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VIDHVATH IAS KAS ACADEMY & STUDY CENTRE

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FOR UPSC CIVIL SERVICE EXAMINATION

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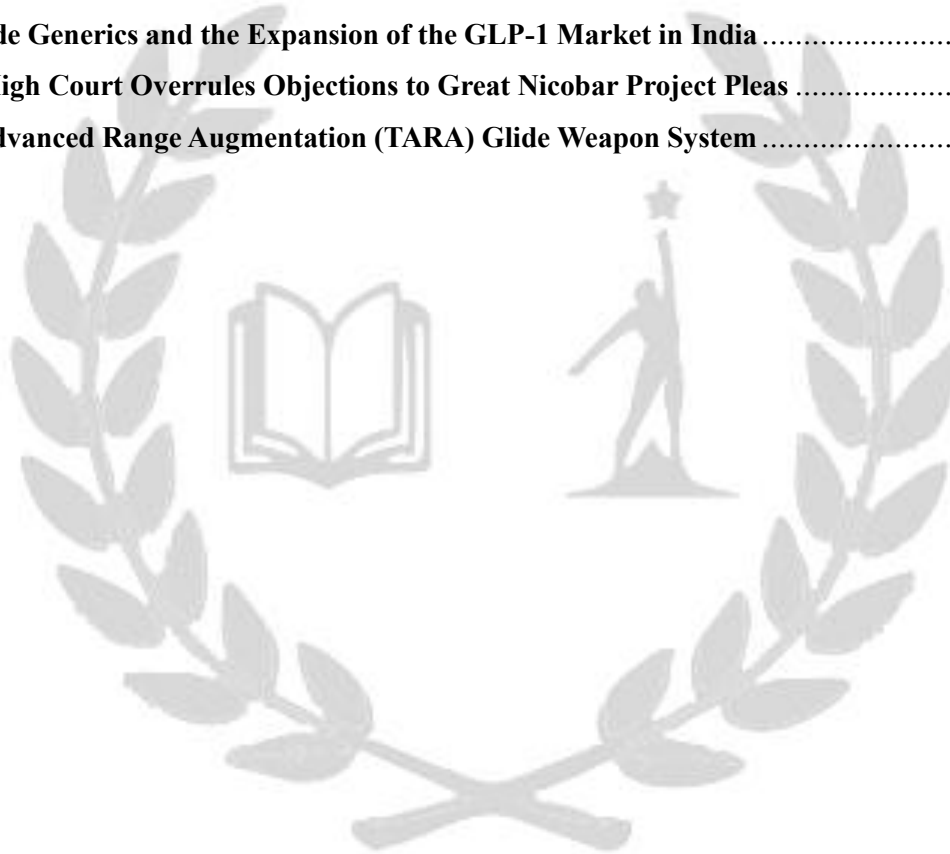
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VIDHVATH IAS ACADEMY



1. IndiaAI and ICMR Partnership for AI in Healthcare

The Ministry of Electronics and Information Technology (MeitY), through the IndiaAI initiative, has formalised a Memorandum of Understanding (MoU) with the Indian Council of Medical Research (ICMR). This strategic alliance aims to foster a nationally coherent and interoperable AI ecosystem, leveraging high-performance computing and extensive biomedical datasets to enhance public health outcomes.

Key Highlights of the IndiaAI-ICMR Collaboration

- **Strategic Integration:** The partnership merges IndiaAI's technological infrastructure (compute power and dataset platforms) with ICMR's domain expertise in biomedical research to create scalable AI-driven healthcare solutions.
- **The AIKosh Platform:** ICMR will contribute anonymised, ethics-approved health datasets and AI toolkits developed under the MIDAS framework to the AIKosh platform, providing researchers and startups with high-quality data for innovation.
- **Infrastructure Support:** IndiaAI will provide ICMR with subsidised access to GPU-based High-Performance Computing (HPC), addressing the critical infrastructure gap required for complex medical AI modeling.
- **Public Health Focus:** The collaboration prioritises the co-development of AI solutions for India's specific disease burdens, ensuring that technological advancements are aligned with ground-level healthcare needs.
- **Global Governance Participation:** Building on their status as 'Pioneer Countries' under the HealthAI Global Regulatory Network (GRN), the entities aim to establish global benchmarks for the responsible governance of AI in medicine.
- **Data Ethics and Privacy:** The framework emphasizes a robust regulatory approach, ensuring that AI adoption adheres to strict ethical standards and data privacy protocols.

Definitions of Key Terms

- **IndiaAI:** A flagship national initiative under MeitY designed to create a comprehensive AI ecosystem in India through compute capacity, datasets, and skill development.
- **MIDAS (Medical Information Data for AI Solutions):** An ICMR framework dedicated to creating high-quality, curated medical datasets specifically for training and validating AI algorithms.
- **Compute Infrastructure:** Refers to the processing power (specifically GPUs) required to run the massive mathematical calculations involved in training Artificial Intelligence models.
- **Interoperability:** The ability of different information systems, devices, and applications to access, exchange, and cooperatively use data in a coordinated manner.



Constitutional and Legal Provisions

- **Article 21 (Right to Life and Health):** The state's pursuit of AI in healthcare aligns with its obligation to provide quality healthcare to citizens, which is an integral part of the Right to Life.
- **Article 39(f):** Directive Principles of State Policy (DPSP) emphasize that the state shall direct policy towards ensuring children and citizens are given opportunities to develop in a healthy manner.



- **Digital Personal Data Protection (DPDP) Act, 2023:** This acts as the primary legal safeguard for the "anonymised health research datasets" shared between IndiaAI and ICMR, ensuring individual privacy is not compromised.
- **National Health Policy, 2017:** Explicitly advocates for the use of digital health and "Big Data" to improve health outcomes and optimize resource delivery.

Additional Key Points

- **The HealthAI Global Regulatory Network (GRN):** A multilateral initiative involving India, the UK, and Singapore, which provides India a platform to lead in international AI regulation.
- **NIRDHDS Role:** The National Institute for Research in Digital Health and Data Sciences serves as the operational arm for ICMR in this digital transformation.
- **Start-up Ecosystem:** By providing subsidised compute and open datasets, the government is lowering the entry barrier for Indian med-tech startups.

Conclusion The IndiaAI-ICMR MoU represents a paradigm shift from fragmented digital health efforts to a unified, infrastructure-backed strategy. By combining "Compute" (IndiaAI) with "Content" (ICMR's MIDAS), India is positioning itself to lead the global South in responsible AI healthcare applications. This synergy is crucial for achieving the goal of 'Universal Health Coverage' through cost-effective, precision-based technology.

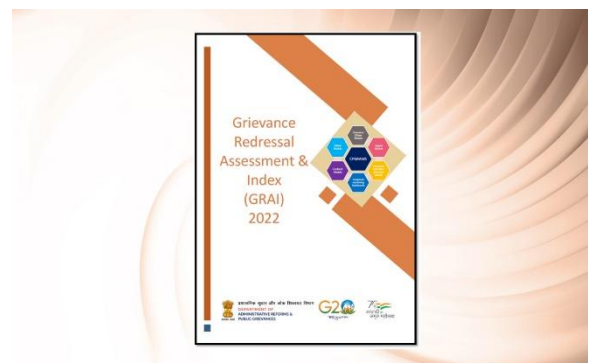
UPSC Relevance

- **GS Paper II:** Issues relating to development and management of Social Sector/Services relating to Health; Government policies and interventions.
- **GS Paper III:** Science and Technology- developments and their applications and effects in everyday life; Achievements of Indians in science & technology; Indigenization of technology and developing new technology; Awareness in the fields of IT, Space, Computers, Robotics, and AI.
- **Prelims:** National AI Mission, ICMR frameworks (MIDAS), and international regulatory bodies (HealthAI GRN).

2. Grievance Redressal Assessment and Index (GRAI) Rankings: March 2026

The Department of Financial Services (DFS), specifically the Insurance and Banking divisions, has demonstrated exceptional performance in public service delivery according to the latest rankings released by the Department of Administrative Reforms and Public Grievances (DARPG). This success highlights the effectiveness of the Centralized Public Grievance Redress and Monitoring System (CPGRAMS) in managing high-volume public concerns. **Key Highlights of the GRAI Performance**

- **Insurance Division Leadership:** The Insurance Division of the DFS secured the 1st rank in the "Group A" category (departments receiving ≥ 500 grievances) for March 2026, marking a peak in service efficiency.
- **Sustained Banking Performance:** The Banking Division retained the 5th position for the second consecutive month, indicating a consistent and stable mechanism for handling financial sector complaints.
- **Institutional Monitoring:** Success is attributed to a multi-tiered review system where Joint Secretaries





review 20 grievances monthly, and the Secretary (FS) personally audits 20 randomly selected closed cases each month to ensure quality.

- **Volume Management:** The DFS manages a significant load of over 2.50 lakh grievances annually, maintaining a top-10 presence in GRAI rankings consistently since November 2025.
- **Core Objectives:** The department operates on the principles of "Seamless, Time-bound, and Empathetic Resolution," focusing on reducing pendency and improving the qualitative aspect of responses.
- **Global Benchmark:** The structured review of closed grievances (400 cases reviewed by the Secretary to date) serves as a model for "feedback-loop" governance in the public sector. **Definitions of Key Terms**
- **CPGRAMS:** An online platform available 24/7 for citizens to lodge grievances to public authorities on any subject related to service delivery.
- **GRAI (Grievance Redressal Assessment and Index):** A framework used to rank Central Ministries and Departments based on their efficiency, depth, and quality of grievance disposal.
- **Group A Category:** A classification in the GRAI ranking for entities that receive a high volume of complaints, typically defined as 500 or more grievances in a reporting period.
- **Pendency:** The state of being undecided or unsettled; in this context, it refers to the backlog of unresolved public complaints. **Constitutional and Legal Provisions**
- **Article 19:** While primarily about freedom of speech, the right to information and to seek redressal from the state is increasingly viewed as a corollary to a functional democracy.
- **Article 21:** The judiciary has often interpreted the right to a dignified life to include the right to efficient and timely public services and grievance redressal.
- **Citizen's Charters:** Although not legally enforceable in all sectors, they represent the "Moral Obligation" of the state to provide services within a specified timeframe.
- **Sevottam Model:** A service delivery excellence model that includes Citizen's Charters, Public Grievance Mechanisms, and Service Delivery Capability. **Additional Important Key Points**
- **Department of Administrative Reforms and Public Grievances (DARPG):** The nodal agency for formulating policy for the redressal of public grievances in the Government of India.
- **Feedback Mechanism:** The inclusion of "randomly selected closed grievances" for review by senior leadership prevents the "mechanical disposal" of complaints where issues are closed without actual resolution.
- **Technology in Governance:** The use of AI-enabled analytics in CPGRAMS (version 7.0) has helped in categorizing grievances and identifying recurring "pain points" for systemic reform. **Conclusion**
The top ranking of the Insurance Division and the steady performance of the Banking Division underscore a shift toward a "Pro-People, Pro-Active Governance" (P2G2) model. By institutionalizing high-level oversight and utilizing the GRAI framework, the Department of Financial Services has transitioned from mere complaint handling to a focus on the quality and empathy of the resolution. This builds public trust in the financial ecosystem, which is vital for economic stability. **UPSC Relevance**
- **GS Paper II:** Governance, Transparency and Accountability, Citizens Charters, Role of Civil Services in a Democracy, and e-governance applications.



- **GS Paper IV:** Ethics in Public Administration, Probity in Governance, and Empathy towards the weaker sections/public.
- **Essay:** Transparency and accountability as pillars of a developed nation (Viksit Bharat).

3. Hantavirus Outbreak on Cruise Ship: Global Health Emergency and Response

Spanish authorities and the World Health Organization (WHO) are managing a critical health crisis involving a Hantavirus outbreak aboard the Dutch-flagged vessel, *MV Hondius*, currently en route to the Canary Islands. The situation highlights the challenges of containing viral outbreaks within the confined environment of maritime travel and the necessity of rigorous international health protocols. **Key Highlights of the Hantavirus Crisis**

- **Emergency Evacuation:** Spanish health officials are preparing to evacuate over 140 passengers and crew members to a "completely isolated, cordoned-off area" upon the ship's arrival at Tenerife.
- **Mortality and Infection:** The outbreak has already resulted in three confirmed deaths, with five additional passengers known to be infected after departing the vessel at various ports.
- **Timeline of Transmission:** The crisis began on April 1, 2024, following the ship's departure from Ushuaia, Argentina, with the first fatality recorded on April 11 and subsequent cases emerging throughout April and May.
- **Global Monitoring:** The WHO is actively responding to the situation, particularly after three more individuals fell ill on May 3, underscoring the virus's potential for sustained transmission.
- **Quarantine Measures:** While the cruise operator, Oceanwide Expeditions, claims no current passengers show active symptoms, health authorities are maintaining strict isolation protocols to prevent community spread.
- **Geographical Spread:** The ship's route touched multiple jurisdictions—including Argentina, St. Helena, South Africa, and Cape Verde—necessitating a multi-national epidemiological investigation. **Definitions of Key Terms**



- **Hantavirus:** A family of viruses spread mainly by rodents that can cause varied disease syndromes in people worldwide, including Hantavirus Pulmonary Syndrome (HPS) and Hemorrhagic Fever with Renal Syndrome (HFRS).
- **Zoonotic Disease:** An infectious disease that is transmitted between species from animals to humans; Hantavirus is typically contracted through contact with rodent urine, droppings, or saliva.
- **Epidemiological Surveillance:** The continuous, systematic collection, analysis, and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice.

Constitutional and Legal Provisions

- **International Health Regulations (IHR) 2005:** A legally binding instrument of international law that requires WHO Member States to report certain disease outbreaks and public health events to WHO.
- **Maritime Labour Convention (MLC):** Ensures the right of seafarers to a safe and secure workplace that complies with safety standards, including health protection and medical care.



- **National Health Act (India Perspective):** While this is a Spanish event, in India, the Epidemic Diseases Act, 1897, provides the state with powers to take special measures and prescribe regulations to prevent the spread of dangerous diseases. **Additional Important Key Points**
- **Transmission Concerns:** Although Hantavirus is primarily zoonotic, this outbreak raised concerns regarding potential transmissibility in close-quarters environments like cruise ships.
- **Logistical Challenges:** The evacuation involves specialized medical transport to ensure that infected or exposed individuals do not come into contact with the general population of Tenerife.
- **Aviation Safety Link:** A flight attendant who boarded a plane with an infected passenger fortunately tested negative, alleviating fears of wider spread through air travel. **Conclusion** The *MV Hondius* incident serves as a stark reminder of the vulnerability of global transport hubs to infectious diseases. Successful containment depends entirely on the seamless coordination between ship operators, port authorities, and international health bodies like the WHO. As the vessel nears the Spanish coast, the focus remains on ensuring that the evacuation is executed without compromising public safety or the health of the local population in the Canary Islands. **UPSC Relevance**
- **GS Paper II:** Issues relating to development and management of Social Sector/Services relating to Health; International relations and the role of global bodies like the WHO in managing transnational health threats.
- **GS Paper III:** Science and Technology—developments and their applications in everyday life; Awareness in the fields of Biotechnology and health (zoonotic diseases).
- **Current Affairs:** Understanding global health protocols (IHR) and the impact of disease outbreaks on international logistics and tourism.

4. Impact of Fuel Price Freeze on State-Owned Oil Marketing Companies

State-owned Oil Marketing Companies (OMCs), including Indian Oil, Bharat Petroleum, and Hindustan Petroleum, are currently facing significant financial strain due to a freeze on retail prices for petrol, diesel, and cooking gas. Despite rising global crude oil prices driven by the West Asia crisis, domestic retail rates have remained unchanged to protect consumers from inflationary shocks. This decoupling of domestic prices from international market trends has led to a substantial accumulation of financial losses for these entities. **Key Highlights of the Fuel Price Freeze**

- **Massive Under-recoveries:** State-owned OMCs are estimated to be incurring under-recoveries of approximately Rs 30,000 crore per month on the sale of petrol, diesel, and cooking gas.
- **Impact of Global Crisis:** The surge in international oil prices is primarily attributed to the ongoing West Asia conflict and the potential closure of the Strait of Hormuz, a critical maritime oil transit route.
- **Broadening Loss Spectrum:** Beyond transport fuels, OMCs are also losing revenue on the sale of Aviation Turbine Fuel (ATF) for domestic flights, further impacting their balance sheets.
- **Absence of Compensation:** Currently, there are no immediate government plans to compensate OMCs for these ballooning losses, leading to intense speculation regarding an imminent price hike.
- **LPG Intervention:** While the government has previously intervened to cushion OMCs against LPG-related losses, such support for the current fiscal period remains uncertain but cannot be ruled out.



- **Macroeconomic Warning:** The State Bank of India (SBI) has cautioned that a prolonged war in West Asia could lead to a moderation in demand, further complicating the energy economics for India. **Definitions of Key Terms**

- **Oil Marketing Companies (OMCs):** Entities responsible for the refining, distribution, and marketing of petroleum products to the end consumer.
- **Under-recoveries:** The difference between the actual retail price of fuel and the price the OMCs should ideally charge to cover import costs and refining margins.



- **Aviation Turbine Fuel (ATF):** A specialized type of petroleum-based fuel used to power aircraft.
- **Strait of Hormuz:** A strategically vital waterway between the Persian Gulf and the Gulf of Oman through which a significant portion of the world's oil supply passes. **Constitutional and Legal Provisions**
- **Article 38 & 39 (DPSP):** These Directive Principles mandate the State to promote the welfare of the people and ensure that the ownership and control of material resources are distributed to best subserve the common good, often used to justify fuel subsidies.
- **Petroleum Act, 1934:** The primary legal framework governing the import, transport, storage, and production of petroleum and other inflammable substances in India.
- **Essential Commodities Act, 1955:** Empowering the government to regulate the price and distribution of petroleum products to ensure availability and prevent hoarding.
- **Administered Price Mechanism (APM):** Historically, the system where the government set fuel prices; though officially deregulated, "informal" freezes like the current one reflect a de facto APM during crises. **Additional Important Key Points**
- **Fiscal Deficit Concerns:** If the government eventually decides to compensate OMCs, it could increase the fiscal deficit, affecting India's sovereign credit rating.
- **Inflation Management:** The price freeze is a critical tool used by the government to keep the Consumer Price Index (CPI) within the RBI's target range of 4% (+/- 2%).
- **Energy Security:** The situation underscores India's vulnerability to geopolitical tensions in the Middle East, as the country imports over 80% of its crude oil requirements. **Conclusion** The current situation presents a classic "Trilemma" for the Indian government: balancing the financial health of state-owned OMCs, managing retail inflation for the common man, and maintaining fiscal discipline. While the freeze provides temporary relief to consumers, the sustainability of Rs 30,000 crore monthly losses is questionable. A strategic shift toward diversifying energy sources and increasing domestic production is essential to mitigate such external shocks in the long term. **UPSC Relevance**
- **GS Paper II:** Government policies and interventions for development in various sectors and issues arising out of their design and implementation.
- **GS Paper III:** Indian Economy and issues relating to planning, mobilization of resources, growth, and development; Infrastructure: Energy; Effect of liberalization on the economy.



- **Current Affairs:** Geopolitical impacts on the Indian economy, specifically the West Asia crisis and its resonance with domestic fuel pricing and energy security.

5. JANANI Platform: Transforming Maternal and Child Healthcare through Digital Integration

The Union Ministry of Health and Family Welfare has introduced the JANANI (Journey of Antenatal, Natal and Neonatal Integrated Care) platform to revolutionize maternal and child health (MCH) tracking. Launched during the National Summit on Innovation and Inclusivity, this service-oriented digital ecosystem serves as an advanced upgrade to the existing Reproductive and Child Health (RCH) portal. It aims to institutionalize longitudinal digital health records, ensuring that every stage of the reproductive and neonatal journey is monitored with precision to reduce maternal and infant mortality rates.

Key Highlights of the JANANI Platform

- **Continuum of Care:** The platform provides comprehensive tracking from antenatal care and delivery preparedness to postnatal and newborn care, including home-based young child care and family planning.
- **Longitudinal Health Records:** Unlike fragmented data systems, JANANI creates a continuous health history for women of reproductive age by capturing all key service delivery events in a single digital file.
- **QR-Enabled Portability:** The introduction of QR-enabled digital MCH cards ensures that health records are portable and easily accessible across different healthcare facilities nationwide.
- **Advanced Monitoring Tools:** The system incorporates automated alerts for high-risk pregnancies, real-time supervisory dashboards, and "due-list" generation to ensure timely medical interventions.
- **Interoperability and Convergence:** JANANI is designed to sync with other national platforms like U-WIN (immunization) and POSHAN (nutrition), facilitating seamless data exchange across sectors.
- **Robust Verification:** The platform utilizes unique identifiers such as ABHA and biometric/OTP-based Aadhaar authentication to prevent record duplication and assist migratory populations.



Definitions of Key Terms

- **Antenatal Care (ANC):** The systemic medical supervision and care provided to pregnant women to ensure the best health conditions for both mother and fetus.
- **Longitudinal Record:** A permanent, digital health thread that tracks a patient's medical history over time rather than a single clinical encounter.
- **ABHA (Ayushman Bharat Health Account):** A unique 14-digit identification number used to link all health records of a person across different healthcare providers.
- **U-WIN:** A national digital platform specifically designed to digitize India's Universal Immunization Programme (UIP).



Constitutional and Legal Provisions

- **Article 21:** The Right to Life includes the right to health; JANANI facilitates this by ensuring maternal and neonatal safety.
- **Article 42 (DPSP):** Directs the State to make provisions for securing just and humane conditions of work and for maternity relief.
- **Article 47 (DPSP):** Mandates the State to raise the level of nutrition and the standard of living and to improve public health.
- **Digital Personal Data Protection (DPDP) Act, 2023:** Governs the ethical handling and privacy of the digital health data collected through platforms like JANANI.

Additional Important Key Points

- **Current Progress:** The platform has already achieved 1.34 crore beneficiary registrations and over 30 lakh MCH card generations.
- **Self-Registration:** Beneficiaries can actively engage in their healthcare journey through web-based and mobile self-registration facilities.
- **High-Risk Management:** By automating alerts for complications, the platform directly targets the reduction of the Maternal Mortality Ratio (MMR) and Neonatal Mortality Rate (NMR).
- **Migratory Continuity:** The pan-India search functionality ensures that pregnant women who migrate for work or family reasons do not lose access to their health history or scheduled visits.

Conclusion The JANANI platform marks a significant structural reform in India's public health administration. By shifting from manual registries to a real-time, interoperable digital ecosystem, the government is not only improving service delivery but also enhancing accountability. This integration of technology with grassroots healthcare is a vital step toward achieving Sustainable Development Goal (SDG) 3.1 and 3.2, which aim to reduce global maternal and neonatal mortality.

UPSC Relevance

- **GS Paper II:** Issues relating to the development and management of Social Sector/Services relating to Health; Government policies and interventions for development in various sectors.
- **GS Paper III:** E-governance- applications, models, successes, limitations, and potential; Science and Technology- developments and their applications in everyday life.
- **Social Issues:** Empowerment of women through health literacy and digital inclusion.

6. Indo-Canada Strategic Collaboration in Critical Minerals

The High Commissioner of Canada to India, H.E. Chris Cooter, visited the CSIR–Institute of Minerals and Materials Technology (CSIR-IMMT) to strengthen bilateral ties in the critical minerals sector. This visit underscores the growing synergy between Canada's vast mineral reserves and India's burgeoning expertise in processing and downstream manufacturing. The interaction focused on building resilient supply chains essential for clean energy, electric mobility, and advanced manufacturing, while exploring joint research through frameworks like the Joint Declaration of Intent (JDI) with the University of Saskatchewan.





Key Highlights of the Indo-Canada Collaboration

- **Strategic Synergy:** The partnership leverages Canada's significant critical mineral reserves and mining expertise alongside India's expanding capabilities in mineral processing and advanced metallurgical technologies.
- **Institutional Framework:** Discussions highlighted the role of the Centre of Excellence on Critical Minerals at CSIR-IMMT, established by the Ministry of Mines, in driving research, technology development, and capacity building.
- **Facility Inspection:** The delegation toured high-tech pilot plants at CSIR-IMMT, including those for Platinum Group Elements (PGE), recycling, seabed minerals, and molten salt electrolysis.
- **Collaborative Research:** The visit emphasized the JDI signed with the University of Saskatchewan, focusing on academic exchange and joint scientific programmes to address global energy transition challenges.
- **Supply Chain Resilience:** Both nations aimed to create diversified and sustainable supply chains to reduce dependence on single-source suppliers for minerals vital to strategic industries.
- **Sustainable Development:** The engagement concluded with a symbolic tree plantation, reflecting a mutual commitment to environmentally conscious mining and processing innovations.

Definitions of Key Terms

- **Critical Minerals:** Metallic or non-metallic elements (like Lithium, Cobalt, Rare Earth Elements) that are essential for modern technology and economy, and whose supply is at risk of disruption.
- **Metallurgical Technologies:** The branch of science and technology concerned with the properties of metals and their production and purification.
- **Downstream Technologies:** Processes involving the conversion of refined minerals into finished products or components, such as battery manufacturing or semiconductor fabrication.
- **Platinum Group Elements (PGE):** A group of six noble, precious metallic elements (Ruthenium, Rhodium, Palladium, Osmium, Iridium, and Platinum) clustered together in the periodic table.

Constitutional and Legal Provisions

- **Article 51 (c):** Under Directive Principles of State Policy, the State shall strive to foster respect for international law and treaty obligations, providing the spirit for bilateral MoUs and JDIs.
- **Mines and Minerals (Development and Regulation) Act, 1957:** The primary legal framework in India that governs the mining sector, recently amended to encourage private sector participation in exploring deep-seated and critical minerals.
- **National Mineral Policy, 2019:** Focuses on transparency, better regulation, and enforcement, while promoting sustainable mining practices and international collaborations.
- **Seventh Schedule (Entry 23 & 54):** Regulation of mines and mineral development is a subject where both State (List II) and Union (List I) have specific jurisdictions, though the Union handles regulation of mines and mineral development to the extent declared by Parliament.

Additional Important Key Points

- **Clean Energy Transition:** Critical minerals are the backbone of the "Green Transition," required for solar panels, wind turbines, and Electric Vehicle (EV) batteries.



- **Mineral Security Partnership (MSP):** India's entry into the US-led MSP (which includes Canada) further strengthens the multilateral framework for critical mineral security.
- **Circular Economy:** The focus on "Recycling Pilot Plants" at CSIR-IMMT highlights the importance of urban mining and recovering minerals from e-waste.

Conclusion The visit of the Canadian delegation to CSIR-IMMT marks a pivotal transition from diplomatic dialogue to functional scientific cooperation. By integrating Canada's resource wealth with India's technical "Know-How," both nations are positioned to lead the global shift toward a carbon-neutral economy. Such collaborations are essential for mitigating geopolitical risks associated with mineral monopolies and ensuring a steady flow of raw materials for India's "Make in India" and "Aatmanirbhar Bharat" initiatives.

UPSC Relevance

- **GS Paper II:** Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests; Effect of policies and politics of developed and developing countries on India's interests.
- **GS Paper III:** Science and Technology- developments and their applications and effects in everyday life; Infrastructure: Energy; Conservation, environmental pollution and degradation.
- **Geography (Mains):** Distribution of key natural resources across the world (including South Asia and the Indian sub-continent).

7. India-Vietnam Science & Technology Partnership: Strengthening Bilateral Cooperation

Union Minister Dr. Jitendra Singh and Vietnam's Minister of Science and Technology, Prof. Dr. Vu Hai Quan, held high-level talks in New Delhi to deepen cooperation in emerging technologies and innovation. The dialogue builds upon the Comprehensive Strategic Partnership and India's "Act East Policy," emphasizing the role of science and technology (S&T) as a central pillar of bilateral engagement.

Key Highlights of the High-Level Talks

- **Strategic Technology Focus:** Both nations agreed to advance collaboration in Artificial Intelligence (AI), deep-tech, semiconductors, cybersecurity, robotics, and biotechnology.
- **Startup Ecosystem Integration:** India proposed stronger links between the startups and innovators of both countries to create new opportunities for young researchers and entrepreneurs.
- **Institutional Coordination:** The ministers decided to nominate dedicated nodal points and continue the Joint Committee Meeting (JCM) mechanism to prepare a concrete action plan for implementable outcomes.
- **Regional Cooperation:** Vietnam's active participation in India-ASEAN S&T programmes was highlighted, including research fellowships and joint projects currently underway.
- **Knowledge Sharing:** India expressed readiness to share best practices in AI missions and cybersecurity frameworks to support Vietnam's interest in practical technology applications.
- **Academic Exchange:** Discussions covered startup exchange programmes, co-innovation centres, and industry-linked research partnerships to enhance institutional depth.





Definitions of Key Terms

- **Deep-Tech:** Technologies based on tangible engineering innovation or scientific discoveries and diagnoses; they often address major societal and environmental challenges.
- **Comprehensive Strategic Partnership:** The highest level of bilateral relationship India maintains with select countries, involving deep cooperation across political, economic, security, and technological fronts.
- **Act East Policy:** A diplomatic initiative to promote economic, strategic, and cultural relations with the vast Asia-Pacific region at different levels.
- **Technology Transfer:** The process of transferring skills, knowledge, or technologies from one organization or country to another to ensure scientific developments are accessible to a wider range of users.

Constitutional and Legal Provisions

- **Article 51 (c):** Under the Directive Principles of State Policy, the State shall strive to foster respect for international law and treaty obligations in the dealings of organized peoples with one another.
- **Seventh Schedule (List I, Entry 10):** Foreign affairs; all matters which bring the Union into relation with any foreign country are under the exclusive jurisdiction of the Parliament.
- **Seventh Schedule (List I, Entry 13):** Participation in international conferences, associations, and other bodies and implementing decisions made thereat.
- **Science, Technology, and Innovation Policy (STIP) 2020:** India's core policy guiding international S&T collaborations to achieve technological self-reliance while fostering global partnerships.

Additional Important Key Points

- **Civilizational Linkages:** The partnership is grounded in nearly two thousand years of shared cultural and historical ties.
- **Indo-Pacific Vision:** Vietnam is a key partner in India's vision for a free, open, and inclusive Indo-Pacific region.
- **Human Resource Development:** Programs like the India-ASEAN Research and Training Fellowship have already benefited several Vietnamese researchers, strengthening grassroots scientific ties.

Conclusion The strengthening of S&T ties between India and Vietnam signifies a transition from traditional diplomacy to a future-ready partnership focused on the fourth industrial revolution. By aligning India's technical expertise in AI and startups with Vietnam's desire for practical deep-tech applications, both nations are poised to enhance their strategic autonomy and economic resilience. This collaboration not only benefits bilateral interests but also reinforces the broader India-ASEAN scientific framework.

UPSC Relevance

- **GS Paper II:** Bilateral, regional, and global groupings and agreements involving India; Effect of policies of developed and developing countries on India's interests; India's "Act East" and Indo-Pacific policies.
- **GS Paper III:** Science and Technology—developments and their applications and effects in everyday life; Achievements of Indians in science & technology; Indigenization of technology.



- **Prelims:** India-ASEAN S&T initiatives, specific technology sectors (Semiconductors, Deep-tech), and Joint Committee mechanisms.

8. Operation Sindoor: A Paradigm Shift in India's Strategic Doctrine

Operation Sindoor, launched on May 7, 2025, marks a watershed moment in India's national security history. Executed as a direct response to the Pahalgam carnage of April 22, 2025, the operation involved high-intensity strikes against terrorist infrastructure and a massive integrated military response to Pakistani retaliation. This transition from "reactive restraint" to a "zero tolerance" policy signifies the emergence of a new Indian doctrine where cross-border terrorism is treated as an act of war, effectively redrawing the strategic red lines in a nuclear-armed sub-continent.

Key Pillars of Operation Sindoor

- **Doctrinal Evolution:** The operation signals the end of "reactive restraint" and the "dossier approach," replacing it with a proactive "zero tolerance" policy where state-sponsored terrorism is met with decisive military retribution.
- **Integrated Tri-Service Action:** It served as a real-world test for the integration of the Indian Army, Navy, and Air Force, demonstrating seamless synergy in hitting high-value targets across the border, including Bahawalpur and Muridke.
- **Escalation Dominance:** India demonstrated masterful control of the escalation ladder by countering Pakistani airstrikes on May 9 and 10 with precise waves of strikes hitting 11 Pakistani airbases, including Sargodha and Bholari.
- **Strategic Coercion:** The deployment of robust networked air defences like the S-400 and aggressive naval and land positioning created a "denial of airspace" and operational paralysis, forcing the adversary to request a ceasefire within 88 hours.
- **Political Resolve:** The operation reflected an unambiguous political mandate, giving the armed forces a "free hand" to act, thereby dismantling the "nuclear blackmail" narrative traditionally used by the adversary.
- **Indigenous Capability Validation:** The success of the operation was underpinned by the stellar performance of indigenous defense systems, providing a major boost to the "Atmanirbhar Bharat" initiative in the defense sector.



Definitions of Key Terms

- **Reactive Restraint:** A historical diplomatic and military posture where India avoided direct military escalation following terror attacks, often relying on international diplomatic pressure and dossiers of evidence.
- **Escalation Ladder:** A concept in strategic studies referring to the series of steps or stages in an increasing conflict; "masterful control" implies the ability to outpace the adversary at every level of intensity.
- **Under-Recoveries / Nuclear Overhang:** In a military context, this refers to the strategic complications and risks of conventional war breaking out between two nuclear-armed states.



- **Atmanirbharata:** Self-reliance; in this context, the indigenous design, development, and manufacture of critical defense hardware to reduce foreign dependency.

Constitutional & Legal Provisions

- **Article 51:** Under Directive Principles of State Policy, while India promotes international peace and security, the "Right to Self-Defence" is an inherent sovereign right under international law (Article 51 of the UN Charter).
- **Article 355:** It is the duty of the Union to protect every State against external aggression and internal disturbance; Operation Sindoor is a functional execution of this constitutional mandate.
- **The Armed Forces Acts:** Statutory frameworks that empower the three services to carry out operations as directed by the Union Government for national integrity.

Additional Key Points

- **Targeting Logic:** The choice of targets like Muridke and Bahawalpur—hubs of terror organizations—was intended to send a direct signal to the backers of cross-border terrorism.
- **Whole-of-Nation Approach:** The operation emphasizes the need for integrating the private sector, MSMEs, and startups with DRDO and DPSUs to build a robust defense ecosystem.
- **Global Perception:** Analytical communities have noted this as a rare instance of a concise, high-impact military action taken against a nuclear-armed adversary without triggering a full-scale war.

Conclusion Operation Sindoor has successfully established a "new normal" in the Indian subcontinent. By demonstrating that nuclear status does not grant immunity for sub-conventional warfare (terrorism), India has permanently altered its strategic mindset. The transition from a defensive to a "proactive-retributive" posture ensures that the cost of cross-border provocation is now prohibitively high, making the "Modi redlines" an irreversible pillar of Indian foreign and defense policy.

UPSC Relevance

- **GS Paper II:** India and its neighborhood- relations; Linkages between development and spread of extremism; Security challenges and their management in border areas.
- **GS Paper III:** Role of external state and non-state actors in creating challenges to internal security; Various Security forces and agencies and their mandate; Challenges to internal security through communication networks.
- **Essay/Ethics:** Strategic resolve vs. strategic restraint; The ethics of pre-emptive and retributive strikes in international relations.

9. Data Standardisation: The Grammar of Indian Governance

As India aspires to become a \$5 trillion economy, the fragmentation and lack of interoperability in its data systems have emerged as significant impediments to effective governance. While India generates vast amounts of data, the absence of shared standards among Ministries and Departments leads to administrative inefficiencies, fiscal leakages, and misinformed policy decisions. Strengthening data governance through standardisation is no longer a technical choice but a strategic necessity for a "Viksit Bharat."

Key Challenges in India's Data Ecosystem

- **Lack of Interoperability:** India's data system is currently fragmented, with various Ministries failing to use shared standards for common indicators, which prevents seamless data integration.



- **Fiscal Leakages:** Incoherent welfare databases often list the same beneficiary multiple times; a June 2025 NITI Aayog report indicates this inflates annual spending by 4%-7% due to duplication.
- **Policy Inefficiency:** In sectors like health, the same patient (e.g., childhood tuberculosis cases) is often counted multiple times across different registries, leading to conflicting estimates and making data-driven decision-making difficult.
- **Impact on Global Rankings:** Poor data coordination affects India's standing in indices like the Global Innovation Index, where missing or outdated data can mask actual performance.
- **Economic Costs:** Improving public-sector data availability and sharing is estimated by the OECD to potentially add up to 1.5% to the GDP, reflecting the high cost of squandered economic potential.
- **Parliamentary Accountability:** A large share of parliamentary questions seek basic facts that should already be in the public domain in a standardised format, diverting time from deeper accountability functions.

Definitions of Key Terms

- **Data Standardisation:** The process of bringing data into a common format that allows for consistent definitions, methodologies, and attributes across different platforms.
- **Interoperability:** The ability of different information systems and software applications to communicate, exchange data, and use the information that has been exchanged.
- **IDMO (India Data Management Office):** A proposed central body under the National Data Governance Framework Policy responsible for enforcing data rules and protocols.
- **Schema-Consistent Repository:** A centralised data storage system where all datasets follow the same structured blueprint, ensuring they can be compared and integrated easily.



Constitutional and Legal Provisions

- **Article 75:** Establishes the principle of collective responsibility of the Council of Ministers to the Lok Sabha; efficient data governance is essential for Parliament to exercise this oversight effectively.
- **Right to Information (RTI) Act, 2005:** Section 4 mandates proactive disclosure of information by public authorities; standardisation ensures this disclosed data is actually usable by citizens.
- **National Data Governance Framework Policy (NDGFP):** The primary policy framework aimed at transforming the data ecosystem to enhance service delivery and promote research and innovation.
- **Digital Personal Data Protection (DPDP) Act, 2023:** Provides the legal basis for processing digital personal data while ensuring individual privacy, which must be balanced with data standardisation efforts.

Additional Important Key Points

- **Potential Savings:** Data clean-ups have shown immense value, such as removing 35 million bogus LPG connections to save ₹210 billion and 16 million fake ration cards to save ₹100 billion annually.
- **Global Benchmarking:** Aligning with international frameworks, such as the UN's System of National Accounts, can unify definitions and practices nationwide.



- **Data.gov.in:** India's open data platform needs to be scaled into a centralised repository where Ministries regularly upload standardised, real-time datasets.
- **Incentivising Quality:** NITI Aayog's Data Governance Quality Index should be used as an annual benchmark to drive healthy competition among Ministries and States.

Conclusion Data standardisation is the foundational "grammar" of modern governance. To overcome the "elephant in the room"—data fragmentation—India must empower the India Data Management Office (IDMO) with the authority to audit and enforce binding standards. By committing to robust stewardship and shared protocols, India can transform its vast data abundance into a high-utility asset that informs policy, prevents fiscal waste, and fuels economic growth.

UPSC Relevance

- **GS Paper II:** Governance, Transparency and Accountability, Role of Civil Services in a Democracy, and e-Governance applications, models, and successes.
- **GS Paper III:** Indian Economy and issues relating to planning, mobilization of resources, growth, and development; Government Budgeting.
- **Ethics (GS IV):** Probity in Governance and the ethical use of data to ensure the "Antyodaya" (welfare of the last person) by eliminating leakages.

10. Semaglutide Generics and the Expansion of the GLP-1 Market in India

The Indian pharmaceutical landscape has witnessed a transformative shift in the management of diabetes and obesity following the launch of generic Semaglutide. Within a single month, the market for GLP-1 (Glucagon-Like Peptide-1) receptor agonists surged by over 75%, driven by increased affordability and the entry of domestic manufacturers. This development highlights the critical intersection of patent expiration, market competition, and public health accessibility in India's healthcare sector. **Key Highlights of the GLP-1 Market Surge**

- **Exponential Volume Growth:** Total sales of GLP-1 injectables in India reached 4.14 lakh units in April 2026, a sharp increase from 2.35 lakh units in February, primarily due to the availability of generic versions.
- **Impact of Patent Expiry:** Following the patent expiry of Novo Nordisk's blockbuster molecule, generic versions became available on March 21, leading to a nearly seven-fold increase in Semaglutide sales volume by April.
- **Market Expansion vs. Cannibalization:** Generic drugs have expanded the total market size rather than merely cutting into the innovator's share; innovator Semaglutide sales remained steady at approximately Rs 44 crore, while generics matched that value with significantly higher unit volumes.
- **Dominance of Domestic Players:** Torrent Pharmaceuticals has emerged as the generic market leader with a 38% share, followed by Zydus (10%) and Lupin (9%), particularly dominating the oral segment with brands like Semalix and Sembolic.
- **Comparative Efficacy:** While Semaglutide targets the GLP-1 hormone, Tirzepatide (the current market leader by value) utilizes both GLP-1 and GIP (Gastric Inhibitory Polypeptide) receptors, showing higher average weight loss in clinical trials.
- **Price Sensitivity and Access:** The rapid uptake of generics indicates a massive latent demand in India, where price reduction has enabled a broader demographic to access advanced anti-obesity and diabetes treatments. **Definitions of Key Terms**



- **GLP-1 Receptor Agonists:** A class of drugs (incretin mimetics) that mimic gut hormones to stimulate insulin secretion, inhibit glucagon, and slow digestion to manage blood sugar and weight.
- **Innovator Molecule:** The original patented version of a drug developed by a pharmaceutical company after extensive research and clinical trials.

- **Generic Drug:** A medication created to be the same as an already marketed brand-name drug in dosage form, safety, strength, and quality, usually sold at a lower price after patent expiry.



- **Incretin Mimetics:** Agents that act like incretin hormones to control the way the body uses glucose and regulates appetite. **Constitutional and Legal Provisions**

- **Article 21 (Right to Health):** The availability of affordable generic versions of life-saving or chronic-care drugs is a functional aspect of the State's obligation to ensure the Right to Health.

- **Patents Act, 1970:** Specifically Section 3(d), which prevents "evergreening" of patents, and provisions regarding patent expiry that allow domestic firms to launch affordable generics once protection ends.
- **National Pharmaceutical Pricing Authority (NPPA):** While these specific new-age drugs may not all be under the National List of Essential Medicines (NLEM), the NPPA monitors price movements to ensure public interest is protected.
- **Drugs and Cosmetics Act, 1940:** Regulates the manufacture, distribution, and sale of drugs, ensuring that generic versions maintain bio-equivalence and safety standards. **Additional Important Key Points**
- **Therapeutic Trends:** Doctors are observing that while generic versions increase access, innovator molecules are still preferred for patients who can afford them due to established long-term safety profiles.
- **Segment Differentiation:** Torrent Pharmaceuticals' unique entry into the oral segment has provided it a significant competitive advantage over other firms focused primarily on injectables.
- **Global Implications:** India's role as the "Pharmacy of the World" is reinforced by the speed at which domestic firms have scaled Semaglutide production post-patent expiry. **Conclusion** The generic launch of Semaglutide in India serves as a textbook case of how market competition can democratize access to cutting-edge medical technology. The 75% market expansion in just 30 days underscores the immense burden of metabolic diseases in India and the critical role of affordable generics. Moving forward, the sustained growth of this segment will depend on maintaining stringent quality standards and further integrating these treatments into public health protocols for obesity and diabetes management. **UPSC Relevance**
- **GS Paper II:** Government policies and interventions for development in health sectors; Issues arising out of their design and implementation.
- **GS Paper III:** Economics of pharmaceuticals; Intellectual Property Rights (IPR) and their impact on public health; Science and Technology- developments and their applications in everyday life.



- **Health and Social Justice:** Addressing the dual burden of communicable and non-communicable diseases (NCDs) through affordable technology.

11. Calcutta High Court Overrules Objections to Great Nicobar Project Pleas

The Calcutta High Court has dismissed the Union government's preliminary objections regarding petitions challenging the ₹92,000-crore Great Nicobar Island (GNI) project. The legal challenge, spearheaded by a retired IAS officer, alleges significant violations of the Forest Rights Act (FRA), particularly concerning the consent process for diverting forest land. By upholding the maintainability of these petitions, the Court has reinforced the principle that even projects of "national importance" must adhere strictly to the governing environmental and tribal laws and remain subject to judicial review. **Key Highlights of the Judicial Ruling**

- **Locus Standi Upheld:** The Court rejected the Centre's claim that the petitioner lacked standing, ruling that as a former Secretary to Tribal Affairs and Environment Ministries, she has "sufficient interest" in espousing the cause of vulnerable tribal communities.
 - **Judicial Review of National Projects:** The Bench clarified that while a project may involve huge expenditure and be of national importance, it is not beyond the scope of judicial review and must proceed in accordance with the law.
 - **FRA Violation Allegations:** The petitions challenge the validity of Gram Sabha resolutions and a certificate issued by the Andaman and Nicobar administration claiming that all tribal rights under the FRA have been settled.
 - **Buffer Zone Notified Reductions:** The legal challenge explicitly questions the notifications that reduced buffer zones for Campbell Bay and Galathea Bay National Parks to facilitate infrastructure development.
 - **Rejection of Res Judicata:** The High Court dismissed the argument that earlier National Green Tribunal (NGT) rulings barred these pleas, stating the issues before the Court are distinct and not subject to the principle of res judicata.
 - **Procedural Authenticity:** The Court overlooked objections regarding the petitioner's place of residence (Hyderabad) and the lack of explicit authorization from the local tribes, focusing instead on the gravity of the legal questions raised. **Definitions of Key Terms**
 - **Locus Standi:** The right or capacity of a party to bring an action or to appear in a court.
 - **Res Judicata:** A legal principle that a matter that has been adjudicated by a competent court may not be pursued further by the same parties.
 - **Gram Sabha:** A forum in the Panchayat Raj system comprising all adult members of a village, whose consent is mandatory for forest land diversion under the FRA.
 - **Buffer Zone:** An area surrounding a protected site (like a National Park) where certain land-use restrictions apply to minimize the impact of human activity on the core wildlife habitat.
- Constitutional and Legal Provisions**
- **Forest Rights Act (FRA), 2006:** Specifically sections regarding the "informed consent" of the Gram Sabha before any forest land is diverted for non-forest purposes.
 - **Article 226:** Grants High Courts the power to issue writs for the enforcement of fundamental rights and for "any other purpose," providing the basis for judicial review of executive actions.





- **Article 21:** The Right to Life has been judicially expanded to include the right to a clean environment and the protection of the traditional livelihoods of indigenous tribes.
- **Fifth and Sixth Schedules:** Although the islands have specific administrative structures, the spirit of protecting scheduled tribes and their lands as per constitutional mandates is central to the dispute.

Additional Important Key Points

- **Petitioner Profile:** Meena Gupta's background as a former top bureaucrat in relevant ministries adds significant weight to the allegations of procedural lapses in environmental clearance.
 - **Scope of the Project:** The ₹92,000-crore mega-project includes an international transshipment terminal, a greenfield airport, and a power plant, which environmentalists argue will devastate the island's unique biodiversity.
 - **Tribal Vulnerability:** The Great Nicobar Island is home to the Shompen and Nicobarese tribes; the legal battle centers on whether their constitutional rights were bypassed for strategic gains.
- Conclusion** The Calcutta High Court's decision to proceed with a final hearing on June 23 marks a significant check on executive overreach in the name of national development. By dismissing technical objections over standing and prior adjudication, the Court has prioritized the substantive legal question of whether the "Gram Sabha consent" was obtained through due process or via procedural circumvention. This case will likely set a major precedent for how large-scale infrastructure projects in ecologically and ethnographically sensitive zones are balanced against the rule of law.
- UPSC Relevance**
- **GS Paper II:** Judicial Review; Statutory, regulatory and various quasi-judicial bodies; Welfare schemes for vulnerable sections (Tribals).
 - **GS Paper III:** Conservation, environmental pollution and degradation, environmental impact assessment; Linkages between development and spread of extremism (land alienation issues).
 - **Prelims:** Forest Rights Act, 2006; Geography of Andaman and Nicobar Islands (Galathea Bay, Campbell Bay); Jurisdiction of the Calcutta High Court over Andaman & Nicobar.

12. Tactical Advanced Range Augmentation (TARA) Glide Weapon System

The Defence Research and Development Organisation (DRDO) and the Indian Air Force (IAF) successfully conducted the maiden flight-trial of the Tactical Advanced Range Augmentation (TARA) weapon system off the coast of Odisha. This indigenous development represents a major leap in India's aerial strike capabilities, providing a cost-effective solution to modernize existing inventories. By integrating advanced guidance and range extension technologies, TARA enables the Indian Air Force to conduct high-precision strikes from safer stand-off distances, minimizing risk to the launch platform while maximizing impact on ground-based targets.

Key Highlights of the TARA Weapon System

- **Inaugural Flight-Trial:** The system underwent its first successful flight-test off the Odisha coast, marking a critical milestone in its induction process into the Indian Air Force.
- **Indigenous Precision Technology:** TARA is India's first indigenously developed glide weapon system designed to convert conventional, unguided warheads into high-precision guided munitions.
- **Modular Range Extension:** The system utilizes a modular kit, developed by Research Centre Imarat (RCI) and other DRDO labs, which can be retrofitted onto existing low-cost aerial weapons to enhance their range and lethality.



- **Strategic Engagement:** It is specifically engineered to accurately engage ground-based targets, allowing the IAF to strike with pinpoint accuracy without the high cost associated with fully dedicated missile systems.
- **Enhanced Survivability:** By providing glide capabilities, the system allows the launch aircraft to remain at a stand-off distance, reducing vulnerability to enemy surface-to-air defense systems.
- **Cost-Effective Modernization:** The platform focuses on improving the utility of massive existing stocks of conventional bombs, aligning with the "Atmanirbhar Bharat" vision in the defense sector.



Definitions of Key Terms

- **Glide Weapon:** A type of munition that uses aerodynamic surfaces (wings/fins) to fly toward its target after release from an aircraft, rather than falling in a purely ballistic arc.
- **Range Augmentation:** The process of increasing the distance a weapon can travel through mechanical or aerodynamic enhancements.
- **Research Centre Imarat (RCI):** A premier DRDO laboratory based in Hyderabad, specialized in the development of missile avionics, navigation, and control systems.
- **Precision-Guided Munition (PGM):** A guided weapon intended to precisely hit a specific target to minimize collateral damage and increase lethality.

Constitutional and Legal Provisions

- **Article 51A (h):** The Fundamental Duties of Indian citizens include the development of a scientific temper and the spirit of inquiry, which is the foundational drive behind indigenous R&D like TARA.
- **Seventh Schedule (List I, Entry 1):** The "Defence of India" is a Union Subject, giving the central government exclusive power to legislate and manage the development of advanced weaponry through organizations like DRDO.
- **National Security Act, 1980:** Provides the overarching legal framework for measures taken by the state to maintain national security, supported by technical advancements in defense.
- **Defence Acquisition Procedure (DAP) 2020:** The policy framework that prioritizes "Buy (Indian-IDDMM)" to promote indigenous design and manufacturing of systems like TARA.

Additional Important Key Points

- **Stand-off Capability:** Such systems are vital in modern "contested airspaces" where entering the range of enemy air defenses is highly risky for manned aircraft.
- **Modular Design:** The modularity ensures that the technology is not restricted to one type of bomb, allowing for wide application across various weight categories of unguided munitions.
- **Strategic Autonomy:** Reducing reliance on imported precision kits (like the Israeli SPICE or American JDAM) enhances India's strategic independence during conflicts.

Conclusion The successful trial of the TARA glide weapon system is a testament to India's maturing defense R&D ecosystem. By transforming "dumb" bombs into "smart" weapons, the IAF can now achieve surgical



strike capabilities at a fraction of the cost of traditional missiles. This development not only strengthens the tactical offensive capability of the Indian Air Force but also reinforces the country's commitment to self-reliance in high-technology defense domains.

UPSC Relevance

- **GS Paper III:** Science and Technology—developments and their applications and effects in everyday life; Achievements of Indians in science & technology; Indigenization of technology and developing new technology.
- **GS Paper III:** Security challenges and their management in border areas; Various Security forces and agencies and their mandate.
- **Prelims:** Specific technical details of TARA, its development agency (DRDO/RCI), and its classification as a glide weapon system.



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