"We help you reach for the star"

VIDHVATH IAS KAS ACADEMY
& STUDY CENTRE

DAILY CURRENT AFFAIRS

FOR UPSC CIVIL SERVICE EXAMINATION

DATE: 16/02/2026 (MONDAY)

📞 9972258970 & 9740702455

#317/A SKB Arcade, D. Subbaiah Road, Ramaswamy Circle, Mysuru–570004

Table of Contents

1. Decentralized Waste Management: The 'Anupam' Model

The New Delhi Municipal Council (NDMC) has pioneered the 'Anupam' model, a decentralized waste management strategy aimed at achieving 100% source segregation and on-site processing. By treating waste as a resource rather than a burden to be transported, this model sets a benchmark for sustainable urban governance and circular economy principles.

- **Decentralized Processing:** The core shift involves moving away from centralized dumping towards on-site treatment, where wet and horticultural waste are composted within the colony using wire-mesh bins and pits, eliminating the carbon footprint of waste transportation.

- **Three-Way Source Segregation:** Residents must segregate waste into wet, dry, and sanitary categories at the doorstep. Dry waste is further sub-categorized to maximize the recovery of recyclables, while e-waste is channeled to CPCB-authorized recyclers.

- **Community-Led Governance:** The model leverages Resident Welfare Associations (RWAs) and NGOs to manage collection and sorting, moving from a top-down municipal approach to a participatory "bottom-up" governance structure.

- **Integration of Technology and Labor:** The model combines mechanized sweeping systems with dedicated sanitation inspectors and specialized staff to oversee composting, ensuring that the process is both efficient and scientifically managed.

- **Behavioral Change and Enforcement:** Success is driven by intensive door-to-door awareness campaigns and "regular meetings" with stakeholders, backed by the strategic use of penalties for mixed waste to ensure 100% compliance.

- **Zero-Waste Circularity:** By converting organic waste into high-quality compost (e.g., producing 800 kg in initial phases) used for local parks and green belts, the model closes the nutrient loop within the urban ecosystem.

Key Definitions

- **Decentralized Waste Management:** A system where waste is collected, sorted, and treated close to the point of generation rather than being transported to a distant, large-scale landfill or processing plant.

- **Source Segregation:** The practice of dividing waste into different groups (biodegradable and non-biodegradable) at the point of origin to facilitate recycling and composting.

- **Circular Economy:** An economic system aimed at eliminating waste and the continual use of resources through reuse, sharing, repair, refurbishment, and recycling.

Constitutional & Legal Provisions

- **Article 51A (g):** Fundamental Duty of every citizen to protect and improve the natural environment.

- **Article 21:** The Right to Life includes the right to a clean and healthy environment as interpreted by the Judiciary.

- **Solid Waste Management (SWM) Rules, 2016:** These rules mandate the segregation of waste at source and emphasize the role of local bodies in setting up decentralized processing facilities.

- **Swachh Bharat Mission (Urban) 2.0:** Focuses on making cities "garbage-free" and mandates 100% processing of all waste.

Additional Key Points

- **Economic Viability:** Reduces municipal spending on fuel, vehicle maintenance, and large-scale landfill management.

- **Environmental Impact:** Significantly reduces methane emissions from landfills and lowers the environmental hazards associated with "waste-to-energy" incineration.

- **Scalability:** While currently a pilot in six colonies (including Chanakyapuri and Bapu Dham), the NDMC aims to scale this to all residential areas under its jurisdiction.

Conclusion

The 'Anupam' model represents a paradigm shift from "waste disposal" to "resource management." By empowering local communities and utilizing simple yet effective composting technologies, it addresses the urban crisis of overflowing landfills. For a sustainable future, such micro-models must be integrated into the broader Urban Development Framework to ensure cities breathe easier.

UPSC Relevance

- **GS Paper II:** Statutory, regulatory, and various quasi-judicial bodies (NDMC roles); Governance and the role of NGOs/SHGs in development.

- **GS Paper III:** Environmental pollution and degradation; Waste management (Solid Waste/E-waste); Circular economy.

- **Essay/Ethics:** Case study on community participation and civic responsibility.

2. Kerala Vision 2031: A Roadmap for Human-Centric Growth

The Kerala government has launched 'Vision 2031,' a strategic blueprint aimed at transitioning from its historic successes in social development to a high-productivity, knowledge-based economy. Unveiled during an international conference on "Development and Democracy" in Thiruvananthapuram, the vision coincides with the upcoming 75th anniversary of the state's formation in 2031, aiming to synthesize economic modernization with social justice and climate resilience.

- **Transition to Knowledge Economy:** Vision 2031 marks a shift from focusing solely on social welfare to building a modern, productive economy. It emphasizes frontier sectors such as Artificial Intelligence (AI), Data Science, and Green Hydrogen, utilizing Kerala's highly educated workforce as a core economic asset.

- **Industrial and Infrastructure Modernization:** The plan proposes the creation of specialized industrial corridors, such as the Vizhinjam Outer Area Growth Corridor and the Kochi Global City. It aims to establish 200 Global Capability Centres (GCCs) and a dedicated University for Skill Development to attract high-tech investments and generate quality employment.

- **Climate Resilience and Sustainability:** Recognizing the state's vulnerability to extreme weather, the vision integrates "scientific water management" and renewable energy expansion. It promotes a

circular economy model where waste from one industry serves as raw material for another, ensuring growth does not compromise ecological integrity.

- **Strengthening Local Governance:** The model reaffirms the "People's Plan Movement" by further decentralizing power to Local Self-Governments (LSGs). It envisions local bodies as primary drivers for implementing climate-resilient strategies and managing grassroots-level economic transitions.

- **Social and Secular Harmony:** A central pillar of the vision is the preservation of secularism and social inclusivity. Nobel laureate Amartya Sen highlighted that Kerala's human development gains—such as the near-eradication of extreme poverty—are inextricably linked to its culture of participatory democracy and social cooperation.

- **Addressing Fiscal Constraints:** The state government identifies federal restrictions on borrowing and revenue centralization as significant hurdles. Vision 2031 seeks to navigate these "fiscal bottlenecks" through innovative financing, public-private partnerships (PPP), and leveraging the global Malayali diaspora.

Key Definitions

- **Kerala Model of Development:** A development paradigm characterized by high social indicators (literacy, life expectancy, low infant mortality) achieved through state intervention and social welfare, despite moderate per capita income.

- **Knowledge Economy:** An economic system in which the production of goods and services is based primarily upon knowledge-intensive activities that contribute to a rapid pace of technical and scientific advancement.

- **Global Capability Centres (GCCs):** Offsite centers established by multinational companies to handle specialized operations like IT, research, and data analytics, moving beyond traditional back-office roles.

Constitutional & Legal Provisions

- **Article 243G:** Endows Panchayats with powers and authority to function as institutions of self-government, a cornerstone of Kerala's decentralized planning.

- **Article 282:** Provisions regarding discretionary grants from the Union to States, relevant to Kerala's concerns over fiscal federalism and revenue sharing.

- **Seventh Schedule (State List):** Governance of Public Health, Agriculture, and Land—sectors where Kerala has pioneered state-specific reforms under its development model.

- **Directive Principles of State Policy (Part IV):** Specifically Article 38 (promoting welfare of people) and Article 47 (duty to raise level of nutrition and standard of living), which underly the "Vision 2031" social objectives.

Additional Key Points

- **Demographic Transition:** Kerala is the first Indian state to enter a "post-transitional" demographic phase with an aging population, necessitating the vision's focus on geriatric care and specialized health services.

- **Global Benchmarking:** The state aims to align its 2031 goals with the United Nations Sustainable Development Goals (SDGs), where it currently leads the NITI Aayog SDG India Index.

- **Labor Rights:** Unlike traditional industrial models, Vision 2031 emphasizes "skilled labor and protection of workers' rights" as competitive advantages rather than liabilities.

Conclusion

Vision 2031 represents an evolutionary leap for the Kerala Model. By attempting to marry the "Justice" of its past with the "Technology" of the future, Kerala seeks to prove that high-wage, high-welfare societies can also be industrial and technological powerhouses. The success of this model will depend on overcoming fiscal challenges and maintaining the delicate balance between rapid industrialization and environmental conservation.

UPSC Relevance

- **GS Paper II:** Federalism (Centre-State financial relations); Role of LSGs in development; Issues relating to the development and management of Social Sector/Services relating to Health and Education.

- **GS Paper III:** Indian Economy and issues relating to planning, mobilization of resources, growth, and development; Investment models; Environmental impact assessment and climate resilience.

- **Ethics (GS Paper IV):** Case study on "Development vs. Environment" and "Participatory Democracy" in governance.

3. West Bengal's Banglar Yuva Sathi Scheme: Addressing Youth Unemployment

In a significant social welfare move ahead of the state elections, the West Bengal government has operationalized the 'Banglar Yuva Sathi' scheme. This initiative, part of the 2026-27 state budget, aims to provide a monthly financial safety net to the state's educated but unemployed youth. By establishing physical registration camps across all 294 Assembly constituencies, the government seeks to bridge the economic gap for job seekers while navigating the complex landscape of youth labor force participation.

- **Targeted Financial Support:** The scheme provides a monthly allowance of ₹1,500 to eligible unemployed individuals. This assistance continues for a maximum of five years or until the beneficiary secures employment, whichever occurs earlier.

- **Defined Eligibility Criteria:** To qualify, applicants must be residents of West Bengal aged between 21 and 40 years. The minimum educational requirement is a pass in the Madhyamik (Class 10) examination, ensuring the aid reaches the "educated unemployed" segment.

- **Social Security Exclusivity:** A key feature of the scheme is the prevention of "benefit doubling." Applicants must not be covered under any other state social security scheme (such as Lakshmir Bhandar), though those receiving educational scholarships or stipends remain eligible.

- **Decentralized Enrollment:** The government has prioritized accessibility by setting up physical camps in every Assembly constituency from February 15 to February 26, 2026. This "on-ground" approach aims to reach the grassroots level where digital literacy or access may be limited.

- **Fiscal Commitment:** With an initial allocation of ₹5,000 crore, the state expects to cover approximately 27.8 lakh beneficiaries. The implementation was notably advanced from the original August 15 start date to February to provide immediate relief.

- **Political and Governance Debate:** While the ruling party frames the scheme as a crucial intervention for youth empowerment, the opposition has critiqued the move, questioning the sustainability of "dole-based" economics over long-term job creation and the efficiency of physical registration over online systems.

Key Definitions

- **Unemployment Allowance:** A government-provided stipend given to individuals who are capable of working and actively seeking work but are currently unable to find a job.

- **Educated Unemployment:** A situation where individuals with formal educational qualifications (like Class 10, Graduation, etc.) are unable to find work suited to their skills and education level.

- **Vote-on-Account:** A grant in advance to enable the government to carry on until the voting of demands for grants and the passing of the Appropriation Bill and Finance Bill.

Constitutional & Legal Provisions

- **Article 41 (DPSP):** Explicitly directs the State to make effective provisions for securing the "right to work" and "public assistance in cases of unemployment," within its economic capacity.

- **Article 39 (a):** Directs the State to ensure that citizens, men and women equally, have the right to an adequate means of livelihood.

- **Seventh Schedule:** "Social security and social insurance; employment and unemployment" falls under the Concurrent List (Entry 23), allowing both Centre and States to legislate and launch schemes in this domain.

Additional Key Points

- **Gender Dynamics:** While the Banglar Yuva Sathi scheme sees high registration from young men, most women in the state are already beneficiaries of the 'Lakshmir Bhandar' cash transfer scheme, highlighting a gender-segmented social security strategy.

- **Historical Context:** Critics have compared the new initiative to the 2013 'Yuva Shree' scheme, emphasizing the need for administrative transparency and consistent funding to avoid the "termination" of benefits seen in previous iterations.

- **Economic Stimulus:** Beyond social welfare, such direct benefit transfers (DBT) function as a local economic stimulus by increasing the disposable income of the youth, which can boost consumption in the short term.

Conclusion

The Banglar Yuva Sathi scheme reflects a growing trend of "rights-based" social assistance at the state level. While it offers immediate financial breathing room to the youth, its long-term success will be measured by its ability to integrate with skill development programs and actual industrial growth. For a state like West Bengal, balancing fiscal health with expansive welfare mandates remains a critical governance challenge.

UPSC Relevance

- **GS Paper II:** Welfare schemes for vulnerable sections of the population; Issues relating to the development and management of Social Sector/Services relating to Education and Human Resources.

- **GS Paper III:** Indian Economy and issues relating to planning, mobilization of resources, growth, development, and employment; Inclusive growth and issues arising from it.

- **Essay:** The debate between "Welfare vs. Growth" and the role of social safety nets in a developing economy.

4. India AI Impact Summit 2026: Positioning the Global South in the AI Race

The Ministry of Electronics and Information Technology (MeitY) is hosting the **India AI Impact Summit 2026** at Bharat Mandapam, New Delhi (February 16–20). As the fourth global edition following summits in the UK, South Korea, and France, this event marks a strategic shift. India is leveraging its position as the first "Global South" host to transition the global dialogue from theoretical AI safety toward **tangible developmental impact**, social empowerment, and the democratization of digital resources.

- **Strategic Sovereignty through IndiaAI Mission:** The summit showcases the progress of the ₹10,372 crore IndiaAI Mission. Central to this is the **IndiaAI Compute** pillar, which has already onboarded over 38,000 GPUs to provide affordable high-performance computing to domestic startups and researchers, reducing dependence on foreign infrastructure.

- **AI as Digital Public Infrastructure (DPI):** India is advocating for the "India AI Stack," proposing that government-funded AI models be treated as global DPI. This mirrors the success of UPI and Aadhaar, offering modular, scalable AI solutions to other developing nations for public service delivery and financial inclusion.

- **The Three Sutras & Seven Chakras:** The summit is anchored by three foundational pillars— **People, Planet, and Progress**. These are operationalized through seven "Chakras" (working groups) focusing on themes like Human Capital, Safe and Trusted AI, and Science, aiming to move from high-level political declarations to actionable sectoral outcomes.

- **Global Leadership and Talent Hub:** While the US and China lead in foundational models, India ranks **3rd globally** in the 2025 Stanford Global AI Vibrancy Index. India boasts the second-largest AI talent pool and the highest year-on-year growth in AI hiring, positioning it as the world's "back-office" for AI development and deployment.

- **Collaborative Governance & Safety:** Building on the **Bletchley Park Declaration (2023)** and the **Seoul Statement** (2024), the summit seeks consensus on a global doctrine. Participating nations are expected to sign frameworks for the responsible use of AI in defense, cybersecurity, and disaster management while addressing risks like deepfakes and misinformation.

Where India's AI stands

India's AI journey has taken a different path than that of US and China. But, it still ranks among the world's top three AI nations, leading in R&D and talent bases globally.

AI vibrancy score, top 5 countries

Country	Score
US	78.6
China	36.9
India	21.6
South korea	17.6
UK	16.6

Scores ranked on a weighed scale.
Source: Stanford Global AI Vibrancy Ranking, 2026 AI Index

SATISH KUMAR/MINT

- **Inclusive Innovation (BharatGen):** A major highlight is **BharatGen**, the world's first government-funded multimodal LLM project. It focuses on creating foundational models tailored to India's diverse languages and cultural nuances, ensuring that the benefits of Generative AI are not limited to English-speaking urban populations.
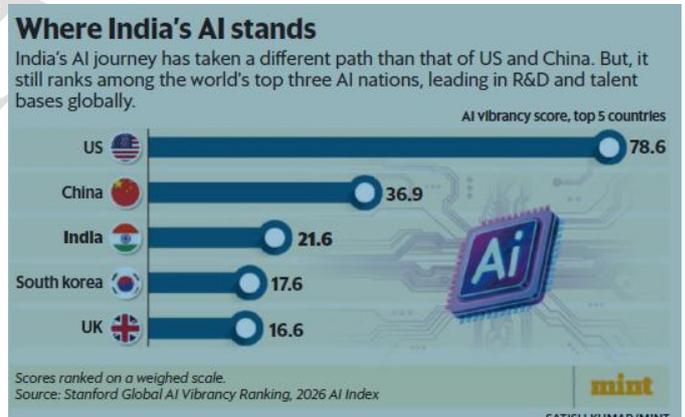
Key Definitions

- **Foundational Models:** Large-scale AI models (like GPT-4 or Gemini) trained on vast datasets that can be adapted to a wide range of downstream tasks such as translation, coding, or reasoning.

- **AI Compute:** The specialized processing power (provided by GPUs/TPUs) required to train and run complex AI algorithms. It is currently a critical bottleneck in global AI development.

- **Global South:** A term used to describe countries typically characterized as developing, newly industrialized, or in the process of industrializing, largely located in the Southern Hemisphere.

Constitutional & Legal Provisions

- **Article 51A(h):** Fundamental Duty to develop the "scientific temper, humanism and the spirit of inquiry and reform," which aligns with the adoption of transformative technologies like AI.

- **Digital Personal Data Protection (DPDP) Act, 2023:** Provides the legal framework for data privacy, which is essential for training AI models responsibly and maintaining public trust.

- **IT Act, 2000 & Rules:** Currently the primary legal tool for regulating AI-generated content, specifically addressing challenges like deepfakes and cybercrimes.

- **National Strategy for AI (#AIforAll):** NITI Aayog's 2018 roadmap which prioritizes five sectors: Healthcare, Agriculture, Education, Smart Cities, and Smart Mobility.

Additional Key Points

- **Viksit Bharat 2047:** The summit links AI adoption to the long-term vision of making India a developed nation by 2047, identifying AI as a "kinetic enabler" for 10%–12% GDP growth.

- **Venture Capital Gap:** Despite high talent, Indian AI startups receive significantly lower funding compared to US peers; the summit aims to attract global marquee investors and VC firms to the Indian ecosystem.

- **Center of Excellence (CoE):** The government has established CoEs in Healthcare, Agriculture, and Sustainable Cities, with a new ₹500 crore CoE for Education announced in the latest budget.

Conclusion

The India AI Impact Summit 2026 signifies India's evolution from a consumer of technology to a global rule-maker. By focusing on "Impact" rather than just "Safety," India is carving out a unique middle path that prioritizes innovation for social good. The success of this summit will be judged by its ability to finalize multilateral agreements that ensure AI remains an inclusive tool for human progress rather than a source of further global inequality.

UPSC Relevance

- **GS Paper II:** Bilateral, regional and global groupings; Effect of policies of developed and developing countries on India's interests; Important International institutions (GPAI, UNESCO AI Ethics).

- **GS Paper III:** Science and Technology- developments and their applications; IT and Computers; Awareness in the fields of IT, Space, Computers, Robotics, Nanotechnology, Bio-technology.

- **GS Paper IV (Ethics):** Ethical concerns in AI (bias, privacy, accountability); Human-centric technology.

5. Vision 2047: Strategic Priorities for the 'Reform Express'

Prime Minister Narendra Modi, in a comprehensive interview, outlined the government's vision for the next decade, emphasizing that the "Reform Express" has transitioned from incremental changes to systemic transformation. The strategy for the upcoming decade is built on a tripartite framework: enhancing economic competitiveness, fostering a culture of deep innovation, and achieving a state of "minimum government, maximum governance." By expanding the definition of reform to include social equity and tribal welfare, the government seeks to ensure that the dividends of growth reach the last mile of the country's demographic profile.

- **Productivity-Led Structural Reforms:** The primary focus remains on structural shifts that enhance national competitiveness. This includes the implementation of the New Labour Codes to balance worker interests with business agility and the refinement of the Goods and Services Tax (GST) to further reduce the compliance burden on MSMEs and households.

- **Deepening Innovation Ecosystems:** Moving beyond traditional sectors, the government aims to catalyze innovation in manufacturing and services. This involves leveraging state-funded missions in Artificial Intelligence, Green Hydrogen, and Semiconductors to move India up the global value chain from a service provider to a high-tech manufacturing hub.

- **Governance Simplification and Trust:** A core priority is the elimination of red tape to foster a "trust-based" regulatory environment. This includes the repeal of archaic laws, the creation of specialized ministries (e.g., Skill Development, Jal Shakti, Ayush), and the expansion of Digital Public Infrastructure (DPI) to eliminate middlemen.

- **Inclusive Social Sector Reforms:** The vision elevates social sector initiatives like the Aspirational Districts and Aspirational Blocks programmes to the status of economic reforms. By targeting the most backward regions and vulnerable tribal groups through PM-JANMAN, the government aims to decouple development from geographical and social disadvantages.

- **MSME and Startup Integration:** Recognizing MSMEs as the backbone of the economy, the decade ahead will focus on ensuring easier credit access and integrating local businesses into global value chains. The startup ecosystem will be further supported by aligning aspirational goals with tangible market opportunities.

- **Infrastructure and Logistics Efficiency:** Continued focus on the PM Gati Shakti framework is intended to slash logistics costs and improve multimodal connectivity, which is seen as a prerequisite for making Indian exports competitive in the international market.

Key Definitions

- **Structural Reforms:** Fundamental changes to the way an economy or government operates, moving from "business as usual" to more efficient, market-oriented, or transparent systems.

- **MSME (Micro, Small and Medium Enterprises):** The growth engines of the Indian economy; recently redefined by the government based on investment and turnover to reduce compliance hurdles.

- **Systemic Transformation:** A shift that affects the entire framework of an institution or sector rather than addressing isolated symptoms or making minor adjustments.

Constitutional & Legal Provisions

- **Article 38:** Directive Principle mandating the State to secure a social order for the promotion of the welfare of the people and to minimize inequalities in income and status.

- **Article 300A:** Right to Property (Legal Right), which underpins economic reforms related to land and asset monetization.

- **The Labour Codes (2020):** Four codes (Wages, Social Security, Industrial Relations, and Occupational Safety) aimed at consolidating 29 central labor laws to improve ease of doing business.

- **GST Act (101st Amendment):** The landmark constitutional change that enabled a unified "One Nation, One Tax" market structure.

Additional Key Points

- **FDI Liberalization:** 100% FDI in the insurance sector is highlighted as a tool for increasing financial penetration and providing more choices to the middle class.

- **Digital Leadership:** The UPI platform is cited as a global benchmark in financial inclusion, showcasing how "reform in transaction" can empower the grassroots economy.

- **Institutional Innovation:** The creation of dedicated ministries for Cooperatives and Fisheries represents a shift toward specialized governance for high-potential rural sectors

Conclusion

The government's reform agenda for the next decade is characterized by "constructive restlessness"—a refusal to settle for past successes. By merging economic productivity with social justice, the 'Reform Express' aims to build a resilient, innovation-led economy. The success of this vision will depend on the seamless coordination between the Centre and States, ensuring that the transition from incremental to systemic change remains inclusive and sustainable.

UPSC Relevance

- **GS Paper II:** Government policies and interventions for development; Governance, Transparency, and Accountability; Important aspects of the role of Civil Services in a democracy.

- **GS Paper III:** Indian Economy (Issues relating to planning, mobilization of resources, and growth); Infrastructure; Investment models; Effects of liberalization on the economy.

- **Essay/Ethics:** "Reform, Perform, Transform" as a philosophy of governance; Balancing economic growth with social empathy.

6. Indian Scientific Service (ISS): Structural Reform for Science-Driven Governance

India's post-Independence governance framework was designed for generalist administration, a model effective for early nation-building but increasingly challenged by the technical complexities of the 21st century. The proposed creation of an **Indian Scientific Service (ISS)** addresses the institutional mismatch between rigid administrative rules and the dynamic requirements of scientific inquiry. By integrating specialized expertise directly into the policy hierarchy, the ISS aims to transform science from a reactive advisory tool into a proactive partner in governance.

- **Mismatch of Service Rules:** Current government scientists are governed by the **Central Civil Services (Conduct) Rules, 1964**, which emphasize administrative hierarchy and political neutrality. However, scientific integrity requires the freedom to challenge policy assumptions based on evidence—a conflict that often renders scientific input symbolic rather than substantive.

- **Specialized Recruitment vs. Generalist Exams:** Unlike the broad-based competitive exams for civil services, the ISS would draw from a specialized pool of experts shaped by advanced research and peer review. This ensures that ministries like Earth Sciences, Health, and MeitY have leaders with deep domain knowledge rather than generalist coordinators.

- **Proactive Evidence-Based Policy:** Scientific input is currently often commissioned for immediate crises or legal disputes. The ISS model advocates for "continuous, long-term research" that anticipates emerging challenges in sectors like AI, climate change, and biotechnology, allowing for foresight-led decision-making.

- **Institutional Safeguards for Integrity:** Drawing parallels with the **U.S. Scientific Integrity Policies**, the ISS would provide professional protections to prevent the suppression or alteration of research findings. This ensures that ecological risks and technological limitations are formally recorded, even if final political choices differ.

- **Cadre-Based Specialization:** The proposed ISS structure includes diverse sub-cadres such as the **Indian Environmental and Ecological Service**, **Indian Public Health and Biomedical Service**, and **Indian Regulatory Science Service**, creating a permanent specialized workforce across critical technical sectors.

- **Synergy, Not Replacement:** The ISS is envisioned to complement, not replace, the administrative services. While administrators handle coordination and execution, ISS officers would provide the underlying evidence, risk assessment, and technical perspective necessary for resilient governance.

Key Definitions

- **Generalist Administrator:** A civil servant recruited based on broad intellectual ability and rotated across diverse ministries (e.g., IAS), prioritizing administrative coordination over domain expertise.

- **Scientific Integrity:** The adherence to professional standards and objectivity in research, ensuring that scientific findings are communicated transparently and protected from political interference.

- **All-India Service:** A service common to both the Union and the States (like IAS/IPS), established under Article 312 of the Constitution, to ensure uniform standards and national integration.

Constitutional & Legal Provisions

- **Article 51A(h):** A Fundamental Duty of every citizen to develop "scientific temper, humanism and the spirit of inquiry and reform."

- **Article 312:** Empowers Parliament to create new All-India Services if the Council of States (Rajya Sabha) declares it necessary in the national interest.

- **Article 309:** Provides the basis for framing rules for recruitment and conditions of service of persons serving the Union or a State.

- **Central Civil Services (Conduct) Rules, 1964:** The existing framework that currently restricts the professional independence of government scientists by mandating strict administrative discipline.

Additional Key Points

- **Global Benchmarking:** Advanced economies like France, Germany, Japan, and the UK already utilize dedicated scientific cadres to strengthen their regulatory and policymaking frameworks.

- **Professional Hierarchy:** Currently, even in technical organizations like CSIR or ICAR, scientists lack the formal institutional authority relative to their expertise when compared to their administrative counterparts.

- **New India Vision:** The ISS aligns with the goal of "Viksit Bharat," moving away from colonial-era "command and control" models toward a science-driven administrative system.

Conclusion

The shift toward an Indian Scientific Service marks a transition from "governance by authority" to "governance by evidence." In an era defined by climate risks and technological disruption, structural reform that values scientific independence alongside administrative efficiency is no longer optional. The ISS provides a permanent, professional pathway for India to harness its vast scientific talent for national resilience and global leadership.

UPSC Relevance

- **GS Paper II:** Role of Civil Services in a democracy; Structure, organization, and functioning of the Executive; Issues relating to the development and management of Social Sector/Services (Health, Education, HR).

- **GS Paper III:** Science and Technology- developments and their applications and effects in everyday life; Awareness in fields of IT, Space, Computers, Robotics, Nanotechnology, Bio-technology.

- **GS Paper IV (Ethics):** Professional integrity vs. Administrative obedience; Ethics in public administration; Scientific temper as a civic value.

7. India-UAE Strategic Arc: Beyond Energy to High-Tech Integration

The India-UAE economic corridor has entered a "decisive phase," marked by the early achievement of the $100 billion trade milestone—originally targeted for 2030 but reached in early 2025. Following the 2022 Comprehensive Economic Partnership Agreement (CEPA), both nations have set a new, ambitious target of **$200 billion by 2032**. This partnership is shifting from a commodity-based "oil for labor" relationship to a deep institutional integration centered on advanced manufacturing, financial services, and digital public infrastructure.

- **Trade Milestone and Revised Targets:** Bilateral trade crossed the **$100 billion** mark in FY 2024-25. In January 2026, a new target of **$200 billion by 2032** was set, reflecting a projected annual growth rate of 9% to 10%.

- **CEPA and BIT Frameworks:** The **2022 CEPA** eliminated tariffs on 90% of trade lines. This was strengthened by the **2024 Bilateral Investment Treaty (BIT)**, which provides institutional safeguards for investors and replaces the older 2013 BIPPA, ensuring a "trust-based" policy architecture.

- **Infrastructure and Greenfield Assets:** The UAE has committed to active "greenfield asset creation" in India. Major projects include DP World's **$5 billion** investment in Indian logistics and ports, and potential UAE participation in the **Dholera Special Investment Region** (Gujarat), covering airports, smart townships, and energy grids.

- **Bharat Mart - The Export Hub:** Currently under construction in Dubai's Jebel Ali Free Zone (Jafza), Bharat Mart will serve as a **mega-distribution hub**. Spanning 2.7 million sq. ft., it is designed to help Indian MSMEs reach markets in Africa, West Asia, and Eurasia, positioning India to rival China's Dragon Mart.

- **AI and Digital Convergence:** As India hosts the **AI Impact Summit 2026** (Feb 16-20), the UAE (the first nation with a dedicated AI Minister) has emerged as a key collaborator. Pacts signed in early 2026 focus on **supercomputing clusters**, joint data centers in India, and "Digital Embassies."

- **Energy and Nuclear Security:** Beyond traditional oil, the partnership now includes long-term **LNG Supply Agreements** (e.g., HPCL-ADNOC 10-year pact) and a landmark shift toward civil nuclear cooperation involving **Small Modular Reactors (SMRs)** under India's new SHANTI Act framework.

Key Definitions

- **CEPA (Comprehensive Economic Partnership Agreement):** A type of free trade pact that is more comprehensive than a regular FTA, covering trade in services, investment, intellectual property, and other areas.

- **Sovereign Wealth Fund (SWF):** State-owned investment funds (like ADIA or Mubadala) that invest in real and financial assets such as stocks, bonds, and real estate globally.

- **Digital Public Infrastructure (DPI):** Digital solutions that enable basic functions essential to public and private service delivery, such as data exchange, messaging, and payments (e.g., India's UPI-AANI link).

Constitutional & Legal Provisions

- **Article 73:** Extends the executive power of the Union to matters with respect to which Parliament has power to make laws, underpining the signing of international treaties.

- **SHANTI Act (2025/26):** India's recent legislative framework for "Sustainable Harnessing and Advancement of Nuclear Energy," enabling enhanced civil nuclear partnerships and SMR development with the UAE.

- **Entry 10 & 13 (Union List):** Seventh Schedule entries covering "Foreign Affairs" and "Participation in international conferences and implementing decisions made thereat."

Additional Key Points

- **Financial Integration:** The acquisition of a majority stake in **RBL Bank** by Emirates NBD represents the largest foreign investment in Indian banking history.

- **Diaspora Factor:** The **5 million-strong Indian diaspora** in the UAE acts as a "human bridge," facilitating one of the world's busiest air corridors (1,200 flights per week).

- **Third-Market Cooperation:** India and UAE are exploring joint capacity-building initiatives in Africa, utilizing the UAE's logistics and India's digital expertise.

Conclusion

The India-UAE corridor has evolved into a vanguard of the "Global South," demonstrating how two nations can bypass traditional Western trade dependencies through aligned capital and policy. While the $100 billion target was a numerical victory, the true success of this relationship lies in the **structural deepening** of economies—where Indian talent and UAE capital co-create the digital and physical infrastructure of the future.

UPSC Relevance

- **GS Paper II:** Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests; Effect of policies of developed and developing countries on India's interests.

- **GS Paper III:** Indian Economy and issues relating to planning, mobilization of resources, growth, and development; Investment models; Infrastructure (Ports, Energy, Airports).

- **Mains Context:** Often asked in the context of India's "West Asia" policy and the strategic significance of the Gulf Cooperation Council (GCC) for energy security and remittances.

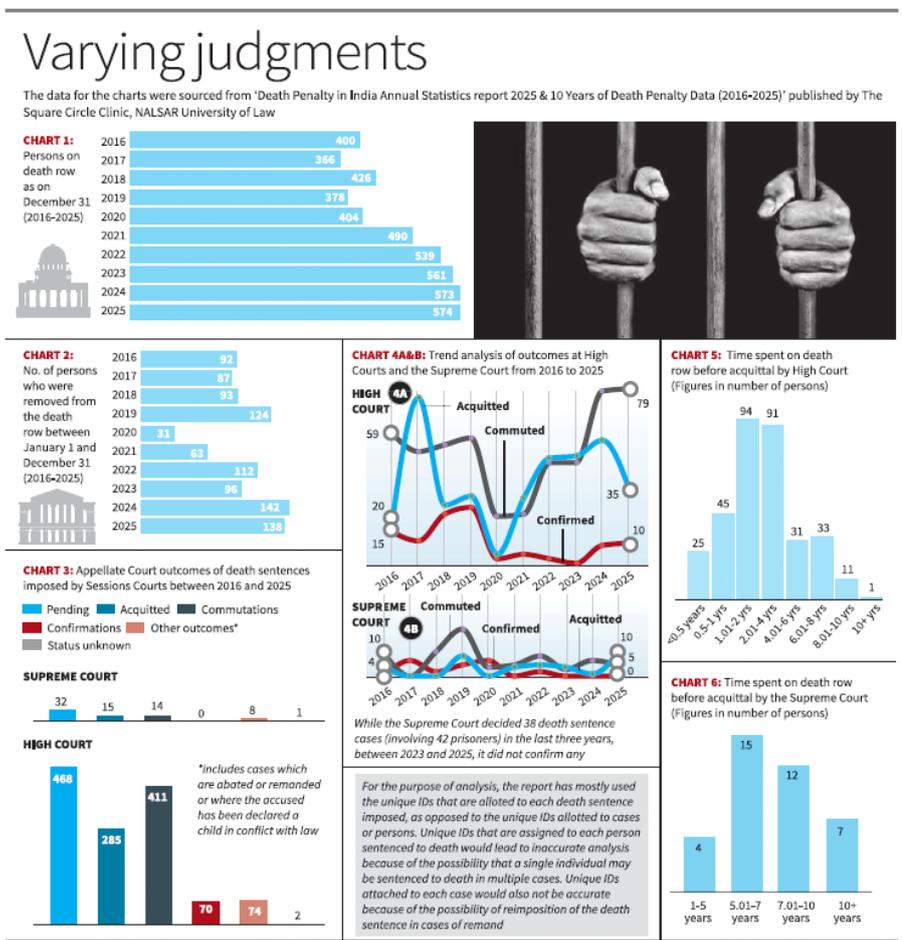# 8. Judicial Trends in Capital Punishment: A Decade of Skepticism

The latest "Death Penalty in India: Annual Statistics Report (2016-2025)" by the Square Circle Clinic at NALSAR reveals a widening chasm between trial court convictions and appellate scrutiny. While Sessions Courts continue to impose death sentences at a high frequency, the higher judiciary has shown unprecedented restraint, with the Supreme Court not confirming a single death sentence for three consecutive years (2023-2025). This trend highlights systemic concerns regarding procedural fairness, the quality of investigation, and the strict application of the "rarest of rare" doctrine.

- **Rising Death Row Population:** As of December 31, 2025, India's death row population stood at 574 (550 men and 24 women), the highest since 2016. This is largely attributed to the prolific sentencing by trial courts, which outpaces the rate of disposal and commutations in higher courts.

- **The Confirmation-Acquittal Paradox:** Over the last decade, High Courts confirmed only 8.31% of the death sentences referred to them. In stark contrast, 34.65% of cases resulted in full acquittals, suggesting that nearly one in three death sentences handed down by trial courts involved wrongful convictions or unsustainable evidence.

- **Supreme Court Restraint:** The apex court has not upheld a death penalty since 2022. In 2025 alone, it acquitted 10 death row prisoners—the highest in a decade—citing "procedural failures" and "lack of proof beyond reasonable doubt."

- **Non-Compliance with Sentencing Guidelines:** Despite the landmark **Manoj v. State of MP (2022)** judgment, which mandated "mitigation investigations" (psychological and social profiles of the convict), nearly 95% of trial court death sentences in 2025 were imposed without following these constitutional safeguards.

- **Regional Disparities in Acquittals:** Significant variations exist across states; for instance, the Patna High Court recorded an acquittal rate of 78.31% in death penalty cases over the decade, highlighting a severe crisis of evidence appreciation at the lower levels in certain jurisdictions.

- **Evolution of Alternative Sentences:** There is a growing judicial preference for "Life Imprisonment without Remission" as a distinct sentencing category. Appellate courts are increasingly choosing this as a middle path to ensure public safety without resorting to the irreversible nature of the gallows.

Key Definitions

- **Rarest of Rare Doctrine:** A judicial principle established in *Bachan Singh v. State of Punjab (1980)*, stating that the death penalty should be imposed only when the alternative of life imprisonment is unquestionably foreclosed.

- **Mitigation Investigation:** A comprehensive study of the convict's upbringing, socio-economic background, and mental health to determine if there is any possibility of reformation.

- **Confirmation Proceeding:** Under Section 366 of the CrPC, a death sentence passed by a Sessions Court must be submitted to the High Court for mandatory confirmation before it can be executed.

Constitutional & Legal Provisions

- **Article 21:** Guarantees the right to life, stipulating that no person shall be deprived of it except according to "procedure established by law."

- **Article 72/161:** Grants the President and Governors the power to pardon or commute death sentences.

- **Section 354(3) of CrPC:** Requires judges to provide "special reasons" for awarding a death sentence instead of life imprisonment.

- **Vasanta Sampat Dupare v. Union of India (2025):** A recent landmark ruling where the SC elevated the right to a meaningful sentencing hearing to the status of a Fundamental Right under Articles 14 and 21.

Additional Key Points

- **Socio-Economic Bias:** Empirical data from the *Death Penalty India Report* consistently shows that over 74% of death row inmates are from economically vulnerable backgrounds, often lacking access to high-quality legal representation at the trial stage.

- **Offence Trends:** Murder simpliciter and murder involving sexual offences constitute the vast majority (over 80%) of capital cases, indicating that the death penalty is increasingly being concentrated in specific crime categories.

- **Collective Conscience:** The judiciary has recently cautioned against using "public outcry" or "collective conscience" as the sole basis for sentencing, emphasizing that judicial discretion must remain anchored in legal principles.

Conclusion

The current decade marks a significant "judicial retrenchment" regarding capital punishment in India. While the legislative ambit of the death penalty has expanded through new laws like the *Bharatiya Nyaya Sanhita (BNS)* and the *POCSO Act*, the higher judiciary is increasingly acting as a sentinel against wrongful executions. The high acquittal rates suggest that the crisis is not just one of sentencing, but of the very integrity of the criminal investigation process in India's lower courts.

UPSC Relevance

- **GS Paper II:** Structure, organization, and functioning of the Judiciary; Welfare schemes for vulnerable sections; Issues relating to the development and management of Social Sector/Services.

- **GS Paper IV (Ethics):** Ethical dilemmas in capital punishment; Retributive vs. Reformative justice; Human rights and the "Right to Life."

- **Mains Context:** Often forms a core part of questions on Criminal Justice Reforms, the Law Commission's recommendations (262nd Report), and judicial activism vs. restraint.

9. India–U.S. Interim Trade Agreement: Strategic De-escalation and Sovereign Challenges

In a landmark shift following a year of intense trade friction, India and the United States announced an **Interim Trade Agreement** in February 2026. This framework marks a tactical "reset" by U.S. President Donald Trump and Prime Minister Narendra Modi, aiming to resolve the "Tariff War" that peaked in August 2025. While the deal significantly reduces U.S. punitive duties, it necessitates substantial concessions from India—ranging from energy procurement shifts to agricultural market access—raising critical questions about India's strategic autonomy and the protection of its agrarian economy.

The 2026 US-India Interim Trade Framework: A $500B Partnership

- **Tariff De-escalation:** The U.S. has agreed to lower its effective tariffs on most Indian goods from **50% to 18%**. This includes the removal of the 25% "punitive" duty linked to India's purchase of Russian oil. In exchange, India has committed to eliminating or reducing tariffs on all U.S. industrial goods and a wide range of agricultural products.

- **Energy Pivot and Russian Oil:** A cornerstone of the deal is India's reported commitment to halt the "direct or indirect" importation of Russian crude oil. To compensate for this shift, India "intends" to purchase **$500 billion** worth of U.S. energy products, aircraft, technology (including GPUs for AI), and coking coal over the next five years.

- **Agricultural Market Access:** India has agreed to reduce barriers on U.S. farm products, including soybean oil, tree nuts, fruits, and dried distillers' grains (DDGs). This has sparked domestic concerns regarding the livelihoods of Indian farmers growing competing crops like maize, jowar, and soybean, who already face price volatility.

- **Non-Tariff Barriers (NTBs) and GM Food:** The agreement pledges to resolve "long-standing concerns" regarding NTBs. Experts warn this is "coded language" for the potential entry of Genetically Modified (GM) food and feed—products India has historically restricted due to biosafety and environmental concerns.

- **Trade Balance vs. Sovereign Surveillance:** The Trump administration aims to reverse the trade surplus India enjoys by enforcing large-scale purchase mandates. Furthermore, the provision that the U.S. may reimpose 25% additional tariffs if India resumes Russian oil imports raises fears of permanent U.S. "surveillance" over India's sovereign energy decisions.

- **Digital Trade and Services:** India has committed to negotiating robust digital trade rules, which may involve the removal of digital services taxes. However, the agreement currently offers less clarity on "Mode 4" services (movement of professionals/visas) compared to the India-EU FTA.

Key Definitions

- **Interim Trade Agreement:** A "stepping stone" pact that addresses immediate trade barriers and provides mutual concessions while negotiations for a comprehensive Bilateral Trade Agreement (BTA) continue.

- **Non-Tariff Barriers (NTBs):** Trade restrictions such as quotas, embargos, or technical standards (like GM-free certifications) that limit imports without using direct taxes (tariffs).

- **Reciprocal Tariff:** A trade policy where a country sets its import duties at the same level as the duties imposed by its trading partner on its own exports.

Constitutional & Legal Provisions

- **Article 73:** Extends the executive power of the Union to international treaties and agreements, giving the Central Government the authority to negotiate trade pacts.

- **Article 253:** Empowers Parliament to make any law for the whole or any part of India for implementing any treaty, agreement, or convention with any other country.

- **The Environment (Protection) Act, 1986:** Governs the regulation of Genetically Modified Organisms (GMOs) through the Genetic Engineering Appraisal Committee (GEAC).

- **Section 11 of the Customs Act, 1962:** Gives the Central Government the power to prohibit or restrict the import/export of goods for the protection of domestic industry or national security.

Additional Key Points

- **The "Bangladesh Factor":** While India gains an edge via lower U.S. tariffs, this may be diluted by the U.S.-Bangladesh trade deal (Feb 9, 2026), which grants duty-free access to certain Bangladeshi textiles, threatening India's labor-intensive exports.

- **Food Security:** The absence of an explicit exclusion for cereals (wheat/rice) in the interim text creates ambiguity, as India has traditionally shielded these staples in all previous FTAs to maintain food sovereignty.

- **Technological Cooperation:** The deal includes a "Technology Segment" focused on high-end Graphics Processing Units (GPUs) and data center equipment, aligning with the **IndiaAI Mission**.

Conclusion

The India–U.S. Interim Agreement is a pragmatic attempt to end a damaging trade war, but it places India on a precarious path. While it restores competitiveness for Indian exporters, the "price" includes a shift in energy dependency and potential risks to the agrarian sector. The final Bilateral Trade Agreement (BTA) must ensure that "reciprocity" does not translate into a lopsided opening of markets that undermines India's food security or its long-term strategic autonomy.

UPSC Relevance

- **GS Paper II:** Bilateral, regional, and global groupings and agreements involving India and/or affecting India's interests; Effect of policies of developed and developing countries on India's interests (U.S. "America First" vs. India's Strategic Autonomy).

- **GS Paper III:** Issues relating to intellectual property rights; Indian Economy (Trade balance, FDI); Agriculture (Food security, GM crops, Farmer livelihoods).

- **Mains Context:** Often forms the basis for questions on "Shifting Geopolitics in Energy," "Trade vs. Sovereignty," and "Impact of FTAs on Indian Agriculture."

10. Bio-Enabling India: The Rise of Bio-based Chemicals and Enzymes

Under the recently approved **BioE3 (Biotechnology for Economy, Environment and Employment) Policy (2024)**, India has identified bio-based chemicals and enzymes as a core thematic vertical. This strategic shift aims to transition India from a petroleum-dependent industrial base toward a **Circular Bioeconomy**. By leveraging biological feedstocks and advanced fermentation technologies, India seeks to decouple economic

growth from fossil fuel consumption while addressing net-zero targets and reducing its multi-billion dollar import bill for industrial intermediates.

- **Pillar of BioE3 Policy:** Bio-based chemicals and enzymes are among the six priority sectors under the BioE3 framework. The policy facilitates **High-Performance Biomanufacturing** by integrating "Bio-AI Hubs" and "Biofoundries" to bridge the gap between lab-scale research and commercial production.

- **Strategic Import Substitution:** India's heavy reliance on petrochemical imports (e.g., \$479.8 million for acetic acid alone in 2023) creates a vulnerability. Domestically produced bio-based organic acids, alcohols, and solvents provide a resilient, sustainable alternative for the plastics, pharma, and textile industries.

India's Bio-Revolution via Bio-E3

- **Biocatalysis for Efficiency:** Enzymes act as biological catalysts that operate at lower temperatures and pressures than traditional chemical processes. This reduces energy consumption and toxic waste, directly supporting the **Mission LiFE (Lifestyle for Environment)** objective of mindful resource utilization.

- **Agrarian Linkages:** Scaling bio-based chemicals creates a high-value market for agricultural residues (biomass) and starch-rich crops. This "Agrarian-Industrial Nexus" boosts rural incomes and provides a decentralized manufacturing model that reduces migration pressure on metropolitan centers.

- **Consolidated Market Leadership:** The Indian enzyme market is highly consolidated, with the top players (e.g., Novozymes, DuPont, Advance Enzyme) controlling over 75% of the share. The government aims to foster more indigenous startups (like StringBio) to democratize the technology and lower the capital expenditure barrier through shared infrastructure.

- **Global Competitive Landscape:** While the U.S. uses the **USDA BioPreferred Program** and the EU follows the **Bioeconomy Strategy**, India's advantage lies in its world-class fermentation expertise inherited from its generic pharmaceutical and vaccine leadership.

Key Definitions

- **Bio-based Chemicals:** Industrial chemicals derived from renewable biological resources (sugarcane, corn, biomass) rather than fossil hydrocarbons.

- **Enzymes:** Proteins that act as biological catalysts, accelerating chemical reactions with high specificity and minimal by-products.

- **Biomanufacturing:** The use of biological systems (microbes, plant cells, enzymes) to produce commercially important products at scale.

- **Biofoundries:** Integrated facilities that combine automation, biology, and data science to rapidly design, build, and test new biological systems for industrial use.

Constitutional & Legal Provisions

- **Article 48A:** Directive Principle of State Policy (DPSP) mandating the State to protect and improve the environment, aligning with bio-based green chemistry.

- **Article 51A(g):** Fundamental Duty to protect and improve the natural environment, which supports the transition from toxic petrochemicals to biodegradable bio-inputs.

- **The Environment (Protection) Act, 1986:** Provides the overarching framework for regulating industrial waste and pollution, increasingly favoring bio-based alternatives.

- **National Policy on Biofuels (2018):** Although focused on energy, its 2022 amendments and the push for 20% ethanol blending (E20) provide the foundational infrastructure for the bio-chemical sector.

Additional Key Points

- **The "Cost Barrier":** Currently, bio-based chemicals often face a higher price point compared to their petroleum-derived counterparts. Government "Green Procurement" policies and carbon credits are essential to level the playing field.

- **Shared Infrastructure:** The BioE3 policy emphasizes setting up **Bio-Enabler Hubs** in Tier-II and Tier-III cities to lower the "death valley" risk for biotech startups that cannot afford private large-scale fermentation plants.

- **Circular Economy:** Bio-based chemicals are inherently regenerative; their waste is often biodegradable or can be recycled back into the agricultural system as bio-fertilizers.

Conclusion

The shift toward bio-based chemicals and enzymes is not merely a scientific endeavor but a macroeconomic necessity for India. By integrating the **BioE3 Policy** with its existing pharmaceutical prowess, India is positioned to lead the Global South in sustainable industrialization. The success of this transition will depend on the effective rollout of Biofoundries and a regulatory framework that incentivizes green alternatives over traditional petrochemicals.

UPSC Relevance

- **GS Paper II:** Government policies and interventions for development in various sectors; Issues arising out of their design and implementation.

- **GS Paper III:** Science and Technology- developments and their applications and effects in everyday life; Conservation, environmental pollution and degradation; Economy (Import substitution, net-zero targets).

- **Mains Context:** Questions often focus on "Biotechnology as a driver of Green Growth," "Circular Bioeconomy," and "Role of bio-manufacturing in achieving $5 trillion economy."

11. Operation Sindoor & India-U.S. Strategic Convergence: A New Doctrine

The visit of **Admiral Samuel J. Paparo**, Commander of the U.S. Indo-Pacific Command (INDO-PACOM), to New Delhi on February 15, 2026, has underscored a significant shift in global recognition of India's military capabilities. Admiral Paparo lauded the "tactical execution" and "strategic restraint" of **Operation Sindoor** (May 2025), a non-contact, high-tech military campaign launched by India against terror infrastructure in Pakistan. This endorsement signals a deepening "unity of purpose" between the world's oldest and largest democracies to maintain peace through strength in a volatile Indo-Pacific.

- **Recognition of Operation Sindoor:** Admiral Paparo praised the precision and introspection following the May 2025 operation, which was triggered by the **Pahalgam terror attack** (April 2022/2025). He highlighted India's ability to conduct punitive strikes while managing the escalation ladder, effectively calling it a model for modern "strategic restraint."

- **Technological Lessons in Modern Warfare:** The INDO-PACOM chief noted the emergence of complex **"kill chains"** in the 21st century, where geography is secondary to the integration of sensors, AI, and space-based intelligence. He specifically flagged the use of Chinese-origin weaponry and guidance systems by Pakistan as a matter for "constant vigilance."

- **Deepening Defense Acquisition:** The relationship has transitioned from a buyer-seller model to a strategic partnership involving high-end platforms. Key mentions included the **GE-414 jet engines**, **MQ-9B SkyGuardian** drones, and **MH-60R Romeo** helicopters, alongside collaborative efforts in undersea domain awareness (UDA).

- **AI as a Security Frontier:** Both nations have identified **Artificial Intelligence (AI)** as a dual-use critical technology. While the **India AI Impact Summit 2026** focuses on social good, Admiral Paparo emphasized its military applications in enhancing lethality and survivability, proposing deeper cooperation under the **iCET (initiative on Critical and Emerging Technology)** framework.

- **The Indo-Pacific Pivot:** The partnership is increasingly viewed through the lens of countering "coercion and aggression" (an indirect reference to China). INDO-PACOM recognizes India as a "net security provider" in the Indian Ocean Region, essential for ensuring freedom of navigation and a rules-based order.

- **Shift in Security Doctrine:** Operation Sindoor marked the establishment of a **"New Normal"** where India utilizes the space below the nuclear threshold to strike terror targets deep within the mainland. This shift from "reactive restraint" to "deterrence by punishment" has been acknowledged by the U.S. as a sovereign and legitimate exercise of national interest.

Key Definitions

- **Kill Chain:** A military concept that identifies the structure of an attack: find, fix, track, target, engage, and assess. Modern "long-range kill chains" integrate space and cyber domains.

- **Operation Sindoor:** A five-day military campaign (May 7–11, 2025) involving tri-services synergy to dismantle nine major terror camps in Pakistan following the Pahalgam attack.

- **INDO-PACOM:** The oldest and largest of the United States' unified combatant commands, responsible for the Indo-Pacific region, including the Indian Ocean.

- **Net Security Provider:** A nation that addresses the security concerns of its neighbors and the wider region through capacity building, maritime patrol, and disaster relief.

Constitutional & Legal Provisions

- **Article 51:** Directive Principle of State Policy (DPSP) that mandates India to promote international peace and security and maintain just and honorable relations between nations.

- **Article 253:** Empowers Parliament to make laws for implementing international treaties and agreements, which governs the legal framework for defense pacts like **LEMOA, BECA, and COMCASA**.

- **The Aircraft Act, 1934 & The IT Act, 2000:** Legislative frameworks governing the use of drones (UAVs) and cybersecurity/AI applications in defense.

- **Section 132 of the Bharatiya Nagarik Suraksha Sanhita (BNSS):** Provisions related to the use of military force for the maintenance of public order and national integrity.

Additional Key Points

- **Tri-Service Synergy:** Operation Sindoor was the first major demonstration of "jointness" after the appointment of the **Chief of Defence Staff (CDS)**, involving the integrated Air Command and Control System (IACCS).

- **Chinese Footprint:** The presence of Chinese technology in Pakistan's air defense and missile guidance systems has prompted India and the U.S. to focus on **Electronic Warfare (EW)** and counter-space capabilities.

- **Maritime Domain Awareness (MDA):** Both countries are expanding the **Information Fusion Centre-Indian Ocean Region (IFC-IOR)** collaboration to track "dark shipping" and undersea threats.

Conclusion

The commendation of Operation Sindoor by the U.S. INDO-PACOM chief represents a global validation of India's matured military doctrine. By balancing punitive intent with tactical restraint, India has demonstrated that it can call out "nuclear brinkmanship" without triggering full-scale war. As defense ties move toward a "steeply upward trajectory," the focus will shift from hardware acquisition to the co-development of AI-driven kill chains and maritime security, cementing the India-U.S. axis as the bedrock of Indo-Pacific stability.

UPSC Relevance

- **GS Paper II:** India and its neighborhood- relations; Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

- **GS Paper III:** Security challenges and their management in border areas; Linkages of organized crime with terrorism; Challenges to internal security through communication networks; Science and Technology- developments and applications in defense.

- **Mains Context:** Questions on "India's New Security Doctrine," "Strategic Autonomy vs. Strategic Partnership," and "Role of AI in Modern Warfare."

12. ISRO Launch Debris in Maldives: Legal and Strategic Implications

A significant piece of space debris, identified as a **Payload Fairing (PLF)** with the ISRO logo and the Indian National Emblem, was discovered on an uninhabited island in the **Laamu Atoll, Maldives**, on February 12, 2026. This hardware is likely linked to the **LVM3-M6/BlueBird Block-2 mission** launched on December 24, 2025. This incident highlights the physical "footprint" of space missions and brings international space treaties regarding debris recovery into focus.

- **Identification and Origin:** The debris is a curved composite panel from the protective "nose cone" of a rocket. The positioning of the **National Emblem** and **ISRO logo** suggests it originated from the **LVM3-M6** mission, which successfully deployed the 6,100 kg BlueBird Block-2 satellite for U.S.-based AST SpaceMobile.

- **Geographical Drift:** Similar fragments were reported in **Trincomalee, Sri Lanka**, in late 2025. Ocean currents in the Indian Ocean frequently carry jettisoned rocket stages from the Sriharikota launch path toward the shores of neighboring island nations.

- **Safety and Environmental Impact:** While the debris was found on an uninhabited island and caused no injury, it raises concerns regarding maritime safety for fishing vessels and the environmental impact of composite materials in sensitive coral lagoon ecosystems.

- **The LVM3 Workhorse:** The **Launch Vehicle Mark-3 (LVM3)** is India's heaviest launcher, a three-stage vehicle (Solid-Liquid-Cryogenic). As the designated vehicle for the **Gaganyaan** mission, the successful recovery and analysis of such "returned" parts (even if unintended) can provide data on atmospheric re-entry stresses.

- **International Cooperation:** The Maldives National Defence Force (MNDF) and local police have secured the site. Under international law, the recovery process involves diplomatic notification to the "Launching State" (India) for further analysis or disposal.

Key Definitions

- **Payload Fairing (PLF):** The equipment at the tip of a rocket that protects the satellite against the impact of dynamic pressure and aerodynamic heating during launch through the atmosphere.

- **LVM3 (Launch Vehicle Mark-3):** Formerly known as GSLV Mk-III, it is a heavy-lift rocket capable of placing 4,000 kg class satellites into Geosynchronous Transfer Orbit (GTO).

- **Space Debris:** Defunct human-made objects in space—including fragments from rocket stages or satellites—that re-enter the Earth's atmosphere.

Constitutional & Legal Provisions

- **Article 51(c):** Directive Principle of State Policy (DPSP) that encourages respect for international law and treaty obligations.

- **The Rescue Agreement (1968):** Formally the *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*. **Article 5** mandates that a state discovering a space object (or component) must notify the launching authority and the UN Secretary-General and return the object upon request.

- **Outer Space Treaty (1967): Article VIII** specifies that the state on whose registry an object is launched retains jurisdiction and ownership, even if the object or its parts return to Earth or land in another country.

- **Liability Convention (1972):** Establishes that the launching state is "absolutely liable" to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft.

Additional Key Points

- **Commercial Milestone:** The LVM3-M6 mission was a dedicated commercial launch facilitated by **NewSpace India Limited (NSIL)**, highlighting India's growing dominance in the heavy-lift commercial market.

- **Tracking and Mitigation:** India is a signatory to the **IADC (Inter-Agency Space Debris Coordination Committee)** guidelines, which focus on minimizing debris through post-mission disposal and "passivation" (removing internal energy sources).

- **Sovereign Markers:** The presence of the **National Emblem (Sarnath Lion Capital)** on the debris serves as "identifying data" under international law to establish the origin and ownership of the space hardware.

Conclusion

The discovery of ISRO hardware in the Maldives is a reminder of the transboundary nature of space exploration. While it underscores India's active launch calendar, it also necessitates a robust diplomatic protocol for debris recovery. Moving forward, the implementation of **Space Situational Awareness (SSA)** through projects like **NETRA** will be crucial for predicting re-entry points and coordinating with neighboring states to ensure maritime and territorial safety.

UPSC Relevance

- **GS Paper II:** Bilateral and regional groupings (India-Maldives relations); International treaties (UN Space Laws).

- **GS Paper III:** Science and Technology (Space Missions, ISRO's LVM3); Environment (Impact of space debris); Disaster Management.

- **Mains Context:** Questions often focus on "Challenges of Space Debris," "India's Commercial Space Potential (NSIL)," and the "Legal Framework for Outer Space."