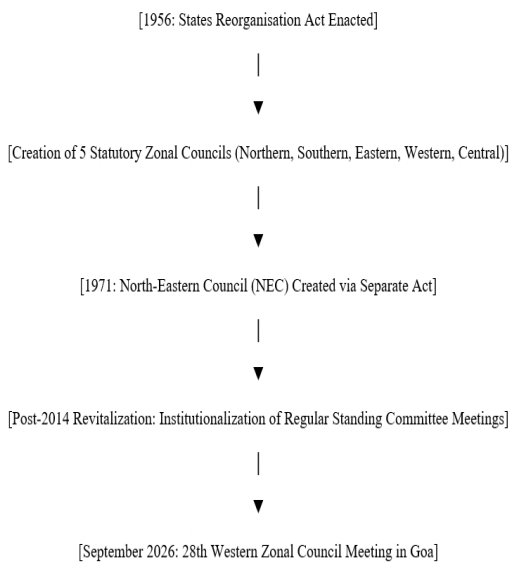
CONCLUSION

The *Ladakh Autonomous Hill Development Councils (Nautor Regularisation) Rules, 2026* mark a step toward resolving long-standing land tenure uncertainties in the region. By combining proprietary ownership caps, leasehold mechanisms, and local council authority, the policy provides structural tenure security to local farming communities while maintaining safeguards for Ladakh's fragile high-altitude environment.

28th Western Zonal Council Meeting: Strengthening Cooperative Federalism and Regional Governance

KEY HIGHLIGHTS & SUMMARY

- **Recent Development:** The Union Home Minister chaired the 28th meeting of the Western Zonal Council on September 7, 2026, in Panaji, Goa, focusing on inter-state cooperation, regional infrastructure, and national security priorities.
- **Composition:** The Western Zonal Council includes the states of Goa, Gujarat, Maharashtra, and the Union Territory of Dadra and Nagar Haveli and Daman and Diu.
- **Statutory Nature:** Established under Sections 15 to 22 of the States Reorganisation Act, 1956; Zonal Councils are statutory bodies, unlike the constitutional Inter-State Council created under Article 263.
- **Leadership & Rotation:** The Union Home Minister serves as the ex-officio Chairman of all five Zonal Councils, while the Chief Minister of the host state acts as Vice-Chairman on an annual rotational basis.
- **Administrative Mechanism:** Issues are initially screened by a Standing Committee headed by the respective Chief Secretaries of member states before escalation to the main Council meeting.



- **Institutional Secretariat:** The Inter-State Council Secretariat (ISCS), functions under the Ministry of Home Affairs and provides operational support to both Zonal Councils and the Inter-State Council.
- **Policy Mandate:** Functions as an advisory body facilitating resolution of inter-state water disputes, boundary issues, power grid synchronization, coastal security, and women's safety measures.
- **Strategic Vision:** Operates as a key engine for "Team India", bridging Centre-State gaps through the dual principles of cooperative and competitive federalism.

WHY IN NEWS?

The Union Home Minister and Minister of Cooperation chaired the 28th meeting of the Western Zonal Council in Panaji, Goa. The meeting brought together Chief Ministers, State Ministers, and senior officials to address key regional challenges, fast-track inter-state infrastructure projects, and coordinate national

initiatives. This meeting highlights the role of Zonal Councils as effective platforms for resolving Centre-State and inter-state friction without relying on formal litigation.

BACKGROUND & CORE CONCEPT

Evolution of Zonal Councils

- **Origin:** Proposed by Pandit Jawaharlal Nehru in 1956 to counter linguistic regionalism following the redrawing of state boundaries, promoting national integration and regional economic planning.
- **Statutory Framework:** Enacted under Part III of the States Reorganisation Act, 1956, dividing the nation into five zones: Northern, Southern, Eastern, Western, and Central.
- **Distinct Status of the North-East:** The North-Eastern states are governed separately under the North-Eastern Council Act, 1971, which operates under the Ministry of Development of North Eastern Region (DoNER).

ESSENTIAL DEFINITIONS

- **Zonal Council:** A statutory regional forum established under the States Reorganisation Act, 1956, designed to foster inter-state coordination and advise the Centre and states on common economic, social, and security matters.
- **Cooperative Federalism:** A model of governance where the Centre and States work together interactively to solve common problems, rather than operating in isolated, competing spheres.
- **Competitive Federalism:** A framework where states compete with one another to attract investments, improve administrative efficiency, and enhance public service delivery, elevating overall national growth.
- **Inter-State Council Secretariat (ISCS):** A permanent administrative body under the Ministry of Home Affairs that processes agendas, tracks compliance, and services meetings for both the Inter-State Council and Zonal Councils.
- **Standing Committee of Zonal Council:** A preliminary deliberative body chaired by the Chief Secretary of the host state, responsible for vetting and resolving administrative and technical issues before formal consideration by the Council.

KEY FEATURES / IMPORTANT FACTS

Institutional Framework of Zonal Councils

VIDHVATH IAS ACADEMY

Aspect	Structural & Operational Details
Legal Status	Statutory bodies (created by an Act of Parliament, not by the Constitution).
Chairman	Union Home Minister (ex-officio Chairman of all five Zonal Councils).
Vice-Chairman	Chief Minister of the member state hosting the meeting (rotates annually).
Members	Chief Ministers and two senior Ministers nominated by the Governor from each member state; Administrator/Lieutenant Governor for UTs.
Advisors	One nominee from NITI Aayog and Chief Secretaries/Development Commissioners of member states (non-voting capacity).
Five Zones	**Northern:** PB, HR, HP, RJ, UTs of J&K, Ladakh, Chandigarh, NCT Delhi. **Southern:** AP, TS, KA, KL, TN, UT of Puducherry.

	Eastern: BH, JH, WB, OD. **Western:** GA, GJ, MH, UT of Dadra & Nagar Haveli and Daman & Diu. **Central:** UP, UK, MP, CG.

Major Discussion Themes

- **Women and Child Safety:** Expediting investigations of sexual offenses and expanding Fast Track Special Courts (FTSCs).
- **Emergency Infrastructure:** Nationwide implementation of the Emergency Response Support System (ERSS-112).
- **Financial Inclusion:** Expanding brick-and-mortar banking services within a 5 km radius of every unbanked rural village.
- **Sectoral Reforms:** Digital power grid coordination, cybercrime mitigation, coastal security integration, and cooperative sector expansion.

LEGAL AND CONSTITUTIONAL FRAMEWORK

Statutory Authority

- **Sections 15 to 22, States Reorganisation Act, 1956:** Defines the constitution, territorial jurisdiction, composition, and functions of the five Zonal Councils.
- **Section 21:** Specifies that a Zonal Council may discuss and make recommendations on any matter of common interest in economic and social planning, border disputes, inter-state transport, and state reorganisation issues.

Constitutional Intersections

- **Article 263 (Inter-State Council):** A constitutional body established by presidential order to investigate and advise on inter-state disputes. While Article 263 operates at the national level, Zonal Councils address regional and localized state issues.
- **Seventh Schedule Allocation:** Addresses issues across List I (Union List) and List III (Concurrent List), facilitating harmonized policy implementation across states.
- **Article 301:** Protects freedom of trade, commerce, and intercourse across state boundaries, supported by Zonal Councils through the removal of inter-state transit barriers.

PRELIMS PERSPECTIVE

VIDHVATH IAS ACADEMY

- **Statutory vs. Constitutional:** Zonal Councils are statutory bodies established under the States Reorganisation Act, 1956; they are **not** created under Article 263 (which governs the Inter-State Council).
- **Chairmanship Uniformity:** The Union Home Minister chairs **all five** Zonal Councils, maintaining policy continuity across regions.
- **North-Eastern Council Distinction:** Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim do not belong to the 1956 statutory Zonal Councils; they are covered under the North-Eastern Council Act, 1971.
- **Potential Prelims Traps:**
    - *Trap 1:* "The Prime Minister is the Chairman of Zonal Councils." -> **False.** The **Union Home Minister** serves as Chairman; the Prime Minister chairs the Governing Council of NITI Aayog and the Inter-State Council.

- *Trap 2:* "Zonal Councils possess legally binding executive powers." -> **False.** Their recommendations are strictly **advisory** in nature.
- *Trap 3:* "Sikkim is a member of the Eastern Zonal Council." -> **False.** Sikkim was added to the **North-Eastern Council** via an amendment in 2002.

MAINS PERSPECTIVE

Strategic and Multi-Dimensional Significance

- **Fostering Cooperative Federalism:** Provides a regular, structured mechanism for Centre-State dialogue, resolving administrative and boundary disputes outside formal judicial channels.
- **De-cluttering the Judiciary:** Resolves inter-state administrative and water-sharing friction informally, reducing litigation burden under Article 131 (Original Jurisdiction of the Supreme Court).
- **Regional Infrastructure Integration:** Facilitates cross-border transport corridors, coastal security networks, gas pipelines, and synchronized regional power grids.
- **Execution of National Priority Mandates:** Converts national goals—such as expanding Fast Track Courts, standardizing food safety, and fighting cybercrime—into localized state actions.

GOVERNMENT / POLICY RESPONSE

- **Institutionalization of Deliberations:** Over 70 meetings of Zonal Councils and their Standing Committees have been conducted since 2014, reflecting a structural commitment to active federal dialogue.
- **Inter-State Council Secretariat Strengthening:** Upgrading digital tracking mechanisms under MHA to monitor implementation rates of Zonal Council decisions.
- **Cooperative Sector Expansion:** Integrating primary agricultural credit societies (PACS) with regional cooperative networks discussed at zonal platforms.

KEY CHALLENGES

- **Advisory Nature:** Lacking statutory enforcement powers, the implementation of recommendations depends on voluntary state compliance.
- **Political Divergences:** Irregular meetings and partisan differences between Centre and state leadership can slow decision-making on controversial issues.
- **Persistent Boundary & Water Disputes:** Long-standing issues, such as the Belagavi boundary debate or inter-state river water sharing, often stall despite repeated zonal deliberations.
- **Resource Asymmetries:** Varied administrative capacity and financial health among member states can delay uniform adoption of policy standards.

MAINS VALUE ADDITION

- **Key Terms & Concepts:** *"Team India Paradigm", "Statutory Federal Machinery", "Standing Committee Pre-Screening", "Inter-State Dispute Resolution Architecture", "Functional Federalism".*
- **Statutory Reference:** Sections 15–22 of the States Reorganisation Act, 1956.
- **Judicial Precedents:** *S.R. Bommai v. Union of India (1994)* (declaring federalism a basic structure of the Constitution); *State of Karnataka v. Union of India (1977)* (defining federal coordination parameters).
- **SDG Linkages: SDG 16** (Peace, Justice, and Strong Institutions) and **SDG 17** (Partnerships for the Goals).

POSSIBLE UPSC QUESTIONS

Mains Question 1

"Zonal Councils serve as vital administrative conduits for balancing cooperative and competitive federalism in India." Examine their structural framework and evaluate their effectiveness in resolving inter-state friction. (250 Words, 15 Marks)

Mains Question 2

Differentiate between the constitutional mandate of the Inter-State Council under Article 263 and the statutory function of Zonal Councils under the States Reorganisation Act, 1956. How do these platforms strengthen national integration? (250 Words, 15 Marks)

ONE-LINE TAKEAWAYS

- Created under **Sections 15–22 of the States Reorganisation Act, 1956**, as statutory advisory bodies.
- The **Union Home Minister** acts as the ex-officio Chairman of all five Zonal Councils.
- The **Chief Minister** of the host state serves as Vice-Chairman on an annual rotational basis.
- The **Western Zonal Council** covers Goa, Gujarat, Maharashtra, and Dadra & Nagar Haveli and Daman & Diu.
- Pre-screened by a **Standing Committee** headed by state Chief Secretaries to filter operational issues.
- Strengthens the **Team India** vision by facilitating inter-state dialogue on infrastructure, security, and governance.

WAY FORWARD

To maximize the impact of Zonal Councils, their advisory recommendations should be supported by a formal decision-tracking system managed by the Inter-State Council Secretariat. Establishing time-bound implementation schedules for consensus decisions will strengthen accountability across central ministries and state departments. Furthermore, expanding the scope of deliberations to include climate adaptation, renewable energy grid integration, and joint disaster management will transform Zonal Councils into proactive drivers of sustainable, balanced regional development.

CONCLUSION

VIDHVATH IAS ACADEMY

The 28th Western Zonal Council meeting underscores the continued importance of statutory regional forums in Indian federalism. By bringing together central and state leadership to resolve shared administrative, infrastructural, and legal issues, Zonal Councils turn the concept of "Team India" into practical governance. Strengthening these advisory bodies enhances Centre-State coordination, promotes regional stability, and reinforces cooperative federalism across the nation.

ECONOMY

India's Sovereign Credit Rating Upgraded to 'A-' by Japan Credit Rating Agency (JCR)

KEY HIGHLIGHTS & SUMMARY

- **Investment Grade Elevation:** Japan Credit Rating Agency (JCR) upgraded India's long-term foreign currency and local currency issuer ratings by one notch, moving from **'BBB+' to 'A-' with a Stable Outlook**, while simultaneously raising India's country ceiling to **'A'**.
- **Sustained High Growth Trajectory:** The upgrade cites robust macroeconomic fundamentals, with real GDP growth reaching **7.8% in FY26** and maintaining momentum into **Q1 of FY27** (MoSPI estimates), powered by private consumption and sustained public capital investment.
- **Productivity-Enhancing Reforms:** JCR highlighted structural drivers—primarily Digital Public Infrastructure (DPI) and the Goods and Services Tax (GST)—for broadening the tax base, boosting formalization, and elevating total factor productivity.
- **Fiscal Consolidation with Quality Spending:** The Centre's fiscal deficit narrowed from **4.7% in FY25 to 4.4% in FY26**, prioritizing high-multiplier capital expenditure over non-developmental revenue expenditure.
- **Banking Sector Balance Sheet Cleanup:** Asset quality across scheduled commercial banks (SCBs) and non-banking financial companies (NBFCs) improved significantly, driven by the Insolvency and Bankruptcy Code (IBC), regulatory tightening by the RBI, and capital fortification.
- **Robust External Sector Buffers:** The Current Account Deficit (CAD) remains well-contained, supported by robust services exports and remittances, with foreign exchange reserves vastly exceeding short-term external debt obligations.
- **Cumulative International Recognition:** This upgrade follows a series of positive sovereign rating actions by global agencies, including **Morningstar DBRS (May 2025)**, **S&P Global Ratings (August 2025)**, and **Rating and Investment Information, Inc. (R&I Japan, September 2025)**.

WHY IN NEWS?

The upgrade by JCR to **'A-'** marks a significant vote of confidence in India's medium-term economic trajectory. Sovereign credit ratings influence global capital allocation, corporate borrowing costs, and foreign portfolio flows. Elevating India into the **'A' rating category** by a major international rating agency lowers the country risk premium and strengthens India's positioning as a primary global investment destination amidst macroeconomic headwinds in advanced economies.

BACKGROUND & CORE CONCEPT

Sovereign credit ratings serve as an independent evaluation of a nation's creditworthiness—specifically its ability and willingness to service debt obligations without default. Historically, major global rating agencies maintained India at the lowest tier of investment grade (**'BBB-'** or **'BBB+'**), citing high public debt-to-GDP ratios and structural fiscal deficits.

However, India's recent economic performance—characterized by high growth differentials, fiscal discipline post-pandemic, robust foreign exchange reserves, and banking sector health—has led to a synchronized upward reassessment by international credit rating agencies.

Rating Trajectory & Key Upgrade Drivers

Legacy Tier (BBB-) ──► Consolidation Phase (BBB+) ──► Upgraded Status ('A-')

Primary Drivers:

├── Fiscal Deficit Consolidation (4.7% -> 4.4%)

├── High Capital Expenditure Multipliers (Article 112)

├── Cleaned SCB/NBFC Balance Sheets (IBC 2016)

└── Resilience in External Sector (Strong Forex Buffers)

ESSENTIAL DEFINITIONS

- **Sovereign Credit Rating:** A formal grade assigned by a rating agency evaluating a sovereign government's capacity and risk profile regarding timely debt servicing.
- **Country Ceiling:** The maximum credit rating achievable by private or public corporate entities domiciled within a specific country, reflecting country-level transfer, convertibility, and systemic risk.
- **Stable Outlook:** A forward-looking assessment indicating that the assigned credit rating is unlikely to be modified in the near-to-medium term.
- **Fiscal Deficit:** The total financial shortfall experienced when a government's aggregate expenditure exceeds its total non-borrowed receipts in a fiscal year.
- **Current Account Deficit (CAD):** The net measure of a trade balance where a nation's total imports of goods, services, and unilateral transfers exceed its aggregate exports.

KEY FEATURES & IMPORTANT FACTS

1. Macroeconomic Drivers of the Upgrade

- **GDP Growth Differential:** Real GDP grew at **7.8% in FY26**, outperforming major emerging market peers and advanced economies.
- **Capex Quality:** High government capex allocation toward physical infrastructure (roads, railways, logistics) has crowded in private investment and enhanced long-term economic efficiency.
- **Digital Public Infrastructure (DPI):** Systems like UPI, Aadhaar, and DigiLocker reduced transaction costs, enhanced financial inclusion, and expanded formal tax collection via integrated data analytics.

Constitutional, Statutory & Financial Sector Framework

CONSTITUTIONAL MANDATES	STATUTORY DISCIPLINE	FINANCIAL SECTOR OVERSIGHT
Article 112 – Union Budget	**FRBM Act, 2003** – Fiscal consolidation targets	**IBC, 2016** – NPA resolution
Article 266 – Consolidated Fund of India	**Fiscal Responsibility & Fiscal Consolidation Framework**	**RBI Act, 1934** – Monetary & financial oversight

2. Financial Sector Resilience

- **Insolvency and Bankruptcy Code (IBC), 2016:** Accelerated non-performing asset (NPA) resolution, reducing gross NPAs across scheduled commercial banks to decade lows.

- **RBI Prudential Supervision:** Enhanced regulatory oversight under the **Prompt Corrective Action (PCA)** framework and tighter capital adequacy guidelines strengthened balance sheets across banks and NBFCs.

3. External Sector Soundness

- **Reserves Buffer:** India's foreign exchange reserves provide multi-month import cover, significantly outpacing total short-term external debt obligations.
- **Invisibles Surplus:** Software exports and worker remittances effectively cushion the merchandise trade deficit, keeping CAD within a manageable corridor.

LEGAL AND CONSTITUTIONAL FRAMEWORK

1. Constitutional Mandates

- **Article 112:** Mandates the presentation of the *Annual Financial Statement* before Parliament, establishing transparent expenditure and revenue projections.
- **Article 266:** Establishes the *Consolidated Fund of India*, from which no money can be appropriated except under law passed by Parliament.
- **Article 292:** Empowers the Union Executive to borrow upon the security of the Consolidated Fund of India within limits fixed by Parliamentary law.
- **Article 246A (101st Constitutional Amendment Act, 2016):** Grants concurrent powers to Parliament and State Legislatures to structure the Goods and Services Tax (GST), establishing the GST Council for cooperative fiscal federalism.

2. Statutory Framework

- **Fiscal Responsibility and Budget Management (FRBM) Act, 2003:** Sets statutory limits on fiscal deficits and public debt targets, driving structural fiscal discipline.
- **Insolvency and Bankruptcy Code (IBC), 2016:** Provides a time-bound legislative mechanism for corporate insolvency resolution, preserving asset value and restoring bank capital health.
- **RBI Act, 1934 & Banking Regulation Act, 1949:** Provide statutory powers to the Reserve Bank of India to regulate monetary policy, oversee commercial banks, and enforce liquidity standards.

PRELIMS PERSPECTIVE

VIDHVATH IAS ACADEMY

Critical Facts & Chronology of Upgrades

- **May 2025:** Upgrade by Morningstar DBRS.
- **August 2025:** Upgrade by S&P Global Ratings.
- **September 2025:** Upgrade by Rating and Investment Information, Inc. (R&I Japan).
- **2026:** Upgrade by Japan Credit Rating Agency (JCR) to **'A-'** (Stable).

Common Prelims Traps & Confusions

Concept	Common Trap / Misconception	Actual Legal / Economic Reality
Country Ceiling vs Sovereign Rating	"A corporate entity in India can easily hold a higher rating than the Sovereign Country Ceiling."	**Incorrect.** The Country Ceiling represents the maximum rating limit achievable by domestic entities due to transfer/convertibility risks.
Fiscal Deficit Calculation	"Fiscal deficit includes net borrowings raised by the government during the financial year."	**Incorrect.** Fiscal deficit is total expenditure minus non-borrowed receipts. Borrowings offset the deficit, they do not reduce it.
Article 292 Borrowing Limits	"Article 292 mandates an automatic ceiling on executive borrowing without parliamentary approval."	**Incorrect.** Parliament *may* fix limits by law; borrowing powers are exercised by the executive subject to those statutory limits.
CAD Dynamics	"A Current Account Deficit always indicates economic distress and balance of payments crisis."	**Incorrect.** For growing developing economies, a moderate CAD funded by stable foreign direct investment (FDI) can reflect productive domestic investment exceeding domestic savings.

MAINS PERSPECTIVE

Dimensions of Analysis

1. Economic & Investment Impact

- **Lowering Capital Costs:** Upgrading to the **'A-'** tier reduces sovereign risk premiums, lowering interest yields on foreign currency borrowing for Indian corporations entering international debt markets.
- **Catalyzing Portfolio and Foreign Direct Investments:** Institutional investors, sovereign wealth funds, and pension funds often operate under statutory mandates restricting investments to 'A' category rated sovereigns, unlocking institutional capital inflows.

2. Fiscal Policy & Quality of Governance

VIDHVATH IAS ACADEMY

- **Capital Expenditure Multiplier:** Moving away from consumption subsidies toward asset-creating capital infrastructure increases long-term potential GDP output without accelerating structural inflation.
- **Fiscal Deficit Target Path:** Staying committed to the FRBM framework enhances international credibility and dampens crowd-out effects on private domestic borrowing.

3. Financial Sector & Balance Sheet Dynamics

- **Twin Balance Sheet Advantage:** Unlike the pre-2016 period marked by bad loans and corporate distress, Indian banks and corporate balance sheets currently exhibit high capital-to-risk-weighted assets ratios (CRAR) and low leveraged exposure.

GOVERNMENT / POLICY RESPONSE

- **FRBM Path Alignment:** Continued trajectory to bring down the central fiscal deficit toward **4.5% and below**, prioritizing debt-to-GDP reduction over medium-term horizons.
- **National Infrastructure Pipeline (NIP) & PM Gati Shakti:** Integrated planning platforms designed to optimize infrastructure investments, de-risk projects, and maximize return on public investments.
- **Production-Linked Incentive (PLI) Schemes:** Targeted industrial policies designed to drive domestic value addition, boost manufacturing exports, and narrow the merchandise trade balance.

KEY CHALLENGES

- **External Geopolitical Volatility:** Global supply chain disruptions, energy price shocks, and interest rate realignments across Western central banks can impact import bills and local currency volatility.
- **General Government Debt-to-GDP Ratio:** While the Centre's fiscal deficit is narrowing, combined debt levels of Central and State governments remain around 80% of GDP, requiring sustained fiscal consolidation at the state level.
- **Private Sector Capex Acceleration:** Public capital expenditure has driven recent growth; sustained investment momentum requires a broader, self-sustaining revival in private corporate capex.

MAINS VALUE ADDITION

Constitutional Provisions & Statutory References

- **Article 112:** Union Budget laying mandate.
- **Article 246A:** Constitutional basis for GST regime.
- **Article 292:** Constitutional authority for sovereign borrowings.
- **FRBM Act, 2003:** Fiscal discipline framework.

Key Terminology for Answer Writing

- **"Twin Balance Sheet Advantage"**
- **"Fiscal Consolidation Path"**
- **"Sovereign Risk Premium Reduction"**
- **"Capital Expenditure Multiplier Effect"**
- **"Total Factor Productivity Enhancement"**

VIDHVATH IAS ACADEMY

POSSIBLE UPSC QUESTIONS

Mains Question 1

"The recent upgrade of India's sovereign credit rating reflects structural improvements in fiscal quality and financial sector health. Analyze the primary macroeconomic drivers of this upgrade and examine its implications for private investment and international borrowing costs."

Mains Question 2

"Despite robust economic growth and strong external sector buffers, high general government debt remains a structural constraint for India's sovereign rating. Discuss the measures required under fiscal federalism to achieve long-term debt sustainability."

ONE-LINE TAKEAWAYS

1. JCR upgraded India's sovereign rating to **'A-'** with a Stable Outlook, elevating the country ceiling to **'A'**.
2. Growth momentum stayed strong, recorded at **7.8% in FY26** and continuing into **Q1 of FY27**.
3. Fiscal consolidation saw the Centre's deficit drop from **4.7% in FY25 to 4.4% in FY26**.
4. The IBC (2016) and RBI's supervisory framework reduced bank NPAs and strengthened overall financial stability.
5. Robust services trade surpluses and ample foreign exchange reserves keep the Current Account Deficit well-managed.
6. Constitutional provisions under **Articles 112, 246A, and 292**, along with the **FRBM Act**, underpin India's fiscal and structural governance.

WAY FORWARD

The upgrade of India's sovereign credit rating to 'A-' by JCR validates the country's structural reforms, fiscal discipline, and financial sector resilience. Retaining and further improving this rating will require sticking to the fiscal consolidation path mandated under the FRBM framework, widening the domestic tax base, and strengthening fiscal discipline across State governments. Concurrently, boosting private investment, expanding manufacturing through PLI schemes, and deepening domestic corporate bond markets will ensure sustained macroeconomic stability and long-term economic growth.

Districts as Export Hubs (DEH): Unlocking Decentralized, District-Led Export Growth

KEY HIGHLIGHTS & SUMMARY

- **Core Objective:** The Districts as Export Hubs (DEH) initiative transforms each district from a basic production center into a unit of decentralized export planning, connecting local products and services directly to global supply chains.
- **Evolutionary Context:** Scales up the One District One Product (ODOP) framework from single-product branding to a comprehensive, multi-sectoral export promotion and ecosystem-building strategy implemented across 770+ districts.
- **Convergence Model:** Functions as a non-budgetary convergence framework rather than a stand-alone financial scheme, leveraging existing Central and State schemes, infrastructure, and institutional funding.
- **Institutional Architecture:** Anchored by a three-tiered structure comprising the Department of Commerce/DGFT at the Centre, State Export Promotion Committees (SEPCs) at the State level, and District Export Promotion Committees (DEPCs) at the grassroots level.
- **District Export Action Plans (DEAPs):** Formulated by DEPCs to map local agricultural, industrial, and GI-tagged assets, identify infrastructure bottlenecks, and recommend targeted interventions.
- **E-Commerce & Digital Integration:** Partners with digital platforms and leverages Dak Ghar Niryat Kendras (Post Office Export Centres) to reduce logistics overheads, buffer against freight volatility, and enable cross-border e-commerce for MSMEs.
- **Targeted Interventions & Strategic Collaborations:** Collaborates with institutions like EXIM Bank under the Grassroots Initiatives for Development (GRID) programme across selected districts (e.g., Tiruppur, Kanpur, Kolhapur) to resolve sector-specific production and export constraints.
- **Syllabus & Macro Alignment:** Aligns directly with GS Paper III (Growth, Development, MSMEs, Infrastructure) and supports India's macro targets of achieving $1 trillion in merchandise exports and $2 trillion in total exports by 2030.

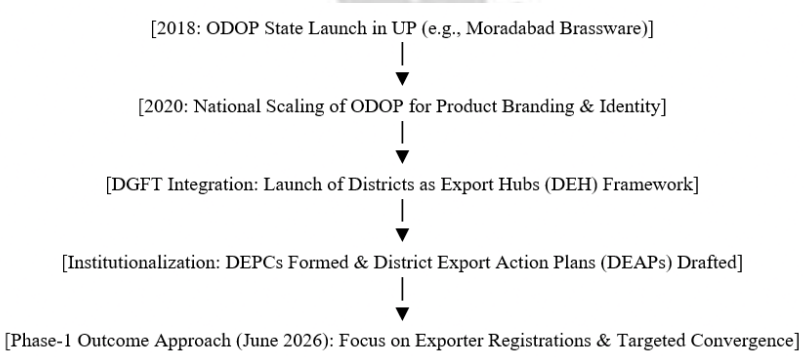
WHY IN NEWS?

Despite India achieving record total exports of goods and services touching $825.25 billion in FY 2024–25 and an estimated $863.11 billion in FY 2025–26, export generation historically remained concentrated in a few coastal states, port cities, and industrial hubs. To address regional trade disparities and democratize economic growth, the Ministry of Commerce and Industry (MoCA) highlighted the progress of the DEH initiative, transitioning to an outcome-oriented, phased implementation model covering 770+ districts to drive inclusive, decentralized export growth.

BACKGROUND & CORE CONCEPT

Evolution from ODOP to DEH

- **Origin of ODOP:** Pioneered by Uttar Pradesh in 2018 to revive traditional industrial clusters (such as Moradabad brassware and Bhadohi carpets), ODOP was subsequently scaled nationally to promote one distinctive product per district.
- **The DEH Paradigm Shift:** Recognizing that product identification alone is insufficient without end-to-end export infrastructure, the Directorate General of Foreign Trade (DGFT) expanded ODOP into the DEH initiative. DEH broadens the scope from single-product promotion to full-scale district export ecosystem development, covering manufacturing, handlooms, agricultural clusters, service sectors, and Geographical Indication (GI) goods.



- **Concept of Decentralized Export Planning:** DEH moves away from top-down trade policymaking by establishing the district as the primary administrative unit for mapping export potential, overcoming regulatory hurdles, and building last-mile logistics.

ESSENTIAL DEFINITIONS

- **Districts as Export Hubs (DEH):** An institutional framework aimed at decentralizing export promotion by identifying products and services with international market potential in every district and addressing localized supply-chain bottlenecks.
- **District Export Action Plan (DEAP):** A comprehensive policy document prepared by DEPCs detailing district-specific exportable items, mapping logistics gaps, specifying quality/compliance constraints, and outlining actionable interventions.
- **Dak Ghar Niryat Kendra (DNK):** A joint initiative by India Post and CBIC providing streamlined, low-cost postal export documentation, customs clearance, and small-consignment shipping facilities for rural and small-town exporters.
- **Grassroots Initiatives for Development (GRID):** A targeted capacity-building programme by EXIM Bank that offers technical and financial assistance to resolve sector-specific constraints in selected industrial and rural districts.
- **Geographical Indication (GI) Tag:** A legal protection and certification granted to products possessing a specific geographical origin and unique qualities or reputation attributable to that origin (e.g., Bastar Iron Craft, Jalgaon Bananas).

KEY FEATURES / IMPORTANT FACTS

Institutional Architecture

- **Central Level:** Department of Commerce provides overall strategic policy direction; Directorate General of Foreign Trade (DGFT) anchors implementation through its 24 Regional Authorities.
- **State Level:** State Export Promotion Committees (SEPCs), chaired by Chief Secretaries or Trade/Industry Secretaries, align state policies with central export initiatives.
- **District Level:** District Export Promotion Committees (DEPCs), headed by the District Collector/District Magistrate and co-headed by DGFT Regional Authorities, drive field-level implementation.

Status and Mapping Metrics

- **Coverage:** Extended across more than 770 districts as of early 2026.
- **DEAP Formulation:** Draft District Export Action Plans prepared for 590 districts, with over 249 formally adopted by respective DEPCs.
- **District Product Mapping Examples:**

District	State	Identified Export Potential / Cluster
Sabarkantha	Gujarat	Ceramic & Tiles, Potato processing
Aravalli	Gujarat	Minerals, Agro-processing, Glassware
Jalgaon	Maharashtra	Jalgaon Banana (GI), Jalgaon Bharit Brinjal
Agar Malwa	Madhya Pradesh	Citrus Fruits (Orange clusters)
Bastar	Chhattisgarh	Bastar Iron Craft (GI), Rice, Maize, Millets
Jamtara	Jharkhand	Bamboo Craft, Cashew processing
Tiruppur	Tamil Nadu	Knitwear and Textiles (₹46,000 crore exports in FY26)

LEGAL AND CONSTITUTIONAL FRAMEWORK

Constitutional Architecture

- **Entry 41, List I (Seventh Schedule):** Union List item granting Parliament exclusive jurisdiction over *"Trade and commerce with foreign countries; import and export across customs frontiers"*.
- **Entry 26, List II (Seventh Schedule):** State List item governing *"Trade and commerce within the State"*, necessitating strong Centre-State administrative coordination for export promotion.
- **Article 243ZD:** Provisions for District Planning Committees (DPCs), providing a constitutional basis for integrating economic development and trade planning at the district level.

Statutory and Regulatory Guidelines

- **Foreign Trade (Development and Regulation) Act, 1992:** Parent statute empowering the Central Government to formulate Foreign Trade Policies (FTP) and execute export promotion schemes through DGFT.
- **Foreign Trade Policy (FTP) 2023:** Formally institutionalized the DEH framework as a core pillar for achieving long-term trade goals through grassroots capacity building and e-commerce export hubs.

PRELIMS PERSPECTIVE

- **Nodal Department:** Department of Commerce, Ministry of Commerce and Industry (implemented via DGFT).
- **Funding Model:** DEH is **not** a standalone centrally sponsored scheme with a dedicated budgetary outlay; it operates strictly on a **convergence model** leveraging existing schemes (e.g., PMEGP, PM-

FME, TIES, ASIDE, MSME-CLCSS).

- **Key Ecosystem Partners:** EXIM Bank (GRID programme), ECGC (credit risk insurance), EPCH, FIEO, India Post (DNKs), and CPCB/BIS for quality standardization.
- **Potential Prelims Traps & Confusions:**
    - *Trap 1:* "DEH is a financially backed Centrally Sponsored Scheme with a dedicated central budget." -> **False.** It is a governance and convergence framework leveraging pre-existing Central and State schemes.
    - *Trap 2:* "ODOP and DEH are mutually exclusive programs." -> **False.** ODOP focuses on product identification and branding, whereas DEH provides the overarching institutional and logistical mechanism to export those products.
    - *Trap 3:* "District Export Promotion Committees are headed by State Trade Ministers." -> **False.** DEPCs are chaired at the district level by the **District Collector/District Magistrate/Deputy Commissioner**.

MAINS PERSPECTIVE

Strategic and Multi-Dimensional Significance

- **Decentralization of Economic Growth:** Shifts India's export growth engine away from a few coastal enclaves, distributing manufacturing, employment, and income generation into Tier-II, Tier-III, and rural districts.
- **Strengthening the MSME Ecosystem:** Small and micro-enterprises contribute approximately 45% of India's manufacturing output and 40% of total exports. DEH lowers market-entry barriers for MSMEs through shared testing facilities, group logistics, and digital onboarding.
- **Promoting Inclusive Rural Development:** By targeting agricultural clusters, handlooms, and GI-tagged indigenous crafts (e.g., Bastar Iron Craft), DEH boosts rural household incomes and preserves traditional artisanal heritage.
- **E-Commerce and Digital Export Enablement:** Integration with e-commerce logistics providers and Dak Ghar Niryat Kendras helps traditional exporters overcome freight rate volatility and complex customs documentation.

GOVERNMENT / POLICY RESPONSE

- **Foreign Trade Policy 2023 (DEH Pillar):** Formalized the integration of district-level planning into national trade strategies.
- **Grassroots Initiatives for Development (GRID):** Partnership between DGFT and EXIM Bank offering specialized financial and advisory support across selected pilot districts (Anantapur, Raipur, Solan, Tiruppur, Kanpur, Kolhapur).
- **Dak Ghar Niryat Kendras (DNK):** Established nationwide by India Post to provide paperless customs booking and postal export facilities for micro-consignments.
- **Focused Implementation Drive (Phase 1):** Outcome-oriented rollout across 27 States and Union Territories backed by 24 DGFT Regional Authorities, tracking specific metrics like new exporter registrations and total export value growth.

KEY CHALLENGES

- **Last-Mile Infrastructure Gaps:** Inland districts often face acute shortages of cold-chain storage, testing laboratories, specialized packaging units, and Inland Container Depots (ICDs), increasing logistics costs.
- **Quality Compliance and Sanitary Standards:** Rural producers often struggle to comply with complex international standards, such as EU Phytosanitary norms, Non-Tariff Barriers (NTBs), and chemical residue limits.

- **Inter-Departmental Coordination Friction:** As DEH relies entirely on scheme convergence, delays in inter-ministerial coordination (e.g., between Ministry of MSME, Ministry of Agriculture, State Industry Departments, and Customs) can slow execution.
- **Awareness Deficits Among MSMEs:** Micro-enterprises frequently lack access to actionable intelligence on international demand patterns, trade agreements (FTAs), foreign exchange hedging, and e-commerce compliance.

MAINS VALUE ADDITION

- **Key Terms & Concepts:** *"Decentralized Trade Governance", "District Export Action Plan (DEAP)", "Convergence-based Development Model", "Dak Ghar Niryat Kendra (DNK)", "Non-Budgetary Policy Framework".*
- **Statistical Data:** Total Indian exports reached $825.25 billion in FY25 and an estimated $863.11 billion in FY26. Tiruppur knitwear cluster achieved ₹46,000 crore in exports in FY26, targeting ₹1 trillion by 2030.
- **Institutional Triad:** Department of Commerce / DGFT (Policy & Anchor) + State Export Promotion Committees (State Level Alignment) + District Export Promotion Committees (Grassroots Execution).
- **SDG Connections: SDG 1** (No Poverty), **SDG 8** (Decent Work and Economic Growth), **SDG 9** (Industry, Innovation, and Infrastructure), and **SDG 10** (Reduced Inequalities).

POSSIBLE UPSC QUESTIONS

Mains Question 1

"Shifting the unit of export planning from national industrial corridors to individual districts is essential for achieving inclusive trade growth." Critically analyze the Districts as Export Hubs (DEH) initiative in light of this statement. (250 Words, 15 Marks)

Mains Question 2

Discuss the structural and logistical constraints faced by MSMEs in rural and Tier-II districts in accessing global markets. How does the convergence model under the DEH framework address these challenges? (250 Words, 15 Marks)

ONE-LINE TAKEAWAYS

- DEH transforms every district from a production center into an active unit of **export planning**.
- Operates as a **convergence framework** rather than a funded scheme, utilizing existing Central and State resources.
- **District Export Promotion Committees (DEPCs)** are headed by the District Collector and anchor local action plans.
- Extends the **ODOP framework** from product branding to full supply-chain, quality, and logistics enablement.
- Integrates **Dak Ghar Niryat Kendras (DNKs)** and e-commerce platforms to lower shipping costs for small exporters.
- Supports India's broader target of reaching **$1 trillion in merchandise exports** by democratizing trade access.

WAY FORWARD

To unlock the full potential of the Districts as Export Hubs initiative, policy focus must shift toward closing infrastructure and compliance gaps. State governments should expedite the formal adoption and execution of District Export Action Plans (DEAPs) across all 770+ districts. Establishing accredited testing laboratories, cold-storage chains, and common facility centers at the district level will ensure products meet global quality benchmarks. Furthermore, expanding digital literacy, simplifying e-commerce export documentation via

Dak Ghar Niryat Kendras, and improving credit access through EXIM Bank and ECGC will enable local MSMEs and artisans to compete effectively in global markets.

CONCLUSION

The Districts as Export Hubs initiative marks a structural shift in India's international trade strategy by establishing local districts as active drivers of foreign trade. By moving beyond centralized industrial corridors and leveraging local economic strengths, DEH bridges the gap between rural producers and international markets. As India works toward its goal of $1 trillion in merchandise exports, sustaining Centre-State convergence, building last-mile logistics, and upgrading quality infrastructure will ensure that export growth remains resilient, inclusive, and geographically balanced.

Emergency Credit Line Guarantee Scheme (ECLGS) 5.0: Strengthening Business Resilience through Credit Support

KEY HIGHLIGHTS & SUMMARY

- **Recent Approval:** The Government approved ECLGS 5.0 on May 5, 2026, allocating a credit guarantee envelope of up to ₹2.55 lakh crore to insulate businesses from external economic shocks and logistics disruptions.
- **Nodal Implementation Agency:** Executed by the National Credit Guarantee Trustee Company (NCGTC), a wholly-owned trustee company established by the Ministry of Finance.
- **Target Beneficiaries:** Broadened to cover MSMEs across all sectors, eligible non-MSME business enterprises, and scheduled passenger airline companies.
- **Validity Period:** Operational until March 31, 2027, or until cumulative guarantees amounting to ₹2.55 lakh crore are sanctioned, whichever is earlier.
- **Coverage Norms:** Provides 100% credit guarantee cover for loans to MSMEs and 90% guarantee cover for non-MSMEs and scheduled passenger airlines, with zero guarantee fees charged to Member Lending Institutions (MLIs).
- **Credit Quantum:** MSMEs and eligible non-MSMEs can access up to 20% of peak fund-based working capital (capped at ₹100 crore per borrower); airlines can access up to 100% of outstanding credit (capped at ₹1,500 crore, with mandatory promoter equity pairing above ₹1,000 crore).
- **Regulated Interest Capping:** Interest rates for MSMEs are linked to EBLR and for non-MSMEs to MCLR (capped at Benchmark + 0.75%, maximum 9% per annum for banks; maximum 13% for NBFCs).
- **Implementation Performance:** As of August 20, 2026, over 6.73 lakh guarantees worth ₹2,50,024 crore have been issued, with MSMEs accounting for 97.3% of total guarantees by volume and 80.79% by value.

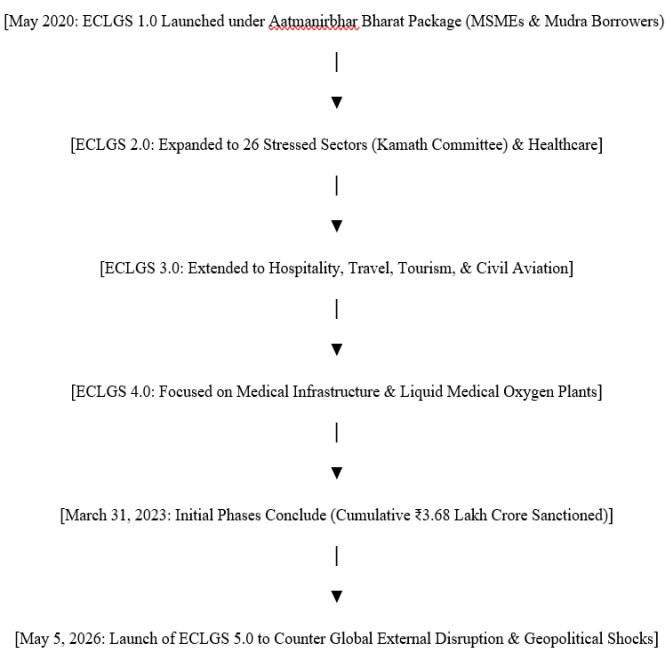
WHY IN NEWS?

Evolutions in global geopolitical dynamics, maritime transit disruptions, and supply-chain realignments have created liquidity bottlenecks and elevated freight costs for domestic enterprises. To prevent these external shocks from turning into balance-sheet stress, the Ministry of Finance launched ECLGS 5.0 on May 5, 2026. The scheme serves as an emergency credit bridge, providing working capital guarantees through MLIs to maintain domestic manufacturing, retain employment, and ensure operational continuity.

BACKGROUND & CORE CONCEPT

Evolution of the ECLGS Framework

- **Genesis:** Launched initially in May 2020 during the COVID-19 pandemic to provide liquidity support to credit-starved MSMEs without burdening bank balance sheets with additional capital adequacy requirements.
- **Core Concept of Credit Guarantee:** Instead of direct government lending, the state acts as a guarantor via NCGTC. If a borrower defaults, NCGTC compensates the lender (100% for MSMEs, 90% for non-MSMEs/Airlines), removing risk aversion among banks and facilitating systemic credit creation.
- **Transition to ECLGS 5.0:** Unlike earlier pandemic-response phases (which relied on pre-2020/2021 stress markers), ECLGS 5.0 addresses post-2025 external geopolitical disruptions. Eligibility is pegged to active working capital facilities as of March 31, 2026, with an account overdues limit of up to 60 days past due (DPD).



ESSENTIAL DEFINITIONS

- **Emergency Credit Line Guarantee Scheme (ECLGS):** A liquidity-support mechanism wherein the Central Government provides 100% or partial credit guarantees to financial institutions to cover losses arising from defaults on additional working capital facilities.
- **National Credit Guarantee Trustee Company (NCGTC):** A private limited company incorporated in 2014 by the Ministry of Finance, Government of India, to act as a common trustee for managing multiple credit guarantee trust funds.
- **Member Lending Institutions (MLIs):** Financial intermediaries registered under NCGTC to extend guaranteed loans, including Scheduled Commercial Banks, Small Finance Banks, Regional Rural Banks (RRBs), Co-operative Banks, and eligible NBFCs.
- **Special Mention Account (SMA) Classification:** Stressed asset categorizations applied by the RBI prior to NPA classification:
  - **SMA-0:** Principal or interest payment overdue between 1 to 30 days.
  - **SMA-1:** Payment overdue between 31 to 60 days.
  - **SMA-2:** Payment overdue between 61 to 90 days (Excluded from ECLGS 5.0 eligibility).
- **External Benchmark Lending Rate (EBLR):** Mandatory floating interest rate regime introduced by the RBI in 2019 for MSME and retail loans, linking lending rates directly to external benchmarks like the Repo Rate or Treasury Bill yields.
- **Marginal Cost of Funds-Based Lending Rate (MCLR):** Internal benchmark rate fixed by individual banks based on their marginal cost of funds, operating expenses, and tenor premium.

KEY FEATURES / IMPORTANT FACTS

Comparative Matrix of ECLGS 5.0 Provisions

Parameter	MSMEs (All Sectors)	Eligible Non-MSMEs	Scheduled Passenger Airlines
Eligibility Reference Date	Working capital as on March 31, 2026	Working capital as on March 31, 2026	Credit facilities as on March 31, 2026
Asset Quality Constraint	Overdue <= 60 days	Overdue <= 60 days	Standard account (SMA-2 Excluded)
Guarantee Coverage	100% Government Guarantee	90% Government Guarantee	90% Government Guarantee
Additional Credit Limit	Up to 20% of peak Q4 FY26 working capital	Up to 20% of peak Q4 FY26 working capital	Up to 100% of credit facilities
Borrower Credit Cap	Max ₹100 crore per borrower	Max ₹100 crore per borrower	Max ₹1,500 crore (Equity match required above ₹1,000 cr)
Loan Tenure & Moratorium	5 Years (1-Year Moratorium)	5 Years (1-Year Moratorium)	7 Years (2-Year Moratorium)
Interest Rate Ceiling	Banks: EBLR + 0.75% (Cap: 9%); NBFCs: Max 13%	Banks: MCLR + 0.75% (Cap: 9%); NBFCs: Max 13%	Board-approved policy of the lending institution

Negative List for Non-MSME Borrowers

To ensure targeted credit delivery, non-MSME coverage excludes capital-intensive or protected sectors:

- Non-Banking Financial Companies (NBFCs)
- Power generation, transmission, and distribution entities
- Telecom service providers
- Sugar and ethanol manufacturers
- Information Technology (IT) companies and paper products
- Educational institutions and tobacco/beverages (excluding tea and coffee)
- *Note on Mixed Operations:* If a non-MSME operates in both eligible and ineligible segments, eligibility is calculated based on the proportion of turnover derived from eligible sectors in FY 2025–26.

LEGAL AND CONSTITUTIONAL FRAMEWORK

Constitutional Architecture

- **Article 292 (Borrowing by the Union):** Empowers the executive power of the Union to give guarantees within limits fixed by Parliament, providing the constitutional foundation for NCGTC-backed credit guarantees.
- **Entry 38, List I (Seventh Schedule):** Union List jurisdiction over *"Banking"* enables the Central Government to prescribe lending mechanisms and risk-mitigation frameworks for commercial banks.
- **Article 300A (Right to Property):** Safeguards contractual liabilities, ensure enforceability of loan agreements, and legal recovery frameworks through DRTs and the SARFAESI Act.

Statutory and Regulatory Guidelines

- **RBI Prudential Norms on Asset Classification:** Outlines guidelines for non-performing assets (NPAs) and SMA definitions. Loans extended under ECLGS 5.0 receive zero risk-weighting for the guaranteed portion under Capital Adequacy Ratio (CAR) calculations.
- **Companies Act, 2013:** Regulates the corporate structure of NCGTC as a state-owned trustee company.
- **Pradhan Mantri Jan Samarth Portal Integration:** Uses a unified digital portal under the National Portal for Government Sponsored Schemes to streamline application, verification, and disbursement processes.

PRELIMS PERSPECTIVE

- **Nodal Agency:** National Credit Guarantee Trustee Company (NCGTC); Ministry of Finance (Department of Financial Services).
- **Funding Mechanism:** Not a direct capital grant or equity infusion; operates through **contingent liabilities** backed by Central Government sovereign guarantees.
- **Exclusionary Conditions:** Borrowers availing funds under the Credit Guarantee Scheme for Exporters (CGSE) are disqualified up to the exact quantum already availed under CGSE.
- **Digital Interface:** Applications are processed digitally via the **Jan Samarth Portal**.
- **Potential Prelims Traps & Confusions:**
    - *Trap 1:* "ECLGS 5.0 provides a 100% credit guarantee across all eligible borrower categories." -> **False.** It offers 100% guarantee for MSMEs, but 90% guarantee for eligible non-MSMEs and scheduled passenger airlines.
    - *Trap 2:* "All Non-MSME business entities are eligible for additional credit lines under ECLGS 5.0." -> **False.** Non-MSMEs in telecom, power, IT, educational institutions, and sugar/ethanol are placed on a negative list.
    - *Trap 3:* "Member Lending Institutions must pay an annual guarantee fee to NCGTC under ECLGS 5.0." -> **False.** Zero guarantee fee is charged to MLIs under ECLGS 5.0 to lower overall borrowing costs.
    - *Trap 4:* "Scheduled Passenger Airlines receive 5-year loans with a 1-year moratorium like MSMEs." -> **False.** Airline loans carry a longer 7-year tenure with a 2-year moratorium.

MAINS PERSPECTIVE

VIDHVATH IAS ACADEMY

Strategic and Multi-Dimensional Significance

- **Preserving Economic Growth & Employment:** MSMEs contribute ~30% of India's GDP and employ over 11 crore citizens. Targeted liquidity support prevents distress sales, insolvency cascades, and job losses during global downturns.
- **Addressing Risk Aversion in Banking:** By absorbing credit default risk, the scheme encourages public and private banks to lend to vulnerable sectors without inflating non-performing assets (NPAs).
- **Supply Chain Continuity:** Prevents operational shutdowns among Tier-2 and Tier-3 component vendors, maintaining supply stability for major domestic manufacturing hubs.
- **Strategic Aviation Intervention:** Airlines operate on low margins with high dollar-denominated fixed costs (aircraft leases, ATF). The ₹1,500 crore cap with mandatory promoter equity pairing provides stabilization without creating moral hazard.

GOVERNMENT / POLICY RESPONSE

- **Phased Nationwide Outreach:** Conducting multi-location SLBC outreach campaigns across Tier-2 and Tier-3 cities through the PSB Alliance and industry bodies to boost uptake among rural MSMEs.
- **Jan Samarth Portal Integration:** End-to-end digitisation reduces processing turnaround time (TAT) and minimizes paperwork.
- **Monitored Disbursement:** NCGTC and the Department of Financial Services regularly monitor bank-wise allocations to ensure compliance with interest rate caps and eligibility criteria.

KEY CHALLENGES

- **Risk of Delayed Default Realization:** Unsubsidized debt accumulation could result in delayed defaults once moratorium periods end, shifting fiscal risk onto the government's contingent liability balance sheet.
- **Exclusion of High-Stress Non-MSME Sectors:** Excluding power, IT, and telecom may affect downstream MSME vendors operating within those supply networks.
- **Transmission Gaps in NBFC Sector:** While banks borrow at lower benchmark rates, the 13% cap for NBFCs may restrict credit flow to higher-risk, unbanked micro-enterprises reliant on non-bank lenders.
- **Global Demand Volatility:** Credit support resolves short-term liquidity deficits, but extended international demand slumps require broader structural trade interventions.

MAINS VALUE ADDITION

- **Key Terms & Concepts:** *"Sovereign Credit Guarantee", "Contingent Fiscal Liability", "Jan Samarth Portal", "Promoter Equity Matching", "Risk-Weighting Exemption", "Special Mention Accounts (SMA)".*
- **Implementation Data (As of August 20, 2026):** Total guarantees sanctioned: **6,73,979**; Guaranteed value: **₹2,50,024 crore** (~98% of overall ₹2.55 lakh crore target pool). MSME share: **97.3% by volume**, **80.79% by total value**.
- **Committee Reference:** *UK Sinha Committee on MSMEs (2019)* (recommending non-collateralized emergency credit mechanisms) and *KV Kamath Committee (2020)* (framework for sector-specific financial restructuring).
- **SDG Alignment: SDG 8** (Decent Work and Economic Growth), **SDG 9** (Industry, Innovation, and Infrastructure), and **SDG 10** (Reduced Inequalities).

POSSIBLE UPSC QUESTIONS

Mains Question 1

"Emergency credit guarantee schemes shift private credit risks onto the sovereign balance sheet." In light of the launch of ECLGS 5.0, critically analyze the trade-off between fiscal risk management and preserving business liquidity during global economic uncertainties. (250 Words, 15 Marks)

Mains Question 2

Examine the role of the Emergency Credit Line Guarantee Scheme (ECLGS) in sustaining the MSME sector through external economic disruptions. How do EBLR-linked interest caps and digital portals improve institutional credit delivery? (250 Words, 15 Marks)

ONE-LINE TAKEAWAYS

- ECLGS 5.0 provides **₹2.55 lakh crore** in government-backed additional credit facilities to protect businesses against global economic shocks.
- Managed by **NCGTC** under the Department of Financial Services, Ministry of Finance.
- Offers **100% guarantee for MSMEs** and **90% guarantee for eligible non-MSMEs and scheduled passenger airlines**.
- MSME additional loan limit capped at **20% of peak Q4 FY26 working capital** (up to ₹100 crore per borrower).
- Caps interest rates for MSMEs at **EBLR + 0.75% (Max 9%)** for banks and **13%** for NBFCs.
- Applications are processed through the digital **Jan Samarth Portal** without charging guarantee fees to lenders.

WAY FORWARD

To maximize the long-term effectiveness of ECLGS 5.0, the government should combine credit guarantees with structural reforms in MSME competitiveness. Facilitating technology upgrades, expanding export credit insurance, and expediting delayed payments under the MSMED Act, 2006, will build self-sustaining business solvency. Furthermore, close monitoring of post-moratorium repayments by NCGTC and lenders will help identify sector-specific stress early, preventing defaults and protecting sovereign contingent liabilities.

CONCLUSION

The launch of ECLGS 5.0 highlights India's proactive approach to protecting domestic business ecosystems from global volatility. By absorbing default risks through NCGTC and providing regulated, digital-first credit channels, the scheme maintains corporate liquidity, safeguards employment, and supports domestic supply chains. Sustaining this momentum alongside broader structural reforms will strengthen MSME resilience and reinforce India's economic growth trajectory.

Next-Gen Aquaculture in India: Harnessing RAS and Bio-floc Technology in the Blue Economy for the Atmanirbhar Bharat and Viksit Bharat Vision

Key Highlights & Summary

VIDHVATH IAS ACADEMY

- **Economic Pillar**: Fisheries sector supports nearly 3 crore fishers, making India the 2nd largest fish producer (8% global share) and aquaculture producer globally.
- **Production & Export Surge**: Total fish production reached 198 lakh tonnes (2024-25), with inland fisheries growing 147% since 2013-14. Seafood exports touched a record ₹73,890 crore (2025-26).
- **Capital Infusion**: Cumulative public investment exceeds ₹39,272 crore since 2015, including ₹4,120 crore targeted at tech-adoption under Pradhan Mantri Matsya Sampada Yojana (PMMSY).
- **Next-Gen Tech Adoption**: PMMSY has approved 9,467 Recirculatory Aquaculture Systems (RAS) and 4,573 Biofloc units to drive intensive, climate-resilient farming.
- **Resource Efficiency**: RAS recycles 90–95% of water, enabling peri-urban fish farming, while Biofloc utilizes microbial communities to convert waste into feed.
- **Geographical Expansion**: Technologies enable high-value trout farming in cold-water regions (J&K, Ladakh, HP, Uttarakhand) and saline shrimp culture in non-traditional areas.

Essential Definitions

- **Recirculatory Aquaculture Systems (RAS)**: A closed-loop land-based aquaculture technology that filters and reuses water, maintaining controlled environmental parameters with minimal water exchange.
- **Bio-floc Technology (BFT)**: A sustainable farming system using beneficial heterotrophic microbes to purify water quality by consuming nitrogenous waste, converting it into nutrient-rich protein feed for aquatic species.
- **Blue Economy**: Sustainable utilization of ocean and inland water resources for economic growth, improved livelihoods, and ecosystem health.

Legal and Constitutional Framework

- **Seventh Schedule (State List, Entry 21)**: Places fisheries within state jurisdiction, requiring synchronized centre-state cooperative federalism for national policy execution.
- **Article 48A**: Directive Principle mandating the protection and improvement of the environment and safeguarding of wildlife and water bodies.
- **Coastal Aquaculture Authority (CAA) Act, 2005 (Amended 2023)**: Regulates coastal aquaculture activities, biosecurity compliance, environmental sustainability, and registration of farms.

Prelims Perspective

- **PMMSY Nodal Ministry**: Ministry of Fisheries, Animal Husbandry and Dairying (Department of Fisheries).
- **Production Ranks**: 2nd globally in total fish and aquaculture production; 1st globally in shrimp production and exports.
- **Key Species Covered**: Cold-water (Trout), inland brackish/saline (Shrimp, Tilapia, Seabass, Murrel, Pangasius), and ornamental species.

Mains Perspective

- **Inclusive Growth & Livelihood Security**: Empowers land-scarce farmers, women entrepreneurs, and young agri-preneurs through high-density yield on minimal land footprints.
- **Export Diversification & Resilience**: Enables strict biosecurity, traceability, and year-round quality control needed to bypass non-tariff barriers in global import markets.
- **Resource Conservation**: Addresses severe groundwater depletion and climate vulnerabilities by shifting from traditional open-pond systems to recirculating, biosecure environments.

Government and Policy Response

- **Pradhan Mantri Matsya Sampada Yojana (PMMSY)**: Umbrella scheme driving production expansion, infrastructure modernization, and high-tech aquaculture adoption.
- **Fisheries and Aquaculture Infrastructure Development Fund (FIDF)**: Provides concessional finance to state governments, cooperatives, and private entities for infrastructure creation.
- **Integration of Emerging Technologies**: Promoting IoT-based water quality sensors, drone-assisted feeding, AI monitoring, and solar-powered aquaculture units.

Key Challenges

- **High Initial Capital Cost**: High CAPEX and OPEX for continuous power supply, filtration systems, and specialized feed limit smallholder adoption without credit.
- **Technical Skill Deficit**: Requires precision monitoring of bio-parameters; biological crashes in Biofloc or power failures in RAS lead to total stock mortality.
- **Supply Chain Gaps**: Deficiencies in cold-chain logistics, processing centers, and quality certification networks outside major coastal hubs.

Mains Value Addition

- **Data Point**: Inland fisheries production registered a steep growth of 147% from 61.36 lakh tonnes (2013-14) to 151.60 lakh tonnes (2024-25).
- **Strategic Concept**: "Peri-Urban Aquaculture" — positioning high-density RAS units near urban demand centers to minimize transportation losses and carbon emissions.

Possible UPSC Two Questions of Mains

1. "Next-generation aquaculture technologies are central to realizing the vision of a sustainable Blue Economy." Examine how RAS and Bio-floc technologies can transform Indian fisheries while addressing climate vulnerabilities.
2. Discuss the structural bottlenecks in India's aquaculture sector. How does the Pradhan Mantri Matsya Sampada Yojana (PMMSY) address these challenges to foster an Atmanirbhar Bharat?

Way Forward

- **Targeted Credit & Subsidies**: Provide interest subvention and accessible micro-credit for capital-intensive RAS and Biofloc setups.
- **Capacity Building**: Establish regional tech-demonstration centers and specialized vocational training programs for rural youth and fishers.
- **Public-Private Partnerships**: Encourage private investment in cold-chain infrastructure, disease diagnostics, and high-protein indigenous broodstock development.

Conclusion

Integrating RAS and Bio-floc technologies marks a strategic paradigm shift from traditional capture-based fisheries to technology-driven precision aquaculture. By bridging production gaps, ensuring biosecurity, and raising export competitiveness, this transition serves as a crucial engine for rural prosperity and achieving the Viksit Bharat vision by 2047.

From Traditional skills to Rural Enterprises: How KVIC is creating new Livelihoods

Key Highlights & Summary

- **Rural Enterprise Transformation**: KVIC is transitioning traditional rural skills and local resources into viable, technology-driven village micro-enterprises.
- **Core Institutional Framework**: Interventions are channeled through flagships including Prime Minister's Employment Generation Programme (PMEGP), Khadi Vikas Yojana (KVY), and Gramodyog Vikas Yojana (GVY).

- **Honey Mission Scale**: Launched in 2017, the initiative distributed ~2,46,000 bee boxes/colonies (2017–18 to 2025–26), generating ~5,500 metric tonnes of honey production in 2025–26.
- **Agro-Waste & Herbal Value Addition**: Promotes circular economy models like converting banana fibre into commercial craft products and leveraging vetiver for natural aromatic industries.
- **Cross-Sectoral Impact**: Integrates beekeeping with agricultural pollination, boosting crop yields, protecting biodiversity, and raising farm incomes across multi-state clusters.
- **Capacity Building & Extension**: Focuses on marginalized groups (SC/ST, women, rural youth) using toolkits, financial subsidies, AGMARK certification, and digital media training outreach.

Essential Definitions

- **Khadi and Village Industries Commission (KVIC)**: A statutory body established under the KVIC Act of 1956, tasked with planning, promoting, organizing, and executing rural industrial development.
- **Honey Mission**: A targeted KVIC program aimed at promoting scientific beekeeping, providing toolkits and bee colonies to build sustainable livelihoods and enhance crop pollination.
- **Agro-Waste Circularity**: The practice of processing agricultural by-products (e.g., banana pseudo-stem fibre) into marketable enterprise outputs, preventing field burning and creating economic value.

Legal and Constitutional Framework

- **Article 43 (Directive Principles)**: Mandates the State to endeavor to promote cottage industries on an individual or co-operative basis in rural areas.
- **Khadi and Village Industries Commission Act, 1956**: Provides the statutory setup, operational scope, and administrative powers to execute rural industrialization programs.
- **Micro, Small and Medium Enterprises Development (MSMED) Act, 2006**: Outlines regulatory, credit, and promotion mechanisms governing village enterprises and micro-units.

Prelims Perspective

- **Nodal Ministry**: Ministry of Micro, Small and Medium Enterprises (MSME).
- **PMEGP Structure**: A credit-linked subsidy scheme merged from REGP and PMRY, administered by KVIC at the national level as the nodal agency.
- **Agro-Ecological Benefits**: Beekeeping acts as a natural ecosystem service, boosting crop yields via cross-pollination in crops like oilseeds, pulses, and fruits.

VIDHVATH IAS ACADEMY

Mains Perspective

- **Rural Livelihood Diversification**: Mitigates seasonal agricultural unemployment by building off-farm enterprise streams grounded in indigenous knowledge.
- **Women & Inclusive Empowerment**: Low capital requirements in village industries facilitate entry for marginalized communities, fostering grassroots socio-economic mobility.
- **Circular Economy & Sustainability**: Transforms agricultural residue into eco-friendly commodities, reducing environmental footprints and advancing local self-reliance.

Government and Policy Response

- **Gramodyog Vikas Yojana (GVY)**: Focuses on holistic development of village industries via specialized technology infusion, toolkits, and artisan training.

- **Prime Minister's Employment Generation Programme (PMEGP)**: Facilitates credit-linked subsidies through banks to set up micro-enterprises in non-farm sectors.
- **SFURTI (Scheme of Fund for Regeneration of Traditional Industries)**: Organizes traditional artisans and industries into clusters to enhance competitiveness and market viability.

Key Challenges

- **Market Access & Branding**: Rural entrepreneurs face supply chain bottlenecks, lack of standardized quality certification, and competition from mass-manufactured goods.
- **Credit Flow & Bank Formalities**: Delays in bank sanctioning of margin money/loans under schemes like PMEGP limit rapid scaling for micro-units.
- **Post-Harvest & Storage Deficits**: Inadequate cold storage, processing infrastructure, and testing labs for specialized products like raw honey or herbal extracts.

Mains Value Addition

- **Data Point**: KVIC's Honey Mission enabled ~5,500 MT of honey production in 2025–26 through the distribution of ~2,46,000 bee boxes nationwide.
- **Conceptual Linkage**: "Waste-to-Wealth" model — utilizing banana fibre for crafts demonstrates circular bio-economy principles in rural manufacturing.

Possible UPSC Two Questions of Mains

1. "Traditional skills and local resources can form the bedrock of sustainable rural industrialization." Discuss the role of KVIC in transforming village crafts into modern micro-enterprises.
2. Critically analyze the impact of schemes like PMEGP and SFURTI in tackling rural underemployment and promoting inclusive growth in India.

Way Forward

- **Strengthen Forward Linkages**: Integrate village entrepreneurs with e-commerce platforms (e.g., ONDC, GeM) and establish centralized AGMARK testing facilities.
- **Cluster-Based Incubation**: Expand SFURTI clusters equipped with shared technology infrastructure, common facility centers, and design mentors.
- **Credit Guarantee Enhancement**: Streamline single-window digital clearing systems for PMEGP loan disbursements to minimize credit acquisition turnaround time.

Conclusion

Transitioning traditional skills into modern rural enterprises is vital for achieving a self-reliant village economy. By combining technology infusion, financial support, and market linkage through KVIC, India can convert rural heritage and local bio-resources into resilient engines of inclusive growth under the Vision of Atmanirbhar Bharat.

AI-Driven Precision Livestock Farming: Automated Behavioural Tracking of Mithun in Northeast India

Key Highlights & Summary

- **Technological Paradigm Shift**: ICAR-NRC on Mithun, Nagaland, developed a non-contact, AI-driven framework for real-time detection and behavioral tracking of Mithun (*Bos frontalis*).
- **Core Technological Integration**: Combines YOLOv8n deep learning models (for object/behaviour detection) with DeepSORT algorithms (for real-time multi-object tracking and persistent identification).
- **High Technical Precision**: Achieved a 99.5% Mean Average Precision (mAP@0.5) and 99.6% recall, operating seamlessly at 31 frames per second, including under infrared night vision and partial occlusion.
- **Precision Welfare Inputs**: Tracks four primary behaviors—feeding, standing, lying, and mounting—providing early diagnostic markers for health issues, nutritional stress, and estrus detection.
- **Inter-Institutional Synergies**: Collaborative innovation between ICAR-NRC on Mithun, NIT Nagaland, Nagaland University, and CHRIST (Deemed to be University), published in *Engineering Research Express*.
- **Socio-Economic Relevance**: Addresses labor shortages in continuous livestock monitoring for indigenous hill communities, supporting the conservation of Northeastern bio-cultural assets.

Essential Definitions

- **Mithun (*Bos frontalis*)**: A unique semi-domesticated bovine species indigenous to the hill forests of Northeast India (Nagaland, Arunachal Pradesh, Manipur, Mizoram), central to tribal socio-cultural and economic systems.
- **Precision Livestock Farming (PLF)**: The application of process engineering, computer vision, and IoT tools to monitor and manage individual animal health, welfare, and production in real time.
- **YOLOv8 & DeepSORT**: YOLOv8 (You Only Look Once v8) is an advanced real-time computer vision object-detection model; DeepSORT (Deep Simple Online and Realtime Tracking) assigns persistent ID tags to track individual targets across video frames.

Legal and Constitutional Framework

- **Article 48 (Directive Principles)**: Directs the State to organize agriculture and animal husbandry on modern and scientific lines and preserve indigenous breeds.
- **Prevention of Cruelty to Animals Act, 1960**: Mandates animal welfare standards, biosecurity, and humane treatment, which automated non-invasive monitoring supports.
- **Biological Diversity Act, 2002**: Protects indigenous animal genetic resources and ensures equitable sharing of benefits arising from local bio-resources.

Prelims Perspective

- **Species Profile**: Mithun is recognized as a food animal by FSSAI (2023) to promote commercial farming and conservation.
- **Nodal Research Centre**: ICAR-National Research Centre on Mithun (located in Jharnapani, Nagaland).
- **Core Technology Stack**: Computer vision, deep learning neural networks, infrared edge computing, and non-contact sensor platforms.

Mains Perspective

- **Tribal Bio-Economy**: Shifts traditional semi-wild grazing practices toward structured, technology-driven precision management, improving rural tribal incomes.
- **Indigenous Livestock Conservation**: Leverages artificial intelligence to preserve unique bovine breeds, mitigate disease outbreaks, and enhance reproductive efficiency.
- **Climate Resilience & Hill Agriculture**: Offers non-intrusive monitoring solutions suited for terrain-restricted, rugged hill agro-climatic zones where manual surveillance is constrained.

Government and Policy Response

- **National AI Strategy (NITI Aayog)**: Promotes AI applications in agriculture and livestock under the "AIforAll" strategic mandate.
- **Digital Agriculture Mission**: Emphasizes integrating AI, remote sensing, and computer vision technologies across livestock and agricultural value chains.
- **Rashtriya Gokul Mission**: Aims at genetic upgradation, indigenous breed conservation, and high-tech interventions in bovine breeding ecosystems.

Key Challenges

- **Environmental Occlusion**: Dense forest canopies, heavy rainfall, mud, and extreme terrain in Northeast India can affect camera-line-of-sight tracking accuracy.
- **Scalability & Edge Deployment**: Transitioning GPU-heavy processing pipelines to low-power, affordable edge hardware for resource-constrained rural farms.
- **Data Generalization**: Current AI training sets are single-farm derived; models require cross-regional validation across different seasons and stocking densities.

Mains Value Addition

- **Data Point**: The YOLOv8n AI model recorded a 99.5% mAP accuracy and 31 FPS processing speed for real-time livestock tracking.
- **Strategic Concept**: "Tech-Enabled Bio-Cultural Conservation" — deploying frontier technologies to protect indigenous biodiversity while improving tribal economic security.

Possible UPSC Two Questions of Mains

VIDHVATH IAS ACADEMY

1. "Precision Livestock Farming (PLF) powered by Artificial Intelligence holds the key to transforming tribal economies in fragile hill ecosystems." Discuss with reference to indigenous livestock management in Northeast India.
2. Examine the ethical, infrastructural, and technological challenges in deploying AI and computer vision in India's agricultural and livestock sectors.

Way Forward

- **Develop Edge-AI Hardware**: Deploy lightweight AI models on solar-powered, low-cost edge sensors to operate without continuous high-grid power.
- **Expand Behavioral Datasets**: Train AI frameworks to detect early disease-related lethargy, aggression, and distress behaviors across diverse agro-ecological zones.

- **Public-Private Infrastructure Partnerships**: Integrate state animal husbandry departments with tech startups to scale computer vision systems to rural farmers.

Conclusion

Integrating computer vision and artificial intelligence into Mithun husbandry marks a milestone for precision livestock farming in India's hill regions. By pairing technology with traditional knowledge, India can strengthen indigenous livestock conservation, boost tribal livelihoods, and advance smart agriculture under the Viksit Bharat roadmap.

Unincorporated Non-Agricultural Enterprises: District-Level Insights from ASUSE 2025

Key Highlights & Summary

- **First-Ever District Estimates**: The National Statistics Office (NSO), Ministry of Statistics and Programme Implementation (MoSPI), released its first-ever district-level economic estimates for the unincorporated non-agricultural sector using data from the Annual Survey of Unincorporated Sector Enterprises (ASUSE) 2025.
- **High Economic Concentration**: The top 50 districts account for nearly one-third of the country's total unincorporated establishments, workforce, and Gross Value Added (GVA).
- **Scale Distribution**: Roughly one-third of all districts host more than 1 lakh unincorporated establishments each, while only 16 districts have over 5 lakh establishments.
- **Women Workforce Participation**: Women constitute at least one-third of the workforce in 237 districts, and over 50% of the workforce in 25 districts.
- **Productivity Benchmarks**: In 280 districts, the GVA per worker exceeds the all-India average of Rs 1,56,539, reflecting higher economic productivity in these regions.
- **Survey Coverage**: Estimates cover 757 out of 770 sampling districts across manufacturing, trade, and other services sectors.

Essential Definitions

- **Unincorporated Sector**: Business entities that are not incorporated as separate legal entities from their owners, including proprietary, partnership (excluding LLPs), cooperative, and society/trust-run establishments.
- **ASUSE (Annual Survey of Unincorporated Sector Enterprises)**: A nationwide, multi-stage stratified sample survey conducted by the NSO using Computer Assisted Personal Interviewing (CAPI) to track the unincorporated non-agricultural sector.
- **Gross Value Added (GVA) per Worker**: A productivity metric calculated by dividing the total net value added by an establishment by its number of active workers.

Legal and Constitutional Framework

- **Collection of Statistics Act, 2008**: Provides the statutory framework for the central government and NSO to collect economic, social, and demographic data nationwide.
- **Article 282**: Constitutional provision enabling central grants and technical support to strengthen statistical capacity and data infrastructure at sub-state levels.

- **National Policy on Official Statistics**: A legislative and policy framework aimed at modernizing statistical systems, improving data timeliness, and providing granular, sub-distributive data for evidence-based governance.

Prelims Perspective

- **Surveying Body**: National Statistics Office (NSO), Ministry of Statistics and Programme Implementation (MoSPI).
- **Sectors Covered**: Manufacturing, Trade, and Other Services.
- **Excluded Entities**: Limited Liability Partnerships (LLPs), corporate firms, and agricultural production units.
- **Top District Concentration**: Top 10 districts (covering ~10% of total GVA) span four states: Gujarat, Telangana, Uttar Pradesh, and West Bengal.
- **Exceptions in District Reporting**: Estimates were not generated separately for Delhi (due to single-stratum sampling), while Chandigarh and Lakshadweep estimates coincide with their UT-level reports.

Mains Perspective

- **Evidence-Based Regional Planning**: Granular sub-state data allows policymakers to target credit schemes, infrastructure funds, and skill development directly to lagging economic clusters.
- **Regional Disparities in Informal Economy**: Economic activity remains concentrated, with just 50 districts driving one-third of total GVA and establishments.
- **Female Entrepreneurship & Empowerment**: Strong female workforce participation in Northeastern states (Manipur, Meghalaya, Mizoram) and Telangana shows how localized micro-enterprises support gender inclusion.

Government and Policy Response

- **Urban & District Profiles**: MoSPI has expanded its statistical coverage, moving from 46 million-plus cities data to full district-level profiles across all States/UTs.
- **Digital Data Collection**: Implemented CAPI platforms on handheld tablets to reduce data processing latency and improve survey accuracy.
- **Strengthening Decentralized Governance**: Providing granular data to District Development Committees to help align local PM Vishwakarma and MSME initiatives with regional needs.

Key Challenges

- **High Relative Standard Errors (RSEs)**: Statistical variability in smaller sample districts can lead to higher RSEs, requiring careful interpretation for micro-level planning.
- **Administrative Boundary Changes**: Reorganization of district boundaries and names after sample selection creates minor gaps between survey frames and current local maps.
- **Informality and Low Productivity**: Over 300 districts report GVA per worker below Rs 1 lakh, pointing to persistent low productivity and underemployment in rural informal units.

Mains Value Addition

- **Top District Contributors by State (Sample)**:
  - **Maharashtra**: Pune (9.14% of state units)

  - **Gujarat**: Surat (19.43% of state units)
  - **Karnataka**: Bengaluru Urban (12.83% of state units)
  - **Uttar Pradesh**: Prayagraj (5.77% of state units)
  - **West Bengal**: North 24 Parganas (15.99% of state units)
- **Female Ownership Spotlight**: In Mizoram, female-owned proprietary establishments account for over 50% of total units in every district across the state.

Possible UPSC Two Questions of Mains

1. "Granular sub-state economic statistics are essential to address regional imbalances in India." Discuss how district-level ASUSE data can inform micro-targeted MSME policies.
2. Analyze the regional variations in female workforce participation and entrepreneurship within India's unincorporated sector, highlighting the factors driving performance in high-performing states.

Way Forward

- **Targeted Credit Flow**: Direct priority sector lending and formal credit schemes (like PM MUDRA) toward districts showing lower productivity and capital investment.
- **Skill & Tech Upgradation**: Establish district-level cluster development programs to boost tech adoption and raise GVA per worker above the national average.
- **Harmonize Statistical Frames**: Standardize geo-tagging and dynamic updating of local urban blocks and rural Panchayat wards to improve sampling precision in future ASUSE rounds.

Conclusion

The release of district-level unincorporated sector estimates by NSO marks an important step toward data-driven regional development. By identifying regional productivity gaps and patterns of female participation, these insights provide a baseline to strengthen informal enterprises and promote balanced, inclusive economic growth.

Fueling the Blue Economy: Six Years of Empowering India's Fisheries Sector under PMMSY

Key Highlights & Summary

VIDHVATH IAS ACADEMY



- **Record Fish Production**: Fish production reached a record **197.75 lakh tonnes in 2024–25**, rising from 141.64 lakh tonnes in 2019–20.
- **Surge in Fisheries Exports**: Exports grew to **Rs 73,890 crore in 2025–26**, up from Rs 46,663 crore in 2019–20.
- **Mass Employment Creation**: Generated direct and indirect employment opportunities for **58 lakh persons** in fisheries and aquaculture.
- **Key Financial Allocations**: Record budget allocation of **Rs 2,500 crore in BE 2026–27**. Total project approvals reached **Rs 21,394.88 crore** (Central share: Rs 9,510.89 crore) from FY 2020–21 to FY 2025–26.

- **Infrastructure Approvals**: Approved Rs 3,741.89 crore for fishing harbours, landing centers, and dredging, along with Rs 2,797 crore for cold-chain and marketing infrastructure.
- **Sub-Scheme & Digital Governance**: Launched the **Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY)** sub-scheme (Rs 6,000 crore outlay) and the **National Fisheries Digital Platform (NFDP)**, which recorded over 37.23 lakh total registrations as of September 2026.

Essential Definitions

- **Pradhan Mantri Matsya Sampada Yojana (PMMSY)**: An umbrella scheme consisting of Central Sector (100% centrally funded) and Centrally Sponsored (cost-shared with states) components designed to drive sustainable development in the fisheries sector.
- **Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY)**: A Central Sector sub-scheme under PMMSY operating from 2023–24 to 2026–27 with an outlay of Rs 6,000 crore to formalize the sector, facilitate credit access, and provide insurance.
- **Bio-floc Technology**: A sustainable aquaculture method that uses beneficial microbes ("green soup") to recycle nutrients in water into natural feed, enabling high-density fish farming with minimal water exchange.
- **Recirculatory Aquaculture System (RAS)**: A high-density farming model that filters and recirculates water to minimize land and water usage.

Legal and Constitutional Framework

- **Seventh Schedule (State List, Entry 21)**: Assigns state jurisdiction over fisheries within state boundaries, while deep-sea fishing beyond territorial waters falls under central jurisdiction (Union List, Entry 57).
- **Article 48A (Directive Principles)**: Mandates the State to protect and improve the environment and safeguard forests and wildlife, including marine/aquatic ecosystems.
- **Coastal Regulation Zone (CRZ) Notification, 2019**: Regulates physical developments along coastal stretches to preserve fragile marine habitats and support traditional fishing communities.

Prelims Perspective

- **Implementing Nodal Agency**: Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying.
- **PM-MKSSY Details**: Central Sector sub-scheme spanning 4 years (2023–24 to 2026–27) with an outlay of Rs 6,000 crore.
- **NFDP Platform**: Single-window system managing digital IDs, aquaculture insurance, performance incentives, and credit access.
- **Climate Resilient Coastal Fishermen Villages (CRCFV)**: 100 villages selected under the Central Sector component with a unit cost of Rs 200 lakh per village fully funded by the Centre.
- **Aquaculture Infrastructure Highlights**: 12 Integrated Aquaparks (Rs 713.80 crore), 12,081 RAS units, 4,205 Biofloc units, and 2,195 FFPOs (Rs 544.86 crore) approved.

Mains Perspective

- **Blue Economy Engine**: Modernizing post-harvest infrastructure helps transition the sector from subsistence fishing to high-value export logistics.
- **Socio-Economic Formalization**: Digital onboarding through NFDP provides informal fishers access to institutional credit, mitigating exploitation by informal lenders.

- **Climate Adaptation in Coastal Areas**: CRCFV addresses the vulnerability of coastal fishing communities to extreme weather events through climate-resilient infrastructure.

Government and Policy Response

- **Cluster Development & Aquaparks**: Developing 12 Integrated Aquaparks to consolidate production, processing, and cold storage in single hubs.
- **Seaweed Cultivation Promotion**: Approved projects worth Rs 198.17 crore over 5 years (2020–25) to expand seaweed farming as an alternative coastal income stream.
- **Fish Farmers Producer Organizations (FFPOs)**: Supported 2,195 FFPOs to improve small-scale fishers' collective bargaining power and market access.

Key Challenges

- **Post-Harvest Losses**: Insufficient cold-chain coverage in remote inland and island areas causes quality degradation before products reach urban markets.
- **Extreme Climate Events**: Increasing frequencies of tropical cyclones and rising sea surface temperatures threaten marine stocks and coastal infrastructure.
- **International Quality Compliance**: Strict sanitary standards in key export markets (like the US and EU) require continuous monitoring for chemical residues and micro-contaminants.

Mains Value Addition

- **Production Jump**: 141.64 lakh tonnes (2019–20) -> **197.75 lakh tonnes (2024–25)**.
- **Export Earnings Growth**: Rs 46,663 crore (2019–20) -> **Rs 73,890 crore (2025–26)**.
- **SDG Linkage**: Directly supports **SDG 14 (Life Below Water)** through sustainable resource management, responsible aquaculture, and ecosystem protection.

Possible UPSC Two Questions of Mains

1. "The Pradhan Mantri Matsya Sampada Yojana (PMMSY) serves as a key driver for India's Blue Economy." Analyze its role in modernizing post-harvest infrastructure and improving fishers' livelihoods.
2. Evaluate the potential of technology-driven aquaculture—such as Recirculatory Aquaculture Systems (RAS) and Bio-floc technology—in meeting national production targets sustainably.

Way Forward

- **Deepen Cold-Chain Integration**: Expand cold storage facilities and reefer transport connectivity in inland and regional fish markets.
- **Scale Up Digital Registration**: Complete onboarding of all traditional and artisanal fishers onto the National Fisheries Digital Platform (NFDP) to ensure full coverage of social security benefits.
- **Promote Mariculture & Open-Sea Caging**: Encourage open-sea cage farming and mariculture to relieve pressure on near-shore coastal fisheries.

Conclusion

By combining infrastructure investments, technology adoption (like RAS and Bio-floc), and digital governance via NFDP, PMMSY has strengthened India's fisheries sector. As the scheme approaches its full

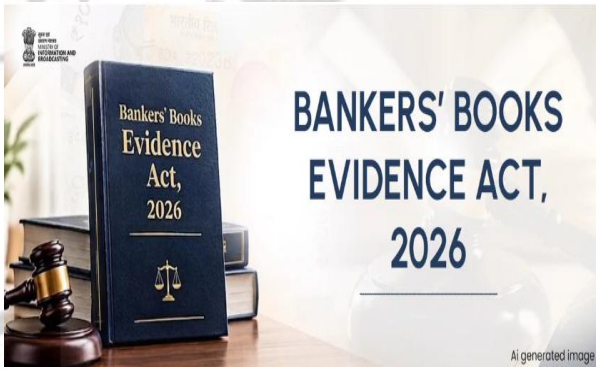
implementation, continuing to build climate resilience and market linkages will be crucial for sustained Blue Economy growth.

Legal Reform: Bankers' Books Evidence Act, 2026

Key Highlights & Summary

- **Enactment & Enforcement**: The Bankers' Books Evidence Act, 2026 received Presidential assent on 13th August 2026 and comes into force on **1st October 2026**.
- **Repeal of Colonial Law**: Replaces the **Bankers' Books Evidence Act, 1891** to modernize the legal admissibility of banking records in line with digital financial systems.
- **Technology-Neutral Framework**: Explicitly recognizes records maintained across physical, electronic, digital, virtual, and cloud-based systems.
- **Simplified Certification**: Standardizes the certification process using manual, digital, or electronic signatures for seamless court submission.
- **Protection for Bank Officials**: Mandates that courts must record a **"special cause" in writing** before summoning bank officials in cases where the bank is not a direct party.
- **Future-Proof Scope Expansion**: Empowers the Central Government to extend these provisions to other specified financial sector entities.

Essential Definitions



- **Bankers' Books**: Registers, ledgers, daybooks, cash books, account books, and all data files maintained by a financial institution, whether in physical, digital, or cloud environments.
- **Special Cause Requirement**: A statutory threshold requiring courts to provide explicit written justification before summoning bank employees as witnesses when the bank itself is not a party to the lawsuit.
- **Certified Copy**: A duplicate of a banking entry accompanied by a standardized certificate (signed manually or digitally) verifying that it is a true record of an entry made in the ordinary course of business.

VIDHVATH IAS ACADEMY

Legal and Constitutional Framework

- **Seventh Schedule (Union List, Entry 45 & Entry 93)**: Grants Parliament exclusive authority over banking legislation, offenses against laws with respect to banking, and procedural evidence frameworks.
- **Interplay with Bharatiya Sakshya Adhiniyam (BSA), 2023**: Aligns special rules for documentary and electronic evidence with modern primary/secondary evidence frameworks.
- **Information Technology Act, 2000**: Complements statutory recognition of electronic signatures and digital records.

Prelims Perspective

- **Enactment Dates**: Assented by the President on **13th August 2026**; enforced from **1st October 2026**.

- **Replaced Legislation**: Bankers' Books Evidence Act, 1891.
- **Nodal Ministry**: Ministry of Finance / Ministry of Law and Justice.
- **Authorized Signatures**: Manual, digital, and electronic signatures.

Mains Perspective

- **Ease of Doing Business & Judicial Efficiency**: Standardizing evidentiary certification speeds up commercial dispute resolution and recovery proceedings (e.g., under DRT, IBC, or Section 138 NI Act).
- **Protection of Human Resources**: Restricting unnecessary court summonses for non-party bank officials prevents operational disruptions in daily banking services.
- **Adapting to FinTech Evolution**: Recognizing cloud-based and virtual records updates statutory evidence laws to keep pace with core banking solutions (CBS) and neo-banking platforms.

Government and Policy Response

- **Statutory Modernization**: Systematic replacement of colonial-era laws with contemporary legislation designed for digital governance.
- **Extension to Non-Banking Financial Sectors**: Provisions allow the Ministry to extend the framework to NBFCs, payment aggregators, and fintech entities as the ecosystem evolves.

Key Challenges

- **Cybersecurity & Authenticity**: Ensuring cloud-stored or virtual banking records remain tamper-proof and verifiably authentic during litigation.
- **Standardization Across Cooperative Banks**: Upgrading digital infrastructure and training personnel across smaller cooperative banks to meet new electronic certification standards.
- **Judicial Discretion on "Special Cause"**: Defining clear judicial boundaries for what constitutes a "special cause" to avoid procedural delays in complex financial fraud cases.

Mains Value Addition

- **Statutory Shift**: Replaces a 135-year-old framework (1891 Act) with a technology-neutral legislation fit for modern digital banking.
- **Procedural Efficiency**: Reduces the burden on bank personnel by establishing standardized digital certifications in place of physical court appearances.

Possible UPSC Two Questions of Mains

1. "Modernizing evidentiary laws is a crucial prerequisite for promoting digital financial infrastructure and ease of doing business." Examine in the context of the Bankers' Books Evidence Act, 2026.
2. Discuss how the Bankers' Books Evidence Act, 2026 balances procedural ease in judicial proceedings with operational protection for financial institutions.

Way Forward

- **Standardize Digital Certification Templates**: Issue clear regulatory guidelines (via RBI) for uniform digital certification formats across public, private, and cooperative banks.

- **Judicial Capacity Building**: Sensitize lower judiciary and debt recovery tribunals on verifying cloud and electronic banking entries under the new framework.
- **Phase-in NBFC Inclusion**: Gradually extend the Act's coverage to major Non-Banking Financial Companies (NBFCs) and digital lending platforms to streamline credit dispute resolution.

Conclusion

The Bankers' Books Evidence Act, 2026 aligns India's financial evidence rules with modern digital practices. By recognizing cloud and virtual records, streamlining certification, and safeguarding bank personnel, the Act strengthens commercial dispute resolution and supports the growth of the financial sector.

Institutionalizing Traditional Medicine: BRICS Working Group on TCIM

Key Highlights & Summary

- **New Delhi Declaration Adoption**: Adopted at the 18th BRICS Summit under India's Chairship, endorsing cooperation in Traditional, Complementary, and Integrative Medicine (TCIM) to strengthen health systems and advance Universal Health Coverage (UHC).
- **Creation of Expert Working Group**: Formally welcomed the establishment of the BRICS Expert Working Group on TCIM under the BRICS Health Track.
- **Focus on Research & Quality**: Emphasized evidence-based research, quality assurance, safety, and efficacy across traditional pharmacopoeias and herbal preparations.
- **Preparatory Consensus at Chandigarh**: Builds on outcomes from the BRICS Meeting on TCIM held in Chandigarh on July 21, 2026, which finalized the Terms of Reference (ToR) for the Expert Working Group.
- **Alignment with Global Frameworks**: Directly aligns with the WHO Global Traditional Medicine Strategy 2025–2034.

Essential Definitions

- **Traditional, Complementary, and Integrative Medicine (TCIM)**: An umbrella term referring to health practices, approaches, knowledge, and beliefs incorporating plant, animal, and mineral-based medicines, spiritual therapies, manual techniques, and exercises applied singularly or in combination.
- **BRICS Health Track**: The official intergovernmental framework within BRICS dedicated to policy dialogue, regulatory harmonisation, and joint initiatives in public health, pharmaceuticals, and medical research.
- **Universal Health Coverage (UHC)**: Ensuring that all people have access to necessary, quality health services without suffering financial hardship, with TCIM serving as an accessible, primary-level contributor.

Legal and Constitutional Framework

- **Seventh Schedule (Concurrent List, Entry 26)**: Covers legal, medical, and other professions, granting Parliament and State Legislatures joint jurisdiction over medical regulatory frameworks.
- **National Commission for Indian System of Medicine (NCISM) Act, 2020**: Provides the statutory structure for maintaining quality education, research, and ethics in Ayush systems within India.
- **Drugs and Cosmetics Act, 1940 (Chapter IVA)**: Contains provisions for regulating Ayurvedic, Siddha, and Unani drugs to ensure safety, quality, and efficacy before commercial distribution.

Prelims Perspective

- **Summit Host & Venue**: 18th BRICS Summit hosted by India in New Delhi (September 2026).
- **Nodal Indian Ministry**: Ministry of Ayush in coordination with the Ministry of Health & Family Welfare.
- **Chandigarh Meeting (July 2026)**: Formulated the Terms of Reference (ToR) for the proposed Expert Working Group on TCIM.
- **Key Focus Areas**: Shared pharmacopoeias, research on medicinal plants, standardization of herbal preparations, and regulatory alignment.

Mains Perspective

- **Evidence-Based Global Integration**: Transitions traditional medicine from informal usage to scientifically validated, evidence-based global integration through shared protocols.
- **Health System Resilience & UHC**: Provides affordable and culturally accessible healthcare options to lower out-of-pocket expenditure across developing nations.
- **Diplomatic & Economic Soft Power**: Position's India's Ayush framework (Ayurveda, Yoga, Unani, Siddha, Homeopathy) as a credible benchmark for global traditional medicine regulation.

Government and Policy Response

- **Ayush Academic & Research Links**: Leveraging institutions like the All India Institute of Ayurveda (AIIA) to lead cross-border research and clinical trial standardisation.
- **Strengthening Ayush Grid**: Integrating digital registries and research databases with international platforms to streamline clinical data exchange.
- **Quality Assurance Certification**: Promoting WHO Good Manufacturing Practices (GMP) and Ayush Mark certifications to boost herbal exports across BRICS markets.

Key Challenges

- **Heterogeneity in Regulatory Systems**: Varied regulatory classification of traditional products across BRICS members (e.g., classified as dietary supplements vs. prescription drugs).
- **Lack of Standardized Clinical Data**: Insufficient randomized controlled trials (RCTs) and standardized toxicological profiling for multi-herb formulations.
- **Intellectual Property & Biopiracy Risks**: Protecting traditional knowledge from unauthorized patenting while encouraging open scientific collaboration.

Mains Value Addition

- **Global Strategy Linkage**: Complementary to the WHO Global Centre for Traditional Medicine (GCTM) located in Jamnagar, Gujarat.
- **Target Audience Alignment**: Directly advances Sustainable Development Goal 3 (Good Health & Well-being) and target 3.8 (Universal Health Coverage).

Possible UPSC Two Questions of Mains

1. "The integration of Traditional, Complementary, and Integrative Medicine (TCIM) into mainstream health systems is essential for achieving Universal Health Coverage." Discuss in light of the New Delhi Declaration at the 18th BRICS Summit.

2. Evaluate the regulatory and scientific challenges in standardizing traditional medicine across international groupings like BRICS. How can India leverage its Ayush ecosystem to address these hurdles?

Way Forward

- **Harmonize Pharmacopoeial Standards**: Develop joint BRICS pharmacopoeial monographs for common medicinal plants to facilitate seamless international trade and clinical acceptance.
- **Institutionalize Joint Research Grants**: Set up a dedicated BRICS research fund to study the efficacy of herbal therapies against non-communicable diseases (NCDs) and antimicrobial resistance (AMR).
- **Protect Intellectual Property via TKDL**: Expand the reach of India's Traditional Knowledge Digital Library (TKDL) model to other BRICS nations to safeguard traditional heritage while enabling innovation.

Conclusion

The inclusion of TCIM in the New Delhi Declaration and the creation of the BRICS Expert Working Group mark a step toward formalizing traditional medicine globally. By prioritizing scientific research, quality assurance, and regulatory alignment, BRICS nations can expand access to safe, effective, and affordable healthcare solutions.

GEOGRAPHY & ENVIRONMENT

National Biodiversity Authority Crosses ₹200-Crore Mark in Access and Benefit-Sharing (ABS) Disbursement

KEY HIGHLIGHTS & SUMMARY

- **Financial Milestone Achieved:** The National Biodiversity Authority (NBA) crossed the cumulative milestone of **₹200 crore in Access and Benefit-Sharing (ABS) disbursements**, establishing India's ABS mechanism as a operational model among developing nations.
- **Targeted Crop Disbursement:** The NBA sanctioned **₹8.23 crore** across 27 State Biodiversity Boards (SBBs) and 5 Union Territory Biodiversity Councils for commercial research and utilization of germplasm of four key horticultural crops: **Bitter Gourd, Okra, Chilli, and Onion**.
- **Corporate ABS Realization:** Proceeds were realized from major seed and agricultural bio-technology enterprises, including *Nunhems India*, *East West Seeds India*, and *Bayer Science and Innovation*.
- **Area-Proportional Distribution Formula:** Because these bio-resources were sourced through open agricultural markets and traders, individual source farmers could not be traced. The NBA deployed a novel **Area-Proportional Allocation Modality** recommended by its Expert Committee, distributing funds based on official crop cultivation area data published by the Ministry of Agriculture and Farmers Welfare.

- **Top Recipient States: Madhya Pradesh (₹1.17 crore)** and **Maharashtra (₹1.01 crore)** emerged as the largest financial recipients. Maharashtra's allocation reflects its dominant share, holding over **49% of India's total onion cultivation area**.
- **Statutory Fund Utilization Rules:** Disbursed funds must be deployed strictly in accordance with **Section 32(2) of the Biological Diversity Act, 2002**, focusing on updating People's Biodiversity Registers (PBRs), ecosystem restoration, declaring Biodiversity Heritage Sites (BHS), capacity-building of Biodiversity Management Committees (BMCs), and supporting local community livelihoods.
- **Alignment with Global Pacts:** The milestone reinforces India's national commitments under the **Nagoya Protocol (2010)** and the **Kunming-Montreal Global Biodiversity Framework (KM-GBF, 2022)**.

WHY IN NEWS?

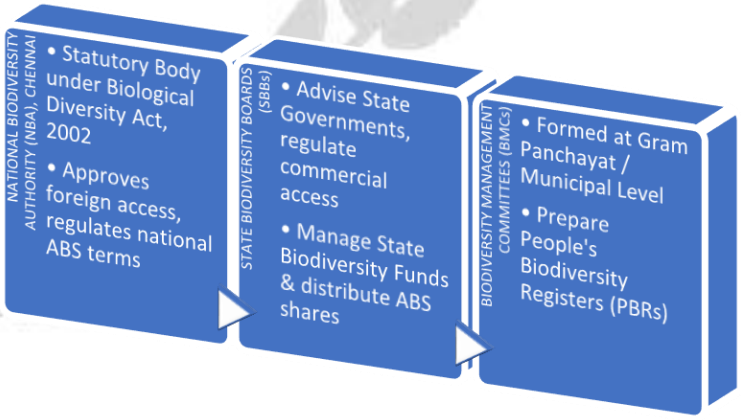
Crossing the **₹200-crore milestone** in ABS disbursements marks a transition from regulatory oversight to actual benefit realization for local communities. The NBA's adoption of an **area-proportional distribution mechanism** resolves a longstanding legal and operational bottleneck: how to share commercial bio-resource benefits when individual traditional knowledge holders or source farmers cannot be pinpointed due to open-market trade channels.

BACKGROUND & CORE CONCEPT

India's Three-Tier Biodiversity Architecture

The concept of **Access and Benefit-Sharing (ABS)** emerged globally during the 1992 Rio Earth Summit to counter "biopiracy"—the unauthorized commercial exploitation of biological resources and traditional knowledge from developing countries without fair compensation.

Under the **Convention on Biological Diversity (CBD)** and its supplementary **Nagoya Protocol**, nations hold sovereign rights over their biological resources. Users of genetic resources (e.g., pharmaceutical, seed, and cosmetic corporations) must obtain **Prior Informed Consent (PIC)** and agree on **Mutually Agreed Terms (MAT)** with the provider nation/community. India operationalized this mechanism through the *Biological Diversity Act, 2002*, setting up a three-tier institutional structure (NBA - SBBs - BMCs).



ESSENTIAL DEFINITIONS

- **Access and Benefit-Sharing (ABS):** The fair and equitable distribution of commercial or research benefits (financial or non-financial) arising from the utilization of biological resources and associated traditional knowledge between commercial users and local provider communities.
- **Biodiversity Management Committee (BMC):** A statutory local body constituted at the local self-government level (Gram Panchayat, Panchayat Samiti, or Municipality) responsible for promoting conservation, sustainable use, and documentation of local bio-resources.

- **People's Biodiversity Register (PBR):** A comprehensive legal document prepared by local BMCs that records local biological resources, their ecological status, traditional uses, and associated Indigenous Knowledge (IK).
- **Biodiversity Heritage Site (BHS):** Unique, ecologically fragile areas possessing rich biodiversity, endemic species, or cultural heritage value, notified by State Governments under Section 37 of the Biological Diversity Act.
- **Nagoya Protocol:** A 2010 supplementary international agreement to the CBD providing a transparent legal framework for the implementation of the third objective of the CBD: fair and equitable benefit-sharing.

KEY FEATURES & IMPORTANT FACTS

1. The Area-Proportional Distribution Model

- **The Operational Bottleneck:** Seed companies regularly procure crop germplasm through wholesale traders or open *mandis*, making it impossible to identify specific farmers or micro-regions that conserved the original landraces.
- **The Expert Committee Solution:** The NBA adopted a macro-allocation model. ABS fees collected from commercial users are allocated to SBBs based on the relative crop cultivation area published by the Ministry of Agriculture and Farmers Welfare.
- **Impact Example:** Maharashtra received ₹1.01 crore out of the ₹8.23 crore horticultural crop distribution specifically because it accounts for **over 49% of India's total onion cultivation acreage**.

2. Mandatory Statutory Utilization (Section 32(2))

SBBs and UT Councils must channel received ABS funds directly to local ground-level conservation and livelihood initiatives:

ABS Funds Received by SBBs

- ├─► Preparation & Updating of People's Biodiversity Registers (PBRs)
- ├─► Capacity Building and Training of Local BMC Members
- ├─► Habitat Restoration & Declaration of Biodiversity Heritage Sites (BHS)
- └─► Grassroots Conservation Incentives & Livelihood Grants to Farmers

LEGAL AND CONSTITUTIONAL FRAMEWORK

Constitutional Pillars	Statutory Mandate	International Commitments
Art. 48A (State Environment Protection)	Biological Diversity Act, 2002	UN Convention on Biological
Art. 51A(g) (Fundamental Duty)	Sections 3, 21, 32, 37	Diversity (CBD, 1992)
Art. 253 (International Treaties)	BD (Amendment) Act, 2023	Nagoya Protocol (2010)

1. Constitutional Foundations

- **Article 48A (Directive Principles of State Policy):** Mandates the State to protect and improve the environment and safeguard the forests and wildlife of the country.
- **Article 51A(g) (Fundamental Duties):** Obligates every citizen to protect and improve the natural environment, including forests, lakes, rivers, and wildlife.
- **Article 253:** Grants Parliament the exclusive power to enact legislation to implement international treaties, conventions, and agreements (the basis for enacting the Biological Diversity Act, 2002 to fulfill CBD commitments).

2. Statutory Architecture

- **Section 3 (BD Act, 2002):** Mandates prior approval from the NBA for foreign individuals, non-resident Indians (NRIs), and foreign-incorporated entities seeking access to Indian biological resources or associated knowledge.
- **Section 21:** Empowers the NBA to determine equitable benefit-sharing terms when granting access approvals.
- **Section 32:** Establishes the **State Biodiversity Fund**, specifying that money received via ABS must be applied to channel benefits to benefit-claimants, preserve bio-resources, and support local BMCs.
- **Biological Diversity (Amendment) Act, 2023:** Streamlined access provisions, decriminalized certain offences, exempted registered AYUSH practitioners and codified traditional knowledge holders from prior approval requirements, while emphasizing fair benefit sharing for commercial users.
- **Guidelines on Access and Benefit Sharing (ABS) Regulations, 2014:** Lay down precise percentages and slabs for benefit-sharing obligations based on commercial turnover and purchase price of raw bio-resources.

PRELIMS PERSPECTIVE

Critical Facts & Institutional Details

- **NBA Headquarters:** Chennai, Tamil Nadu (Statutory body under the Ministry of Environment, Forest and Climate Change - MoEFCC).
- **Top Recipient States (Horticultural Crop ABS):** Madhya Pradesh (₹1.17 crore) and Maharashtra (₹1.01 crore).
- **Crops Covered in the Disbursement:** Bitter Gourd, Okra, Chilli, and Onion.

Common Prelims Traps & Confusions

Statutory Concept	Common Trap / Misconception	Actual Legal / Regulatory Reality
BMCs Formation Level	"Biodiversity Management Committees are formed at the Central level by the NBA."	**Incorrect.** BMCs are constituted by local bodies at the **Gram Panchayat, Block, or Municipal level** across States.
Foreign vs Domestic Entity Approvals	"Indian citizens and foreign entities follow the exact same approval path under Section 3."	**Incorrect.** Foreign nationals/entities require prior approval from the **NBA** under Section 3; Indian entities inform the **SBB** under Section 7.
AYUSH Practitioners Exemption	"The Biological Diversity (Amendment) Act 2023 increased ABS burdens on local AYUSH practitioners."	**Incorrect.** The 2023 Amendment explicitly **exempted** local AYUSH practitioners and traditional healers from prior approval/ABS requirements.
BHS Declaration Power	"Biodiversity Heritage Sites (BHS) are directly notified by the Central Government."	**Incorrect.** BHS are notified by **State Governments** under Section 37 of the Act, in consultation with local bodies.

MAINS PERSPECTIVE

Dimensions of Analysis

1. Economic & Agricultural Dimension

- **Monetizing Agronomic Conservation:** The ABS regime creates an economic bridge between commercial seed corporations and grassroots farming communities that preserve crop diversity.
- **Funding Local Value-Chains:** Channelling ABS revenues into State Biodiversity Funds provides non-budgetary capital to support local seed banks, organic farming collectives, and indigenous crop conservation.

2. Environmental & Climate Resilience

- **Preserving Landraces:** Wild relatives and traditional landraces of crops like chilli, onion, and bitter gourd carry resilient genetic traits against heat stress, drought, and pest attacks. ABS funds reinforce the local preservation of these climate-resilient genetic stocks.

3. Institutional Governance & Federal Dynamics

- **Strengthening Decentralized Governance:** Transferring funds down to SBBs and BMCs empowers Panchayati Raj Institutions (PRIs) and urban local bodies, putting muscle behind the 73rd and 74th Constitutional Amendments.
- **Resolving Sourcing Anonymity:** The area-proportional formula gives governments a practical tool to distribute funds fairly when open-market sourcing makes direct attribution impossible.

GOVERNMENT / POLICY RESPONSE

- **National Biodiversity Targets (NBTs):** Aligned with the global *Kunming-Montreal Global Biodiversity Framework (KM-GBF)*, specifically Target 13, which calls for operational mechanisms for the fair and equitable sharing of benefits from genetic resources.

- **E-PBR Portal:** A digital initiative launched by the NBA to accelerate the preparation and real-time updating of People's Biodiversity Registers across all Gram Panchayats.
- **National Biodiversity Mission:** A coordinated national effort designed to harness biodiversity data for climate resilience, sustainable agriculture, and eco-restoration.

KEY CHALLENGES

- **Functional Latency of BMCs:** While thousands of BMCs exist on paper, many suffer from a lack of technical training, administrative support, and awareness to negotiate ABS terms independently.
- **Incomplete PBR Documentation:** Many People's Biodiversity Registers remain static, paper-based documents rather than dynamic, verified digital records of traditional knowledge and bio-resources.
- **Corporate Compliance Resistance:** Commercial enterprises often view ABS compliance as an added tax or regulatory hurdle, leading to disputes over valuation and royalty percentages.
- **Identification of Primary Benefit Claimants:** Even with area-proportional models, ensuring that funds reach the precise indigenous communities who originally selected and conserved unique crop landraces remains difficult.

MAINS VALUE ADDITION

Key Legal & Policy Anchors

- **Section 32(2), Biological Diversity Act, 2002:** Mandatory utilization guidelines for Biodiversity Funds.
- **Biological Diversity (Amendment) Act, 2023:** Legal modernization of ABS terms and compliance pathways.
- **Target 13, Kunming-Montreal Global Biodiversity Framework:** International benchmark for equitable benefit sharing.

POSSIBLE UPSC QUESTIONS

Mains Question 1

"Access and Benefit-Sharing (ABS) is a cornerstone for preventing biopiracy and promoting sustainable bio-resource utilization. Evaluate the effectiveness of India’s three-tier biodiversity architecture under the Biological Diversity Act, 2002 in ensuring equitable benefit distribution to local communities."

Mains Question 2

"Tracing primary traditional knowledge holders in open-market biological sourcing presents significant administrative hurdles. Discuss how innovative financial allocation models, like the NBA’s area-proportional distribution mechanism, can resolve these challenges while strengthening grassroots conservation."

ONE-LINE TAKEAWAYS

1. The NBA crossed **₹200 crore** in cumulative ABS disbursements, reinforcing India's leadership in biodiversity finance.

2. An allocation of **₹8.23 crore** was disbursed across 27 States and 5 UTs for research on Bitter Gourd, Okra, Chilli, and Onion.
3. Funds were collected from major seed companies, including *Nunhems*, *East West Seeds*, and *Bayer Science*.
4. Sourcing through open markets led the NBA to adopt an **Area-Proportional Allocation Modality** based on official crop cultivation acreage.
5. Disbursed funds must be used under **Section 32(2)** for PBR updating, BMC capacity building, BHS declarations, and eco-restoration.
6. The three-tier statutory mechanism (NBA - SBBs - BMCs) is grounded in **Article 253** and India's commitments under the Nagoya Protocol.

WAY FORWARD

The ₹200-crore milestone demonstrates that India's ABS framework has evolved from a regulatory concept into a functional economic engine. To build on this momentum, India must strengthen the operational capacity of local Biodiversity Management Committees (BMCs) and fully digitize People's Biodiversity Registers (PBRs). Expanding transparent, area-proportional distribution formulas provides a practical solution when direct source tracing is impossible. Ultimately, ensuring that ABS funds flow smoothly to grassroots conservers will protect India's rich genetic heritage, safeguard community rights, and support climate-resilient agriculture.

Global Plastics Treaty: Architecture, Geopolitical Fault Lines, and Implications for India

KEY HIGHLIGHTS & SUMMARY

- **Mandate and Origin:** Adopted under UN Environment Assembly (UNEA) Resolution 5/14 in March 2022, mandating an Intergovernmental Negotiating Committee (INC) to draft a legally binding treaty addressing plastic pollution across its full life cycle.
- **Life-Cycle Approach:** Moves beyond traditional end-of-pipe waste management to regulate primary plastic polymer production, chemical additives, product design, consumption, and legacy remediation.
- **Polarised Geopolitical Coalitions:** Pits the High Ambition Coalition (HAC) advocating global caps on primary plastic production against the Like-Minded Group/Petrostates opposing supply caps and favoring national waste management.
- **Negotiation Trajectory:** Spanned six formal sessions (INC-1 Punta del Este, INC-2 Paris, INC-3 Nairobi, INC-4 Ottawa, INC-5.1 Busan, INC-5.2/5.3 Geneva), reflecting deep rifts over primary polymer production limits and financing mechanisms.
- **India's Strategic Stance:** Defends a "bottom-up" approach based on National Action Plans (NAPs), rejects mandatory global supply caps, highlights Extended Producer Responsibility (EPR), and demands dedicated financial and technology transfers.
- **Key Mechanisms:** Envisages mandatory Extended Producer Responsibility (EPR), eco-design standards, microplastics restrictions, and just transition frameworks for informal waste collectors.
- **Constitutional Alignment:** Aligns with India's Article 48A (Environmental Protection), Article

21 (Right to a Clean Environment), and Entry 52 List I (Industries Regulation).

- **Financial Governance Split:** High debate over establishing a dedicated new multilateral plastics fund versus using existing structures like the Global Environment Facility (GEF).

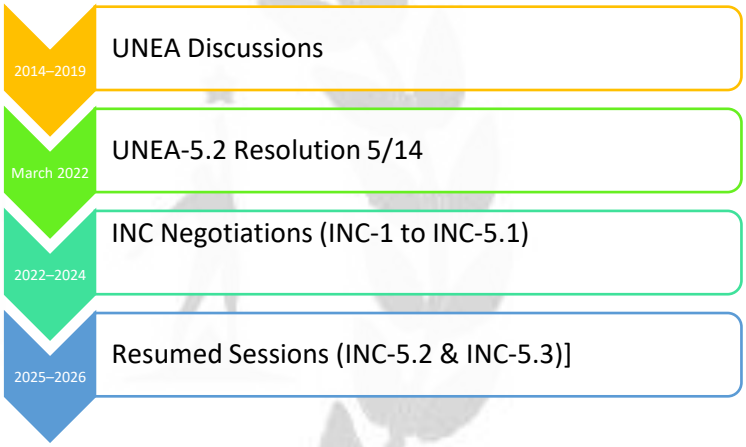
WHY IN NEWS?

Plastic pollution has escalated into a planetary crisis, with an estimated 460 million tonnes of plastic produced annually and less than 10% recycled. The negotiations for a historic legally binding instrument—popularly known as the **Global Plastics Treaty**—reached a critical juncture following the Intergovernmental Negotiating Committee (INC) sessions.

The negotiations underscore the tension between environmental protection and geopolitical economic interests. Divergence persists over whether to restrict primary petrochemical production or limit interventions strictly to waste recycling, placing sustainable development and global environmental governance under direct scrutiny.

BACKGROUND & CORE CONCEPT

Historical Evolution

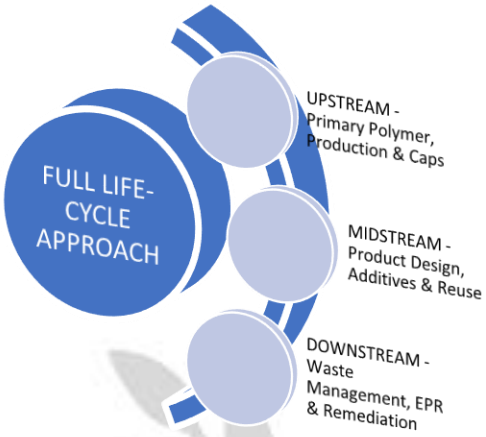


- **UNEA Discussions (2014–2019):** Initial focus was restricted to marine litter and microplastics under voluntary frameworks.
- **UNEA-5.2 Resolution 5/14 (Nairobi, March 2022):** A historic turning point where 175 UN member states adopted a resolution to establish an INC with a mandate to develop an "international legally binding instrument on plastic pollution, including in the marine environment".
- **The Negotiation Process:** The INC met across several sessions:
    - **INC-1 (Punta del Este, 2022):** Scope, baseline principles, and procedural rules.
    - **INC-2 (Paris, 2023):** Mandated the preparation of a "Zero Draft".
    - **INC-3 (Nairobi, 2023):** Draft review; emerging split between production caps and waste emphasis.
    - **INC-4 (Ottawa, 2024):** In-depth deliberations on chemicals of concern, eco-design, and financial instruments.
    - **INC-5.1 (Busan, 2024):** Intended final session; failed to reach consensus due to irreconcilable positions on primary polymer caps.
    - **INC-5.2 & INC-5.3 (Geneva, 2025–2026):** Resumed sessions to navigate procedural rules, leadership, and compromised text structures.

Core Concept: The Full Life-Cycle Approach

Unlike traditional waste management regimes (e.g., Basel Convention) that act when waste is generated, the treaty's foundation is a **full life-cycle approach**.

- **Upstream:** Regulating fossil fuel extraction for polymers, limiting primary plastic production, and listing hazardous monomers.
- **Midstream:** Standardising product design (eco-design), restricting single-use plastics (SUPs), and regulating chemical additives (e.g., phthalates, PFAS).
- **Downstream:** Waste management, Extended Producer Responsibility (EPR), circular recycling, and legacy pollution remediation.



ESSENTIAL DEFINITIONS

- **Primary Plastic Polymers:** Newly synthesized virgin polymers derived directly from petrochemical feedstocks (e.g., ethylene, propylene) before being converted into products.
- **Extended Producer Responsibility (EPR):** An environmental policy approach placing financial and/or physical responsibility on manufacturers for the treatment, disposal, or recycling of post-consumer products.
- **Microplastics:** Plastic particles less than 5 millimetres in diameter. They are categorized into *Primary* (intentionally added to cosmetics/pesticides or released as virgin pellets/nurdles) and *Secondary* (derived from the fragmentation of larger plastic items).
- **Just Transition:** A framework ensuring that the shift toward a circular plastic economy safeguards the rights, livelihoods, and health of vulnerable populations, particularly informal waste collectors (waste pickers).
- **Chemicals of Concern:** Hazardous additives incorporated into plastics to impart properties like flexibility, flame retardancy, or color (e.g., Bisphenol A, phthalates, heavy metals, persistent organic pollutants).

KEY FEATURES & INSTITUTIONAL DYNAMICS

Dimension	**Details & Mechanics**
Scope & Mandate	Legally binding rules covering the whole life cycle of plastic, including marine, terrestrial, and atmospheric pollution.
Control Measures	Target options: (a) Mandatory global reduction targets on primary polymer production; (b) Voluntary, nationally determined restrictions.
Product Design	Minimum recycled content mandates, restrictions on problematic polymers and short-lived single-use plastics, design-for-recyclability.
Financial Mechanism	Dispute over establishing a independent **Dedicated Multilateral Fund** versus utilizing the existing **Global Environment Facility (GEF)** architecture.
National Action Plans	Core compliance tool requiring countries to submit NAPs detailing domestic policies, EPR implementation, and metrics.

Geopolitical Coalitions & Fault Lines

High Ambition Coalition (HAC): Led by the EU, Rwanda, Norway, Small Island Developing States (SIDS), and several Latin American nations. They demand legally binding global targets, primary polymer production reduction, lists of banned chemical additives, and a dedicated fund.



1. **Like-Minded Group / Petrochemical Bloc:** Consisting of major oil and gas producing nations (e.g., Saudi Arabia, Russia, Iran) and petrochemical hubs. They argue the mandate focuses on *plastic pollution*, not production, advocating for downstream waste management, chemical recycling, and voluntary national commitments.
2. **Emerging Economies (e.g., India, China):** Balance industrial reliance with waste management. They emphasize Common But Differentiated Responsibilities (CBDR), fair financial compensation, technology transfer, and protection of domestic manufacturing capabilities.

LEGAL AND CONSTITUTIONAL FRAMEWORK (INDIAN CONTEXT)

Constitutional Provisions

- **Article 48A (DPSP):** Directs the State to protect and improve the environment and safeguard forests and wildlife.
- **Article 51A(g) (Fundamental Duties):** Duties of every citizen to protect and improve the natural environment.
- **Article 21 (Right to Life):** Interpreted by the Supreme Court (*Subhash Kumar v. State of Bihar, 1991* and *M.K. Ranjitsinh v. Union of India, 2024*) to include the fundamental right to be free from the adverse impacts of environmental degradation and climate change.

Statutory Architecture

- **Environment (Protection) Act, 1986:** Primary enabling statute under which plastic rules are promulgated.
- **Plastic Waste Management (PWM) Rules, 2016 (as amended):**
    - Banned identified single-use plastic (SUP) items from July 1, 2022.
    - Prescribed minimum thickness standards (120 microns for carry bags).
    - Mandatory registration of Producers, Importers, and Brand Owners (PIBOs) via the Central Pollution Control Board (CPCB) portal.
    - Comprehensive **Extended Producer Responsibility (EPR) Guidelines (2022)** establishing category-wise recycling targets, reuse mandates, and end-of-life disposal protocols.

International Obligations & Alignments

- **Basel Convention:** Amendments regulating transboundary movement of plastic waste.

- **Stockholm Convention:** Banning persistent organic pollutants (POPs) used as chemical additives in plastics.
- **UN SDGs:** Directly targets SDG 12 (Responsible Consumption and Production), SDG 14 (Life Below Water), and SDG 15 (Life on Land).

PRELIMS PERSPECTIVE

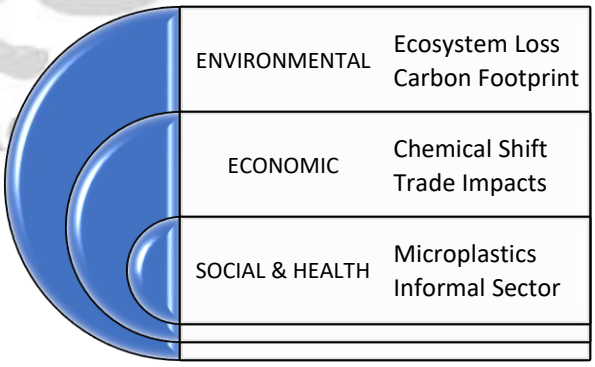
Key Facts, Organisations, and Terminology

- **Resolution 5/14:** Passed at UNEA-5.2 in Nairobi (2022) titled *"End plastic pollution: Towards an international legally binding instrument"*.
- **Nurdles:** Pre-production virgin plastic pellets shipped globally for processing; major source of primary marine microplastic pollution when spilled.
- **Common Traps & Confusions:**
    - *Trap 1:* "The treaty falls under the United Nations Framework Convention on Climate Change (UNFCCC)." -> **False.** It is negotiated under the aegis of the **United Nations Environment Programme (UNEP)**.
    - *Trap 2:* "India opposes the Global Plastics Treaty." -> **False.** India supports a legally binding treaty but opposes mandatory global caps on primary polymer production, advocating instead for national flexibility and downstream circularity.
    - *Trap 3:* "The Basel Convention completely bans plastic exports." -> **False.** The 2019 Plastic Waste Amendments control and restrict the trade of unmixed, contaminated, or non-recyclable plastic waste, requiring Prior Informed Consent (PIC).
    - *Trap 4:* "Microplastics only come from degraded plastic litter." -> **False.** Primary microplastics are manufactured directly for commercial use (e.g., microbeads, industrial abrasives).

MAINS PERSPECTIVE

Multi-Dimensional Impact Analysis

1. Environmental & Ecological Dimension



- **Marine & Terrestrial Pollution:** Over 11 million metric tonnes of plastic enter the oceans annually, suffocating marine fauna, damaging coral reefs, and altering soil ecosystems.
- **Climate Nexus:** Plastic production is highly carbon-intensive. If unchecked, plastics could account for up to 10-15% of the global carbon budget by 2050, directly threatening the Paris Agreement goals.

2. Economic & Trade Governance

- **Petrochemical Restructuring:** Binding caps on primary polymers would stranded capital assets in fossil fuel and petrochemical infrastructure, forcing a pivot toward bio-based polymers and advanced recycling.

- **Trade Barriers:** Disparate national standards on chemical additives and recycled content risk fragmenting global supply chains, leading to non-tariff barriers under WTO law.

3. Health & Social Dimensions

- **Human Health Impacts:** Microplastics and associated chemical additives (endocrine disruptors) have been detected in human blood, lungs, placenta, and breast milk, linked to hormonal disruption and cellular toxicity.
- **Just Transition for Informal Waste Sector:** In developing economies like India, over 80-90% of plastic recycling is managed by informal waste pickers. Global standards must integrate these actors to prevent economic displacement.

GOVERNMENT / POLICY RESPONSE (INDIA)

DOMESTIC POLICY FRAMEWORK

▼	▼	▼
[REGULATORY]	[INFRASTRUCTURE]	[INNOVATION]
• PWM Rules 2016	• Swachh Bharat 2.0	• India Plastics Pact
• Ban on SUPs (2022)	• Material Recovery	• Alternatives Grant
• Mandatory EPR Portal Facilities (MRFs)		• Circular R&D

- **National Single-Use Plastic Ban (2022):** Prohibition on manufacture, import, stocking, distribution, sale, and use of identified single-use plastic items with low utility and high littering potential.
- **Extended Producer Responsibility (EPR) Framework:** Comprehensive digital tracking via the CPCB online portal requiring PIBOs to fulfill progressive recycling targets and purchase certificates from authorized recyclers.
- **Swachh Bharat Mission – Urban 2.0 & Gramin Phase II:** Institutionalizing solid waste management, establishing Material Recovery Facilities (MRFs), and utilizing plastic waste in road construction (as per Indian Roads Congress guidelines).
- **India Plastics Pact:** A collaboration between CII and WWF-India connecting businesses, government, and NGOs to accelerate circular economy transitions.

KEY CHALLENGES

- **Upstream Supply vs. Downstream Recycling Conflict:** Deep institutional disagreement on whether to limit primary polymer synthesis or rely strictly on circular waste recovery.
- **Financial and Technological Asymmetry:** Global South nations lack the capital, testing infrastructure, and high-tech recycling facilities required to implement strict eco-design standards without external aid.
- **Substitute Viability & Cost Inflation:** Bio-based or compostable alternatives remain costly, scaled insufficiently, and often require specialized industrial composting infrastructure that does not exist in developing nations.
- **Informal Sector Integration:** Standardizing waste systems without formalizing waste pickers

risks destroying informal livelihoods and reducing raw material recovery rates.

- **Data and Chemical Transparency Deficit:** Lack of global disclosure mandates for trade secrets regarding proprietary chemical additives impedes hazardous additive tracking.

MAINS VALUE ADDITION

- **Relevant Judicial Judgments:**
    - *Vanguard Fire and General Insurance Co. v. Fraser and Ross / Subhash Kumar (1991):* Environment as a prerequisite to Right to Life under Article 21.
    - *M.K. Ranjitsinh Case (2024):* Recognition of the distinct right to be free from adverse climate and environmental impacts.
- **Reports & Statistics:**
    - **UNEP *Turning off the Tap* Report:** Transitioning to a circular plastic economy can reduce plastic volume entering oceans by 80% and save $4.5 trillion by 2040.
    - **OECD *Global Plastics Outlook*:** Plastics generation doubled globally over the past two decades, with global recycling rates hovering around 9%.
- **Key Terminologies to Use in Answers:** *"Life-Cycle Assessment (LCA)", "Primary Polymer Caps", "Design-for-Circularity", "Chemical Recycling vs. Mechanical Recycling", "Extended Producer Responsibility (EPR) Certificates", "Just Transition for Waste Pickers".*
- **SDG Target Interlinks: SDG 12.5** (Substantially reduce waste generation through prevention, reduction, recycling, and reuse) and **SDG 14.1** (Prevent and significantly reduce marine pollution of all kinds).

POSSIBLE UPSC QUESTIONS

Mains Question 1

"The proposed Global Plastics Treaty highlights a fundamental divergence between supply-side production caps and demand-side waste management." In light of this statement, critically analyze the major geopolitical fault lines in the treaty negotiations and discuss the strategic stance adopted by India. (250 Words, 15 Marks)

VIDHVATH IAS ACADEMY

Mains Question 2

Evaluate the effectiveness of India's domestic Extended Producer Responsibility (EPR) framework in curbing plastic pollution. How can the incoming international legally binding instrument on plastics balance environmental ambition with a 'just transition' for the informal waste sector? (250 Words, 15 Marks)

ONE-LINE TAKEAWAYS

- The treaty originates from **UNEA Resolution 5/14** (March 2022) to establish an international legally binding instrument.
- Adopts a **full life-cycle approach** covering polymer production, chemical additives, design, consumption, and waste management.
- The central geopolitical rift pits the **High Ambition Coalition** (advocating primary polymer

caps) against petrostates (favoring downstream waste interventions).

- **India advocates** for a bottom-up framework anchored in National Action Plans, rejecting global production caps while prioritizing tech transfer and financial mechanisms.
- India's domestic framework rests on the **Plastic Waste Management Rules, 2016**, the **2022 SUP ban**, and mandatory **EPR implementation** through a digital portal.
- Inclusion of a **Just Transition** framework is essential to protect the livelihoods of millions of informal waste collectors in the Global South.

WAY FORWARD

A effective Global Plastics Treaty must reconcile environmental ambitions with socio-economic realities in developing nations. The agreement should move past binary disputes over primary production caps by establishing a phased, differentiated framework supported by science-based standards.

For developing economies like India, the treaty must provide dedicated financial transfers, non-discriminatory technology access, and robust capacity-building mechanisms to scale up circular infrastructure. Domestically, India should strengthen its Extended Producer Responsibility (EPR) framework, enforce eco-design standards, invest in scalable plastic alternatives, and formally integrate informal waste pickers into municipal SWM frameworks.

A pragmatic treaty grounded in the principle of Common But Differentiated Responsibilities (CBDR) can halt plastic pollution while upholding a fair transition for all.

Climate-Resilient Agriculture: CAZRI Moth Bean Varieties Excel Under El Niño Stress

Key Highlights & Summary

- **Breakthrough Crop Resilience**: Four recently released moth bean varieties (*CAZRI Moth-4, 5, 6, and 7*) demonstrated high drought tolerance during Kharif 2026, enduring a **35-day dry spell** (3 August to 7 September 2026) in an El Niño year.
- **Developed by CAZRI Jodhpur**: The varieties were bred by the ICAR–Central Arid Zone Research Institute (CAZRI), Jodhpur, after over a decade of genetic improvement targeting western Rajasthan's hot arid zones.
- **Adaptation Feature (Developmental Plasticity)**: Flowering begins early (~30 days after sowing), allowing the crop to adjust its growth, pod formation, and maturity dynamically based on subsurface soil moisture availability.
- **Seed Multiplication and Adoption Target**: Seed multiplication is underway at CAZRI to meet a 23.32-quintal breeder seed indent on the **SATHI Portal** for 2026. Wider certified seed multiplication via Rajasthan State Seeds Corporation and National Seeds Corporation aims to cover **25% of Rajasthan's moth bean area**.
- **Low Soil Fertility Performance**: Yielded green canopy growth and profuse pod development even under poor soil fertility (organic carbon 0.13–0.18%, available N 90–100 kg/ha).

Essential Definitions

- **Moth Bean (*Vigna aconitifolia*)**: A highly drought-resistant pulse crop indigenous to the hot arid zones of western Rajasthan, grown over ~10 lakh hectares but traditionally limited by low

average productivity (~350 kg/ha).

- **Developmental Plasticity**: The capacity of a plant variety to alter its phenological development, growth rate, and reproductive timing in response to fluctuating environmental conditions such as moisture stress.
- **SATHI Portal (Seed Traceability, Authentication and Holistic Inventory)**: A centralized digital platform managed by the Ministry of Agriculture and Farmers Welfare to streamline seed supply chains, breeder seed indents, and certification tracking.



Legal and Constitutional Framework

- **Seventh Schedule (State List, Entry 14)**: Designates agriculture, including agricultural education and research, as a primary responsibility of State governments, complemented by central research through ICAR.
- **Seeds Act, 1966**: Regulates the quality and certification of seeds sold in India, facilitating the transition of CAZRI breeder seeds into certified seeds for commercial distribution.
- **National Food Security Mission (NFSM) – Pulses**: Provides financial assistance and technology demonstrations to scale climate-resilient pulse varieties and achieve self-reliance in pulse production.

Prelims Perspective

- **Developing Institute**: ICAR–Central Arid Zone Research Institute (CAZRI), Jodhpur.
- **Varieties Identified**: CAZRI Moth-4, CAZRI Moth-5, CAZRI Moth-6, and CAZRI Moth-7.
- **Key Soil Metrics in Arid Western Rajasthan**: Low organic carbon (0.13–0.18%), alkaline pH (7.9–8.1), and low available nitrogen (90–100 kg/ha).
- **Optimum Management Geometry**: 45 × 10 cm plant spacing combined with mechanical interculture at 20 days after sowing for moisture conservation.

Mains Perspective

- **Climate Adaptation in the Thar Desert**: Genetic improvement combined with agronomic management protects rainfed arid farming against increasing rainfall variability driven by El Niño events.
- **Achieving Pulse Self-Sufficiency**: Scaling up drought-tolerant pulses directly reduces reliance on pulse imports while enriching fragile desert soils through biological nitrogen fixation.
- **Role of Technology-Driven Seed Chain**: Integrating CAZRI breeder seed output with the SATHI Portal ensures rapid multiplication, traceable supply chains, and faster adoption by smallholders.

Government and Policy Response

- **Breeder-to-Certified Seed Scaling**: Collaborating with Rajasthan State Seeds Corporation and National Seeds Corporation (NSC) to turn 1 quintal of breeder seed into 1,000–1,400 quintals of certified seed.
- **Integrated Package of Practices**: Promoting agronomic strategies—such as optimal sowing windows, weeding at 20 DAS, and soil moisture conservation—alongside genetic distribution.
- **SATHI Digital Indenting**: Institutionalizing seed demand from states via a unified portal to streamline distribution.

Key Challenges

- **Low Initial Soil Carbon & Moisture**: Rapid loss of topsoil moisture (dropping from 15–16% to 5–6% during dry spells) places high reliance on subsurface water reserves (10–40 cm layer).
- **Low Farmer Certified Seed Replacement Rate (SRR)**: Ensuring desert farmers replace traditional saved seeds with new certified CAZRI varieties across remote blocks.
- **High Evapotranspiration Rates**: Cumulative pan evaporation reaching 317 mm over the growth window creates high atmospheric water demand during key reproductive stages.

Mains Value Addition

- **Multiplier Effect of Breeder Seeds**: 1 quintal of breeder seed can produce 1,000–1,400 quintals of certified seed, capable of covering up to 10,000 hectares of farm area.
- **Area Coverage Potential**: Widespread adoption of these 4 varieties can cover approximately **25% of the total moth bean area in Rajasthan**.

Possible UPSC Two Questions of Mains

1. "Genetic improvement coupled with tailored agronomic management forms the core of climate-smart agriculture in arid zones." Discuss with reference to CAZRI's recent pulse breeding innovations.
2. Evaluate the challenges of rainfed pulse cultivation in India's hot arid regions. How can digital seed supply chain platforms like the SATHI Portal accelerate the adoption of drought-resilient crop varieties?

VIDHVATH IAS ACADEMY

Way Forward

- **Accelerate Seed Replacement Rate (SRR)**: Expand frontline demonstrations (FLDs) in western Rajasthan districts (e.g., Jodhpur, Barmer, Bikaner) to encourage adoption.
- **Incentivize Soil Organic Carbon Enrichment**: Pair crop cultivation with micro-dosing of organic manures or bio-fertilizers to enhance rhizosphere moisture retention.
- **Expand Micro-Irrigation Backups**: Integrate protective micro-irrigation (e.g., farm ponds with drip systems) to offer critical life-saving irrigation during extreme dry spells exceeding 35 days.

Conclusion

The field performance of CAZRI's moth bean varieties highlights the role of genetic plasticity and crop management in building climate resilience. Scaling these innovations through national seed supply

networks offers a sustainable pathway to strengthen food security and farmer incomes in India's arid ecosystems.

Sustainability & Resource Management: World Circular Economy Forum (WCEF) 2026

Key Highlights & Summary

- **Global Summit Concluded**: The 10th edition of the **World Circular Economy Forum (WCEF2026)** concluded in **Gandhinagar, Gujarat**.
- **Core Theme**: Organized around *"Circular Economy: Transition for People and Prosperity,"* focusing on inclusion, job creation, and scalable resource management.
- **Host & Organizers**: Hosted jointly by India's **Ministry of Environment, Forest and Climate Change (MoEFCC)**, the **Central Pollution Control Board (CPCB)**, the **Government of Gujarat**, and Finland's **Sitra** (Finnish Innovation Fund).
- **Key Launches**: Unveiling of the official **Ecomark logo** alongside 80 accelerator sessions to transition policy commitments into ground-level execution.
- **Next Host Nation**: The baton for **WCEF 2027** was formally handed over to **Columbia University, USA**.

Essential Definitions

- **Circular Economy**: An economic framework that decouples economic activity from the consumption of finite resources by designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.
- **Extended Producer Responsibility (EPR)**: A policy approach under which producers are given significant responsibility—financial and/or physical—for the treatment or disposal of post-consumer products.
- **Ecomark Scheme**: India's eco-labeling initiative administered by the CPCB to identify products that meet specific environmental criteria and circularity standards.
- **Sitra (Finnish Innovation Fund)**: An independent future-oriented fund operating under the Parliament of Finland that initiated the annual World Circular Economy Forum in 2017.

Legal and Constitutional Framework

- **Article 48A**: Directive Principle of State Policy instructing the State to protect and improve the environment and safeguard forests and wildlife.
- **Article 51A(g)**: Fundamental Duty obligating every citizen to protect and improve the natural environment.
- **Environment (Protection) Act, 1986**: Statutory backbone for waste management regulations, including Extended Producer Responsibility (EPR) mandates for plastics, e-waste, battery waste, and hazardous materials.

Prelims Perspective

- **Summit Edition & Venue**: 10th Edition held at Mahatma Mandir, Gandhinagar, Gujarat.
- **WCEF 2027 Host**: Columbia University, United States of America.
- **Key Delegations**: ~2,700 delegates and 260 speakers across 60+ countries.
- **New Eco-Label**: Introduction of the modernized **Ecomark logo**.
- **Founding Entity**: Sitra (Finland).

Mains Perspective

- **Economic and Social Transition**: Shifting the narrative from viewing circularity as a regulatory burden to treating it as an economic catalyst for investment, green job creation, and material security.
- **Inclusion of Informal Waste Sector**: Integrating informal waste pickers into formalized Materials Recovery Facilities (MRFs) to ensure just transitions and social safety nets.
- **Decoupling Resource Intensity**: Driving industrial efficiency to protect supply chains against raw material volatility and high processing costs.

Government and Policy Response

- **EPR Framework Implementations**: Mandatory digital tracking platforms for plastic packaging, e-waste, waste tyres, and used batteries managed by the CPCB.
- **Mission LiFE (Lifestyle for Environment)**: Aligning circular economic principles with individual citizen action and grassroots behavior change (*Jan Bhagidari*).
- **NITI Aayog Circular Economy Committees**: Sector-specific focus groups working across 11 key waste streams (e.g., scrap metal, electronic waste, toxic and hazardous waste, municipal solid waste).

Key Challenges

- **Primary vs. Secondary Material Price Disparity**: Recycled materials often face higher initial market prices than virgin materials due to unpriced environmental externalities.
- **Technological & Quality Barriers**: Fragmented processing technologies hinder secondary materials from consistently meeting high manufacturing standards.
- **Financing Gaps for Circular Startups**: Lenders require predictable cash flows and clear unit economics, which can be difficult for early-stage circular ventures without stable feedstock supply chains.

Mains Value Addition

- **UNEP System Dynamics Projection**: Combining economy-wide resource efficiency with circular practices across vehicles, buildings, and plastics could boost global GDP by **8.18% by 2050** compared to business-as-usual scenarios.
- **Material Intensity Impact**: Scaled circular solutions can reduce global material intensity by **42.9%** and energy demand by **37.3%**.

Possible UPSC Mains Questions

1. "Transitioning to a circular economy is not merely an environmental obligation but an economic imperative for India's long-term material security." Examine in light of the outcomes of WCEF 2026.
2. Evaluate the efficacy of Extended Producer Responsibility (EPR) regulations in India. How can public-private partnerships accelerate the formalization of the waste management sector?

Way Forward

- **Standardization & Certification**: Accelerate clear quality benchmarks and traceability standards for secondary raw materials.
- **De-Risking Circular Investments**: Utilize blended finance and public guarantees to stabilize supply chains and attract private equity to waste-to-wealth infrastructure.
- **Localized Infrastructure**: Build regional Material Recovery Facilities and eco-industrial parks to reduce transportation overheads and foster local industrial symbiosis.

Conclusion

The successful hosting of WCEF2026 in Gandhinagar highlights India's role in advancing climate action and resource efficiency. Turning policy commitments into ground-level partnerships will be key to building scalable and inclusive circular economic models.

INTERNATIONAL RELATIONS

BRICS New Delhi Declaration 2026: Building for Resilience, Innovation, Cooperation and Sustainability

KEY HIGHLIGHTS & SUMMARY

- **Historic Summit Benchmark:** The XVIII BRICS Summit was convened in New Delhi from 12–13 September 2026 under India’s Chairship, coinciding with the 20th anniversary of the BRICS formation.
- **Unified Global Governance Reform:** The Summit adopted the *New Delhi Declaration*, demanding comprehensive reforms of the United Nations (including the UN Security Council) and Bretton Woods institutions, alongside the 17th General Review of IMF Quotas.
- **Opposition to Unilateral Economic Coercion:** Member states unanimously opposed unilateral trade barriers, extraterritorial sanctions, and Carbon Border Adjustment Mechanisms (CBAM).
- **Next-Generation Financial Infrastructure:** Endorsed the BRICS Cross-Border Payments Initiative, the Multilateral Guarantees initiative, a New Investment Platform, and the establishment of a BRICS Risk Lab at GIFT City.
- **Agricultural & Commodity Security:** Proposed the creation of a BRICS Grain Exchange alongside the BRICS AGRIN network and a Global Forum on Farmers' Rights in Seed Systems.



- **Firm Stance on Counter-Terrorism:** Reaffirmed zero tolerance for terrorism, condemned the 22 April 2025 attack in Jammu and Kashmir, rejected geopolitical "double standards," and pressed for the early adoption of the Comprehensive Convention on International Terrorism (CCIT).
- **Frontier Tech & AI Governance:** Released a dedicated BRICS Leaders' Statement on AI Governance, alongside frameworks for Digital Public Infrastructure (DPI) and child-centric digital safety.
- **Institutional Health & Climate Initiatives:** Launched the BRICS Mission for Healthy Lifestyle, a NIMHANS-led mental health Centre of Excellence network, and endorsed India's International Big Cats Alliance (IBCA) for biodiversity preservation.

WHY IN NEWS?

The adoption of the **New Delhi Declaration** at the 18th BRICS Summit signifies a pivotal moment in South-South cooperation. Hosted at Bharat Mandapam, New Delhi under India's 2026 Chairship, the summit marked two decades of BRICS evolution. It signaled a shift from a purely political dialogue forum into an operational economic and technological bloc capable of creating alternative settlement mechanisms, technology standards, and climate action frameworks for the Global South.

BACKGROUND & CORE CONCEPT

Originating as an economic acronym coined by Goldman Sachs in 2001 (BRIC) and formalized as a leader-level summit in 2009 (expanding to BRICS with South Africa in 2010), the grouping underwent landmark expansion. Today, as an expanded multi-continental alliance, BRICS represents over 45% of the world's population and more than 35% of global GDP (PPP).

The 2026 Summit focused on consolidating this expanded membership through the theme **"Building for Resilience, Innovation, Cooperation and Sustainability."**

ESSENTIAL DEFINITIONS

- **BRICS:** A multilateral grouping of major emerging economies (originally Brazil, Russia, India, China, South Africa, now expanded with full members and partner countries) acting as a key driver of South-South cooperation.
- **Emerging Markets and Developing Countries (EMDCs):** Developing nations seeking systemic reform of global political, financial, and trade architectures to reflect contemporary geopolitical realities.
- **Global South:** Non-Western, developing, and emerging nations located primarily across Latin America, Africa, Asia, and Oceania advocating for equitable global governance.

KEY POINTS:

- 2001: "BRIC" Acronym Coined
- 2009: First formal Summit
- 2010: South Africa Joined
- 2024+: Major Bloc Expansion

2026: XVIII Summit (New Delhi)

Focus: Operational & Financial Institutionalization

- **Bretton Woods Institutions:** The International Monetary Fund (IMF) and World Bank Group, established in 1944, currently targeted by EMDCs for structural quota and voting-power realignment.
- **Unilateral Coercive Measures (UCMs):** Non-UN Security Council sanctioned economic tariffs, sanctions, or border adjustment taxes (e.g., CBAM) imposed by individual states or blocs.
- **Multipolarity:** An international distribution of power where geopolitical influence is distributed among multiple sovereign poles rather than dominated by a single hegemon or two super-powers.

KEY FEATURES & IMPORTANT FACTS

1. Financial Architecture & Trade Integration

- **BRICS Cross-Border Payments Initiative:** Focuses on facilitating local-currency cross-border trade settlements to reduce reliance on third-currency clearing systems and minimize exchange-rate volatility.
- **GIFT City BRICS Risk Lab:** Established within Gujarat International Finance Tec-City (GIFT-IFSC) to assess financial risks, sovereign debt vulnerabilities, and macroeconomic stress points for member states.
- **New Investment Platform & Guarantees:** Complements the New Development Bank (NDB) and Contingent Reserve Arrangement (CRA) by deploying multilateral risk-mitigation guarantees to mobilize private capital for infrastructure.

2. Digital Infrastructure & AI Governance

- **AI Governance Statement:** Sets baseline principles for safe, ethical, and inclusive Artificial Intelligence, advocating for open-source AI models accessible to developing nations.
- **Digital Public Infrastructure (DPI):** Integrates India's experience with modular, open-source technology frameworks (e.g., Unified Payments Interface, digital identity) to foster inclusive digital economies across the Global South.

3. Food, Health, and Environmental Initiatives

- **BRICS Grain Exchange:** A proposed institutional exchange to facilitate transparent price discovery and balance grain supply chains across member states.
- **Mental Health Centre of Excellence Network:** Led by India's National Institute of Mental Health and Neurosciences (NIMHANS) to facilitate cross-border psychiatric research and clinical exchanges.
- **Nodal Climate Partnerships:** Endorsed community-based adaptation mechanisms and welcomed the International Big Cats Alliance (IBCA) for mega-fauna conservation.

LEGAL AND CONSTITUTIONAL FRAMEWORK

1. Indian Constitutional Mandate

- **Article 51 (Directive Principles of State Policy):** Mandates that the State shall promote international peace and security, maintain just and honourable relations between nations, foster respect for international law and treaty obligations, and encourage settlement of international disputes by arbitration.
- **Union List (Seventh Schedule, Entries 10–14):** Confers exclusive legislative competence upon Parliament over foreign affairs, diplomatic representation, treaties, and international conferences.

- **Article 253:** Empowers Parliament to enact domestic legislation required to execute international agreements and summit commitments.
- **Article 73:** Extends executive power of the Union to all international domains where Parliament has power to make laws.

2. Domestic Counter-Terrorism Legislation

- **Unlawful Activities (Prevention) Act, 1967 (UAPA):** Provides domestic legal authority to enforce BRICS counter-terrorism declarations and target UN-designated terrorist entities.
- **Prevention of Money Laundering Act, 2002 (PMLA):** Provides the legal architecture to combat terror financing and illicit financial flows highlighted in the Summit declaration.

PRELIMS PERSPECTIVE

Critical Facts & Chronology

- **Summit Host:** Bharat Mandapam, New Delhi (12–13 September 2026).
- **Chairship Transition:** India served as Chair for 2026; China will assume the BRICS Chairship for 2027.
- **NIMHANS Role:** Designated as the lead institution for the newly established BRICS Mental Health Centre of Excellence Network.
- **GIFT City Role:** Host to the new BRICS Risk Lab.

Common Prelims Traps & Confusions

Subject	Common Trap / Misconception	Actual Fact / Position
UNSC Reform Stance	"China and Russia explicitly agreed to confer permanent UNSC seats to India and Brazil."	**Incorrect.** The declaration states China and Russia support the *aspirations* of Brazil and India to play a *greater role* in the UN, including its Security Council.
Local Currency System	"BRICS introduced a single, common monetary currency replacing national currencies."	**Incorrect.** BRICS launched a *Cross-Border Payments Initiative* using existing national local currencies, not a single unified currency.
New Development Bank (NDB)	"The NDB was established under the 2026 New Delhi Declaration."	**Incorrect.** The NDB was established by the Fortaleza Declaration in 2014; the 2026 Summit backed its operational expansion.
Carbon Border Adjustment	"BRICS member states endorsed the European Union's CBAM as an effective climate measure."	**Incorrect.** The Summit explicitly opposed CBAM as a unilateral, protective trade barrier.

MAINS PERSPECTIVE

Dimensions of Analysis

1. Strategic & Geopolitical Dimension

- **Rebalancing Global Multipolarity:** The Declaration reinforces the transition toward a multipolar global order, mitigating western-centric institutional dominance without forming an explicitly anti-Western military bloc.
- **Consensus on Counter-Terrorism:** Aligning member countries against cross-border terrorism—including specific reference to the April 2025 Jammu & Kashmir attack—strengthens the demand for the early adoption of the Comprehensive Convention on International Terrorism (CCIT).

2. Economic & Financial Autonomy

- **De-risking Foreign Exchange Exposure:** Promoting local currency settlement mechanisms insulates emerging market balance sheets from unilateral economic sanctions, interest-rate fluctuations, and liquidity shocks.
- **Reforming Bretton Woods Institutions:** Pressuring the IMF for structural quota alignment under the 17th General Review helps adjust voting weights in favor of growing Global South economies.

3. Technological Sovereignty

- **Democratizing Artificial Intelligence:** The BRICS Statement on AI Governance counters tech-monopolies by supporting open frameworks, avoiding algorithmic biases, and ensuring equitable technology access for developing nations.

GOVERNMENT / POLICY RESPONSE

- **Digital Public Infrastructure Export:** India's *India Stack* architecture serves as a foundational model for the BRICS DPI agenda, aiding financial inclusion across Africa and Latin America.
- **International Big Cats Alliance (IBCA):** India's mega-fauna conservation framework gained formal consensus among BRICS nations to protect vulnerable ecological corridors.
- **Jaipur Consensus on MSME Trade:** Introduced mechanisms for MSME invoice discounting to unlock working capital and improve integration into global supply chains.

KEY CHALLENGES

VIDHVATH IAS ACADEMY

- **Intra-Bloc Geopolitical Divergences:** Differing strategic priorities among key members (e.g., India-China border and strategic dynamics, varying postures on Western engagement) can constrain operational speed.
- **Interoperability of Payment Systems:** Integrating vastly different banking architectures, capital controls, and central bank digital currencies (CBDCs) across diverse economic systems presents technical and regulatory hurdles.
- **Heterogeneous Economic Profiles:** Broad variances in inflation rates, sovereign debt levels, and trade structures make uniform economic policies difficult to execute.

MAINS VALUE ADDITION

Constitutional Provisions & Statutory References

- **Article 51:** DPSPs on promoting international peace and security.

- **Entries 10–14 (List I):** Parliamentary sovereignty over foreign policy and treaty implementation.
- **UAPA (1967) & PMLA (2002):** Domestic legal enforcement tools for counter-terror and anti-financial crime mandates.

Key Terminology for Answer Writing

- **"3Rs Principles (Representation, Responsiveness, Rule-making)"**
- **"De-risking Trade Settlements"**
- **"Democratization of Global Governance"**
- **"Digital Public Infrastructure (DPI) Diplomacy"**
- **"Strategic Autonomy in Multipolarity"**

POSSIBLE UPSC QUESTIONS

Mains Question 1

"The 18th BRICS New Delhi Declaration marks a transition of the grouping from a political dialogue forum to an operational economic bloc. Analyze this statement in light of recent initiatives taken in cross-border payments, supply chain resilience, and global governance reforms."

Mains Question 2

"Examine how India can leverage its position in BRICS to champion the priorities of the Global South while maintaining its strategic autonomy and balancing its engagements with Western partnerships."

ONE-LINE TAKEAWAYS

1. The XVIII BRICS Summit took place in New Delhi under India's Chairship in September 2026, marking 20 years of the bloc's existence.
2. The New Delhi Declaration calls for structural reforms of the UN Security Council and the IMF's 17th General Review of Quotas.
3. Unilateral tariffs, extraterritorial sanctions, and Carbon Border Adjustment Mechanisms (CBAM) were explicitly opposed.
4. A BRICS Risk Lab is slated for establishment at GIFT City, Gujarat.
5. Member nations issued a dedicated Leaders' Statement on AI Governance alongside Digital Public Infrastructure (DPI) initiatives.
6. India's International Big Cats Alliance (IBCA) gained formal backing from BRICS nations.
7. NIMHANS will lead the newly established BRICS Mental Health Centre of Excellence Network.

WAY FORWARD

The BRICS New Delhi Declaration reflects the grouping's evolving role as a constructive force in global governance. For India, leading this chairship provided a platform to align the priorities of the Global South with practical, actionable outcomes in digital finance, healthcare, and sustainable development. Moving forward, the success of the New Delhi Declaration depends on executing the proposed financial and

technical platforms, maintaining diplomatic consensus among an expanded membership, and continuing to uphold a rules-based, inclusive, and multipolar world order.

IndiaAI Mission and Sweden Discuss Strategic Cooperation in Artificial Intelligence and Digitalisation under SITAC

Key Highlights & Summary

- **Bilateral Engagement**: IndiaAI Mission under MeitY convened a strategic dialogue with Sweden under the Sweden-India Technology and AI Corridor (SITAC) in New Delhi.
- **Core Objective**: The meeting aimed to synergize India's AI scale, talent pool, and Digital Public Infrastructure (DPI) with Sweden's industrial, research, and advanced manufacturing expertise.
- **Pillars of IndiaAI Mission**: Discussions highlighted compute capacity, datasets, domain-specific AI models, skill development, startup financing, and Safe & Trusted AI framework.
- **Focus Areas**: Emphasis was placed on enterprise AI adoption, data governance, localization, compute infrastructure, and cross-border commercial testbeds.
- **Industry Collaboration**: Key enterprise leaders from both nations (e.g., TCS, Tech Mahindra, Volvo Group, Saab, SKF) explored co-development, pilots, and industrial technology integration.
- **Sustained Agenda**: SITAC will serve as a structured channel to translate technological cooperation into long-term commercial partnerships and responsible tech deployment.

Essential Definitions

- **SITAC**: Sweden-India Technology and AI Corridor, a bilateral framework designed to accelerate cooperation in emerging technologies, startup bridging, and digital policy.
- **IndiaAI Mission**: A flagship national initiative under MeitY aiming to establish a comprehensive AI ecosystem in India through public-private partnerships, compute development, and indigenous innovation.
- **Industrial AI**: The application of artificial intelligence, machine learning, and advanced analytics in core manufacturing, heavy engineering, and industrial supply chains to optimize operations.

Legal and Constitutional Framework

- **Article 51(c) of the Constitution**: Enjoins the State to foster respect for international law and treaty obligations, providing a constitutional impetus for international technology cooperation.
- **Digital Personal Data Protection (DPDP) Act, 2023**: Governs cross-border data flows, data processing, and enterprise privacy protocols relevant to foreign AI entities operating in India.
- **Information Technology Act, 2000 & Rules**: Regulates digital infrastructure, algorithmic accountability, and intermediary obligations for AI software deployment.

Prelims Perspective

- **IndiaAI Pillars**: Compute Capacity, IndiaAI Innovation Centre (Datasets & Models), Application Development Initiative, IndiaAI FutureSkills, Startup Financing, and Safe & Trusted AI.
- **Nodal Ministry**: Ministry of Electronics and Information Technology (MeitY).

- **SITAC Partnership**: A bilateral track between India and Sweden specifically focusing on technology transfer, startup ecosystems, and industrial AI applications.

Mains Perspective

- **Geopolitics of AI**: Bilateral partnerships allow India to diversify technological dependencies away from single-country monopolies while setting standards for ethical AI governance.
- **Digital Public Infrastructure (DPI)**: Integrates India's large-scale DPI with high-value industrial solutions, facilitating rapid testing and scalability in global markets.
- **Industrial Decarbonization**: Leveraging Swedish manufacturing innovation and Indian software prowess enables green industrial automation and smart energy management.

Government and Policy Response

- **National Strategy for Artificial Intelligence**: NITI Aayog's "AIforAll" roadmap focused on inclusive and safe technology adoption.
- **Production Linked Incentive (PLI) Schemes**: Complementing technology acquisition in electronics manufacturing and advanced component production.
- **IndiaAI Datasets Platform**: Streamlining access to non-personal, anonymized public data sets for researchers and industry partners.

Key Challenges

- **Data Sovereignty vs Cross-Border Flows**: Reconciling strict domestic data localization norms with foreign startup collaboration and data access.
- **Compute Bottlenecks**: High capital expense in creating hardware-heavy Graphic Processing Unit (GPU) infrastructure locally.
- **Standards & Interoperability**: Absence of unified global standards for ethics, testing, and trustworthy AI verification across jurisdictions.

Mains Value Addition

- **Quote**: "Sweden brings deep industrial expertise, while India offers unmatched scale and digital public infrastructure." — CEO, IndiaAI Mission.
- **Concept**: Technology Corridor as a instrument of middle-power tech-diplomacy, bypassing rigid global tech divides.

Possible UPSC Two Questions of Mains

1. "Bilateral technology corridors serve as vital pillars for national AI missions." Examine the strategic significance of the Sweden-India Technology and AI Corridor (SITAC) in strengthening India’s digital economy.
2. Critically analyze the governance and infrastructural challenges India faces in scaling up Enterprise AI, and suggest measures to establish a safe and trusted AI ecosystem.

Way Forward

- **Establish Joint Testbeds**: Create sector-specific sandboxes in robotics, automotive safety, and smart manufacturing to accelerate real-world deployment.

- **Harmonize Ethical Standards**: Co-develop frameworks for transparent, safe, and unbiased AI algorithms aligned with global best practices.
- **Scale Talent Mobility**: Institute dual-degree and research exchange programs focusing on frontier AI models and hardware engineering.

Conclusion

The India-Sweden AI dialogue under SITAC marks a decisive shift towards pragmatic, industry-aligned technology partnerships. By combining India's scalable DPI and engineering talent with Sweden's industrial excellence, both nations can build resilient, ethical, and market-ready AI solutions for the global economy.

Strategic Studies & Foreign Policy: Hard Security Transitions in West Asia

Key Highlights & Summary

- **Obsolescence of Strategic Hedging**: India's legacy West Asia policy—defined by "multi-alignment," transactional commerce, and strategic hedging across regional power centers—is facing rapid obsolescence amid a structural shift in regional security dynamics.
- **Emergence of Trilateral Defence Architecture**: The signing of the **Mecca Joint Defence Agreement (MJDA)** between Saudi Arabia, Türkiye, and Pakistan signals a new collective defence architecture that merges Gulf financial capital, Turkish defence-industrial technology, and Pakistani military manpower.
- **U.S. Selective Re-engagement & Security Vacuum**: The gradual retreat of the United States into selective engagement has created a significant security vacuum across major maritime choke points and trade corridors.
- **Vulnerability to Asymmetric Threats**: Regional energy infrastructure and maritime sea lines of communication (SLOCs) remain highly vulnerable to low-cost drone warfare, grey-zone tactics, and disruptions across the Bab-el-Mandeb and the Strait of Hormuz.
- **Imperative for India**: India must pivot from being a passive beneficiary of regional stability to an active **net security provider** in the Western Indian Ocean to protect its energy lines, trade routes, and diaspora.

Essential Definitions

VIDHVATH IAS ACADEMY

- **Multi-Alignment Policy**: A pragmatic diplomatic strategy where a nation maintains balanced, independent, and non-binding relationships with competing geopolitical power centers without committing to formal security alliances.
- **Net Security Provider**: A nation capable of projecting credible military and operational presence to stabilize its maritime domain, protect international sea lanes, and deliver disaster relief or counter-terrorism support to regional allies.



- **Grey-Zone Warfare**: Strategic activities conducted by state or non-state actors that fall between traditional peace and formal warfare, relying on asymmetric tools such as drone strikes, cyberattacks, and maritime blockades.

- **Mecca Joint Defence Agreement (MJDA)**: A trilateral collective defence framework signed in August 2026 by Saudi Arabia, Türkiye, and Pakistan that contains a mutual assistance clause treating an attack on one member as an attack on all.

Legal and Constitutional Framework

- **Article 51 of the Indian Constitution**: Directs the State to promote international peace and security, foster respect for international law, and maintain just and honorable relations between nations.
- **UN Convention on the Law of the Sea (UNCLOS), 1982**: Codifies international maritime law, guaranteeing freedoms of navigation and innocent passage through strategic straits like Hormuz and Bab-el-Mandeb.
- **Bilateral Defence Cooperation Agreements**: The statutory and institutional frameworks enabling joint naval exercises, intelligence sharing, logistics support, and military training between India and Gulf Cooperation Council (GCC) member states.

Prelims Perspective

- **Key Geopolitical Choke Points**:
  - **Bab-el-Mandeb**: Connects the Red Sea to the Gulf of Aden / Arabian Sea.
  - **Strait of Hormuz**: Connects the Persian Gulf to the Gulf of Oman / Arabian Sea.
- **Trilateral Alliance Members**: Saudi Arabia, Türkiye, and Pakistan.
- **Key Strategic Formations**:
  - **I2U2 Grouping**: India, Israel, UAE, and the United States (focused on economic, infrastructure, and technological integration).
  - **IMEC (India-Middle East-Europe Economic Corridor)**: A multi-modal transit corridor connecting India, the Arabian Gulf, and Europe.
- **Indian Navy Operations**: Operation *Sankalp* (maritime security operations in the Persian Gulf and Gulf of Oman).

Mains Perspective

VIDHVATH IAS ACADEMY

- **Shift to Hard Power Coalitions**: Regional middle powers are prioritizing tangible hard-power security guarantees—including naval patrols, joint military exercises, and defence technology partnerships—over routine diplomatic engagements.
- **Triangular Dynamics (Pakistan-Türkiye-Saudi Arabia)**: The convergence of Turkish drone technology, Pakistani military personnel, and Saudi financing creates a formidable regional axis along India's western strategic flank.
- **Threat to Economic Integration**: Heightened grey-zone warfare and maritime blockades directly threaten the execution of strategic infrastructure initiatives like IMEC and INSTC.
- **Diaspora and Energy Vulnerability**: Over 8.5 million Indian expatriates reside in the Gulf, and over 60% of India's crude oil imports transit West Asian maritime channels, necessitating active maritime domain awareness.

Government and Policy Response

- **Operation Sankalp & Maritime Patrols**: Enhanced deployment of Indian Navy guided-missile destroyers and maritime reconnaissance aircraft (P-8I) to safeguard Indian-flagged merchant vessels.
- **Defence Exports & Security Partnerships**: Deepening bilateral defence cooperation with the UAE, Oman, and Saudi Arabia through joint exercises (e.g., *Zayed Talwar*, *Al Mohed Al Hindi*), logistics sharing, and defence equipment exports.
- **Coastal Security Collaboration**: Expanding Information Fusion Centre – Indian Ocean Region (IFC-IOR) linkages with Gulf partner nations for real-time maritime domain awareness (MDA).

Key Challenges

- **Maintaining Strategic Autonomy**: Balancing hard-security engagement with regional states without getting entangled in regional rivalries or proxy conflicts.
- **Asymmetric Maritime Warfare**: Defending commercial shipping against low-cost Unmanned Aerial Vehicles (UAVs), loitering munitions, and unmanned surface vessels (USVs).
- **Diplomatic Balancing**: Navigating relationships across rival power centers—such as Iran, Israel, and the GCC—as rigid regional blocs emerge.

Mains Value Addition

- **MAHASAGAR Concept**: India's overarching vision of *"Mutual and Holistic Advancement for Security and Growth Across Regions"* serves as a maritime security doctrine extending into the Western Indian Ocean.
- **Commercial Dependence**: Over $200 billion in Indian trade transits the Red Sea and Arabian Sea annually, emphasizing the economic necessity of naval stability.

Possible UPSC Mains Questions

1. "India's traditional policy of multi-alignment in West Asia is encountering limitations as regional security dynamics shift toward hard military alliances." Critically analyze in light of recent geopolitical developments.
2. Evaluate the strategic implications of the emerging Pakistan-Türkiye-Saudi Arabia defence pact for India's national security and maritime interests in the Western Indian Ocean.

Way Forward

- **Enhance Joint Naval Capabilities**: Expand bilateral and multilateral naval patrols, joint surveillance, and port-visit frequencies across the Gulf of Oman, Arabian Sea, and Red Sea.
- **Leverage Defence Indigenization for Exports**: Offer Indian-made defence hardware, surveillance radars, and counter-drone systems to friendly Gulf nations.
- **Accelerate Connectivity Infrastructure**: Secure financial and operational frameworks for the India-Middle East-Europe Economic Corridor (IMEC) to build resilient supply chain redundancies.

Conclusion

As regional security architectures coalesce around hard-power alliances, relying solely on commercial trade and diaspora diplomacy is no longer sufficient to protect Indian national interests. New Delhi must leverage its growing naval capabilities and defence-industrial base to construct robust, hard-power security frameworks in West Asia.

SOCIAL

PM-AJAY: Integrated Development of SC Communities

Key Highlights & Summary

- **Scheme Overview:** Pradhan Mantri Anusuchit Jaati Abhyuday Yojana (PM-AJAY) is a merged 100% Centrally Sponsored Scheme under the Ministry of Social Justice and Empowerment aimed at reducing poverty and disparities in Scheduled Caste (SC) majority areas.
- **Component Restructuring:** Merges three erstwhile schemes: Special Central Assistance to Scheduled Castes Sub Plan (SCA to SCSP), Pradhan Mantri Adarsh Gram Yojana (PMAGY), and Babu Jagjivan Ram Chhatrawas Yojana (BJRCY).
- **Core Pillars:** Operates through three primary components: Adarsh Gram (development of SC-majority villages), Grants-in-Aid for District/State Socio-Economic Projects (livelihoods, skill development, infrastructure), and Construction/Repair of Hostels in higher educational institutions.
- **Implementation Standard:** Selected villages must achieve a score of at least 70/100 across identified socio-economic development indicators and complete a Village Development Plan (VDP) through scheme convergence to earn 'Adarsh Gram' status.
- **Progress in Andhra Pradesh:** Out of 1,159 selected villages, 892 have been declared Adarsh Grams. Between FY 2023–24 and 2025–26, over 1.19 lakh beneficiaries were covered under Grants-in-Aid, with the majority benefiting from infrastructure interventions.
- **Fund Release Prerequisites:** Grants and gap-filling assistance are strictly conditional upon the complete utilization of previously released funds and the timely submission of mandatory Utilization Certificates (UCs).

Essential Definitions

- **Adarsh Gram:** A village having more than 50% SC population that possesses adequate physical and social infrastructure and meets threshold scores on socio-economic indicators across health, education, and sanitation.
- **Village Development Plan (VDP):** A localized, need-based action plan formulated to identify critical infrastructure gaps and enable convergence of existing Central and State schemes.
- **Gap-Filling Funds:** Financial assistance provided under PM-AJAY to meet critical local development needs that cannot be funded through other existing government schemes.

Legal and Constitutional Framework

- **Article 46 (Directive Principles):** Directs the State to promote with special care the educational and economic interests of the weaker sections of the people, and in particular, of the Scheduled Castes.
- **Article 38(2):** Mandates the State to strive to minimize inequalities in income, status, facilities, and opportunities among individuals and groups.
- **Article 338:** Establishes the National Commission for Scheduled Castes (NCSC) to monitor and evaluate legal and constitutional safeguards for SCs.
- **Protection of Civil Rights Act, 1955 & SC/ST (Prevention of Atrocities) Act, 1989:** Statutory frameworks designed to prevent social discrimination and ensure affirmative socio-economic protection.

Conclusion

PM-AJAY serves as a pivotal policy tool for targeted, holistic empowerment of Scheduled Castes by shifting from fragmented assistance to structured convergence. Addressing operational bottlenecks related to Utilization Certificates and enhancing local administrative capacity will ensure long-term socio-economic equity.

NAPDDR & DDACs: Rehabilitation and Social Re-integration

Key Highlights & Summary

- **Scheme Context:** District De-Addiction Centres (DDACs) operate under the National Action Plan for Drug Demand Reduction (NAPDDR), an umbrella scheme of the Ministry of Social Justice and Empowerment aimed at multi-pronged demand reduction.
- **Institutional Architecture:** DDACs function as dedicated district-level facilities—often run by NGOs and voluntary organizations via Grant-in-Aid—providing whole-person rehabilitation including medical de-addiction, counselling, and vocational guidance.
- **Comprehensive Care Model:** Incorporates medical stabilization, mental health support (counselling, yoga, meditation), and post-recovery follow-up to prevent relapse and restore emotional well-being.
- **Focus on Vulnerable Groups:** Targets vulnerable demographics, including Scheduled Tribes (ST) and rural youth, addressing the intersection of substance abuse, mental health issues (e.g., depression), and socio-economic displacement.
- **Livelihood & Re-integration:** Combines addiction recovery with vocational orientation and skill mapping, enabling recovered individuals to achieve financial independence and reintegrate into the workforce.
- **Nasha Mukt Bharat Abhiyaan (NMBA):** Complements DDAC operations through community mobilization, youth awareness campaigns, and institutional identification of affected individuals in high-burden districts.

Essential Definitions

- **National Action Plan for Drug Demand Reduction (NAPDDR):** A flagship Central Sector Scheme that funds awareness generation, capacity building, treatment, and rehabilitation of affected persons.
- **District De-Addiction Centre (DDAC):** A district-level institutional setup providing integrated medical treatment, psychological counselling, and skill rehabilitation under a single window.
- **Harm Reduction & Rehabilitation:** A healthcare approach focusing on stopping drug dependence, mitigating psychological distress, and restoring an individual's socio-economic capabilities.

Legal and Constitutional Framework

- **Article 47 (Directive Principles):** Mandates the State to endeavor to bring about prohibition of the consumption (except for medicinal purposes) of intoxicating drinks and drugs harmful to health.
- **Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985:** Primary statutory framework regulating drug offenses; Section 71 explicitly empowers the Government to establish identification, treatment, and rehabilitation centers.
- **Rights of Persons with Disabilities Act, 2016:** Recognizes mental illness and neurological conditions secondary to substance abuse as areas requiring state-supported rehabilitation.
- **UN Convention on Narcotic Drugs (1961) & Psychotropic Substances (1971):** International conventions to which India is a signatory, binding the nation to supply and demand reduction strategies.

Conclusion

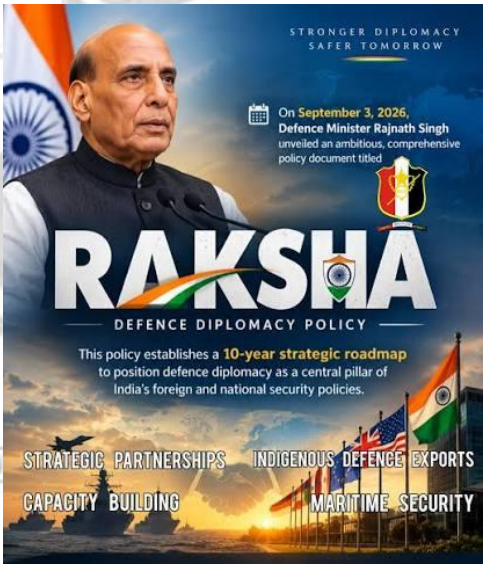
DDACs bridge the gap between medical detoxification and long-term socio-economic re-integration. Standardizing clinical protocols across centers and integrating mental healthcare with rural livelihood programs will strengthen India’s fight against substance dependence.

SECURITY & DEFENCE

RAKSHA: India's Defence Diplomacy Document and the Ten-Year Strategic Roadmap

Key Highlights & Summary

- **Launch of Strategic Roadmap:** Defence Minister Rajnath Singh formally released the landmark 'RAKSHA' defence diplomacy document in New Delhi on September 3, 2026, outlining India's strategic vision for global security partnerships over the next decade.
- **Proactive Engagement Paradigm:** The document marks a paradigm shift in national security planning by transitioning from traditional deterrence to proactive, institutionalized international defense cooperation aligned with broader foreign policy goals.
- **Pillar 1 - Strategic Partnerships:** Focuses on expanding and deepening bilateral and multilateral security architectures, consolidating defense dialogues, and building robust security mechanisms with key regional and global allies.
- **Pillar 2 - Capacity Building:** Emphasizes comprehensive military-to-military engagement through structured joint exercises, specialized defense training programs, military exchanges, and sharing operational best practices with friendly foreign countries.
- **Pillar 3 - Indigenous Exports:** Positions the 'Make in India' defense initiative at the core of defense diplomacy, seeking to establish India as a reliable, high-tech defense manufacturing hub and major global exporter of military equipment.
- **Pillar 4 - Maritime Security:** Reaffirms India's strategic role as a 'Net Security Provider' and 'First Responder' in the Indian Ocean Region (IOR), enhancing domain awareness, joint patrolling, and humanitarian disaster assistance.
- **Inter-Agency Alignment:** Formulated with high-level coordination among the Ministry of Defence, Ministry of External Affairs, and National Security Council Secretariat to ensure India remains an anchor of regional peace, stability, and a rules-based global order.



Essential Definitions

- **Defence Diplomacy:** The strategic, peacetime application of military assets, personnel, and defense resources to foster mutual trust, build cooperative security partnerships, and advance national foreign policy objectives.
- **Net Security Provider:** A state that actively contributes to regional security and stability by providing security assistance, maritime domain awareness, operational training, and patrol capabilities to neighboring countries.
- **First Responder:** A nation capable of rapidly deploying humanitarian assistance, disaster relief (HADR), search-and-rescue, and security aid during crises or natural emergencies in its geopolitical neighborhood.
- **Indian Ocean Region (IOR):** A critical maritime expanse stretching from the East African coast and Arabian Gulf to Southeast Asia, containing vital sea lanes of communication (SLOCs) essential for global energy and trade flows.

- **Rules-Based Order:** A stable international governance system where nation-states adhere to established global norms, international treaties (such as UNCLOS), and legal frameworks rather than unilateral force.

Legal and Constitutional Framework

- **Article 51 of the Constitution (Directive Principles):** Directs the State to promote international peace and security, maintain just and honorable relations between nations, and foster respect for international law.
- **Article 73 of the Constitution:** Extends the executive power of the Union to all defense and foreign policy matters over which Parliament has exclusive legislative competence.
- **Entries 1 & 10 of the Union List (Seventh Schedule):** Grants exclusive legislative authority over the Defence of India, Armed Forces, Foreign Affairs, and diplomatic relations directly to the Union Parliament.
- **Article 253 of the Constitution:** Empowers Parliament to enact national legislation necessary for implementing international treaties, bilateral defense agreements, and security conventions.
- **Article 53(2) of the Constitution:** Formally vests the Supreme Command of the Armed Forces of the Union in the President of India, to be exercised and regulated in accordance with statutory law.
- **Defence Acquisition Procedure (DAP) & Atmanirbharta Framework:** The administrative and regulatory guidelines that govern indigenous defense research, domestic manufacturing pipelines, defense offsets, and military export approvals.

Conclusion

The RAKSHA document signals India's evolution into a proactive global actor that integrates defense capabilities seamlessly into foreign policy and international diplomacy. By institutionalizing capacity building, indigenous defense exports, and maritime guardianship under a single strategic framework, India enhances its credibility as a reliable regional partner. Going forward, sustaining this strategic momentum will depend on timely policy execution, seamless inter-service interoperability with partner nations, and maintaining a fine balance between strategic autonomy and international security cooperation.

India-Belgium Defence Cooperation: Co-Development and Co-Production

Key Highlights & Summary

VIDHVATH IAS ACADEMY

- **Bilateral Defence Summit:** India and Belgium held a high-level Defence CEOs Roundtable and B2B meetings in New Delhi to strengthen military capabilities through joint defence industrial collaboration.
- **Strategic Shift:** Focus moved from traditional buyer-seller relationships to co-development, co-production, and joint R&D in niche defence technologies under Aatmanirbhar Bharat and Make-in-India.
- **Priority Operational Areas:** Identified key technology sectors for collaboration including cyber security, AI-enabled Unmanned Aerial Systems (UAS), Underwater Domain Vehicles (UDVs), anti-drone systems, and complex weapon systems.
- **Ecosystem Drivers:** Foreign Original Equipment Manufacturers (OEMs) were invited to leverage India's innovation platforms—Innovations for Defence Excellence (iDEX) and Aacing Development of Innovative Technologies with iDEX (ADITI)—engaging start-ups and MSMEs.

- **Policy Incentives:** Highlighted enabling policies such as up to 74% Foreign Direct Investment (FDI) via the automatic route (100% via government route/space sector) and dedicated Defence Industrial Corridors in Tamil Nadu and Uttar Pradesh.
- **Industry Engagement:** Exchanged multiple B2B MoUs involving major defence firms, including Kalyani Strategic Systems, L&T, FN Herstal, Thales Belgium, and India Optel Ltd for technology transfer and manufacturing scale.

Essential Definitions

- **Co-Development & Co-Production:** A strategic partnership model where two or more nations jointly design, engineer, and manufacture military hardware, sharing intellectual property and production lines.
- **Innovations for Defence Excellence (iDEX):** An initiative launched by the Ministry of Defence to foster innovation and technology development in Defence and Aerospace by engaging MSMEs, start-ups, and individual innovators.
- **Defence Industrial Corridors (DICs):** Designated geographic regions providing state-of-the-art infrastructure, supply chain clusters, and regulatory incentives to boost domestic defence manufacturing.

Legal and Constitutional Framework

- **Article 51(c) (Directive Principles):** Directs the State to foster respect for international law and treaty obligations in the dealings of organized peoples with one another.
- **Defence Acquisition Procedure (DAP) 2020:** The governing administrative framework prioritizing "Buy (Indian-IDDM)" and "Make" categories to incentivize foreign technology transfers and local manufacturing.
- **Foreign Exchange Management Act (FEMA), 1999:** Provides the regulatory statutory framework governing FDI limits in the defence and aerospace sectors.
- **India-EU Security and Defence Dialogue:** The overarching strategic framework strengthening cooperation in maritime security, cyber defense, and counter-terrorism between India and EU member states.

Conclusion

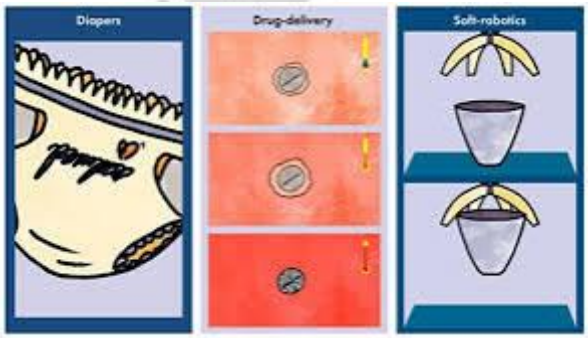
The India-Belgium defence partnership marks a deliberate step toward diversifying India's strategic supply chains and deepening EU-India security ties. Capitalizing on Belgian technological expertise alongside India's manufacturing scale will solidify strategic autonomy and expand India's global defence export footprint.

SCIENCE & TECHNOLOGY

New Study on Temperature-Induced Structural Recovery in Jammed Systems: Implications for Drug Delivery

Key Highlights & Summary

- **Breakthrough Discovery by Indian Scientists:** Researchers at the Raman Research Institute (RRI), an autonomous institute under the Department of Science and Technology (DST), discovered a novel mechanism to make jammed, solid-like systems flow fluidly on demand.
- **Understanding Jammed Glassy Materials:** Glass-like materials are structurally disordered like liquids but behave mechanically like solids. They possess "memory imprints" from past thermal or mechanical processing, making their physical states highly dependent on history.
- **Microgel Particles as Model Systems:** The research team utilized densely packed soft microgel particles—capable of absorbing 300 to 500 times their weight in water—to artificially mimic and analyze glassy behavior under thermal stress.
- **Asymmetric Thermal Relaxation:** The colloidal suspension followed distinct physical paths during heating and cooling cycles back to 20°C. This asymmetry proved that the material's structural state depends heavily on the thermal trajectory taken rather than just initial and final temperatures.
- **Thermal Shock and Memory Erasure:** A sudden acceleration in the temperature ramp rate served as a thermal shock. This forced rapid particle rearrangement, temporarily liquefying the jammed system, reducing asymmetric relaxation, and successfully erasing path memory.
- **Advancements in Precision Healthcare:** Unlike previous studies that merely observed structural asymmetry, this study demonstrates active control over it. Thermo-responsive microgels swell at lower temperatures and collapse above ~34°C, enabling targeted, localized drug release at tumor sites with minimal off-target toxicity.



- **Impact on Materials Science:** Published in the *Journal of Colloid and Interface Science*, the study shifts soft-matter physics from passive observation toward precision material design, setting the groundwork for comparing thermal and mechanical shocks in future research.

Essential Definitions

- **Jamming:** A physical state in soft-matter physics where densely packed particles become immobilized due to crowding, causing a fluid-like substance to behave as a macroscopically solid material.
- **Glass Transition:** An amorphous state of matter characterized by disordered particle arrangements lacking long-range crystalline order, yet exhibiting mechanical rigidity.
- **Microgels:** Cross-linked polymer network particles that undergo reversible volume phase transitions (swelling or shrinking) in response to environmental stimuli like temperature or pH.

- **Structural Recovery:** The thermodynamic relaxation process through which a non-equilibrium material slowly reorganizes its internal structure toward a lower-energy state.
- **Thermo-Responsive Material:** Smart materials whose physical or chemical properties change dynamically in response to external temperature variations.

Legal and Constitutional Framework

- **Article 51A(h) of the Constitution:** Outlines the Fundamental Duty of every Indian citizen to develop scientific temper, humanism, and the spirit of inquiry and reform.
- **Article 51A(j) of the Constitution:** Mandates striving towards excellence in all spheres of individual and collective activity to elevate the nation's scientific and intellectual standing.
- **Article 21 and Article 47:** Read together, Article 21 (Right to Life) encompasses the right to health, while Article 47 directs the State to improve public health, supporting state encouragement for advanced medical research.
- **Anusandhan National Research Foundation (ANRF) Act, 2023:** Establishes the statutory framework for funding, coordinating, and promoting high-level scientific research across Indian academic and research institutions.
- **Drugs and Cosmetics Act, 1940 & New Drugs and Clinical Trials Rules, 2019:** Provide the regulatory oversight for testing, validating, approving, and safety-checking novel therapeutic delivery systems in India.

Conclusion

Controlling path memory and structural asymmetry in jammed soft matter marks a paradigm shift in materials science, moving from passive observation toward functional design. Using thermal shock as a non-invasive, tunable trigger to reset glassy states opens powerful pathways for highly targeted cancer therapies and smart drug delivery systems. Moreover, this indigenous breakthrough demonstrates how foundational scientific research carried out in Indian institutions directly advances national health goals and technological self-reliance.

e-FAST India Launches PACT to Accelerate Zero-Emission Freight Deployment

Key Highlights & Summary

- **Launch of Flagship PACT Platform:** Rajiv Gauba, Member, NITI Aayog, launched the Platform for Aggregating Clean Transport (PACT) at the 5th e-FAST India Summit 2026 to significantly accelerate zero-emission truck (ZET) deployment across India.
- **Demand Aggregation along Freight Corridors:** PACT operates as a demand-side aggregator under the e-FAST India initiative, pooling freight volume needs from shippers and Logistics Service Providers (LSPs) to create actionable deployment opportunities along key national freight corridors.
- **Ecosystem Integration:** The platform unites original equipment manufacturers (OEMs), financiers, and Charge Point Operators (CPOs) to enhance demand visibility, optimize charging station planning, and strengthen the business case for electric medium and heavy-duty vehicles (e-MHDVs).
- **Exponential Growth in e-Freight:** Electric freight deployments surged over fourfold from 201 vehicles in FY25 to 826 in FY26, bringing the total operational count of e-MHD trucks in India past the 3,000-vehicle threshold.

- **Unveiling of ZET Marketplace:** The summit featured the launch of the ZET Marketplace, a dedicated B2B engagement hub connecting e-truck manufacturers, LSPs, CPOs, financial institutions, and technology providers to forge commercial partnerships.
- **Focus on De-risking and Battery Governance:** Ministry of Road Transport and Highways (MoRTH) Secretary V. Umashankar emphasized real-time battery health monitoring, innovative operating models for high-utilization fleets, and resale-value enhancement to mitigate financing risks.
- **Transition to Commercial Scale:** Marking a strategic pivot from market readiness and pilot projects toward large-scale, commercially viable execution, the initiative focuses on corridor-based charging infrastructure, de-risking mechanisms, and market-driven financing.

Essential Definitions

- **Zero-Emission Truck (ZET):** A commercial freight vehicle that operates without producing tailpipe greenhouse gas emissions or air pollutants, primarily powered by battery-electric or hydrogen fuel-cell technology.
- **Logistics Service Provider (LSP):** A third-party commercial entity that manages freight transportation, warehousing, supply chain operations, and distribution logistics on behalf of shippers.
- **Charge Point Operator (CPO):** A specialized business entity responsible for installing, maintaining, managing, and operating electric vehicle charging infrastructure networks.
- **Demand Aggregation:** The process of consolidating procurement needs from multiple buyers into a unified bulk order to achieve economies of scale, lower capital costs, and reduce investment risk.
- **Battery Governance:** The regulatory, technical, and operational framework governing battery health monitoring, safety standards, second-life usage, and end-of-life recycling across the product lifecycle.

Legal and Constitutional Framework

- **Institutional Status of NITI Aayog:** Established in 2015 via a Cabinet Resolution (non-constitutional, non-statutory extra-constitutional body) replacing the Planning Commission to serve as a policy think tank promoting cooperative federalism.
- **Environmental Directives & Duties:** Article 48A (Directive Principles of State Policy) obligates the State to protect and improve the environment, while Article 51A(g) establishes environmental preservation as a Fundamental Duty of every citizen.
- **Legislative Domain:** Entry 13 of the Concurrent List (Seventh Schedule) covers inland transport coordination, with the Motor Vehicles Act, 1988 (administered by MoRTH) serving as the primary statutory law for vehicle regulation and safety.
- **Statutory Environmental Acts:** The Energy Conservation Act, 2001 and the Environment (Protection) Act, 1986 provide the legal foundation for energy efficiency standards, emissions standards, and clean energy promotion.
- **E-Mobility Schemes & Waste Management:** Supported by the FAME India and PM E-DRIVE incentive schemes, alongside the Battery Waste Management Rules, 2022, which enforce Extended Producer Responsibility (EPR) on battery manufacturers.

- **Climate Commitments (NDCs):** Aligns with India's international Paris Agreement targets to reduce the emissions intensity of GDP by 45% by 2030 (from 2005 levels) and achieve net-zero carbon emissions by 2070.

Conclusion

The launch of PACT and the ZET Marketplace directly addresses core structural hurdles facing heavy electric freight—specifically fragmented demand, elevated capital costs, and sparse charging networks. By aggregating shipper demand and scaling corridor-focused charging infrastructure, e-FAST India transitions clean freight from localized pilots to commercially viable deployment. Sustaining this momentum will necessitate robust battery governance, grid infrastructure readiness, and innovative de-risking financial mechanisms, ensuring India's transition to zero-emission freight supports both economic competitiveness and national energy security.

Legal Metrology (Indian Standard Time) Rules, 2026: Vision of "One Nation, One Time"

KEY HIGHLIGHTS & SUMMARY

- **Notification & Authority:** Notified by the Department of Consumer Affairs, Ministry of Consumer Affairs, Food and Public Distribution, under the Legal Metrology Act, 2009. Published in the Official Gazette on August 29, 2026, coming into force 180 days post-publication.
- **Core Objective:** Mandates Indian Standard Time (IST) as the unified, legally recognized, and traceable time reference for all official, commercial, technical, and administrative purposes in India.
- **Institutional Roles:** CSIR-National Physical Laboratory (CSIR-NPL) acts as the scientific custodian generating and maintaining IST, while the Department of Legal Metrology handles regulatory enforcement.
- **Distributed Architecture:** Establishes secondary time scales continuously traceable to CSIR-NPL across 5 Regional Reference Standard Laboratories (RRSLs) at Ahmedabad, Bengaluru, Bhubaneswar, Faridabad, and Guwahati.
- **Satellite & High-Precision Dissemination:** Integrates ISRO's NavIC satellite navigation system and optical fibre-based White Rabbit sub-nanosecond synchronization technology for secure time dissemination.
- **Cybersecurity & Strategic Autonomy:** Aligns with CERT-In 2023 Guidelines to safeguard critical digital infrastructure (banking, power grids, telecom) against cyber incidents and reduce dependence on foreign time sources like US GPS.
- **Constitutional Basis:** Supported by Entry 51, List I (Union List) of the Seventh Schedule, giving Parliament exclusive power over "Establishment of standards of weight and measure".

WHY IN NEWS?

The Ministry of Consumer Affairs notified the **Legal Metrology (Indian Standard Time) Rules, 2026**, to establish IST as the sole legally enforceable time reference across India. Modern critical infrastructure—including high-frequency financial trading, power grid switching, 5G telecommunications, aviation, and data centers—requires microsecond to nanosecond time synchronization. Relying on unsynchronized or foreign time sources creates vulnerabilities to cyberattacks and system failures. The framework enforces time standardization under the "One Nation, One Time" initiative.

BACKGROUND & CORE CONCEPT

Evolution of Indian Standard Time

- **Historical Context:** Adopted in 1906, IST is calculated based on the 82.5° E longitude passing through Mirzapur, Uttar Pradesh (5 hours 30 minutes ahead of UTC).
- **Scientific Generation:** CSIR-NPL maintains IST using an ensemble of Cesium atomic clocks and a Hydrogen Maser, keeping it traceable within a few nanoseconds to Coordinated Universal Time (UTC) maintained by the International Bureau of Weights and Measures (BIPM) in France.
- **The Transition Need:** While CSIR-NPL held the scientific custody of time, India lacked a comprehensive legal enforcement framework mandating that digital systems, private corporations, and infrastructure synchronize their hardware strictly with IST.

ESSENTIAL DEFINITIONS

- **Indian Standard Time (IST):** The official time observed throughout India, derived from primary frequency standards at CSIR-NPL and synchronized with Coordinated Universal Time ($UTC + 5:30$).
- **Traceability:** An unbroken chain of calibrated measurements linking a local system clock directly back to the national primary time standard maintained by CSIR-NPL.
- **NavIC (Navigation with Indian Constellation):** India's autonomous regional satellite navigation system developed by ISRO, transmitting indigenous atomic-clock-based timing signals.
- **White Rabbit Technology:** An open-source Ethernet-based protocol capable of providing sub-nanosecond time synchronization and picosecond accuracy over optical fibre networks.
- **Network Time Protocol (NTP) / Precision Time Protocol (PTP):** Networking protocols used to synchronize computer clock times across packet-switched, variable-latency data networks.

[1884: Greenwich Mean Time (GMT) Established]
|
▼
[1906: IST Adopted at 82.5° E Longitude (Mirzapur)]
|
▼
[1947: CSIR-NPL Designated as Custodian of National Primary Standards]
|
▼
[2009: Legal Metrology Act Enacted]
|
▼
[2023: CERT-In Mandates ICT System Time Synchronization]
|
▼
[August 2026: Legal Metrology (IST) Rules Notified]

VIDHVATH IAS ACADEMY

KEY FEATURES & INSTITUTIONAL DYNAMICS

Institutional Architecture

- **CSIR-National Physical Laboratory (CSIR-NPL):** Serves as India’s National Metrology Institute (NMI) maintaining the primary atomic timescales.
- **Department of Legal Metrology (MoCA):** Serves as the statutory regulator enforcing adoption, calibration, and compliance.
- **Secondary Time Scale Nodes (RRSLs):** Distributed timing centers set up at 5 Regional Reference Standard Laboratories—Ahmedabad, Bengaluru, Bhubaneswar, Faridabad, and Guwahati—ensuring regional redundancy and low-latency network access.
- **ISRO & NIC Integration:** ISRO provides satellite-based dissemination through NavIC, while the National Informatics Centre (NIC) disseminates IST across government ICT networks.

Technical & Strategic Infrastructure

- **Multi-Tier Dissemination:** Time is distributed via NTP/PTP network protocols, NavIC satellite broadcasts, and optical fibre White Rabbit networks (e.g., tested between RRSL Bengaluru and NSE Chennai).
- **180-Day Transition Window:** Provides a grace period for government departments, telecom operators, stock exchanges, and tech companies to align hardware and software logging systems.

LEGAL AND CONSTITUTIONAL FRAMEWORK

Constitutional Directives

- **Entry 51, List I (Seventh Schedule):** Union List item conferring exclusive power on Parliament over *"Establishment of standards of weight and measure"*.
- **Entry 31, List I (Seventh Schedule):** Grants Parliament jurisdiction over Posts, telegraphs, telephones, wireless, broadcasting, and other like forms of communication.

Statutory Architecture

- **Legal Metrology Act, 2009:** Parent legislation providing statutory authority to regulate standards of weights, measures, and time.
- **CERT-In Cyber Security Guidelines (2023):** Mandates that all government entities, service providers, intermediaries, and data centers synchronize system clocks with CSIR-NPL or NIC time servers to maintain valid cyber audit trails.

PRELIMS PERSPECTIVE

- **Meridian of IST:** 82.5° E longitude passing through 5 Indian states: Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Odisha, and Andhra Pradesh.
- **BIPM (Bureau International des Poids et Mesures):** Headquartered in Sèvres, France; maintains global UTC.
- **Potential Prelims Traps:**
    - *Trap 1:* "IST is maintained by the Indian Space Research Organisation (ISRO)." -> **False.** Primary scientific custody rests with **CSIR-NPL** under the Ministry of Science and Technology; ISRO provides satellite dissemination via NavIC.
    - *Trap 2:* "The Legal Metrology Rules mandate two time zones for North-East India." -> **False.** The rules enforce a single unified time reference (**One Nation, One Time**) across all regions, including the North-East (though RRSL Guwahati hosts a secondary scale).
    - *Trap 3:* "The rules come into force immediately upon gazette notification." -> **False.** They take effect **180 days** after publication in the Official Gazette.

MAINS PERSPECTIVE

Strategic and Economic Analysis

- **Cybersecurity & Forensic Auditing:** In inconsistent clock environments, log analysis during a cyber breach fails because events across servers cannot be correlated chronologically. Mandatory IST synchronization aligns with CERT-In norms, enhancing digital forensic capability.

- **Financial Market Stability:** High-frequency trading and digital payment gateways rely on microsecond transaction timestamps to prevent front-running, double-spending, and settlement disputes.
- **Strategic Autonomy:** Most Indian digital infrastructure historically relied on GPS (US-operated) or NTP servers hosted abroad. Domestic dissemination via NavIC and CSIR-NPL secures national timing against foreign signals being jammed or spoofed.
- **Power Grid & Smart Infrastructure:** Synchronized Phasor Measurement Units (PMUs) in national power grids require microsecond timing to detect grid imbalances and prevent cascading blackouts.

GOVERNMENT / POLICY RESPONSE

- **Legal Metrology (IST) Rules, 2026:** Regulatory framework establishing legally traceable time dissemination.
- **White Rabbit Technology Demonstration:** Commissioned at RRSL Bengaluru in July 2026 to showcase sub-nanosecond optical fibre time transfers.
- **NavIC Time Transfer Infrastructure:** Integration between ISRO and CSIR-NPL enabling direct reception of atomic time via satellite receivers.
- **CERT-In Compliance Framework:** Integrating IST synchronization into mandatory cybersecurity audits for critical information infrastructure.

KEY CHALLENGES

- **Legacy Infrastructure Compatibility:** Upgrading outdated hardware in state government offices, regional banks, and small enterprises to support PTP/NTP traceability protocols within 180 days.
- **North-East Daylight Disparity:** A single time zone means the sun rises and sets nearly two hours earlier in Dong (Arunachal Pradesh) than in Guhar Moti (Gujarat), causing economic productivity losses and biological rhythm mismatch in Eastern India.
- **Last-Mile Dissemination Accuracy:** Disseminating sub-nanosecond signals over commercial internet backbones without packet jitter or latency variation.
- **Supply Chain Reliance:** Dependence on imported atomic clocks and specialized high-precision receivers until domestic hardware manufacturing scales up.

MAINS VALUE ADDITION

VIDHVATH IAS ACADEMY

- **Constitutional Provision:** Entry 51, List I (Union List) – Standards of weight and measure.
- **Key Terminology:** *"Traceable Time Reference", "Atomic Timescale", "White Rabbit Synchronization Protocol", "Phasor Measurement Units (PMUs)", "Digital Forensics Correlation".*
- **Institutional Triad:** CSIR-NPL (Scientific Custodian) + Legal Metrology (Regulatory Authority) + ISRO/NIC (Dissemination Engines).
- **SDG Connection: SDG 9** (Industry, Innovation, and Infrastructure) and **SDG 16** (Strong Institutions / Secure Digital Infrastructure).

POSSIBLE UPSC QUESTIONS

Mains Question 1

"Accurate time synchronization is no longer merely a metrological concern but a foundational pillar of national security and digital economy." Discuss in the context of the Legal Metrology (Indian Standard Time) Rules, 2026. (250 Words, 15 Marks)

Mains Question 2

Examine the institutional and technological architecture developed under the 'One Nation, One Time' vision. How does it strengthen India's strategic autonomy and cyber resilience? (250 Words, 15 Marks)

ONE-LINE TAKEAWAYS

- Notified under the **Legal Metrology Act, 2009**, taking effect **180 days** from gazette publication.
- Enforces **IST** as the legal and traceable time reference across all sectors under **"One Nation, One Time"**.
- **CSIR-NPL** generates and maintains the primary atomic time, kept within nanoseconds of UTC.
- **5 RRSLs** (Ahmedabad, Bengaluru, Bhubaneswar, Faridabad, Guwahati) host secondary time scales for regional redundancy.
- Integrates **ISRO's NavIC** and **White Rabbit optical technology** for satellite and terrestrial dissemination.
- Strengthens **cybersecurity** by fulfilling CERT-In guidelines for unified event logging across ICT networks.

WAY FORWARD

The Legal Metrology (Indian Standard Time) Rules, 2026, establish a robust legal foundation for national time synchronization. To achieve full operational success, the government must assist small businesses, regional financial bodies, and state departments during the 180-day transition period with standardized software drivers and low-cost NavIC-based timing receivers. Simultaneously, funding domestic production of atomic clocks will eliminate foreign hardware dependence. In the long term, while maintaining "One Nation, One Time" for legal and technological unity, flexible working hours or seasonal workplace adjustments for Eastern states can address daylight disparities without fragmenting India's timing architecture.

CONCLUSION

VIDHVATH IAS ACADEMY

The notification of the Legal Metrology (Indian Standard Time) Rules, 2026, bridges scientific metrology, statutory regulation, and national security. By establishing a distributed timing network anchored by CSIR-NPL, ISRO, and RRSLs, India reduces reliance on foreign navigation systems while securing its digital economy against cyber threats. This initiative reinforces "One Nation, One Time" as a core pillar of a resilient, self-reliant, and modern Indian infrastructure.

BIO-NIVESH: Bridging Bio-Innovation and Private Investment

Key Highlights & Summary

- **Platform Launch:** Union Minister Dr. Jitendra Singh launched 'BIO-NIVESH', a strategic interface established under the Biotechnology Industry Research Assistance Council (BIRAC) to catalyze private venture capital into early-stage biotech startups.

- **Core Mandate:** Functions as a two-way engagement mechanism connecting biotechnology innovators with investors to de-risk high-gestation research, enable technology translation, and accelerate commercialization.
- **Growth Vision:** Proposes a "Big Five in Five Years" strategy aimed at building anchor biotech companies capable of driving ecosystem-wide economic scaling and positioning India ahead in the bio-industrial revolution.
- **Patient Capital Support:** Leverages the ₹1 Lakh Crore Research, Development, and Innovation (RDI) Fund, with BIRAC acting as a Second-Level Fund Manager to extend long-term equity and capital support to deep-tech bio-entrepreneurs.
- **Whole-of-Government Approach:** Integrates cross-sectoral efforts across biotechnology, bio-manufacturing, space, and nuclear technologies to bridge laboratory research with global market entry.
- **Policy Strategy:** Emphasizes shifting public funding from perpetual grant-making to catalytic risk mitigation, enabling private capital to lead scale-up operations and commercial market integration.

Essential Definitions

- **BIO-NIVESH:** A specialized investment facilitation platform designed by BIRAC to match high-potential deep-tech bio-startups with venture capitalists, angel networks, and corporate investors.
- **Bioeconomy:** An economic framework based on the sustainable utilization of biological resources, biotechnology innovations, and biomanufacturing processes across healthcare, agriculture, and industry.
- **Patient Capital:** Long-term capital investment provided where investors expect financial returns over an extended period without immediate pressure for exit, essential for deep-tech/biotech gestation cycles.

Legal and Constitutional Framework

- **Article 51A(h) (Fundamental Duties):** Mandates every citizen to develop the scientific temper, humanism, and the spirit of inquiry and reform.
- **BioE3 (Biotechnology for Economy, Environment and Employment) Policy:** The overarching policy framework governing high-performance biomanufacturing, synthetic biology, and bio-foundries in India.
- **Biological Diversity Act, 2002:** Regulates access to biological resources and ensures equitable benefit sharing arising from commercial bio-innovation.
- **National Biotechnology Development Strategy (NBDS):** The national blueprint guiding bio-entrepreneurship, institutional infrastructure, and commercial translation of bio-research.

Conclusion

BIO-NIVESH addresses a critical structural gap in India's innovation cycle by linking academic research with patient private capital. Strengthening intellectual property rights (IPR) enforcement and easing cross-border clinical evaluation pipelines will be vital for transforming India into a global biotechnology hub.

VIDHVATH IAS ACADEMY

ISRO's GSLV-F17 Mission: EOS-05 Satellite Launch

Key Highlights & Summary

- **Mission Milestone:** The Indian Space Research Organisation (ISRO) successfully launched the GSLV-F17 mission carrying EOS-05, marking India's first operational imaging satellite placed directly into Geosynchronous Orbit.
- **Geosynchronous Advantage:** Unlike Earth Observation Satellites traditionally placed in Sun-Synchronous Polar Orbits (SSPO), EOS-05 provides continuous, real-time monitoring over the Indian subcontinent from a stationary high-altitude vantage point.
- **Launch Vehicle Deployment:** Executed using the Geosynchronous Satellite Launch Vehicle (GSLV), featuring ISRO's indigenous Cryogenic Upper Stage (CUS), demonstrating maturity in heavy-payload equatorial deployments.
- **Operational Applications:** Enhances real-time disaster management, weather forecasting, oceanographic tracking, agricultural monitoring, and strategic border surveillance through high-frequency temporal resolution imaging.
- **Commercial Integration:** Highlights the expanding collaboration between ISRO and private Indian space industries, aligning with broader commercialization goals under Indian Space Policy reforms.
- **Strategic Autonomy:** Eliminates reliance on foreign satellite constellations for rapid-revisit optical and infrared Earth observation during critical natural emergencies or geopolitical developments.

Essential Definitions

- **Geosynchronous Earth Orbit (GEO):** An orbit positioned ~35,786 km above Earth's equator where a satellite's orbital period matches Earth's rotation, enabling continuous coverage of a fixed geographic area.
- **Earth Observation Satellite (EOS):** A satellite specifically equipped with remote sensing instruments (optical, infrared, or synthetic aperture radar) to collect data on Earth's physical, chemical, and biological systems.
- **Cryogenic Upper Stage (CUS):** A rocket engine stage utilizing liquefied gases at extremely low temperatures (liquid hydrogen and liquid oxygen) to generate high specific impulse required for geostationary injection.



Legal and Constitutional Framework

- **Indian Space Policy (2023):** The comprehensive regulatory framework enabling non-government entities (NGEs) to participate end-to-end in space activities while keeping ISRO focused on advanced R&D.
- **IN-SPACe (Indian National Space Promotion and Authorization Centre):** An autonomous single-window nodal agency established to permit, supervise, and authorize private space operations in India.
- **Article 51A(h) (Fundamental Duties):** Constitutional obligation encouraging the development of scientific temper, humanism, and the spirit of inquiry through space exploration and technological advancement.

- **Outer Space Treaty, 1967:** An international treaty ratified by India governing peaceful principles in outer space exploration, state responsibility, and satellite registration.

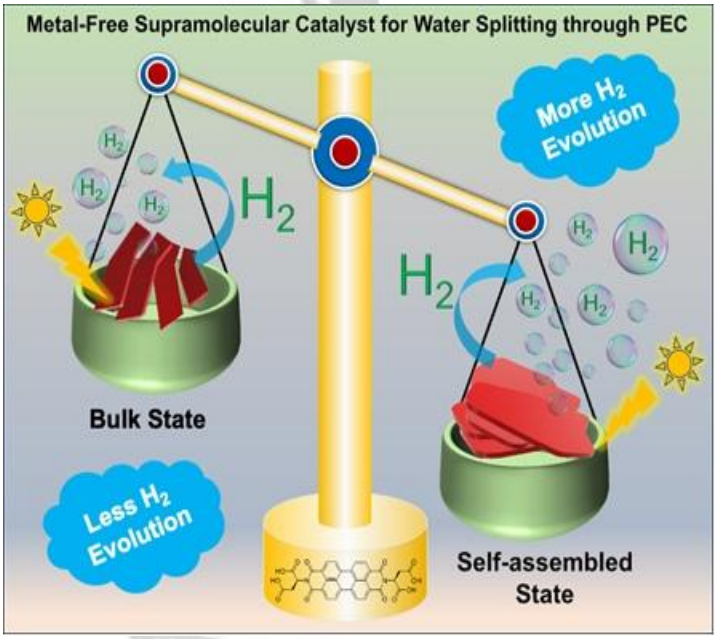
Conclusion

The placement of EOS-05 in geosynchronous orbit significantly enhances India's real-time disaster response and national security capabilities. Deepening indigenous private-sector integration within ISRO's launch ecosystem will solidify India's position in the global commercial space market.

Metal-Free Supramolecular Photocatalysis for Green Hydrogen Production

Key Highlights & Summary

- **Breakthrough Innovation**: Researchers at the **Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru** have synthesized a metal-free organic material that self-assembles into 2D nanosheets to enhance solar-driven water splitting.
- **Molecular Integration**: Combined a light-absorbing organic dye—**perylene diimide (PDI)**—with a naturally occurring amino acid—**aspartic acid**.
- **18% Efficiency Boost**: Spontaneous **supramolecular self-assembly** of the molecules resulted in nearly **18% higher photocurrent** compared to its unstructured bulk counterpart.
- **Key Mechanisms**: Driven by **pi-pi stacking** from the PDI chromophore and extended **hydrogen bonding** from the amino acid moiety, which broadens light absorption and enhances charge separation.



- **Publication**: Published in the peer-reviewed **Journal of Materials Chemistry A** (Royal Society of Chemistry) by a team led by Dr. Goutam Ghosh and Dr. Ashutosh K. Singh.

Essential Definitions

VIDHVATH IAS ACADEMY

- **Green Hydrogen**: Hydrogen gas produced through zero-emission pathways, traditionally using renewable electricity to split water into hydrogen and oxygen via electrolysis.
- **Direct Photocatalytic Water Splitting**: A process that uses light-absorbing semiconductor materials (photocatalysts) directly submerged in water to absorb sunlight and split H2O into H2 and O2 without an external electric circuit.
- **Supramolecular Self-Assembly**: A process where individual molecules spontaneously arrange themselves into structured, non-covalently bound functional architectures (e.g., 2D nanosheets) via hydrogen bonding and pi-pi interactions.
- **Perylene Diimide (PDI)**: A robust, light-absorbing organic chromophore commonly studied for optoelectronic and solar-harvesting applications.

Legal and Constitutional Framework

- **National Green Hydrogen Mission (2023)**: Outlines India's statutory and policy framework to turn the country into a global hub for green hydrogen production and technology exports.
- **Article 51A(h)**: Constitutional duty to develop a scientific temper, humanism, and the spirit of inquiry and reform.
- **Seventh Schedule (Union List, Entry 64 & Entry 66)**: Mandates scientific and technological institutions of national importance and higher research under central coordination.

Prelims Perspective

- **Research Institution**: Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru (an autonomous institute under the **Department of Science and Technology, DST**).
- **Molecules Involved**: Aspartic acid (amino acid) + Perylene Diimide (PDI organic dye).
- **Self-Assembly Forces**: Intermolecular **hydrogen bonding** and aromatic **pi-pi stacking**.
- **Performance Metric**: **~18% increase in photocurrent** during solar water-splitting tests.

Mains Perspective

- **Replacing Precious Metals**: Traditional photocatalysts rely heavily on critical, expensive, and scarce metals (e.g., Platinum, Ruthenium, Titanium dioxide). Metal-free organic alternatives reduce supply chain dependencies and environmental toxicity.
- **Decentralized Solar-to-Fuel Systems**: Direct photocatalysis combines solar absorption and chemical conversion into a single step, bypassing the capital-intensive two-step route (solar panels + electrolyser).
- **Role of Biomolecules in Materials Science**: Demonstrates how natural building blocks like amino acids can tune physical properties (dipole moments, charge transport) without complex chemical synthesis.

Government and Policy Response

- **DST Core Support**: Funding and infrastructure provided to autonomous institutes like CeNS to pursue basic research in clean energy generation.
- **R&D under National Green Hydrogen Mission**: Alignment of advanced materials research with national decarbonization targets.
- **Green Energy Transition**: Supporting clean fuel initiatives to meet India's **Panchamrit** targets (500 GW non-fossil capacity and net-zero by 2070).

Key Challenges

- **Lab-to-Lab Scale & Bench vs. Field Efficiency**: The reported 18% improvement is relative to the molecule's unorganized bulk form, requiring further development to match commercial inorganic systems.
- **Long-Term Photostability**: Organic molecules can suffer from photobleaching or chemical degradation under prolonged solar irradiance in aqueous media.
- **Scale-Up Engineering**: Transitioning from laboratory photocurrent measurements to continuous gas-harvesting reactors presents significant thermal, fluid, and gas-separation challenges.

Mains Value Addition

- **Theoretical Validation**: Used **Density Functional Theory (DFT)** calculations alongside electrochemical analysis to prove that aspartic acid raises the molecular dipole moment, driving photo-generated charge separation.
- **Application Horizons**: Artificial photosynthesis, solar fuel generation, organic optoelectronics, and metal-free renewable energy platforms.

Possible UPSC Two Questions of Mains

1. "Developing efficient metal-free catalysts is critical for scalable and sustainable green hydrogen production." Discuss the strategic importance and scientific challenges of metal-free organic photocatalysts in solar fuel generation.
2. Examine the role of national R&D institutions in advancing India's commitments under the National Green Hydrogen Mission.

Way Forward

- **Durability Testing**: Conduct long-duration stability tests in operational environments to evaluate organic degradation rates.
- **Scale-up Development**: Transition from half-cell photocurrent measurement to prototype flow-cell reactors that collect and measure volumetric hydrogen gas evolution.
- **Hybrid Structural Tuning**: Explore pairing PDI-amino acid architectures with other non-precious organic co-catalysts to lower overpotentials for water oxidation.

Conclusion

The synthesis and supramolecular self-assembly of aspartic acid-functionalized perylene diimide by CeNS researchers presents a metal-free approach to solar-driven green hydrogen generation. By using natural amino acids to direct molecular structure, this strategy offers a sustainable path toward next-generation renewable energy materials.

UPSC Relevance

- **GS Paper III**: Science and Technology- developments and their applications and effects in everyday life; Indigenization of technology and developing new technology; Renewable Energy, Environmental Pollution, and Degradation.

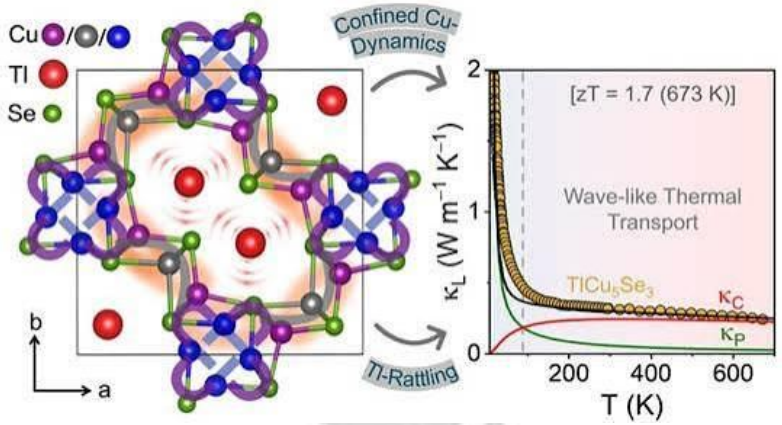
VIDHVATH IAS ACADEMY

Waste Heat Conversion: Wave-Like Thermal Transport in TlCu5Se3

Key Highlights & Summary

- **Scientific Breakthrough**: Researchers at **JNCASR, Bengaluru** discovered an unusual **wave-like thermal transport mechanism** in a pristine copper chalcogenide material, **Thallium Copper Selenide (TlCu_5Se_3)**.
- **Ultrahigh Efficiency**: Achieved a high **thermoelectric figure of merit (zT) of 1.7**, placing it among the highest for pristine ternary chalcogenides.
- **Structural Engineering**: The material features a complex 3D **cloverleaf knot-like framework** with open channels along the c-axis, confining Copper (Cu) ion dynamics to generate strong lattice **anharmonicity** without structural instability.

- **Application Potential**: Paves the way for converting industrial waste heat into electricity across power plants, steel and cement industries, automobiles, data centers, and battery thermal management systems.
- **Publication & Team**: Published in *Science Advances* by a team led by Prof. Kanishka Biswas (New Chemistry Unit) alongside theoretical insights from Prof. Umesh V. Waghmare (Theoretical Sciences Unit), JNCASR.



Essential Definitions

- **Thermoelectric Energy Conversion**: Direct conversion of temperature differences directly into electric voltage using solid-state semiconductor materials (Seebeck effect).
- **Anharmonicity**: A phenomenon where atomic vibrations deviate significantly from simple harmonic motion, causing strong interactions between vibrational modes and suppressing conventional thermal propagation.
- **Wave-Like Thermal Transport (Coherence)**: Heat propagation occurring through quantum-like wave coherence and tunneling between localized, closely spaced vibrational states, rather than through traditional particle-like phonon propagation.
- **Confined Ion Dynamics**: Restricting ionic motion within a complex crystal framework to suppress lattice thermal conductivity while maintaining long-range structural stability.

Legal and Constitutional Framework

- **Article 51A(h)**: Constitutional duty to develop a scientific temper, humanism, and the spirit of inquiry and reform.
- **Energy Conservation Act, 2001**: Provides statutory backing for industrial energy efficiency, waste heat recovery mandates, and decarbonization protocols.
- **Seventh Schedule (Union List, Entry 64)**: Grants Parliament authority over scientific or technical institutions declared by law to be institutions of national importance.

Prelims Perspective

- **Research Institution**: Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru (autonomous institute under the **Department of Science & Technology, DST**).
- **Material Formula**: TlCu_5Se_3 (Thallium Copper Selenide).
- **Crystal System**: Tetragonal structure forming a cloverleaf knot-like framework.
- **Thermoelectric Figure of Merit (zT)**: Reached **1.7** in pristine form.

Mains Perspective

- **Overcoming Superionic Material Shortfalls**: Conventional superionic conductors achieve low thermal conductivity through mobile ions, but rapid ion migration degrades structural integrity. TlCu_5Se_3 solves this by confining Cu ions within open channels.

- **Industrial Decarbonization**: Capturing low-grade and high-grade industrial waste heat supports India's **Panchamrit** climate goals and net-zero targets by 2070.
- **Quantum & Advanced Applications**: Beyond energy harvesting, ultralow thermal conductivity materials are vital for thermal barrier coatings, thermal decoherence reduction in quantum technologies, and solid-state cooling.

Government and Policy Response

- **DST Core Support**: Direct funding for basic research at autonomous institutes to foster advanced materials for clean energy transitions.
- **National Mission on Advanced Materials**: Encouraging indigenous research into thermoelectric devices to replace imported critical electronic components.
- **National Deep Tech Startup Policy**: Supporting lab-to-market translation for solid-state waste heat recovery systems in heavy industries.

Key Challenges

- **Scalability of Synthesis**: Translating complex single-crystal or pristine laboratory synthesis into commercial, large-scale thermoelectric modules.
- **Toxicity of Thallium**: Thallium (Tl) is a heavy metal requiring specialized containment and recycling protocols to meet environmental safety standards.
- **Integration Engineering**: Designing robust thermal interfaces capable of handling extreme temperature gradients inside industrial exhaust pipes and engine systems.

Mains Value Addition

- **Unified Formalism of Thermal Transport**: Moves beyond the conventional **phonon-gas model** (particle transport) by integrating particle propagation with wave-like coherence between phonon branches.
- **Phonon Mean Free Path (MFP)**: In conventional crystals, MFP is larger than interatomic distance; in TlCu_5Se_3, extreme disorder reduces MFP to the atomic scale, enabling wave-based heat tunneling.

Possible UPSC Two Questions of Mains

1. "Developing efficient thermoelectric materials is essential to unlocking industrial energy efficiency and waste heat recovery." Discuss the scientific breakthroughs and challenges in solid-state energy conversion in India.
2. Examine how advanced materials science contributes to India's climate action commitments under the Panchamrit goals, highlighting recent indigenous innovations.

Way Forward

- **Toxicity Mitigation & Substitution**: Research replacing toxic Thallium (Tl) with eco-friendly alternatives while preserving the cloverleaf knot crystal framework.
- **Prototype Device Fabrication**: Build flow-cell and solid-state waste heat recovery modules to evaluate performance under actual industrial operating conditions.
- **Industry-Academia Partnerships**: Collaborate with heavy industries (steel, cement, automotive) to pilot thermoelectric generators directly on high-temperature exhaust stacks.

Conclusion

The discovery of wave-like thermal transport in TlCu_5Se_3 by JNCASR scientists establishes a new paradigm for thermal management. By decoupling thermal conductivity from structural degradation, this approach supports the design of solid-state thermoelectric devices for industrial waste heat recovery.

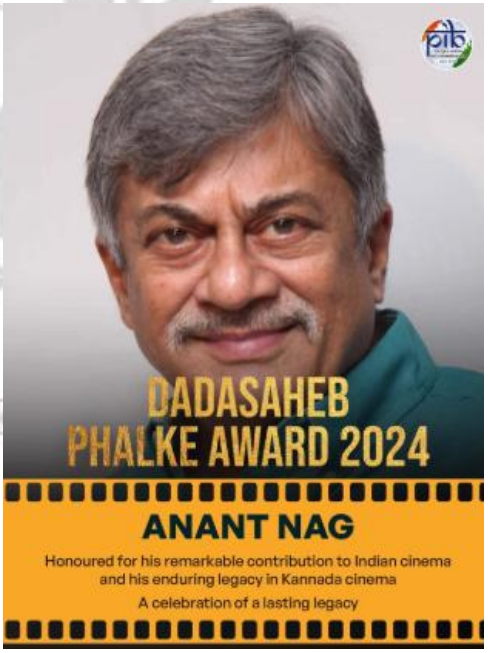
HISTORY & CULTURE

Cinema & Cultural Heritage: Anant Nag Conferred 56th Dadasaheb Phalke Award

Key Highlights & Summary

- **Highest Cinematic Honour**: Veteran actor **Shri Anant Nag** has been conferred the prestigious **Dadasaheb Phalke Award** for his outstanding contributions to Indian cinema, particularly Kannada cinema.
- **Prime Minister's Tribute**: Prime Minister Narendra Modi congratulated the legendary actor, highlighting his effortless performances, remarkable versatility, and artistic brilliance that brought rare depth and authenticity to diverse roles.
- **Decades-Long Legacy**: Recognized for a career spanning over five decades across parallel and commercial Indian cinema (Kannada, Hindi, Marathi, Telugu, and Malayalam).

Essential Definitions



- **Dadasaheb Phalke Award**: India's highest award in cinema, presented annually at the National Film Awards ceremony by the Directorate of Film Festivals (under the Ministry of Information and Broadcasting) for "outstanding contribution to the growth and development of Indian cinema."
- **Kannada Cinema (Sandalwood)**: The regional film industry based in Karnataka, known for seminal works in parallel cinema, literary adaptations, and contemporary pan-Indian cinema.

Legal and Constitutional Framework

- **Seventh Schedule (Union List, Entry 60)**: Assigns sanctioning of cinematograph films for exhibition, as well as national cultural honors and awards, to the jurisdiction of the Central Government.
- **Cinematograph Act, 1952**: Provides the statutory framework for film certification and the regulation of cinematic exhibitions in India.
- **Article 51A(f)**: Fundamental Duty to value and preserve the rich heritage of our composite culture, which includes artistic and cinematic achievements.

Prelims Perspective

- **Recipient**: Anant Nag (born Anant Nagarkatte).

- **Awarding Nodal Body**: Ministry of Information and Broadcasting, Government of India.
- **Prize Components**: Consists of a *Swarna Kamal* (Golden Lotus) medallion, a shawl, and a cash prize of Rs 15 lakh.
- **First Recipient**: Devika Rani (1969).
- **Significant Works**: Known for classics directed by Shyam Benegal (e.g., *Ankur*, *Nishant*, *Bhumika*), partnership with G. V. Iyer, Shankar Nag's *Malgudi Days*, and modern blockbusters like *K.G.F: Chapter 1*.

Mains Perspective

- **Recognition of Regional Cinema**: Bestowing the country's top film honor on regional stalwarts highlights the decentralization of Indian cultural recognition beyond Hindi cinema (Bollywood).
- **Parallel Cinema Movement**: Anant Nag's work bridges the gap between art-house parallel cinema and mainstream commercial film industries.
- **Preservation of Cultural Heritage**: Emphasizes the role of cinema as a medium for preserving local literature, languages, and socio-cultural narratives.

Government and Policy Response

- **National Film Development Corporation (NFDC)**: Strengthening archival restoration of classic Indian films, including pivotal Kannada parallel cinema works.
- **National Film Awards Expansion**: Continuing efforts to ensure broad representation across all regional linguistic cinema streams in national honors.

Key Challenges

- **Archival & Film Preservation**: Ensuring early film reels and physical prints of classical regional cinema are digitized and preserved from degradation.
- **Linguistic Repertoire Access**: Expanding subtitling and dubbing initiatives to make historical regional film masterpieces accessible to broader audiences nationwide.

Mains Value Addition

- **First Kannada Dadasaheb Phalke Winners**: Anant Nag joins the ranks of iconic Kannada film personalities who have previously received the award, such as **Dr. Rajkumar** (1995) and director **K. Balachander** (2010, predominantly Tamil/Kannada).

Possible UPSC Mains Questions

1. "Regional cinema has played a pivotal role in shaping India's composite cultural narrative and social commentary." Discuss in the context of national awards recognizing regional film stalwarts.
2. Examine the role of parallel cinema in addressing socio-economic themes in post-independence India.

Way Forward

- **Digitization & Heritage Archiving**: Accelerate projects under the National Film Heritage Mission (NFHM) to restore classic regional films.
- **Promoting Regional Film Tourism**: Leverage iconic film shooting locations and regional cinema history to boost cultural tourism and creative economies across states.

Conclusion

The conferment of the Dadasaheb Phalke Award on Anant Nag celebrates artistic authenticity and versatile storytelling in Indian cinema. It reaffirms the central role of regional cinema in enriching the country's cultural heritage.

EDITORIALS & OPINION

From an Aspirational District to Academic Excellence: How NFSC Support Empowered Dr. Abinash Mandal

Key Highlights & Summary

- **Empowering SC Scholars**: The National Fellowship for Scheduled Caste Students (NFSC) scheme bridges financial and social barriers for scholars from marginalized communities pursuing higher education (M.Phil/Ph.D.).
- **Aspirational District Inclusion**: Demonstrates how targeted interventions enable talent from remote and underdeveloped areas (like Udalguri district, Assam) to access premier national universities.
- **Financial Security**: Provides monthly stipends (₹37,000 for JRF and ₹42,000 for SRF) to ensure uninterrupted focus on full-time advanced academic research.
- **Academic Productivity**: Enables scholars to access quality research infrastructure, present papers at top-tier institutions (IIMs, IITs), and publish in international journals.
- **Socio-Economic Upward Mobility**: Converts educational assistance into long-term professional independence, enabling scholars to secure faculty positions and contribute to knowledge creation.
- **Social Return on Investment**: Creates role models within marginalized communities, driving generational educational aspirations and social empowerment.

Essential Definitions

- **National Fellowship for Scheduled Caste Students (NFSC)**: A Central Sector Scheme offering financial assistance to Scheduled Caste (SC) students to pursue higher education leading to M.Phil. and Ph.D. degrees in Indian universities and research institutes.
- **Aspirational Districts Programme**: A flagship NITI Aayog initiative launched in 2018 aimed at quickly and effectively transforming 112 of the most underdeveloped districts across the country through targeted development metrics.
- **Forensic Accounting**: An advanced interdisciplinary area of accounting that integrates auditing, accounting, and investigative skills to analyze financial records for legal proceedings or fraud detection.

Legal and Constitutional Framework

- **Article 15(4)**: Empowers the State to make special provisions for the advancement of any socially and educationally backward classes of citizens or for the Scheduled Castes and Scheduled Tribes.

- **Article 46 (Directive Principles)**: Mandates the State to promote with special care the educational and economic interests of the weaker sections of the people, particularly the Scheduled Castes and Scheduled Tribes, and protect them from social injustice.
- **Article 338**: Establishes the National Commission for Scheduled Castes (NCSC) to monitor and evaluate constitutional safeguards and welfare schemes enacted for SC empowerment.

Prelims Perspective

- **Nodal Ministry**: Ministry of Social Justice and Empowerment (MoSJE).
- **Implementing Agency**: National Scheduled Castes Finance and Development Corporation (NSFDC) / UGC / designated government portals.
- **Scheme Type**: Central Sector Scheme (100% funded by the Central Government).
- **Coverage Scope**: Applicable for SC candidates who have qualified for UGC-NET/CSIR-NET or equivalent national selection for doctoral research.

Mains Perspective

- **Addressing Inclusive Education**: Breaks the cycle of inter-generational poverty and social exclusion by offering institutionalized financial buffers to higher education aspirants.
- **Regional Disparity Reduction**: Overcomes the geographical disadvantage of border/remote aspirational districts by enabling mobility to central educational institutions.
- **Building Knowledge Capital**: Fosters indigenous research talent in specialized fields (e.g., Commerce, Technology, Humanities) from historically underrepresented sections.

Government and Policy Response

- **PM-YASASVI**: Umbrella initiative integrating various scholarship schemes for marginalized categories to streamline application processes and digital funds transfer.
- **Direct Benefit Transfer (DBT)**: Ensures direct monthly remittance of fellowship grants into beneficiaries' bank accounts, eliminating administrative delays and leakages.
- **National Education Policy (NEP) 2020**: Emphasizes creating Special Education Zones (SEZs) and expanding targeted scholarships to improve Higher Education Gross Enrolment Ratio (GER) among disadvantaged groups.

VIDHVATH IAS ACADEMY

Key Challenges

- **Delayed Fund Disbursement**: Bureaucracy and administrative lag in fellowship processing occasionally cause cash-flow gaps for scholars.
- **Information Asymmetry**: Low awareness regarding fellowship eligibility, application portals, and university seats in remote aspirational regions.
- **Higher Education Retention**: Socio-cultural pressures and language barriers often lead to early dropouts before scholars attain doctoral degrees.

Mains Value Addition

- **Data Point**: Financial assistance under NFSC ranges from ₹37,000/month (JRF) to ₹42,000/month (SRF), significantly offsetting research costs.

- **Conceptual Linkage**: "Social Inclusion through Academic Capital" — transitioning from welfare-dependent benefits to self-sustaining academic empowerment.

Possible UPSC Two Questions of Mains

1. "Higher education scholarships are not merely financial assistance but crucial instruments for social engineering and mobility." Discuss with reference to schemes targeting Scheduled Castes in India.
2. Critically evaluate the role of the Aspirational Districts Programme in bridging regional human development disparities, particularly in the education sector.

Way Forward

- **Streamline DBT Portals**: Automate fellowship verification pipelines to mandate monthly stipend disbursals without operational lags.
- **Mentorship & Career Guidance**: Institutionalize academic mentoring networks across premier institutions to support research scholars from marginalized backgrounds.
- **Targeted Awareness Drives**: Establish outreach cells within aspirational district schools and colleges to increase awareness of national research fellowships.

Conclusion

The transformation of scholars from aspirational districts into academic mentors highlights the critical importance of schemes like NFSC. By converting constitutional mandates into actionable welfare mechanisms, India ensures that financial constraints do not limit intellectual capabilities, paving the way for inclusive human capital development.

ETHICS

Vibrant Villages Programme

Key Highlights & Summary

- **Strategic Shift in Border Policy:** Redefines border outposts as strategic partners and "first villages" rather than remote "last villages," ensuring border security through community development and reverse migration.



- **Two-Phase Implementation:** Covers 2,616+ border villages across 15 States and 2 UTs with a total financial outlay of ₹11,639 crore (VVP-I: ₹4,800 crore; VVP-II: ₹6,839 crore).
- **Comprehensive Connectivity & Infrastructure:** Enhances all-weather roads, long-span bridges, telecommunications, reliable electricity, healthcare, and SMART classrooms along India's 15,000+ km land border.
- **Economic Empowerment & Hub-Spoke Model:** Promotes border tourism, local cooperatives, Self-Help Groups (SHGs), and "One-Block-One-Product" enterprises, backed by assured local procurement from border-guarding forces.

- **Convergence & Customized Planning:** Driven by tailored Village Action Plans that converge central and state schemes (e.g., PMGSY-IV) under the Ministry of Home Affairs with oversight by a High-Powered Committee.
- **Security-Development Nexus:** Leverages border populations as essential intelligence assets ("eyes and ears"), bolstering frontier resilience and preventing trans-border crimes.

Essential Definitions

- **Vibrant Villages Programme (VVP):** A central scheme launched in 2023 to holistically develop strategic border villages, create sustainable local livelihoods, prevent out-migration, and secure national frontiers.
- **VVP-I:** A Centrally Sponsored Scheme (CSS) launched at Kibithoo, Arunachal Pradesh, targeting 662 priority northern border villages across 4 States and 1 UT from FY 2022-23 to 2026-27.
- **VVP-II:** A Central Sector Scheme fully funded by the Centre, approved in 2025 to extend VVP-I coverage to 1,954 villages across 334 blocks along all other international land borders through FY 2028-29.
- **Reverse Migration:** The demographic trend where residents who previously migrated due to hardship return to their native border settlements as infrastructure and economic prospects improve.
- **Scheme Convergence:** The integration of multiple government schemes and funding streams into a unified Village Action Plan to achieve 100% saturation of basic services without effort duplication.

Legal and Constitutional Framework

- **Article 1(1) & Territorial Integrity:** Underpinning the constitutional duty to safeguard the territory of the Union, border population stability directly aids sovereign defense.
- **Article 246 & Union List (Entry 1 & 2):** Grants the Union Parliament exclusive authority over Defence of India and Armed Forces/Border Guarding Operations.
- **Directive Principles of State Policy (DPSP):** Article 38 (Promoting social order and welfare), Article 39(b) (Distribution of material resources), and Article 47 (Raising standard of living and health) justify state-led capital investment in frontier regions.
- **Nodal Executive Mechanism:** Administered by the Ministry of Home Affairs (MHA), with inter-departmental convergence guidelines recommended by a High-Powered Committee chaired by the Cabinet Secretary.
- **Sunset of BADP:** Supersedes the legacy Border Area Development Programme (BADP) established in 1986-87, shifting from broad border-zone grants to targeted, village-specific saturation models.

Conclusion

The Vibrant Villages Programme integrates national security with grassroots socio-economic development. By turning remote border outposts into thriving economic hubs, VVP mitigates out-migration, strengthens frontier defense via empowered border communities, and advances the national vision of a self-reliant and secure Viksit Bharat@2047.

Water Security: 'Jal Sanchay Jan Bhagidari – Catch the Rain' Anthem Launched

Key Highlights & Summary

- **Anthem Release**: The **Ministry of Jal Shakti** released the official anthem for the nationwide movement **"Jal Sanchay Jan Bhagidari – Catch the Rain"** on September 15, 2026.
- **Artistic Contribution**: Composed and sung by renowned musician **Shankar Mahadevan**.
- **Core Philosophy**: Amplifies Prime Minister Narendra Modi's call: *"Catch the Rain – Where It Falls, When It Falls"*.
- **Central Motto**: *"पकड़ें हम, पकड़ें हम, बारिश का पानी, लिखें हम, लिखें हम, एक नई कहानी"* (*Let us catch the rainwater and write a new story of water sustainability*).
- **Community-Centric Approach**: Shifts water conservation from an administrative government scheme into a participatory *Jan Andolan* (people's movement).

Essential Definitions

- **Jal Sanchay Jan Bhagidari**: A community-driven initiative aimed at rainwater harvesting and groundwater recharge through local participation.
- **Catch the Rain Campaign**: A flagship initiative under the **Jal Shakti Abhiyan** focused on constructing rainwater harvesting structures (RWHS) suitable for local climatic and soil conditions before and during the monsoon season.
- **Jan Bhagidari**: Citizen participation in civic, ecological, and governance programs.

Legal and Constitutional Framework

- **Article 51A(g)**: Fundamental Duty of every citizen to protect and improve the natural environment, including forests, lakes, rivers, and wildlife.
- **Seventh Schedule (State List, Entry 17)**: Primary jurisdiction over water supply, irrigation, drainage, embankments, and water storage lies with State governments, with overarching policy direction provided by the Central Ministry of Jal Shakti.
- **Environment (Protection) Act, 1986**: Provides statutory coverage for groundwater management guidelines issued by the **Central Ground Water Authority (CGWA)**.

Prelims Perspective

VIDHVATH IAS ACADEMY

- **Nodal Ministry**: Ministry of Jal Shakti.
- **Anthem Composer/Singer**: Shankar Mahadevan.
- **Core Campaign Tagline**: *"Catch the Rain – Where It Falls, When It Falls"*.
- **Primary Key Performance Indicators (KPIs)**: Rooftop rainwater harvesting systems (RTRWHS), check dam rejuvenation, removal of encroachments on water bodies, and geo-tagging of water assets.

Mains Perspective

- **Behavioral Economics and Public Nudges**: Utilizing cultural media and music to induce voluntary public behavioral shifts towards water conservation (aligning with *Swachh Bharat Abhiyan's* public awareness model).

- **Mitigating Groundwater Depletion**: Accelerates artificial recharge to combat over-exploited blocks, particularly across critical regions in Punjab, Haryana, Rajasthan, and Tamil Nadu.
- **Climate Resilience & Urban Flooding**: Capturing peak rain runoff decreases urban flash flooding while strengthening localized water security during dry spells.

Government and Policy Response

- **National Water Mission (NWM)**: Coordinates the "Catch the Rain" campaign alongside urban local bodies (ULBs), Panchayati Raj Institutions (PRIs), and District Collectors.
- **Integration with MGNREGA & AMRUT 2.0**: Earmarking funds for desilting traditional water bodies (*Baolis*, ponds) and creating recharge shafts.
- **Jal Shakti Kendras**: Setting up resource centers in every district headquarters to serve as technical guidance hubs for rainwater harvesting designs.

Key Challenges

- **Maintenance Deficit**: Installed rainwater harvesting units often suffer from clogging, lack of filtration maintenance, or poor structural upkeeps post-monsoon.
- **Unplanned Urbanization**: Rapid paving of urban surfaces limits natural aquifer recharge zones despite runoff generation.
- **Geographical Disparity**: Non-uniform monsoon distribution across hard-rock terrain regions limits natural percolation rates compared to alluvial plains.

Mains Value Addition

- **Synergy of Jan Shakti & Jal Shakti**: Institutionalizing participatory water management (*Jan Bhagidari*) strengthens long-term climate adaptation strategies across India's micro-watersheds.
- **Youth & Community Mobilization**: Using cultural campaigns to empower school eco-clubs, youth organizations (NYKS/NSS), and self-help groups (SHGs) as local water stewards.

Possible UPSC Mains Questions

1. "Water security in India cannot be achieved solely through engineering solutions; it requires a socio-cultural Jan Andolan." Discuss in light of the 'Jal Sanchay Jan Bhagidari' campaign.
2. Evaluate the progress of the 'Catch the Rain' initiative in mitigating localized water distress. What policy interventions are needed to ensure long-term structural maintenance of rainwater harvesting infrastructure?

Way Forward

- **Mandatory Norms Enforcement**: Enforce state building bylaws requiring functional rainwater harvesting structures for all commercial and large residential setups.
- **Geo-Tagging & Asset Tracking**: Expand real-time monitoring through GIS mapping to track recharge structure conditions nationwide.
- **Community Water Auditing**: Empower Gram Panchayats to conduct seasonal water budgets to balance local demand with conserved supplies.

Conclusion

The release of the "Jal Sanchay Jan Bhagidari" anthem serves as a cultural catalyst to rally citizens around water sustainability. By turning rainwater harvesting into a widespread public effort, India can strengthen its aquifer health and build long-term water security.

Administrative Reforms: DIPAM Achieves Zero Pendency Under Special Campaign 5.0

Key Highlights & Summary

- **Zero Pendency Milestones**: The Department of Investment and Public Asset Management (DIPAM) achieved **100% disposal** of pending Public Grievances, Public Grievance Appeals, Inter-Ministerial Committee (IMC) references, and Prime Minister's Office (PMO) references.
- **Execution Period**: Performance tracked from **November 2025 to August 2026** under the Special Campaign 5.0 framework, preparing for Special Campaign 6.0 (2nd to 31st October 2026).
- **Swachhata & Office Hygiene**: Modernized workspace hygiene standards through sustainable initiatives, including installing automated urinal sensors across office premises.
- **Space Optimization**: Freeed up physical parking and office space by completing the official scrapping of condemned department vehicles.
- **Citizen Engagement**: Organised *Swachhata Pakhwada* in January 2026 to foster administrative efficiency and civic responsibility among personnel.

Essential Definitions

- **DIPAM (Department of Investment and Public Asset Management)**: A department under the Ministry of Finance responsible for managing central public sector enterprises (CPSEs), disinvestment strategies, asset monetization, and capital restructuring.
- **Special Campaign Framework**: A institutionalized drive coordinated by the Department of Administrative Reforms and Public Grievances (DARPG) across all Union Ministries to clear pendencies, improve record management, recycle scrap, and optimize government office space.
- **Inter-Ministerial Committee (IMC) References**: Cross-departmental policy proposals requiring joint consultation and inter-ministerial clearance before executive execution.

Legal and Constitutional Framework

- **Article 77(3) of the Constitution**: Empowers the President to make rules for the more convenient transaction of the business of the Government of India (Allocation of Business Rules), under which DIPAM's functional mandate is defined.
- **Public Records Act, 1993**: Regulates the management, administration, retention, and systematic weeding out of public records across central government departments.
- **Vehicular Scrapping Policy (2021)**: Mandates the deregistration and eco-friendly scrapping of end-of-life government vehicles older than 15 years to promote space optimization and circular recycling.

Prelims Perspective

- **Parent Ministry**: Ministry of Finance, Government of India.
- **Structural Feature**: DIPAM has **no attached, subordinate offices, or Autonomous Bodies** under its organizational hierarchy.

- **Coordinating Authority for Special Campaigns**: Department of Administrative Reforms and Public Grievances (DARPG).
- **Upcoming Drive**: Special Campaign 6.0 scheduled from **2nd October to 31st October 2026**.

Mains Perspective

- **Administrative Efficiency & Good Governance**: Achieving zero pendency in PMO and inter-ministerial references removes bureaucratic bottlenecks, speeding up strategic disinvestment and asset monetization decisions.
- **Citizen-Centric Administration**: Rapid resolution of public grievances builds trust in public delivery systems and aligns with the *Minimum Government, Maximum Governance* philosophy.
- **Sustainable Workspaces**: Integrating automated hygiene solutions and systematic scrap disposal supports environmental sustainability and urban space efficiency.

Government and Policy Response

- **Institutionalizing Swachhata**: Embedding cleanliness and record management into routine administrative operations, moving beyond temporary seasonal drives.
- **CPGRAMS Integration**: Utilizing the Centralized Public Grievance Redress and Monitoring System (CPGRAMS) for real-time tracking and time-bound resolution of public complaints.
- **Digital Record Weeding**: Digitizing active files while systematically clearing physical archives to reduce paper footprints across government secretariats.

Key Challenges

- **Maintaining Zero Pendency**: Sustaining clear grievance queues as fresh references and commercial disinvestment matters increase continuously.
- **Inter-Departmental Synchronization**: Managing complex disinvestments that require coordination with multiple ministries while preventing administrative delays.
- **Digital Security in Records Management**: Protecting sensitive financial records and strategic asset data as physical files transition to digital formats.

Mains Value Addition

- **Operational Agility**: Streamlined internal procedures allow DIPAM to focus on managing CPSE capital allocations and strategic disinvestment goals without administrative delays.
- **CPGRAMS Compliance**: Achieving zero grievance pendency directly supports top-tier benchmarks set by DARPG for central government bodies.

Possible UPSC Mains Questions

1. "Special Campaigns for clearing pendency and institutionalizing cleanliness have evolved into an effective tool for administrative reform in India." Analyze with reference to recent performance across central ministries.
2. Evaluate the role of the Department of Investment and Public Asset Management (DIPAM) in managing public assets. How do internal administrative reforms impact broader economic decision-making?

Way Forward

- **Automate Public Grievance Tracking**: Integrate AI-driven analytics within CPGRAMS to route and resolve public inquiries automatically.
- **Continuous File Weeding**: Establish routine quarterly file review schedules under the Public Records Act to prevent physical record accumulation.
- **Expand Special Campaign 6.0 Goals**: Standardize energy-efficient digital infrastructure and paperless workflows as core benchmarks during the October 2026 campaign.

Conclusion

DIPAM's achievement of zero pendency across public grievances, IMC, and PMO references demonstrates the impact of structured administrative reforms. As the department prepares for Special Campaign 6.0, maintaining these administrative standards will support efficient public asset management.

YOJANA & KURUKSHETRA

NAMASTE Scheme: Mechanised Sanitation and Occupational Safety

Key Highlights & Summary

- **Scheme Architecture:** National Action for Mechanised Sanitation Ecosystem (NAMASTE) is a joint initiative of the Ministry of Social Justice and Empowerment and the Ministry of Housing and Urban Affairs, executed via NSKFDC.
- **Core Objective:** Directs the total elimination of hazardous manual entry into sewers and septic tanks, driving 100% mechanisation of sanitation work across Urban Local Bodies (ULBs).
- **Skill & Capacity Building:** Mandates 5-day (30-hour) occupational safety training modules covering Personal Protective Equipment (PPE) handling, emergency response, and mechanised cleaning operations, accompanied by training stipends.



- **Profiling & Identification:** Integrates digital profiling, health database creation (including blood-group mapping), distribution of identity cards, and free PPE kits for Sewer and Septic Tank Workers (SSWs).
- **Institutional Technical Support:** Collaborates with technical research bodies like CSIR-CMERI to serve as testing, equipment verification, and safety training hubs for urban sanitation machinery.
- **Socio-Economic Safeguards:** Focuses on converting sanitation workers into enterprise operators ('Sanipreneurs') through subsidized loans, capital assistance, and formal self-employment opportunities.

Essential Definitions

- **NAMASTE Scheme:** A Central Sector Scheme aimed at ensuring zero fatalities in sanitation work, formalizing sewer cleaning, and extending health insurance and livelihood security to sanitation workers.
- **Sewer/Septic Tank Worker (SSW):** Individuals engaged in the cleaning, maintenance, or sludge management of underground drainage systems, septic tanks, and sewer lines.
- **Mechanised Sanitation Ecosystem:** An operational model replacing manual intervention in hazardous environments with specialized technology, robotic cleaning tools, and suction-cum-jetting machines.

Legal and Constitutional Framework

- **Article 21:** Guarantees the Right to Life and Personal Liberty, expanded by the Supreme Court to include the right to live with human dignity and work in a safe environment.
- **Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013:** Explicitly bans hazardous cleaning of sewers and septic tanks without protective gear and mandates strict penal consequences for violations.
- **Protection of Civil Rights Act, 1955:** Prohibits untouchability-based occupations and discriminatory practices tied historically to sanitation labor.
- **Safai Karamcharis Act & NSKFDC Mandate:** Statutory mechanisms dedicated to socio-economic upliftment, low-interest credit access, and comprehensive welfare schemes for sanitation personnel.

Conclusion

The NAMASTE Scheme establishes a multi-tiered safety net by substituting hazardous manual cleaning with modern technological infrastructure. Ensuring strict municipal enforcement of safety protocols and promoting sustainable entrepreneurship among workers will permanently eliminate dignity-denying practices in India's urban landscape.

Transformation of School Education: PM SHRI and Future-Ready Exemplar Institutions

Key Highlights & Summary

VIDHVATH IAS ACADEMY

- **Scheme Outlay & Timeline**: Launched on 7 September 2022, the Pradhan Mantri Schools for Rising India (PM SHRI) scheme is a Centrally Sponsored Scheme with a total outlay of Rs 27,360 crore from 2022–23 to 2026–27 (Central share: Rs 18,128 crore).
- **National Coverage Milestone**: As of July 2026, 13,092 schools (around 90% of the 14,500 target) have been selected across 36 States/UTs, covering 725 districts and 8,340 blocks/ULBs.
- **Beneficiary Demographics**: The network spans 1,305 primary, 3,102 upper primary, 3,141 secondary, and 5,544 higher secondary schools, alongside 80 Kasturba Gandhi Balika Vidyalayas (KGBVs), 913 KVS, 620 NVS, and 4 NCERT institutions, directly benefiting over 20 lakh students.
- **Budget Expansion**: Central share allocations rose from Rs 2,520 crore in 2023–24 to Rs 5,224 crore in 2026–27, marking a 107% increase in funding scale.

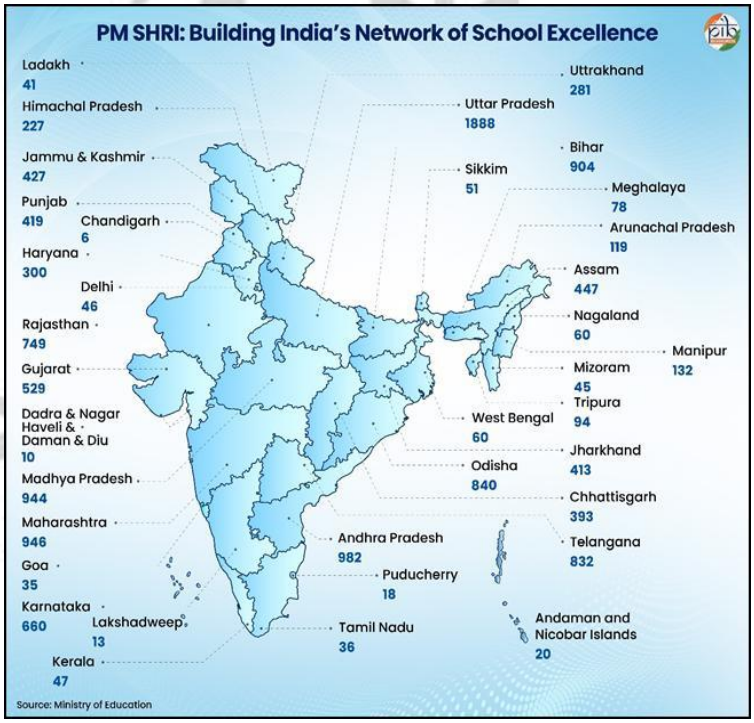
- **Three-Stage Challenge Mode Selection**: Incorporates MoU signing (Stage 1), UDISE+ benchmarking (Stage 2), and challenge-based competition verified through physical inspection (Stage 3).

Essential Definitions

- **Exemplar Institutions**: Hub schools that demonstrate the full implementation of NEP 2020 and provide leadership, mentoring, and resource-sharing to neighbouring schools in a cluster.
- **School Quality Assessment Framework (SQAF)**: A structured evaluation mechanism used to assess and monitor school performance across infrastructure, pedagogy, inclusive practices, and learning outcomes.
- **5+3+3+4 Curricular Structure**: The pedagogical design under NEP 2020 covering Foundational (5 years), Preparatory (3 years), Middle (3 years), and Secondary (4 years) stages.

Legal and Constitutional Framework

- **Article 21A**: Guarantees free and compulsory education for all children aged 6 to 14 years as a Fundamental Right.
- **Right of Children to Free and Compulsory Education (RTE) Act, 2009**: Establishes statutory norms for school infrastructure, pupil-teacher ratios, and inclusive learning environments.
- **National Education Policy (NEP) 2020**: The foundational policy vision translated into practice through the PM SHRI operational framework.



Prelims Perspective

- **Implementing Department**: Department of School Education and Literacy, Ministry of Education.
- **Urban vs Rural Cut-offs for Selection**: Minimum score of 70% for urban schools and 60% for rural schools under the Challenge Method.
- **Final Selection Authority**: Expert Committee headed by the Secretary (School Education & Literacy), Ministry of Education.
- **Teacher Support Allotment**: Up to Rs 3 lakh per DIET for capacity building and up to Rs 2,500 per teacher for specialized training.

Mains Perspective

- **Shift from Infrastructure to Pedagogy**: PM SHRI shifts the development paradigm from physical building construction toward holistic, competency-based, and student-centric learning.
- **Linguistic Inclusion & Foundational Literacy**: Multilingual instruction using mother tongue/regional languages supported by 6,102 Sanskrit, 1,994 Urdu, and 9,152 regional language teachers (UDISE+ 2025–26).

- **Digital Public Infrastructure Integration**: Synergizing physical classrooms with platforms like DIKSHA, smart boards, and STEM labs to bridge the digital divide in rural areas.

Government and Policy Response

- **Cluster Mentorship Model**: PM SHRI schools act as resource hubs to mentor surrounding schools, creating a systemic quality improvement loop.
- **Green School Initiatives**: Incorporating environmental sustainability benchmarks, energy conservation, and eco-friendly school management practices.
- **Teacher and Leadership Capacity Building**: Training principals in pedagogical leadership and supporting teachers with tools like the Holistic Progress Card and first-level counselling.

Key Challenges

- **Inter-State Selection Disparities**: Varied timelines across states in signing MoUs and completing physical verification under Stage 3.
- **Urban-Rural Resource Gaps**: Maintaining uniform implementation standards across remote rural schools facing last-mile internet and ICT infrastructure bottlenecks.
- **Sustaining Cluster Mentorship**: Ensuring long-term engagement between PM SHRI exemplar schools and nearby general schools without administrative friction.

Mains Value Addition

- **The 6 Major Pillars of PM SHRI**:
    1. Curriculum, Pedagogy and Assessment
    2. Inclusive Practices and Gender Equity
    3. Human Resources and Leadership
    4. Infrastructure and Resources
    5. Management, Governance and Beneficiary Satisfaction
    6. Green School Initiatives
- **Scale of Reach**: Covers 14.71 lakh schools and 24.69 crore students nationwide under the broader public education framework.

Possible UPSC Two Questions of Mains

1. "PM SHRI represents a paradigm shift from infrastructure-centric school development to holistic, equity-based education." Analyze this statement in the context of NEP 2020 implementation.
2. Evaluate the Challenge Method selection process and the cluster-based mentoring model in raising education quality in public schools across India.

Way Forward

- **Strengthen DIETs**: Ensure timely disbursement and utilization of capacity-building grants allocated to District Institutes of Education and Training.
- **Expand Local Industry & Artisan Links**: Broaden vocational exposure through partnerships with local craftsmen and enterprises for experiential learning.
- **Robust Monitoring via SQAF**: Use regular real-time tracking through the School Quality Assessment Framework to maintain educational benchmarks across all selected schools.

Conclusion

The PM SHRI scheme operationalizes NEP 2020 by building an inclusive network of over 13,000 exemplar schools. By combining modern infrastructure with experiential learning, teacher empowerment, and cluster mentorship, the initiative establishes a framework for quality education across India.

UPSC Relevance

- **GS Paper II**: Issues relating to development and management of Social Sector/Services relating to Education, Human Resources; Government policies and interventions for development in various sectors.
- **GS Paper III**: Inclusive growth and issues arising from it; Innovation and technological integration in public services.

PIB & PARLIAMENTARY RESEARCH STUDIES (PRS)

Tribal Development: Governance, PM-JANMAN, and DA-JGUA

Key Highlights & Summary

- **National Implementation Review:** The Ministry of Tribal Affairs (MoTA) conducted a high-level review of its flagship initiatives—Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM-JANMAN) and Dharti Aaba Janjatiya Gram Utkarsh Abhiyan (DA-JGUA)—focusing on fund utilization, pending Utilization Certificates (UCs), and inter-ministerial convergence.
- **ITDA Decentralized Planning Framework:** Shared a comprehensive Roadmap and Operational Guidelines for Integrated Tribal Development Agencies/Projects (ITDAs/ITDPs) to standardize block- and district-level governance, streamline administrative workflows, and accelerate resource deployment.
- **Publication of 'Adi Darpan':** Released a compendium detailing the developmental status, ground realities, and baseline progress of indigenous communities to serve as a transparent reference for evidence-based policymaking.
- **District Agri DPR Challenge:** Awarded top-performing districts (including Wayanad, Palakkad, Dima Hasao, and Palghar) for generating actionable Detailed Project Reports (DPRs) to scale up agricultural value chains, sustainable horticulture, and water management in tribal belts.
- **Women-Led Entrepreneurship:** Announced the *Rani Durgavati Adivasi Mahila Sammelan*, a national conclave focused on providing tribal women entrepreneurs with credit access, skill development, market linkages, and mentorship.
- **Capacity Building & Grassroots Cadre:** Reviewed the progress of the *Adi Karmayogi Abhiyan*, integrating volunteers via the iGOT microsite and leveraging local digital platforms (Adi Sewa Kendras) to improve last-mile public service delivery.

Essential Definitions

- **PM-JANMAN:** A targeted mission focusing on 75 Particularly Vulnerable Tribal Groups (PVTGs) across 18 States and 1 UT, delivering 11 critical interventions across 9 line ministries.
- **DA-JGUA (Dharti Aaba Janjatiya Gram Utkarsh Abhiyan):** A comprehensive national campaign aimed at saturating infrastructure and social welfare gaps across tribal-majority villages through multi-sectoral convergence.
- **Integrated Tribal Development Agency (ITDA):** An administrative unit established at the sub-district or district level to implement localized, integrated socio-economic development plans in contiguous tribal-majority areas.

Legal and Constitutional Framework

- **Fifth and Sixth Schedules:** Special constitutional provisions governing the administration and control of Scheduled Areas and Tribal Areas across various states.
- **Article 275(1):** Mandates special central grants-in-aid out of the Consolidated Fund of India to promote the welfare of Scheduled Tribes and raise the administration level of Scheduled Areas.
- **Article 338A:** Establishes the National Commission for Scheduled Tribes (NCST) as a constitutional body to oversee safeguards and investigate rights violations.
- **Forest Rights Act (FRA), 2006:** A statutory framework recognizing individual and community forest rights (IFR/CFR) of forest-dwelling Scheduled Tribes (FDSTs).

Conclusion

The institutionalization of ITDA guidelines and the saturation-based strategies of PM-JANMAN and DA-JGUA represent a structural pivot toward evidence-based, decentralized tribal governance. Addressing local administrative constraints and sustaining inter-ministerial convergence will be imperative to achieving holistic socio-economic empowerment.

VIDHVATH IAS ACADEMY