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FOR UPSC CIVIL SERVICE EXAMINATION

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1. Hygenco's Funding Deal: Strategic Investment in India's Green Hydrogen Sector

Key Points

- **Major Investors:**
 - International Finance Corporation (IFC), Siemens AG, and Fullerton Fund Management are set to acquire **at least 49% equity in Hygenco Green Energies Pvt. Ltd.**
 - IFC plans to invest **\$50 million**, while Siemens and Fullerton will contribute the remaining **\$75 million**, making the total equity value approximately **\$125 million**.
- **Ownership Structure:**
 - Hygenco's founders, Amit Bansal, Anshul Gupta, and Ashish Gupta, along with associates, retain **51% majority ownership**.
 - The remaining stake is held by SBICAP Ventures' **SVL-SME Fund (Neev Fund II)**.
- **Investment Goals:**
 - Hygenco aims to invest **\$2.5 billion over the next 3 years** to build green hydrogen projects in India.
 - Target: Develop **10 GW** of green hydrogen production and distribution assets by **2030**.
- **Industry Context:**
 - **Green Hydrogen:** Produced via **electrolysis of water** using renewable energy; when combined with nitrogen, it forms **green ammonia** used in fertilizers and energy storage, without emitting CO₂.
 - India is pursuing **energy independence** and decarbonization through initiatives like the **National Green Hydrogen Mission (2023)**.
- **Strategic Importance:**
 - Aligns with India's **COP26 commitments** and its target to achieve **50% renewable energy of total capacity by 2030**.
 - Could reduce import dependence for fuels and ammonia, boosting energy security.
 - Supports **Make in India** and green industrialization, with potential employment and technology transfer benefits.



Key Definitions

- **Green Hydrogen:** Hydrogen produced using renewable energy by splitting water molecules through electrolysis.
- **Electrolyzer:** A device that splits water into hydrogen and oxygen via electrical energy.
- **Green Ammonia:** Ammonia produced using green hydrogen, used in fertilizers and long-term energy storage.
- **Enterprise Value (EV):** The total value of a company, including equity and debt, minus cash.



Legal & Policy Framework

- **National Green Hydrogen Mission (2023):** Aims to produce 5 MMT of green hydrogen annually by 2030.
- **Energy Conservation Act (Amendment), 2022:** Mandates consumption of non-fossil resources by designated consumers.
- **FAME II Scheme** (for vehicles): Indirectly supports hydrogen adoption in mobility.
- **SEBI and RBI norms:** Govern FDI and institutional investment in emerging energy sectors.

Conclusion

The investment by IFC, Siemens, and Fullerton in Hygenco marks a **significant vote of confidence** in India's clean energy infrastructure. It reinforces India's global positioning as a future hub for green hydrogen, paving the way for sustainability, innovation, and industrial transformation.

UPSC Relevance

- **GS-III (Environment, Economy):** Renewable energy transition, international finance.
- **Prelims:** Definitions (green hydrogen, electrolyzer), major missions (NGHM).
- **Mains:** Role of private finance in sustainable development, energy security, climate change mitigation, investment trends in green sectors.
- **Essay Paper:** Themes of sustainable development and green economy, global partnerships.

2. COP30 and the Proposed Fossil Fuel Roadmap: Key Developments and Implications

Key Points

- **Proposed Fossil Fuel Roadmap:** COP30 president André Corrêa do Lago indicated that a new **fossil fuel roadmap** may be drafted to guide the global transition to cleaner energy systems. Although not formally listed on the COP30 agenda, the roadmap gained traction after Brazil's President Lula da Silva emphasized it in his opening remarks.
- **Data Challenges:** A major obstacle in drafting the document is the **lack of comprehensive data** on fossil fuel impacts and transition pathways. Delegates emphasized the need for more detailed evidence and expert analysis before proposing concrete steps.
- **Role of Negotiators:** The roadmap is not intended as a **negotiated or binding outcome**, but rather a guidance document for **delegates and negotiators** to consider transition strategies.
- **Global Participation:** Over **190 countries** are participating in COP30, held in Belem, Brazil (10–21 November), under the UNFCCC framework. Discussions include cooperative initiatives between the **Azerbaijani and Brazilian presidencies** for further research and expert consultation.
- **Political and Diplomatic Signals:** The roadmap represents a **consensus-building exercise** that acknowledges the complexities of fossil fuel phase-out in emerging economies and aims to balance **climate action** with **economic development**.





Key Definitions

- **Fossil Fuels:** Natural resources like coal, oil, and natural gas formed from organic matter over millions of years; major source of greenhouse gas emissions.
- **Roadmap:** A strategic document outlining a plan, timeline, and procedures to achieve a given set of goals – in this case, fossil fuel transition.
- **UNFCCC (United Nations Framework Convention on Climate Change):** An international treaty aimed at preventing dangerous human interference with the climate system.

Legal & Policy Framework

- **Paris Agreement (2015):** Legally binding treaty under the UNFCCC that commits countries to limit global temperature rise to well below 2°C above pre-industrial levels.
- **Article 4 of Paris Agreement:** Calls for country-driven strategies and long-term low-emission development plans.
- **Glasgow Climate Pact (COP26):** First global agreement to “**phase down unabated coal**” and rationalize fossil fuel subsidies.

Conclusion

The proposed fossil fuel roadmap at COP30 represents a vital step towards **aligning global climate commitments** with the realities of energy transition. While still at the conceptual stage, it symbolizes growing momentum to **phase out fossil fuels responsibly**, contingent on data-based decision-making and global cooperation.

UPSC Relevance

- **GS Paper-3:** Environmental conservation, climate change negotiations, international agreements.
- **Prelims:** Facts about COP summits, UNFCCC, Paris Agreement, fossil fuels vs. renewables.
- **Mains:** Analyze the implications of fossil fuel phase-down for India’s energy security and development (GS-3: Environment and Economy).
- **Essay:** Sustainable development and global climate governance.

3. HR Modernisation for Mobility in FTAs: India’s Strategic Shift

Key Points

- **HR Standards Upgrade for Trade Mobility:** India is planning a major overhaul of **human resource (HR)** practices in the services sector to align with global standards. The goal: enable Indian professionals to move more freely across borders as part of upcoming **Free Trade Agreements (FTAs)**.
- **Mobility as a Key FTA Component:** Worker mobility has emerged as a **central and sensitive chapter** in India’s FTA negotiations, especially with the **EU, ASEAN, New Zealand, Peru, Chile, Oman, Qatar, and Bahrain**. Areas such as **skill recognition, workplace compliance, and service quality** are under scrutiny.
- **Government's Strategy:** The **Ministry of Consumer Affairs** plans to conduct studies on how Indian service firms operate in terms of **hiring, training, skill certification, and governance systems**. The study aims to benchmark Indian HR systems against international best practices.



- **Sectoral Focus:** Key industries under study include **IT, healthcare, finance, tourism, logistics, education, and legal services**. The initiative also recognizes emerging functions like **remote work, 24x7 delivery, and data-sensitive operations**, which demand stronger HR systems.
- **Diplomatic Leverage:** By modernizing HR frameworks, the government seeks to **boost confidence** among FTA partners, arguing that Indian professionals are prepared for high standards of global service delivery. This strengthens India's position in negotiations.

Key Definitions

- **FTA (Free Trade Agreement):** A pact between two or more countries to reduce trade barriers and increase economic integration.
- **Skill Recognition:** Mutual acceptance of certifications and qualifications across borders.
- **Workplace Governance:** Rules and systems that ensure fair, safe, and regulated working conditions.



Legal & Policy Context

- **Indian Labour Codes (2020):** Consolidate and modernize labor laws, supporting formalization and workplace reforms.
- **Mutual Recognition Agreements (MRAs):** Often negotiated under FTAs to enable cross-border mobility of skilled professionals.
- **Article 301-307 of the Indian Constitution:** Promote freedom of trade, commerce, and intercourse across the territory of India, indirectly linked to openness in global trade.

Conclusion

India's HR modernization initiative indicates a strategic shift from traditional goods-focused FTAs to **services and mobility-led diplomacy**. By aligning with international workplace and skill standards, India seeks to **unlock new opportunities** for its skilled workforce while negotiating **stronger mobility commitments** in trade agreements.

UPSC Relevance

- **GS Paper-2:** International Relations (FTAs, migration), Governance.
- **GS Paper-3:** Skill development, Indian economy services sector.
- **Prelims:** FTAs, HR governance concepts, sectors like IT and healthcare.
- **Essay:** Human capital as a pillar of economic diplomacy; India's services economy and global integration

4. India–Eurasian Economic Union (EAEU) Trade Pact Push: Key Developments

Key Points

- **Regulatory Coordination:** India and the **Eurasian Economic Union (EAEU)** have agreed to hold **quarterly regulatory-level meetings** to address procedural hurdles such as certification and approval delays, especially affecting **agricultural and marine exports**.



- **FTA Negotiations:** Both sides are accelerating talks towards a **Free Trade Agreement (FTA)**, with a **defined 18-month timeline** under the terms signed on 20 August 2025. The FTA aims to boost bilateral trade to **\$100 billion by 2030**.
- **Market Opportunities for MSMEs:** The EAEU market presents a **diversification opportunity** for Indian MSMEs, especially amid global trade uncertainties. Sectors such as **food processing, engineering, chemicals, and marine products** are likely to benefit.
- **Key Discussion Areas:** Discussions also covered **logistics, non-tariff barriers, payment systems (possibly rupee-ruble mechanisms), standards**, and cooperation in **critical minerals, pharmaceuticals, machinery, automobiles, and chemicals**.
- **Strategic Implications:** The move comes as global trade landscapes shift (e.g., **U.S. tariffs, scrutiny of Russian oil trade**), prompting India and Eurasia to seek mutually stable and transparent trade commitments. Emphasis is also placed on **co-investment, co-production**, and leveraging India's growing **digital public infrastructure**.

Key Definitions

- **EAEU (Eurasian Economic Union):** A regional political and economic union between Russia, Armenia, Belarus, Kazakhstan, and Kyrgyzstan for free movement of goods, services, capital, and labor.
- **FTA (Free Trade Agreement):** A pact to reduce tariffs and other barriers to trade between countries or regions.
- **Non-Tariff Barriers:** Measures other than customs tariffs that restrict trade, such as certification or licensing procedures.



Legal & Policy Context

- **Article 51(d) of the Indian Constitution:** Directs India to foster respect for international law and treaty obligations.
- **Foreign Trade Policy (FTP) 2023:** Aims for \$2 trillion in exports by 2030 and diversification of trade partnerships.
- **Make in India and Atmanirbhar Bharat:** Policies promoting domestic manufacturing and resilience in global supply chains—aligned with EAEU trade expansion.

Conclusion

The India–EAEU engagement represents a strategic opportunity to deepen **trade and investment ties** across Eurasia. By instituting coordination mechanisms and addressing regulatory bottlenecks, both partners can unlock new export markets, especially for Indian MSMEs, while ensuring trade stability in uncertain times.

UPSC Relevance

- **GS Paper-2 (IR):** Bilateral/regional trade agreements, India–Russia/Eurasia relations.
- **GS Paper-3 (Economy):** MSME export promotion, international trade and non-tariff barriers.
- **Prelims:** Location and significance of EAEU, trade terminology (FTA, NTBs).
- **Essay:** India's role in changing global trade dynamics, trade diplomacy.



5. ISRO's Upcoming Space Missions: Chandrayaan-4 and Future Roadmap

Key Points

- **Chandrayaan-4 Mission by 2028:** ISRO has received government approval for **Chandrayaan-4**, India's most complex lunar mission yet. Aimed at **lunar sample return**, it will make India one of the few countries (along with the US, Russia, and China) capable of retrieving samples from the Moon.
- **Upcoming Space Missions:** ISRO plans **seven additional launches by FY26**, including PSLV and GSLV missions and a **commercial communication satellite**, with one **PSLV fully built by Indian industry** under Make in India.
- **LUPEX Collaboration:** ISRO and **JAXA (Japan)** are working on **LUPEX**, a lunar polar exploration mission to detect **water ice at the Moon's south pole**—critical for future lunar habitation and exploration.
- **Gaganyaan and Indian Space Station:** India's first human spaceflight mission, **Gaganyaan**, is slated for **2027**, and the first module of the **Indian Space Station** is expected to be deployed by **2028**, with full completion by **2035**.
- **Capacity Expansion:** ISRO intends to **triple annual spacecraft production within three years** to match increasing mission demands and grow India's presence in commercial space markets.



Key Definitions

- **PSLV (Polar Satellite Launch Vehicle):** A launch vehicle developed by ISRO for placing satellites into polar orbits.
- **GSLV (Geosynchronous Satellite Launch Vehicle):** Used to launch heavier satellites into geostationary orbits.
- **Lunar Sample Return Mission:** A space mission designed to land on the moon, collect soil and rock samples, and return them to Earth.
- **Space Station:** An orbiting facility designed for long-term human habitation and research in space.

Legal & Policy Framework

- **Space Activities Bill (Proposed):** Aims to regulate and promote private sector participation in space exploration.
- **National Space Policy 2023:** Encourages private participation, technology transfer, and commercialization in India's space sector.
- **Article 51 of the Indian Constitution:** Promotes scientific temper and international cooperation.

Conclusion

ISRO's strategic focus on **lunar exploration, human spaceflight, and international collaboration** signifies India's transition into a **major space power**. Chandrayaan-4 and LUPEX will enhance scientific knowledge and technological prowess, while initiatives like Gaganyaan and space station development underscore India's rising space ambitions.



UPSC Relevance

- **GS Paper-3:** Science and Technology, space missions, space economy.
- **Prelims:** Space missions (Chandrayaan, Gaganyaan), ISRO-JAXA collaboration.
- **Mains:** Write about India's space diplomacy, role of ISRO in national development, and the emerging space industry.
- **Essay:** Space exploration as a driver of soft power and scientific growth.

6. Britain's Asylum Policy Overhaul: Key Changes and Implications

Key Points

- **Major Policy Shift:** The UK government has announced the **biggest overhaul of its asylum policy in modern times**, drawing inspiration from Denmark's stringent model. The move comes amid growing pressures from the right-wing **Reform UK party**, pushing the ruling Labour government toward a tougher stance on immigration.
- **Revoking Statutory Support:** Under the new policy, the **legal obligation to provide support (housing, allowances)** to certain categories of asylum seekers will be **revoked**, specifically targeting those who are capable of working but choose not to, and those who break the law.
- **Economy-First Approach:** Government-funded support will be **prioritized for asylum seekers who contribute economically and socially** to local communities. This aligns with a broader strategy of linking asylum rights with economic participation.
- **Aim of Policy:** The stated goal is to **discourage illegal migration** and simplify the process of **removing illegal migrants**, making the UK less attractive for non-compliant asylum seekers. More details from the Home Office are expected soon.
- **Human Rights Concerns:** Rights groups have criticized the model as violating basic human rights and international principles on refugee protection, as enshrined in the **1951 Refugee Convention**.

Key Definitions

- **Asylum Seeker:** A person seeking international protection whose claim for refugee status has not yet been determined.
- **Statutory Support:** Legally mandated assistance provided by the government, including housing, food, and financial allowances.
- **Illegal Migrant:** A person who enters or stays in a country without the necessary authorization under immigration laws.

Legal & International Framework

- **1951 UN Refugee Convention & 1967 Protocol:** Establish the right to seek asylum and prohibit refoulement (return of refugees to danger).
- **European Convention on Human Rights (ECHR):** Guarantees humane treatment of all individuals within state jurisdiction, including asylum seekers.
- **UK Asylum Act and Immigration Rules:** Domestic legislation governing asylum procedures.



Conclusion

The UK's proposal reflects a growing trend among Western countries to **tighten asylum regulations**, linking support to economic participation. While politically motivated, it raises concerns over **humanitarian obligations** and potential violations of **international refugee laws**.

UPSC Relevance

- **GS Paper-2:** International relations, human rights, refugee crises, global governance.
- **GS Paper-3:** Migration issues, border security, international conventions.
- **Prelims:** Key migration-related treaties (e.g., Refugee Convention, ECHR).
- **Essay:** Migrant crises in the modern world; balancing national security with humanitarian duty.

7. Economic Proficiency in Judiciary: A Pillar for Sound Policy Decisions

Key Points

- **Judiciary's Role in Economic Policy:** Courts in India often decide on **issues with economic impacts**—from price controls and labor matters to environmental and taxation policies. This makes **economic understanding essential for judicial decision-making**, especially when judges interpret or intervene in policy matters.
- **Challenges of Economic Reasoning:** Economic principles can often be **counterintuitive**, and well-intentioned regulations (e.g., price caps or compliance mandates) can lead to **unintended consequences** like shortages, corruption, and increased compliance burdens.
- **Institutional Solutions Proposed:**
 1. **Case-wise Expert Consultation:** Courts can engage **economists or amicus curiae** for expert advice, though concerns exist around impartiality and selection.
 2. **Appointment of Economic Advisors:** Similar to the PM's or FM's advisors, **judicial economic advisors** can privately assist judges in understanding the economic implications of their decisions.
 3. **Judicial Economic Research Service:** A dedicated research body, similar to the **US Congressional Research Service**, can prepare briefs and offer ongoing support to the judiciary.
- **Judicial Independence ≠ Economic Expertise:** While the judiciary enjoys independence, that does not automatically translate into expertise in technical fields like economics. Yet, **substance and legality of economic decisions are often intertwined**, making economic literacy vital.
- **Recent Example – Karnataka Cinema Ticket Cap:** The High Court and Supreme Court intervened in the ticket price cap policy, reflecting **judicial involvement in market regulation**. Lack of economic insight could result in decisions that undermine policy goals or market functioning.





Key Definitions

- **Amicus Curiae:** Literally, “friend of the court”; a person who offers expertise or insight in a legal case to assist the court.
- **Economic Regulation:** Laws or policies that control or influence economic activities, markets, and resources.
- **Judicial Overreach:** When courts extend their reach into policy-making or executive functions, often due to the absence of economic evaluation in the decision process.

Legal & Constitutional Provisions

- **Article 141 & 142:** Empower the Supreme Court to declare law and pass orders necessary to do complete justice, extending their impact on economic domains.
- **Judicial Review (Article 13):** Courts can strike down economic laws violating fundamental rights but must balance legality with economic outcomes.
- **Doctrine of Separation of Powers:** While judiciary must not legislate, it sometimes indirectly shapes **economic norms through judgments**, underscoring the need for economic expertise.

Conclusion

Strengthening **economic literacy within the judiciary** is vital for informed decision-making that upholds legality without compromising policy effectiveness. Whether through **institutional advisory roles or research support**, India must address this gap for better governance, legal clarity, and economic efficiency.

UPSC Relevance

- **GS Paper-2:** Judiciary’s role in policymaking, separation of powers, judicial review.
- **GS Paper-3:** Economic reforms, impact of regulation, issues in governance.
- **Essay:** Balancing judicial activism with institutional expertise; judiciary as a stakeholder in economic governance.

8. Exercise Garuda 25: Indo-French Bilateral Air Combat Training

Key Points

- **Exercise Overview:** India is participating in the **8th edition of Exercise Garuda**, a bilateral air exercise between the **Indian Air Force (IAF)** and the **French Air and Space Force (FASF)** held at **Mont-de-Marsan, France**, from **16–27 November 2025**.
- **IAF Participation:** The IAF contingent includes **Su-30MKI fighter aircraft**, supported by **C-17 Globemaster III** for airlift and **IL-78 tankers** for aerial refueling, ensuring extended endurance and operational flexibility.
- **Training Focus Areas:** The exercise involves **simulated air combat scenarios**, including **air-to-air combat, air defence maneuvers, and joint strike operations**, enhancing operational readiness and tactical proficiency.
- **Strategic Objectives:** Exercise Garuda 25 aims to **enhance interoperability**, refine **joint combat procedures**, and enable **mutual learning** through real-time operational engagement with advanced multirole fighters of the French Air Force.





- **Diplomatic & Defence Cooperation:** The exercise highlights India's strategic commitment to **defence cooperation with France**, strengthening military diplomacy and fostering greater **mutual trust and coordination** in the Indo-Pacific and global security architecture.

Key Definitions

- **Interoperability:** The ability of military forces from different nations to operate jointly in sync using compatible systems and doctrines.
- **Su-30MKI:** A multirole air superiority fighter aircraft developed by Russia's Sukhoi, customized for India with avionics from multiple countries.
- **C-17 Globemaster III:** A strategic transport aircraft capable of rapid airlift of troops and heavy equipment.
- **IL-78:** An aerial refueling aircraft used to extend the operational radius of fighter jets.

Legal & Policy Context

- **Article 51 of the Indian Constitution:** Encourages international peace, security, and cooperation—this exercise builds defence ties accordingly.
- **Defence Cooperation Agreement (2020):** Strengthened the strategic partnership between India and France through military-industrial collaboration and joint exercises.
- **PMSS (Prime Minister's Science Mission) and Atmanirbhar Bharat:** Emphasize defence preparedness, modernization, and self-reliance.

Conclusion

Exercise Garuda 25 marks a significant step in **India-France defence cooperation**, enhancing operational capabilities and preparing the IAF for modern, multi-domain warfare. By engaging in advanced tactical drills with trusted partners, India strengthens its strategic deterrence and promotes peace and stability through military diplomacy.

UPSC Relevance

- **GS Paper-2:** International cooperation, strategic partnerships, defence diplomacy.
- **GS Paper-3:** Security challenges, military modernisation, role of advanced technology in national defence.
- **Prelims:** Facts on Exercise Garuda, IAF platforms (Su-30MKI, C-17, IL-78).
- **Essay:** India as a responsible stakeholder in global security; role of military exercises in defence strategy.

9. IPC–Jharkhand MoU: Strengthening Pharmacovigilance and Safe Medication Practices

Key Points

- **MoU Objective:** The **Indian Pharmacopoeia Commission (IPC)** and the **Jharkhand State Pharmacy Council (JSPC)** signed an MoU to **promote safe and rational use of medicines**, enhance **pharmacovigilance and materiovigilance**, and improve **patient safety** across Jharkhand.



- **Capacity Building:** The collaboration aims to train pharmacists in **adverse drug reaction (ADR) reporting**, safe medicine practices, and utilization of the **National Formulary of India (NFI)** as a standard reference in healthcare establishments.
- **Pharmacovigilance Initiatives:** IPC and JSPC will coordinate awareness programs, encourage **mandatory use of NFI**, promote **ADR reporting**, and facilitate observance of **National Pharmacovigilance Week**, enhancing vigilance against unsafe medicines and practices.
- **Institutional Roles:** IPC will offer **technical guidance and expertise**, while JSPC will ensure **implementation at ground level** by engaging both public and private pharmacists in statewide initiatives.
- **Public Health Impact:** The partnership reinforces the government's commitment to **structured pharmacy governance**, ensuring safer healthcare delivery through **evidence-based and rational medication practices**.

Key Definitions

- **Pharmacovigilance:** The science and activities related to the detection, assessment, understanding, and prevention of adverse effects or any other drug-related problems.
- **Materiovigilance:** Monitoring medical device-related adverse events to improve patient safety.
- **National Formulary of India (NFI):** An official book containing drug standards and guidelines for safe and effective use in India, published by IPC.



Legal & Policy Context

- **Drugs and Cosmetics Act, 1940:** Governs the regulation of pharmaceuticals, ensuring safety and efficacy.
- **Pharmacy Act, 1948:** Regulates the profession and education of pharmacists in India.
- **National Health Policy (2017):** Aims to strengthen healthcare delivery, including safe use of medicines and technology-backed pharmacovigilance.

Conclusion

The IPC-JSPC partnership marks a **significant milestone in health governance**, aligning with national priorities to promote **rational drug use and patient safety**. By empowering pharmacists with skills and institutionalizing surveillance mechanisms, this collaboration enhances public health resilience and accountable dispensing practices.

UPSC Relevance

- **GS Paper-2:** Government policies for public health, pharmacy regulation, cooperative federalism in health sector.
- **GS Paper-3:** Science and technology in medicine, health systems, public safety.
- **Prelims:** Institutions like IPC, terms like pharmacovigilance, materiovigilance, and health legislation.
- **Essay:** Role of regulatory institutions in ensuring drug safety and public health stability.



10. Electronics Development Fund (EDF): Boosting Innovation in India's ESDM Sector

Key Points

- **Fund Overview:** Launched on **15 February 2016**, the **Electronics Development Fund (EDF)** is a **'Fund of Funds'** established by the Ministry of Electronics and Information Technology (MeitY) to support research, innovation, and entrepreneurship in **electronics, nano-electronics, and IT** sectors through investments in professionally managed Daughter Funds.
- **Investment Impact:** As of **30 September 2025**, EDF has invested **₹257.77 crore** in 8 Daughter Funds, which have collectively deployed **₹1,335.77 crore** across **128 tech startups**, creating over **23,600 jobs** and **368 intellectual properties (IPs)** in high-tech domains.
- **Strategic Objectives:** EDF aims to promote **indigenous design and innovation**, reduce import dependence, build a **national IP pool**, and foster a **self-reliant electronics ecosystem** aligned with **Atmanirbhar Bharat** and **Digital India** missions.
- **Operational Framework:**
 - **Anchor Investor:** MeitY
 - **Trustee/Sponsor:** Canara Bank
 - **Investment Manager:** Canbank Venture Capital Funds Ltd.
 - Daughter Funds must be registered as **Category I or II AIFs under SEBI Regulations (2012)**.
- **Sectoral Focus:** Supported startups are spread across **IoT, robotics, drones, AI-ML, cyber security, autonomous vehicles, healthtech**, etc., making India a hub for frontier technologies and design-led manufacturing.



Key Definitions

- **Fund of Funds:** A fund that invests in other investment funds (e.g., venture capital funds), rather than directly in startups.
- **Daughter Fund:** Investment funds supported by EDF that provide capital to startups in electronics and IT sectors.
- **ESDM (Electronics System Design and Manufacturing):** A critical component of India's digital economy, encompassing design, engineering, and manufacturing of electronic products and systems.

Legal & Policy Context

- **SEBI Alternative Investment Funds Regulations, 2012:** Governs the registration and functioning of venture and angel funds managing risk capital for startups.
- **Digital India Programme (2015)** and **National Policy on Electronics (2019):** Promote domestic electronics manufacturing and innovation.
- **Atmanirbhar Bharat:** Encourages local talent, IP creation, and strategic technology autonomy.

Conclusion

The **Electronics Development Fund** has emerged as an effective mechanism for boosting innovation, entrepreneurship, and **technology self-reliance** in India's rapidly growing ESDM sector. With transparent



institutional processes and active venture support, EDF significantly enhances India's position as a **global electronics innovation hub**.

UPSC Relevance

- **GS Paper-3:** Government interventions in technology development, startup ecosystem, Atmanirbhar Bharat, Digital India.
- **GS Paper-2:** Regulatory frameworks, public-private collaboration in strategic sectors.
- **Prelims:** Facts about EDF, MeitY, ESDM, Category I & II AIFs.
- **Essay:** Role of innovation funds in economic transformation; fostering indigenous tech ecosystems in a globalized world.

11. Delhi's Air Pollution Crisis: A Persistent Public Health Emergency

Key Points

- **Chronic Health Emergency:** Delhi experiences **severe air pollution** during winter, with **AQI levels exceeding 400**, causing school closures, flight delays, and increased respiratory illnesses. Long-term exposure reduces life expectancy by **up to 10 years**, aggravating diseases like **COPD, asthma, heart disease, and cognitive decline**.
- **Multifactorial Causes:** Delhi's pollution originates from several sources: **vehicle emissions (over 3.3 crore vehicles in NCR)**, **unregulated construction dust (27% of PM2.5)**, **stubble burning** in neighboring states, industrial emissions, and weather phenomena like **temperature inversion**, trapping pollutants in the city's bowl-like topography.
- **Economic and Social Costs:** Air pollution costs India **1.36% of GDP annually (~\$36.8 billion)** due to health expenses and productivity loss. It also reduces tourism and investment. Citizens are increasingly relocating to safer environments, reflecting a severe **governance failure** and loss of human capital.
- **Global Best Practices:** International models like Beijing's **multi-year air action plan**, London's **Ultra Low Emission Zone (ULEZ)**, and Los Angeles' **vehicle emission standards** offer scalable solutions through **policy integration, technological innovation, and public participation**.
- **Proposed Solutions:**
 - Establish a **Unified Airshed Management Plan** across Delhi, Haryana, UP, and Rajasthan.
 - Increase **electric mobility**, expand public transport, enforce **dust-control norms**, and penalize waste-burning.
 - Promote farmer incentives like **Happy Seeders and bio-decomposers** to eliminate stubble burning.
 - Invest in **real-time air monitoring, public dashboards, and behavioral change campaigns** to foster citizen responsibility.





Key Definitions

- **PM2.5:** Fine particulate matter with a diameter of less than 2.5 microns; enters the bloodstream and causes serious health issues.
- **Temperature Inversion:** A meteorological event in which a layer of warm air traps cooler air and pollutants near the ground.
- **Wicked Problem:** A complex issue with interdependent causes that are difficult to solve due to political, social, and technical challenges.

Legal & Institutional Context

- **Air (Prevention and Control of Pollution) Act, 1981:** Governs air pollution regulation in India.
- **National Green Tribunal (NGT):** Issues orders to curb pollution, including bans on construction dust, waste burning, and enforcement of stubble alternatives.
- **Commission for Air Quality Management (CAQM):** Established in 2020 to coordinate air quality efforts across NCR states.

Conclusion

Delhi's air pollution is not a seasonal inconvenience but a **systemic failure caused by policy lapses, weak enforcement, and public apathy**. With political alignment among NCR states and global models to emulate, Delhi can adopt a **science-backed, integrated strategy** to reclaim its air. The question remains: is there the political will and citizen support to act now?

UPSC Relevance

- **GS Paper-3:** Environmental pollution and degradation, health, urbanization, disaster management.
- **GS Paper-2:** Governance, inter-state coordination, public health policy.
- **Prelims:** AQI standards, Indian laws on pollution control, CAQM role.
- **Essay:** Climate change and urban air quality; citizen responsibility and environmental governance.

12. Digital Personal Data Protection (DPDP) Rules, 2025: Data Governance & Right to Information Implications

Key Points

- **Legal Framework & Objectives:** The **DPDP Act, 2023** and **DPDP Rules, 2025** create a comprehensive framework for the protection of personal data in India, modeled on international regimes like the EU's **GDPR**. The rules operationalize data protection by setting standards for **data fiduciaries** (firms processing data) and **data principals** (individuals whose data is collected).
- **Data Fiduciaries & Consent Mechanism:** Data fiduciaries must ensure **informed consent**, provide data usage summaries, and allow users to **erase, modify, or delete data**. Certain obligations like appointing a **Data Protection Officer (DPO)** for major firms will be phased in over the next year.





- **Protection of Children’s Data:** The Act restricts **targeted advertising** and data collection from children. However, a **parental tracking exemption** exists, allowing parents to track child’s location data under specific conditions.
- **Data Protection Board of India (DPBI):** The DPBI has been formed as an oversight body under MeitY, with powers to enforce compliance, levy fines (ranging from ₹10,000 to ₹250 crore), and monitor breaches. It will consist of **four members** and act as a quasi-judicial authority.
- **RTI Amendment Controversy:** The Act amends **Section 8(1)(j)** of the **RTI Act, 2005**, removing the “public interest” clause that allowed disclosure of personal information in the larger public interest. Activists argue this change restricts transparency and could hinder **social audits** and anti-corruption efforts.
- **Compliance Timeline & Gaps:** While the Act was notified in 2023, firms have been given **18 months** to comply with the rules. Some sections, including the RTI amendment and DPBI formation, have already come into force, raising concerns about implementation without due preparation.

Key Definitions

- **Data Fiduciary:** Any entity that determines the purpose and means of processing personal data.
- **Data Principal:** The individual whose personal data is being processed.
- **Informed Consent:** Permission granted after clear, concise disclosure of what data is collected and how it will be used.
- **DPO (Data Protection Officer):** A compliance officer responsible for privacy and data protection obligations in significant firms.
- **Consent Manager:** A mechanism facilitating centralized control of consent and data across various platforms.

Legal & Constitutional Context

- **Right to Privacy (Article 21):** Recognized as a fundamental right by the Supreme Court in **KS Puttaswamy vs. Union of India (2017)**, obliging the State to put legal safeguards on personal data.
- **IT Act, 2000:** The primary law for digital regulation, amended under DPDP framework for harmonization.
- **RTI Act, 2005:** Amended to restrict public access to personal data, igniting debates on transparency and citizen oversight.

Conclusion

The DPDP Act and Rules mark a necessary step towards safeguarding digital privacy in India. However, contentious amendments to the RTI Act raise concerns over public accountability and transparency. The success of this legal framework hinges on effective enforcement, DPBI’s independence, and balancing privacy with democratic access to information.

UPSC Relevance

- **GS Paper-2:** Governance, transparency, RTI, digital rights, impact of legislation.
- **GS Paper-3:** Cybersecurity, data protection policy, emerging tech regulation.
- **Prelims:** Basic structure of DPDP Act, RTI provisions, DPO and Consent Manager.
- **Essay:** Privacy vs. transparency debate; digital governance and citizen trust.